BOWDENS SILVER

Part 8a
Visibility Assessment

State Significant Development No. 5765

Prepared by:

Richard Lamb & Associates

May 2020

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BOWDENS SILVER

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Visibility Assessment

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COMMONLY USED ACRONYMS

DEM	Digital Elevation Model
DSM	Digital Surface Model
NAF	non-acid forming
PAF	potential acid forming
RLA	Richard Lamb and Associates
ROM	run-of-mine
RWC	R.W. Corkery and Co Pty Limited
TSF	tailings storage facility
VAC	Visual Absorption Capacity
WRE	waste rock emplacement

EXECUTIVE SUMMARY

- The purpose of this report is to assess the potential visibility and visual impacts of the Project over its life and to recommend means to manage and minimise any significant visual impacts.
- The assessment methodology adopted is set out in detail in Annexure 4 to the report and presented graphically in a flow chart at **Figure 1**. This shows the logic of the method, the criteria of assessment and the sequences of analysis and assessment.
- Beginning with a view analysis based on a total of 53 locations from which the visibility of the Project was assessed, an assessment was made of the likely visual effects of the Project on baseline factors of view composition, existing scenic and landscape quality and on the key viewing locations identified.
- The general setting of the Project is considered to vary in scenic quality from moderate to moderate-high, with the Mine Site itself of moderate quality. There is a very extensive resource of similar landscape and land use in the vicinity.
- The Project includes establishment and construction, relocation of a 500kV power transmission line, mining and processing operations and road traffic and transportation, aspects of which would be visible in certain circumstances from public and private areas and which could lead to visual impacts.
- Lue is located approximately 2km southwest of the Mine Site. The main components of the Project are the Tailings Storage Facility (TSF) north of Lue, the open cut Pits and ore processing area, with associated Waste Rock Emplacement (WRE) and ore stockpiles, situated to the north-east of Lue (**Figure 3**).
- The material that would be extracted within the open cut pits and could be visible within the Mine Site, for example, acoustic barriers, WRE, TSF embankment and ore stockpiles is generally light cream to buff in colour, requiring progressive rehabilitation where possible, to reduce potential visibility.
- None of these components of the Project would be visible from Lue Village itself, as a result of a series of ridges north and north-west of Lue, which have been named Gumarooka, Bingman and Western Ridges and are shown on **Figure 2**.
- Infrastructure changes associated with the Project include a water supply pipeline between the Mine Site and the Ulan Coal Mine and Moolarben Coal Mine, of no visibility from Lue, the relocation of part of Maloneys Road and the relocation of a 3.5km section of a 500kV power transmission line. The road relocation would minimise visual impacts of heavy traffic within Lue after the new road is constructed after approximately 6 months.
- The relocated road would include a new intersection and railway crossing, west of Lue, a crossing on Lawsons Creek and a new section of road linking west of the proposed TSF to a new Mine access road and the existing Maloneys Road. None of these would be significantly visible from the residential area of Lue.
- As the realigned power transmission line would be through country of a similar character and appearance to the existing line and be carried on similar lattice towers, it would be unlikely to have significant visual impacts compared with the existing towers.

- The visibility of the western part of the Mine, comprising the TSF, embankment and associated stockpiles of soil and waste rock, would be confined to a short section of the relocated Maloneys Road and Bara-Lue Road, both considered to be of low sensitivity to impacts as viewing locations. Only one rural residence (Residence R81) was identified that has a view of the western part of the Mine Site, where part of the TSF embankment and waste rock stockpile would be visible.
- The highest visibility of some of the components of the eastern section of the Mine Site is confined to short sections of Lue Road, Pyangle Road and Powells Road, the latter two also being rated as of low visual sensitivity, as a result of being local rural roads with low usage rates.
- The likely visual exposure of components of the Project were analysed by means of cross section studies representing views from both public and private domain locations (Annexure 3). Analytical and photorealistic photomontages were prepared for a selection of these.
- The effects of the Project on view composition would be minor on the western section of the Mine Site, with the TSF embankment the only item visible to a limited visual catchment of low sensitivity. After Year 9, the embankment would be rehabilitated and no further change to view composition would occur.
- Where visible, view compositions of the eastern section of the Mine Site would be substantially altered and some visibility of mining activity would occur until about the end of Year 6. The new landform would then be dominated by construction of the southern barrier and later by the WRE, but mining activity would no longer be seen.
- There would be a low effect on scenic character caused by the western section of the Mine Site and a high level of change to the eastern section, primarily caused by construction of permanent landforms and exposure of residual walls of the open cut pits which although to be rehabilitated to reduce impacts of colour and texture, would tend to retain a manufactured appearance.
- The high level of change to the eastern section of the Mine Site to some view locations would be accompanied by a significant and negative change to the scenic quality caused by the residual landscape of the open cut pit and WRE, incorporating low grade ore stockpiles (during the Project life). The height and proximity of the WRE to Pyangle and Powells Road would cause some localised blocking of views to the existing wooded horizon behind the Mine Site.
- While there would be a negative impact on scenic quality on part of the Mine Site, in relation to the local and regional resource of similar landscapes, the Mine Site is small and would not significantly devalue the resource.
- An analysis of the visibility of the Project from private rural residences outside of Lue showed that only six analysed have direct visibility of any of the components of the Project, one with no view of the eastern section of the Mine Site. Of the other five, one (Residence R4) would have close views that are significantly affected in character and quality.
- Three residences south of the Mine Site (Residences R39, R40 and R47) are at similar distances but differ in visual exposure, with R39 and R40 having no likely view of the open cut pit area and a partial view of the WRE coming into view only after Year 10. Residence 47 would have a view of the southern barrier and later of the growth of the WRE, but no view into the open cut pits.

- The fifth residence (Residence 19) is a minimum of approximately 4.5km from the closest part of the Mine Site and would have very limited views of early site establishment and construction activities in the open cut pit vicinity, the mining of which would later be obscured by growth of the WRE into the view line after Year 10. The overall visibility of activities would be low.
- The assessment methodology specifically distinguishes between the size of the visual effects and the importance of visual impacts by applying weighting criteria of visual sensitivity, absorption capacity and visual compatibility. The visual sensitivity of both the eastern and western sections of the Mine Site were considered to be low.
- The western section of the Mine Site has a high VAC for the Project, while the VAC of the eastern section varies from low (for construction of the southern barrier and WRE) to high (these structures being prominent but hiding mining activities in some views). Overall, however, the VAC of the eastern section was judged to be low.
- Visual compatibility for the western section of the Mine Site was considered to be high overall, whereas for the eastern section compatibility was considered to be medium, as it is not intrinsically incompatible with mining and extraction projects in similar settings.

  The weighting factors were applied to the eastern and western sections of the Mine Site separately, as the two sections are not visible in the same visual catchment.

  The western section was considered to be of low visual impact when the weighting factors were applied, while the eastern section was considered to be of medium impact on more distant views from Lue Road and high on closer views from Pyangle and Powells Road.

  Mitigation of impacts would be required for both sections of the Mine Site, as there is potential for exposed areas of stockpiled materials to contrast with the surrounding environment as a result of colour, line, form and texture of mined and emplaced material. Recommendations are made in relation to the margin plantings, open cut pit benches, progressive rehabilitation and sculpturing of final landform, to produce a semi-natural appearance.

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1. INTRODUCTION

1.1 PURPOSE OF THIS REPORT

The purpose of this report is to assess the potential visibility and initial visual impacts of the Project and to analyse and assess the potential visual exposure of the Project to views in the public and the private domain during its life and means that can be taken to manage and to minimise visual impacts.

The Richard Lamb and Associates (RLA) visual analysis and assessment methodology adopted for the report is shown graphically as a flow chart in **Figure 1**. The flow chart outlines the steps taken in the analysis and assessment of visibility, the sequence of tasks undertaken and the logic of the process leading to determination of the extent and significance of visual impacts. The main assessment and analysis tasks are shown in blue shading.

The methodology consists of three main areas of investigation, beginning with a view analysis. which is informed by relevant policies and plans, the visual attributes of the Project and analysis of the local visual context. Field assessment is undertaken to determine viewing locations and situations to be adopted in the technical investigation. The view analysis forms the basis for the first major assessment task, which is the assessment of visual effects on baseline factors.

Baseline factors of view composition, existing and historic character, scenic and landscape quality and key viewing locations and links are analysed. Against each of these baseline factors, an assessment is made of likely visual effects of the Project, leading to an assessment of the overall level of visual effects of the Project.

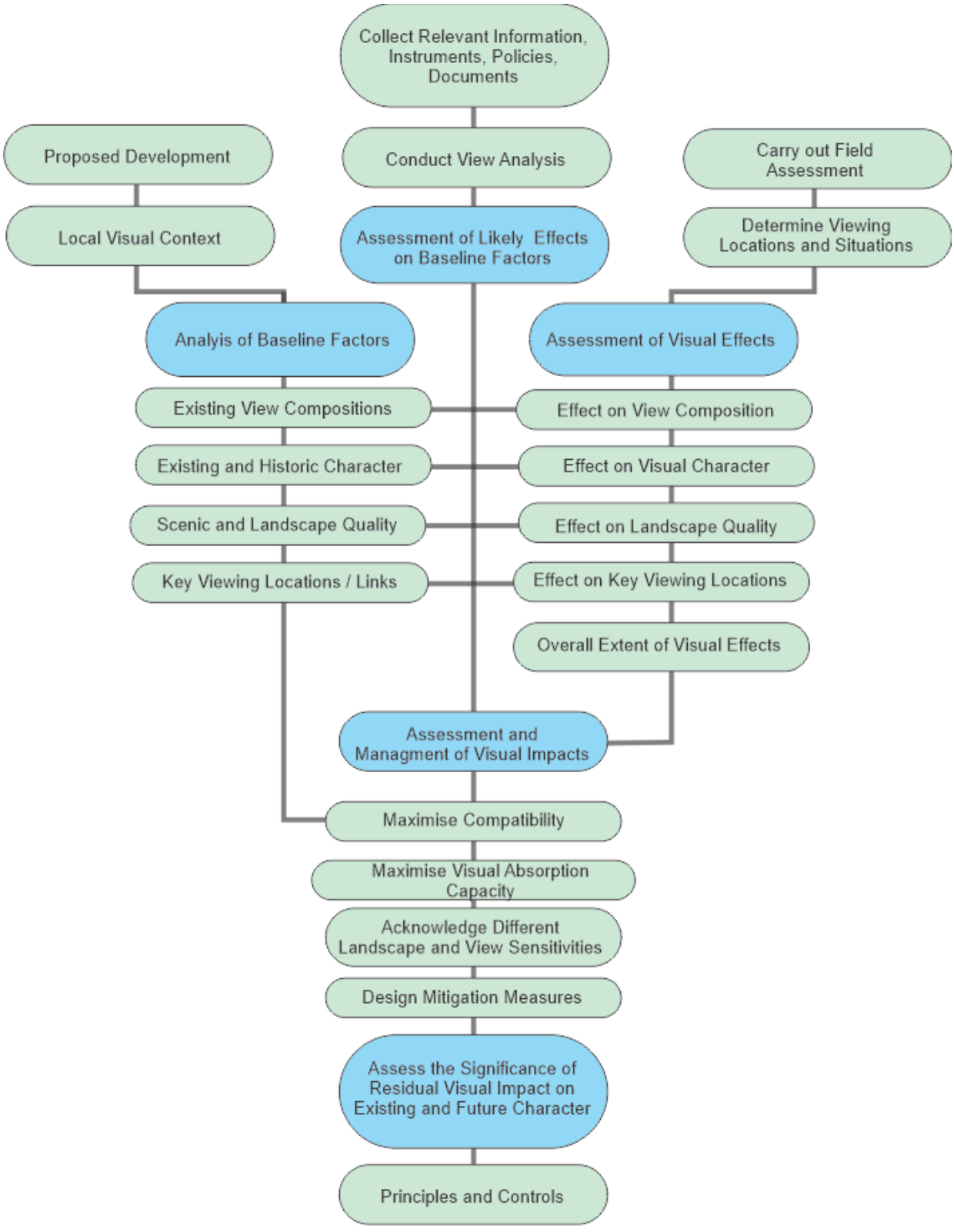
The next major assessment task was to assess the initial level of visual impact, as distinct from visual effects, by giving appropriate weight to factors which determine the relative importance of impacts, as distinct from the extent of the visual effect. The factors identified as relevant weighting factors were considered to be visual compatibility, visual absorption capacity and visual sensitivity.

After application of the weighting factors, the initial level of visual impacts is determined, to identify the need for impact mitigation, if impacts are significant. The final assessment task is to assess the significance of residual visual impacts, i.e. impacts that cannot either not be mitigated, which require ongoing controls, or which remain until or after Project completion.

A full description of the methodology is in **Annexure 4** to this report.

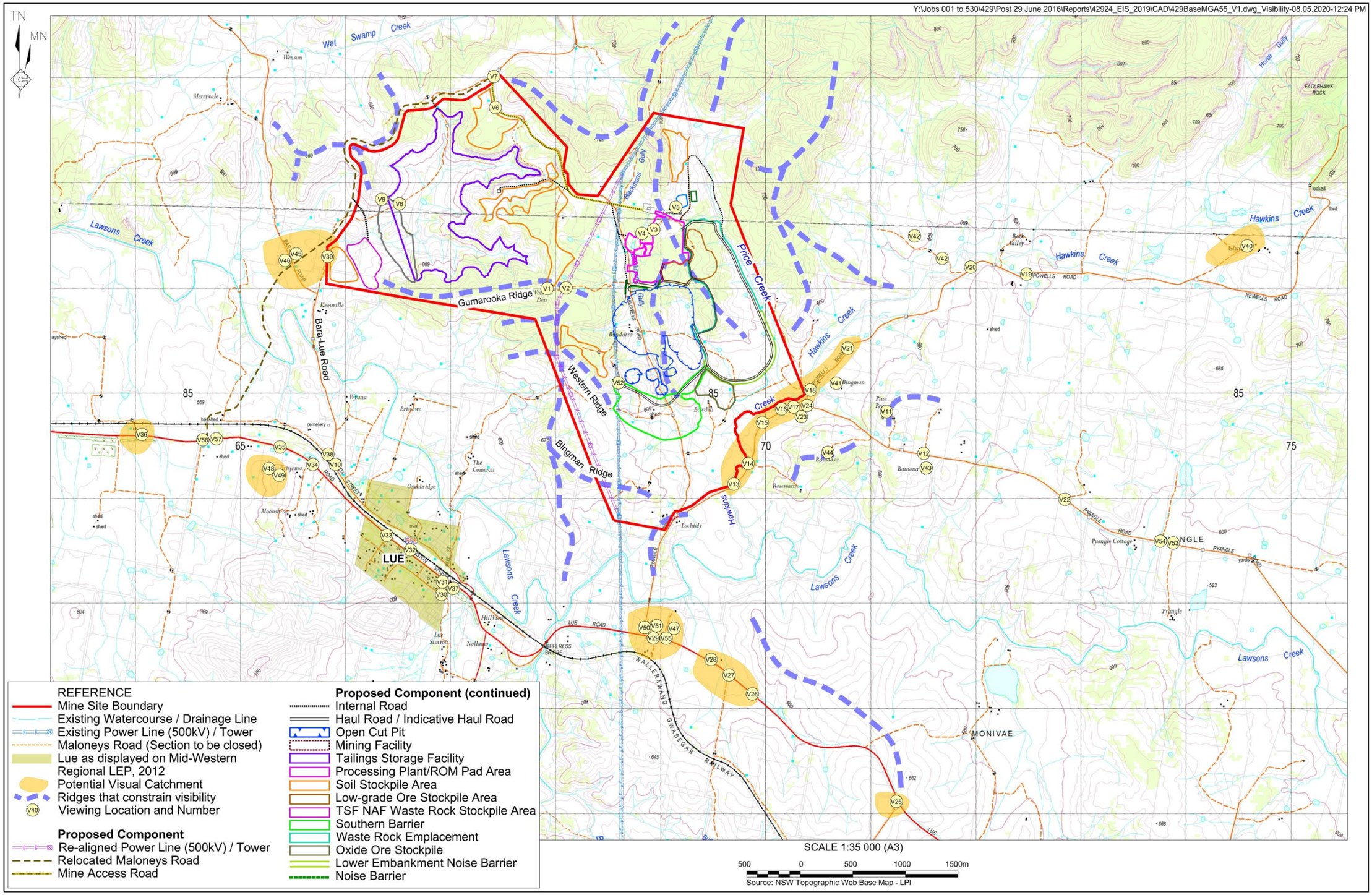
Reference is made through this document to a total of 53 locations from where the visibility of Project components has been assessed. The locations are displayed on **Figure 2**.

Figure 1 RLA Visibility Assessment Method Flow Chart



Richard Lamb and Associates Visual Analysis and Assessment Method Flow Chart

Figure 2 Potential Visual Catchment



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2. SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Table 1 lists the location in this assessment report of coverage of the Secretary's Environmental Assessment Requirements and those nominated by the Lue and District Community, that are relevant to visual impacts.

Table 1
Coverage of Visibility Issues in the Visibility Assessment

Relevant Requirement(s)	Coverage in this Report
Secretary's Environmental Assessment Requirements	
The EIS must include a detailed assessment of the likely visual impacts of the development on:	Sections 3, 5, 6, 7, 8, 9, 10, 11, 12
• private landowners in the vicinity of the development;	5.5.2, 5.4.2, 6.4.2
• key vantage points in the public domain;	5.5.1, 6.4.1
• paying particular attention to the creation of any new landforms; and • minimising the lighting impacts of the development	See SCSC Part 8B
Requirements Nominated by Lue and District Community	
How visible will the mine be from nearby residences and Lue Village?	Sections 5.5.1, 5.5.2
We live in an elevated location and will probably see the mine from our property. What will be done to reduce visual impacts?	Sections 6.4.1, 6.4.2, 11
Will tree screening be implemented to minimise visual impacts? Will cleared areas be revegetated quickly?	Section 11
Impact of stockpiles of overburden and waste rock – prefer not in prominent locations.	Sections 6, 8, 11
The potential for early rehabilitation of waste rock emplacements to reduce impact to visual amenity.	Sections 4.3.3, 6.1 – 6.3, 11
The impacts to visual amenity of the relocated 500kV power transmission lines.	Section 5.1
How have the cross-sections been prepared between the Mine Site and the residences?	Sections 5, 6, Annexure 3
Will there be sufficient topsoil to put on the final landform to adequately vegetate the areas disturbed and make the Mine Site visually acceptable?	Sections 6, 8, 11 (see Soil and Landscape Capability Assessment)

3. LOCAL VISUAL CONTEXT

The Project is proposed on land of a rural and partly natural character northeast of Lue on the western margins of part of the Sydney Basin Bioregion. The Mine Site is on the interface between lower units of the highly dissected sandstone plateaus and Shoalhaven Series sedimentary strata of the Sydney Basin and underlying flatter, erosional and intrusive landscapes of predominantly open rural character, of the Lachlan Fold Belt.

The residual sedimentary plateaus are largely of a natural appearance because of the steep topography, poor soils and retention of native woodland and forest vegetation. The valley floors are of gently undulating topography with residual hills and ridges of varying slopes. The valley floor landscapes are for rural use, largely cleared for grazing, however significant stands of vegetation are present on steeper residual hills and rocky outcrops to the south and southeast of the Mine Site.

The Mine Site is on the side slopes and part of the flood plain of Hawkins Creek, which drains to the southwest to join Lawsons Creek. A narrow valley, proposed to be occupied by the majority of the waste rock emplacement (WRE), occupies the eastern side of the Mine Site extending to the foothills of steeper landscape of a more natural appearance to the north. A wider valley with a complex of gullies on the western side of the Mine Site drains to the southwest toward Lawsons Creek and is the site of the proposed tailings storage facility (the TSF). This valley is of variable character, largely enclosed by an escarpment line above which there is some residual natural vegetation. The floor of the valley has been largely cleared for grazing use.

The proposed main open cut pit occupies a partly cleared hill on the ridge system west of the proposed WRE and straddling Blackmans Gully, through which runs the existing Maloneys Road. To the west of this gully are three prominent ridge systems, which have been called the “Western” and “Bingman” Ridges and an un-named ridge we have called “Gumarooka Ridge” for the purposes of this report, named after a house site on the ridge that is shown on the topographic map. The three ridges, which are between the Mine Site and Lue, which is to the southwest and south of the Mine Site, block the majority of views of aspects of the Project’s components from that direction.

4. THE PROJECT

The principal objectives of the Bowdens Silver Project as identified in the EIS are to:

i) maximise the recovery of the silver, zinc and lead minerals from the defined ore reserves within the proposed open cut pits;

ii) undertake all activities in an environmentally responsible manner to demonstrate compliance with relevant criteria and satisfy reasonable community expectations;

iii) ensure the health of its workforce and the surrounding community is not adversely affected;

iv) preserve the existing character of Lue;

v) maintain a positive relationship with the surrounding agricultural industry and maximise productivity on land retained for agricultural production;

vi) provide a stimulus for the Mudgee, Rylstone, Kandos and district economies; and

vii) achieve the above objectives in a cost-effective manner to ensure the Bowdens Silver Project is economically viable.

4.1 OVERVIEW OF THE PROJECT

4.1.1 Project Components

The following section of this report is a distillation from the EIS of aspects of the Project that are relevant to visibility and visual impacts. For more detail, consult Section 2 of the EIS.

The Bowdens Silver Project comprises six principal components, namely:

i) an open cut pit covering up to approximately 52ha;

ii) a processing plant and related infrastructure covering approximately 22ha;

iii) a WRE covering approximately 77ha;

iv) a low grade ore stockpile covering approximately 23ha;

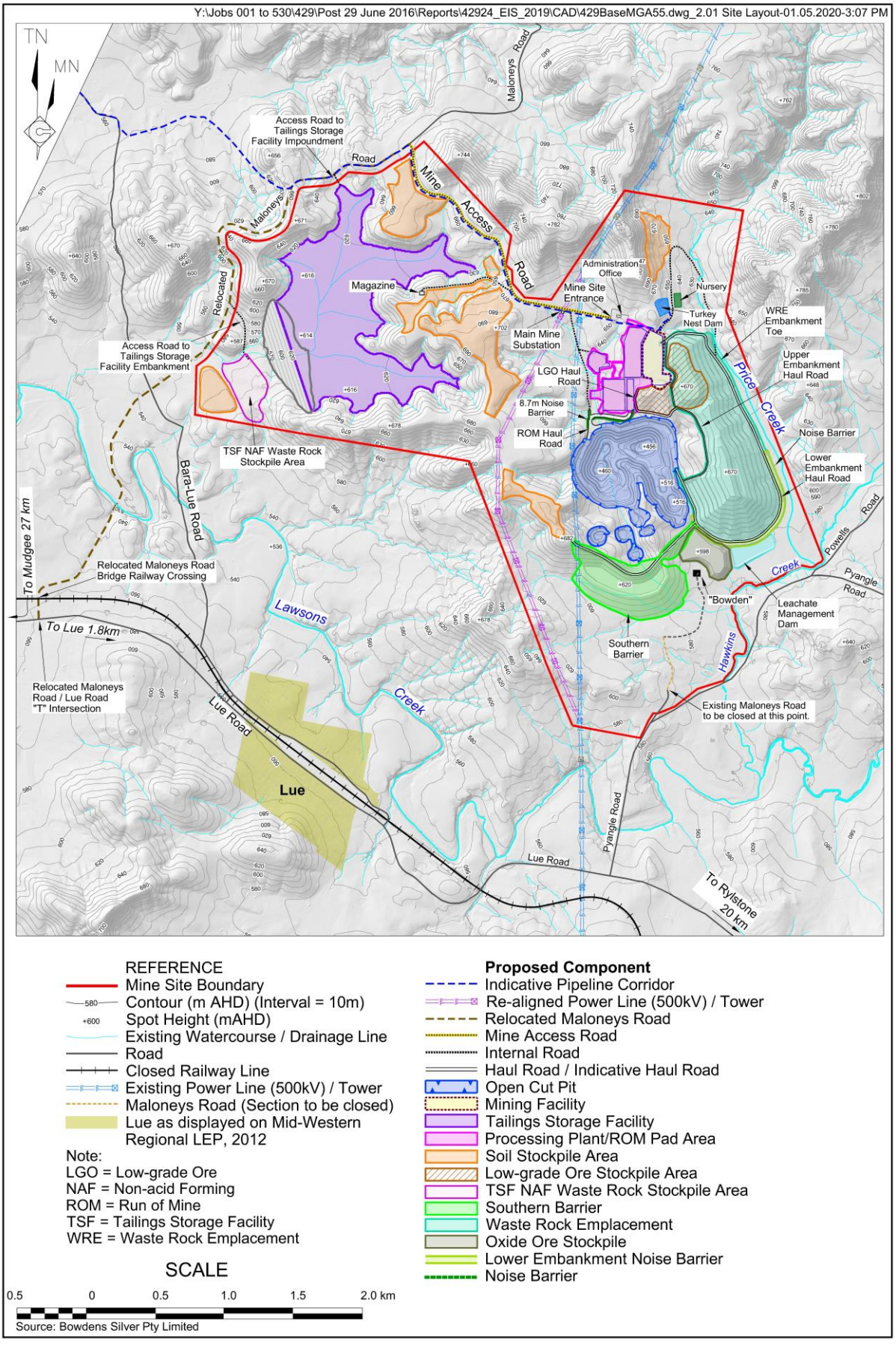
v) a TSF covering approximately 117ha; and

vi) a southern barrier to provide visual and acoustic protection to properties south of the Mine Site covering approximately 32ha.

Minor components in addition are an oxide ore stockpile and soil stockpile areas.

The above components would be supported by a range of on-site and off-site infrastructure. The on-site infrastructure comprises haul roads, water management structures, power/water reticulation, workshops, stores, compounds and offices/amenities. The off-site infrastructure comprises a relocated section of Maloneys Road (including a new railway crossing and new crossing of Lawsons Creek), a 132kV power line and a water supply pipeline for the delivery of water from the Ulan Coal Mine and/or Moolarben Coal Mine. **Figure 3** displays the indicative locations of the principal mine components. The 132kV power line will be the subject of a separate application under Part 5 of the EP&A Act.

Figure 3 Mine Site Layout



The Project would incorporate a conventional open cut pit where overburden/waste rock is removed from above and around the silver-zinc-lead ore and either used for on-site construction activities or placed in the out-of-pit WRE or the southern barrier. The mined ore would be transported by haul trucks to the on-site processing plant where it would be crushed, milled and processed to liberate the silver, zinc and lead minerals. These minerals would be collected by conventional froth flotation to produce two concentrates that would be dewatered and transported off site by truck. The residual materials from processing (tailings) would be pumped in the form of a slurry to a tailings storage facility (TSF) located to the west of the main open cut pit.

The Project would require a site establishment and construction period of approximately 18 months during which the processing plant and all related infrastructure and the initial embankment of the TSF would be constructed. Once operational, Bowdens Silver anticipates the Project would operate for approximately 16 years.

4.1.2 Geological Setting and Resources

4.1.2.1 Regional Geology

The Mine Site is situated near the northeastern margin of the Lachlan Fold Belt, one of the main components of the Tasman Fold Belt System, and the western edge of the Sydney Basin. **Figure 4** presents an extract of the geological map of the Mudgee to Rylstone district displaying the locations of the geological units of the Lachlan Fold Belt and the Sydney Basin together with more recent igneous rocks and Quaternary alluvium.

4.1.2.2 Mine Site Geology

The Bowdens silver deposit is a carbonate-silver-base metal associated low-sulphidation epithermal deposit. The deposit is hosted principally within siliceous volcanic rocks of the early Permian Rylstone Volcanics (approximately 290 million years old) that unconformably overlie a sequence of Ordovician aged metasediments (approximately 445 million years old). The Rylstone Volcanics which range in thickness from 10m to >200m comprise mainly rhyolitic ignimbrites, tuffs and volcanic breccias and are partially overlain by the Snapper Point Formation of the Shoalhaven Group sediments of the Sydney Basin. **Figure 5** displays the surface geology within and adjacent to the Mine Site with Plate 2.1 in the EIS (reproduced below as **Plate 1**) displaying the colour and appearance of the various rock types defined within and immediately surrounding the Mine Site.

It can be seen by inspection of the core samples in **Plate 1** that the dominant colour of the waste rock, prior to weathering if that is likely to occur, is predominantly light cream to grey. A relevant environmental consideration noted in the EIS in Section 2.2.4 in relation to Visibility, is as follows:

Visibility

> *The dominant light colour of the waste rock (and low grade ore) to be produced would require areas where these materials are visible from beyond the Mine Site to be progressively revegetated to limit the visual contrast against the surrounding vegetated landforms. Planting of vegetation around the perimeter of the Mine Site together with progressive rehabilitation/revegetation activities on interim/completed landforms would be undertaken in order to minimise visual impacts to the greatest extent possible. The WRE has been designed so that the final landform provides for a long-term, non-geometric near-natural shape and slopes.*

Figure 4 Regional Geological Setting

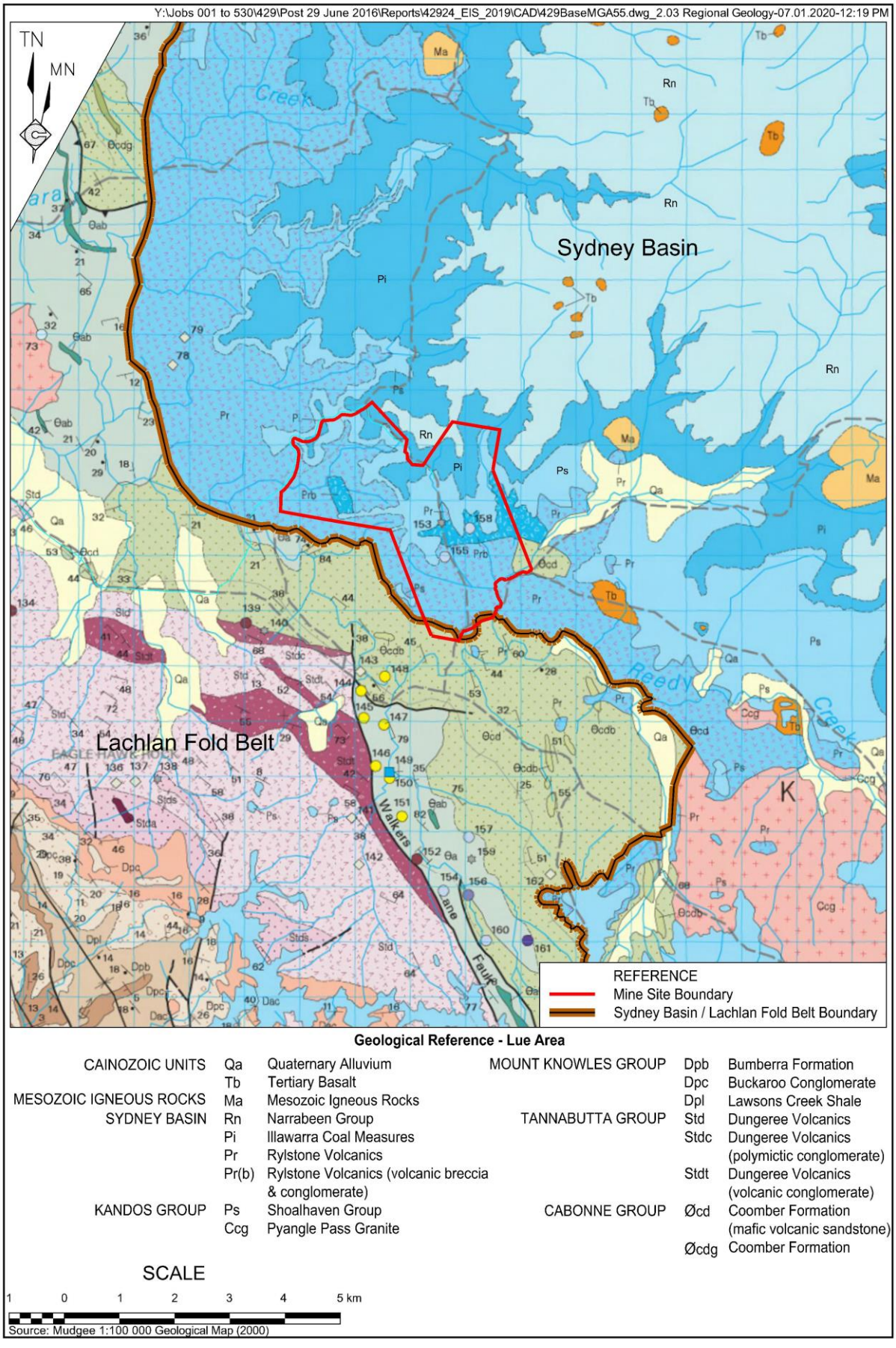
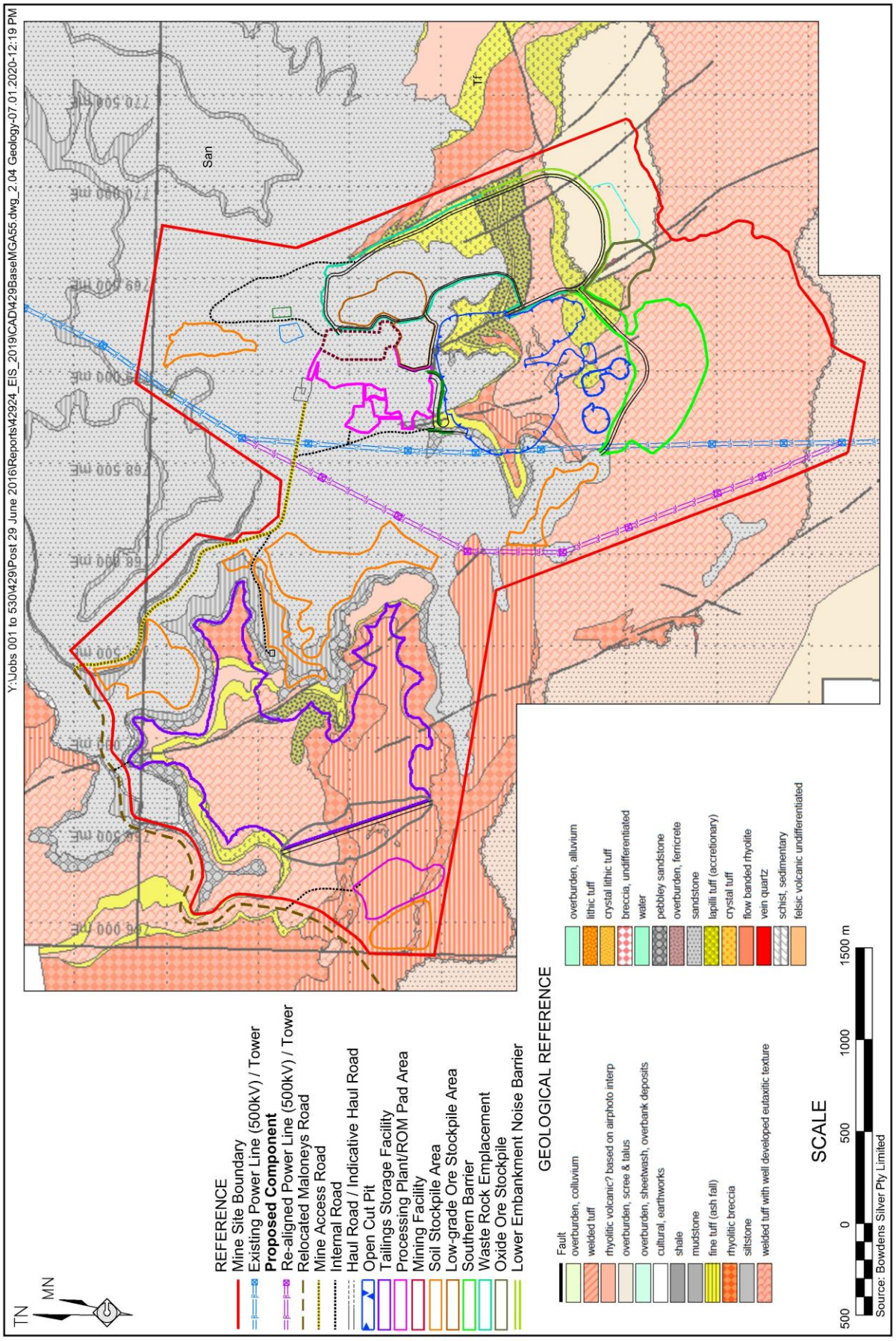


Figure 5 Mine Site Geology



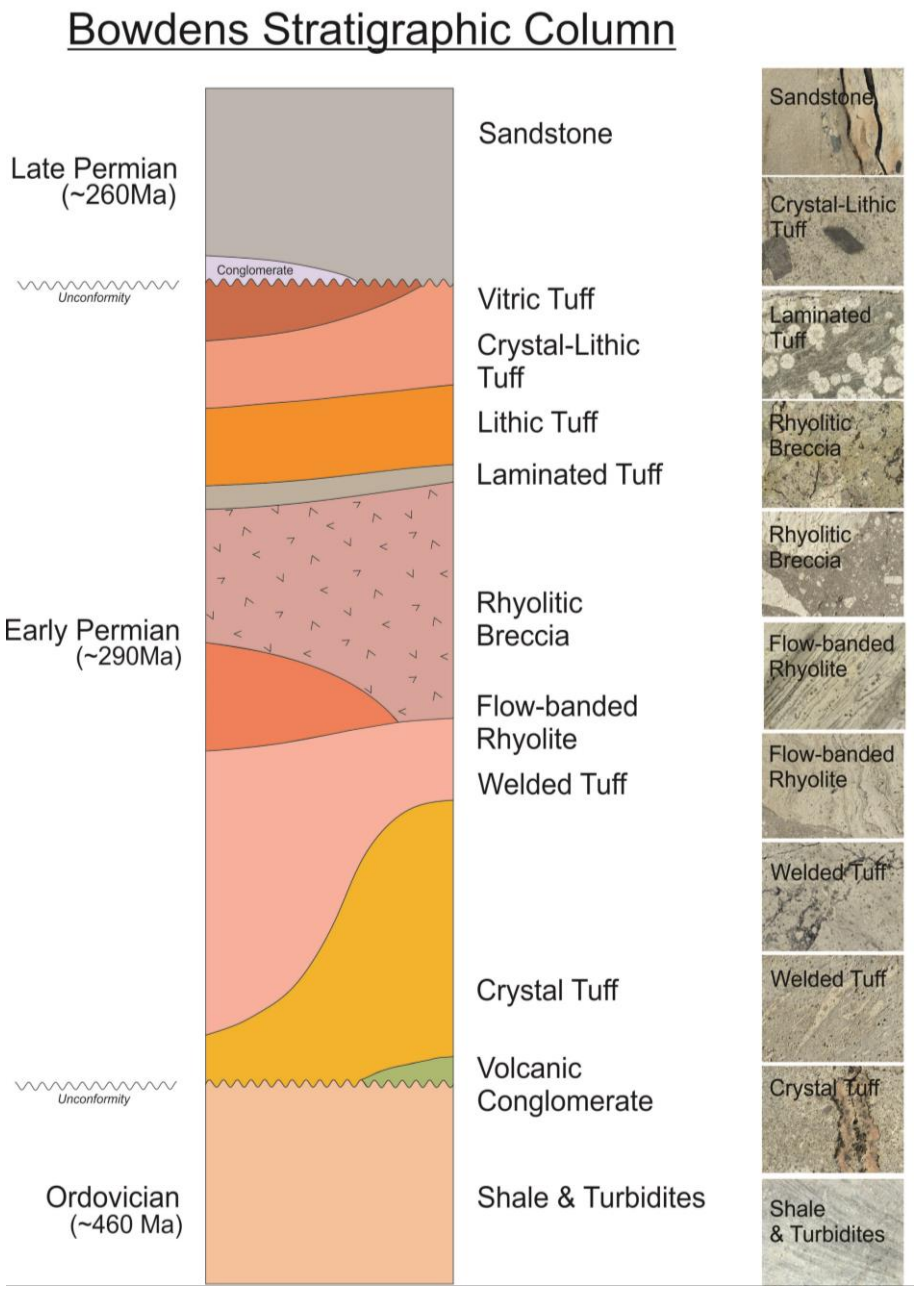


Plate 1 Bowdens Stratigraphic Column and Representative Rock Types

4.2 SITE ESTABLISHMENT AND CONSTRUCTION ACTIVITIES

The site establishment and construction activities for all key components within the Mine Site would be sequenced to achieve the commencement date of concentrate production approximately 18 months after the commencement of the site establishment and construction stage, as set out in Section 2.3 and Table 2.3 of the EIS.

4.2.1 Initial Earthworks

Relevant to visibility, a program of initial earthworks would be undertaken to establish the surface water management system and to develop the required operational areas. Vegetation clearing would be undertaken initially by one or more firewood and mulching contractors who would remove the vegetation only in areas for approved mine components.

Subsoil and topsoil removed during the site establishment and construction stage would either be re-used as part of the initial stabilisation / rehabilitation activities or stockpiled in nominated soil stockpile locations. The soil stockpile areas displayed on **Figure 6** would not be fully cleared during the site establishment and construction stage. Some stockpile areas or parts thereof would be cleared progressively prior to topsoil and subsoil removal throughout the early years of operation. Soil stockpiles would not be of significant visibility as they are constrained to 2m or 6m in height (soil and subsoil, respectively) and are located in areas that are of low visibility from off-site.

Section 2.4 of the EIS provides a detailed description of the site establishment and construction activities of the key components of the Project. The remainder of the subsection reviews the key components constructed during the site establishment and construction stage together with reference to where these components would be visible from beyond the Mine Site.

4.2.2 Processing Plant and Mining Facility

Civil works to allow the construction of the processing plant and mining facility would involve vegetation clearing, topsoil and subsoil removal and storage and the excavation/placement (i.e. cut and fill) of the required landforms for the various mine infrastructure components. **Figure 7** displays the extent of earthworks proposed to create the six pads for the processing plant, mining facility (varying in elevation from 623.3m AHD to 663.9m AHD), ROM pad and crushed ore stockpile.

A raw water pond and a 1ML capacity dewatering pond would be constructed at the southern and southeastern corner of the mining facility, respectively, as part of the civil works program for storage of water.

The planned excess excavated material from the earthworks within the processing plant and mining facility would be placed within the footprint of Stage 1 of the low grade ore stockpile area (see **Figure 7**).

The construction of the processing plant and mining facility would involve the following.

- The assembly of the key components manufactured off site and transported to site in numerous pieces.
- The construction of the various buildings and structures required to support the mining and processing operations.
- The on-site manufacture of specific components to complement the key mechanical plant components.
- The installation of all necessary electricals, communications and plumbing.

Figure 6 Site Establishment and Construction Activities

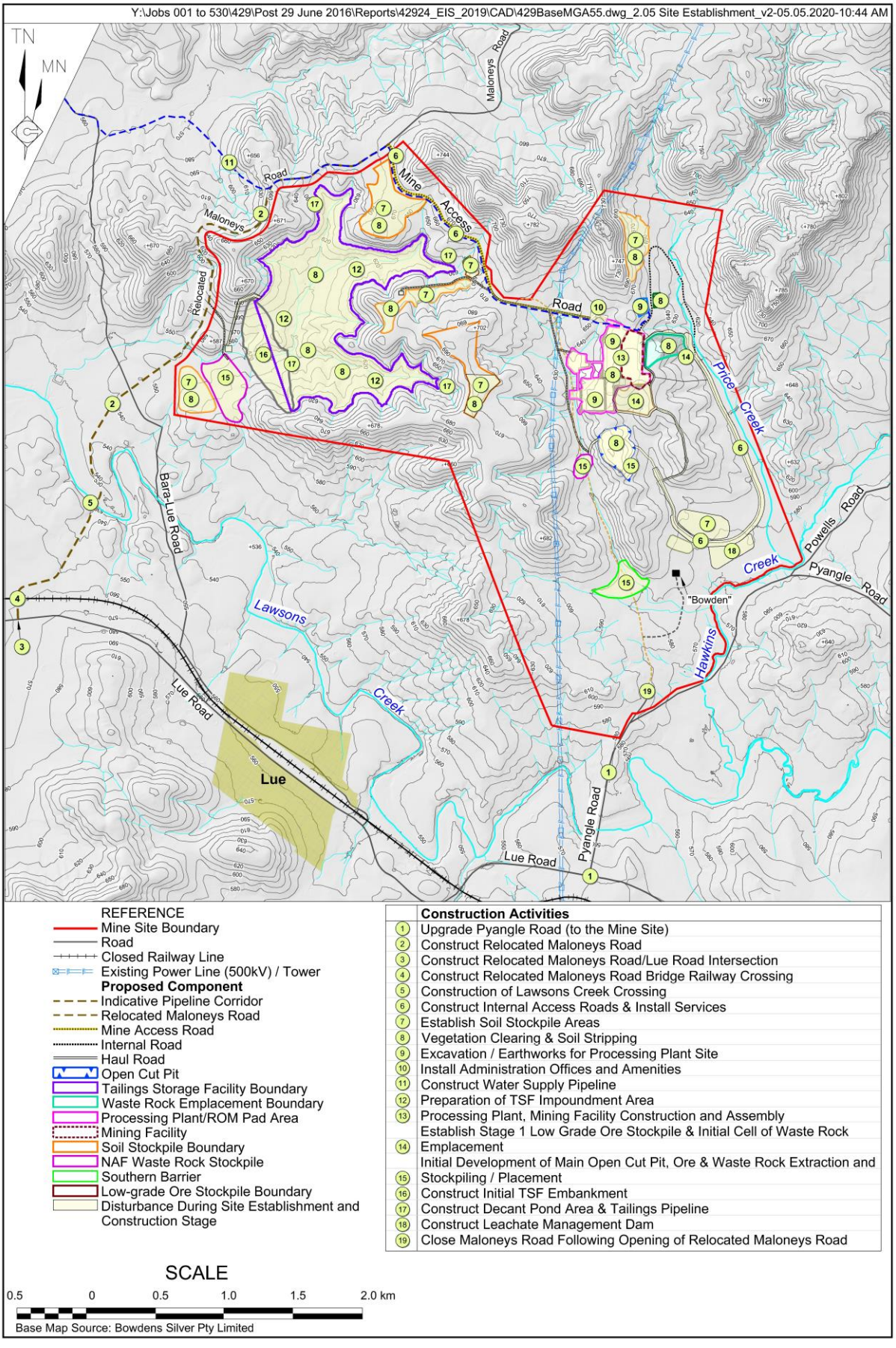
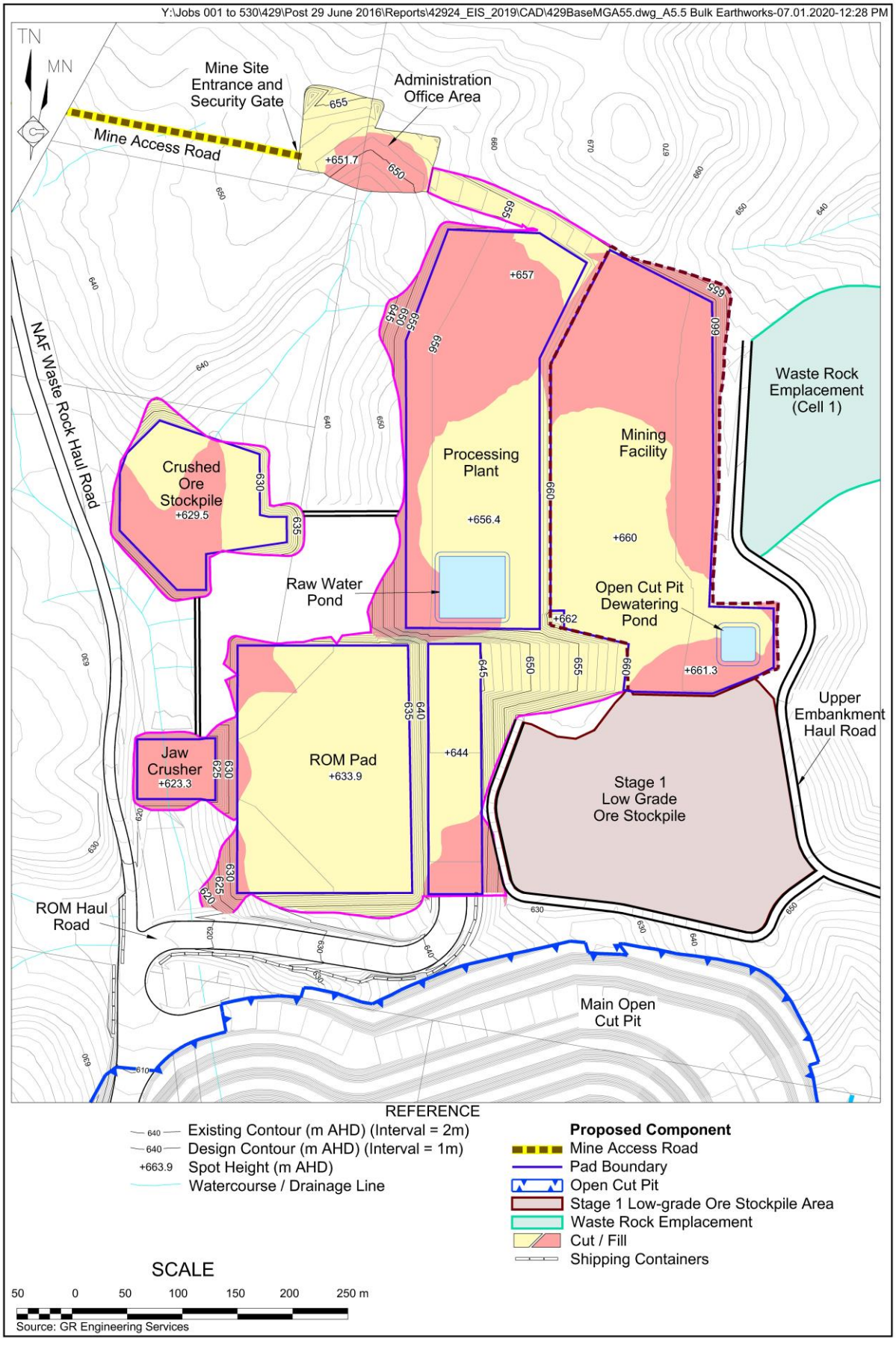


Figure 7 Earthworks for the Processing Plant and Mining Facility



The construction phase of the processing plant would be completed following the successful commissioning of the plant.

The processing area is not visible from Lue as a result its location and height of the intervening topography. The structures proposed are of relatively small vertical scale at a minimum of approximately 1.5km from the nearest section of Pyangle Road, between which and the processing area there are proposed to be the southern barrier and WRE. Bowdens Silver proposes to progressively clear the land required for the processing plant and mining facility and retain, wherever practical, a number of remnant trees in those areas that are not in cut or fill. It is unlikely that there would be significant views of the processing area once the initial section of the southern barrier is constructed (by about Year 5), from Lue Road south of the Mine Site such as V26-29, V50 and V55, or from residences at V47 and V51 (see **Figure 2**).

4.2.3 Waste Rock Emplacement

The construction of the WRE would commence with vegetation clearing, topsoil and subsoil removal and storage and the excavation of the required area of waste rock impoundment in WRE Cell 1 and WRE Cell 2. Excavated material from within the footprint of the WRE, as well as NAF from the main open cut pit, would be utilised for the construction of the design components of the WRE necessary for the encapsulation of the emplaced PAF waste rock.

Construction of the WRE would commence in the north with WRE Cell 1 and WRE Cell 2. Once the construction of WRE Cell 1 has been completed it would be feasible to begin placing the PAF rock within the lined area, however sections of WRE Cell 2 would be developed to accommodate the internal drainage generated within WRE Cell 1. The WRE would have an area of 0.77ha and a maximum elevation to the crest of 660m AHD, with a face slope of 1:3 (V:H). For detailed design features, see the EIS Section 2.5.4.

The WRE as progressively constructed from north to south, would act as a foreground barrier to views into the Mine Site from the intersection of Pyangle Road and the nearby part of Powells Road (V13-18, V21, V23 and V24 on **Figure 2**) and from the only non-Project-related residence that currently has potential views of the area proposed for the open cut pit (e.g. V41, Residence R4). The potential for views from residences has been assessed in detail in this report at Section 5.5.2.1.

4.2.4 Southern Barrier

The southern barrier would be the main destination for non-acid forming (NAF) waste rock and comprise an initial barrier and an extended barrier. The initial barrier developed over Years 1-5 would principally be to mitigate noise primarily from mining operations and to provide access roads east and west across Blackmans Gully, with a crest level of approximately 639m AHD. The extended barrier would be developed on the southern face of the initial barrier between Years 6 and Year 14 to achieve the crest level similar to the initial barrier. NAF material from the barrier would be used in rehabilitation and closure and ultimately the southern barrier would be removed.

The southern barrier, although primarily a NAF waste rock stockpile and acoustic barrier would also act as a barrier to visibility of the main and satellite open cut pits, as it would be likely to block views of both mining activities and the ROM pad and processing area from closer parts of Pyangle Road (e.g. V13, V14, V17) and Lue Road south of the Mine Site (V26-V29), as well as views from a residence in the vicinity, Residence R47 (V47).

4.2.5 Open Cut Pits

Development of the main open cut pit would commence during the site establishment and construction stage with the open cut pit pre-strip. Emphasis would be placed in this stage upon the recovery of sufficient NAF waste rock for the construction of the initial TSF embankment and the accumulation of sufficient ore on the run-of-mine (ROM) pad to enable the processing plant to be commissioned. Any low grade ore recovered during this stage would be transported by haul truck to the low grade ore stockpile area east of the ROM pad. During the open cut pit pre-strip, all potential acid forming (PAF) waste rock would be recovered and transported by haul truck and placed in the first cell of the WRE (see **Figure 7**).

Details of the layout and staged development of the main open cut pit and satellite open cut pits Year 6 and 8 are presented in Section 2.5 of the EIS. Mining within the two satellite open cut pits and the western side of the main open cut pit would occur after Year 5 and hence the operations at and near the natural land surface would be shielded by the initial barrier of the southern barrier.

Parts of the walls of the main open cut pit, in particular the west and northwest parts, may be visible from off-site viewing places south and east of the Mine Site (see **Figure 2**) as extraction of the resource progresses, depending on staging and the heights of the intervening topography of the southern barrier and WRE.

4.2.6 Tailings Storage Facility

The TSF would be designed, constructed and operated to have minimal impact on the existing surrounding environment.

The TSF would be constructed in three stages during the Project life. The TSF construction activities with potential visibility impacts to be undertaken during the site establishment and construction stage would involve the following:

- Removal of ground cover vegetation from the footprint of the TSF embankment and the entire impoundment area.
- Stripping of topsoil and subsoil within the TSF footprint, to be stockpiled for future reuse as part of subsequent embankment raises (subsoil) or site rehabilitation works (topsoil and subsoil).
- Decant pond area foundation preparation as required including ripping, moisture conditioning and compaction to meet the requisite engineering specifications within the tailings storage impoundment.
- Tailings impoundment area foundation preparation including compaction.

- Construction of the initial TSF embankment utilising NAF waste rock from the open cut pit and the in situ clay materials sourced from within the storage containment area.
- Construction of an emergency spillway including suitable armouring.

The above construction aspects, principally relating to the embankment, would subsequently be repeated as required for the subsequent Year 3 and Year 8 raises of the TSF.

4.2.7 Off-site Road Network

4.2.7.1 Relocated Maloneys Road

A part of the southern section of the existing Maloneys Road would be permanently closed, requiring the construction of a new section of public road which would link the retained northern section of Maloneys Road with Lue Road and include a newly constructed "T-intersection" 1.8km west of Lue and a new crossing of Lawsons Creek.

Once the relocated Maloneys Road is open to traffic, access to the Mine Site would be via the mine access road which would generally follow a section of the closed former Maloneys Road.

Figure 8 displays the indicative alignment of the relocated Maloneys Road and the extent of cut and fill. The road would be constructed beyond the western boundary of the Mine Site to minimise the visibility of the activities within the Mine Site to motorists travelling along the road. The full 5.2km length of the relocated Maloneys Road, from Lue Road to its connection with the retained Maloneys Road north of the Mine Site would be a sealed, Type 4 class road suitable for B-Double vehicles. The section of Maloneys Road beyond the intersection with the mine access road would be retained in its current form.

The new section of road would be of low overall visibility in the locality and would not be exposed to views from Lue. It would be partly visible from similar areas with visibility of the TSF embankment noted above. The appearance of areas of cut and fill in the initial stages of construction would be most visible as a result of the light colour of the exposed material and material used for fill but would be expected to decline in visibility with weathering and rehabilitation of vegetation on the batters. Sealing of the visible section of road would decrease its visibility compared to adjacent unsealed roads such as Bara-Lue Road.

4.2.7.2 Relocated Maloneys Road/Lue Road T-Intersection

The relocated Maloneys Road/Lue Road T-intersection would be designed in accordance with Austroads design guidance (see **Figure 9**) and would comprise the following elements.

- An at-grade, 95m single deceleration lane, left turn in for eastbound vehicles entering the relocated Maloneys Road from Lue Road.
- An at-grade, left turn out and 108m single acceleration lane with merge for vehicles exiting the relocated Maloneys Road, entering Lue Road and travelling east towards Lue.
- A 108m centre deceleration lane on Lue Road for westbound vehicles undertaking a right turn into the relocated Maloneys Road.

Figure 8 Relocated Maloneys Road

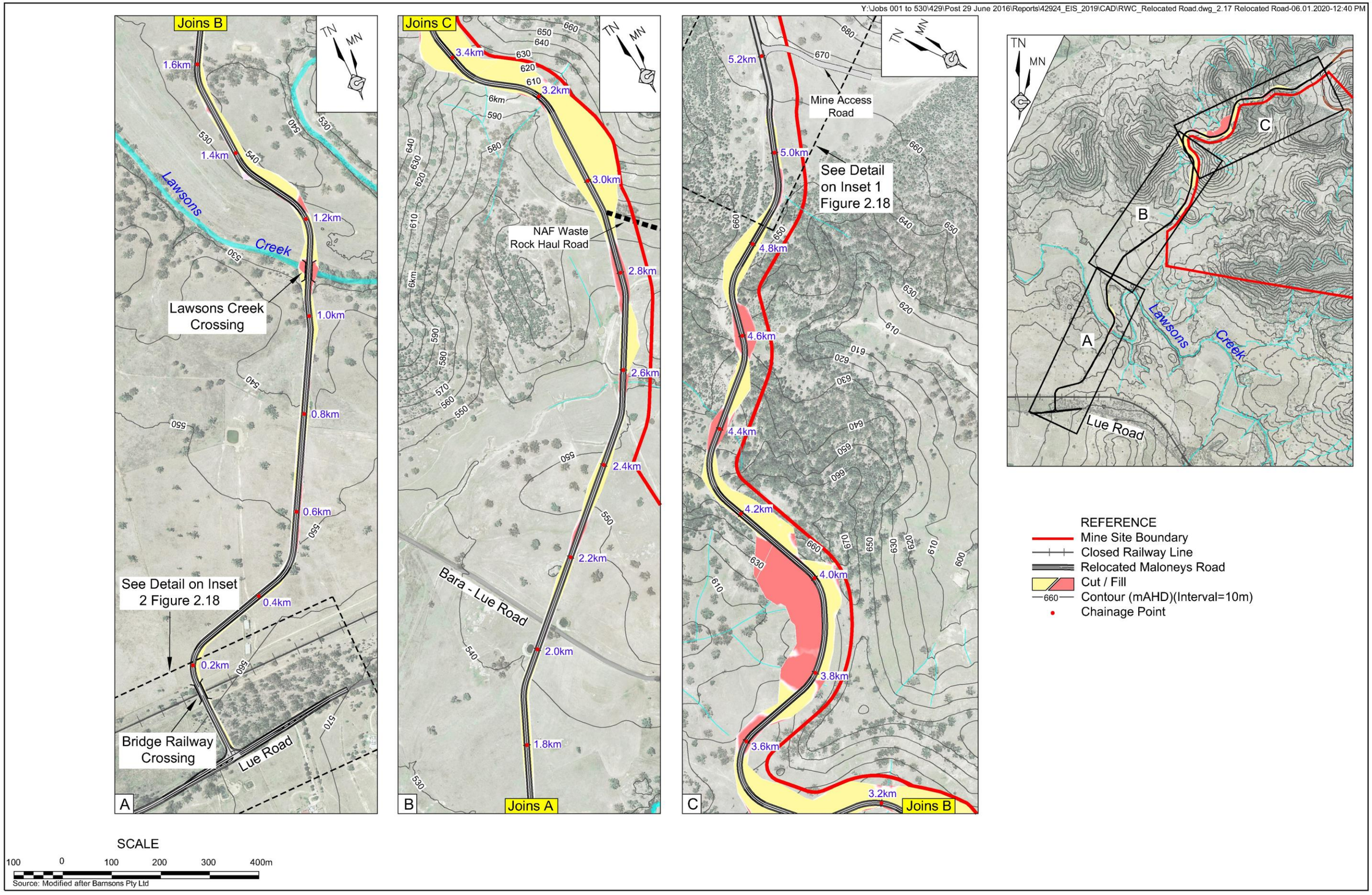


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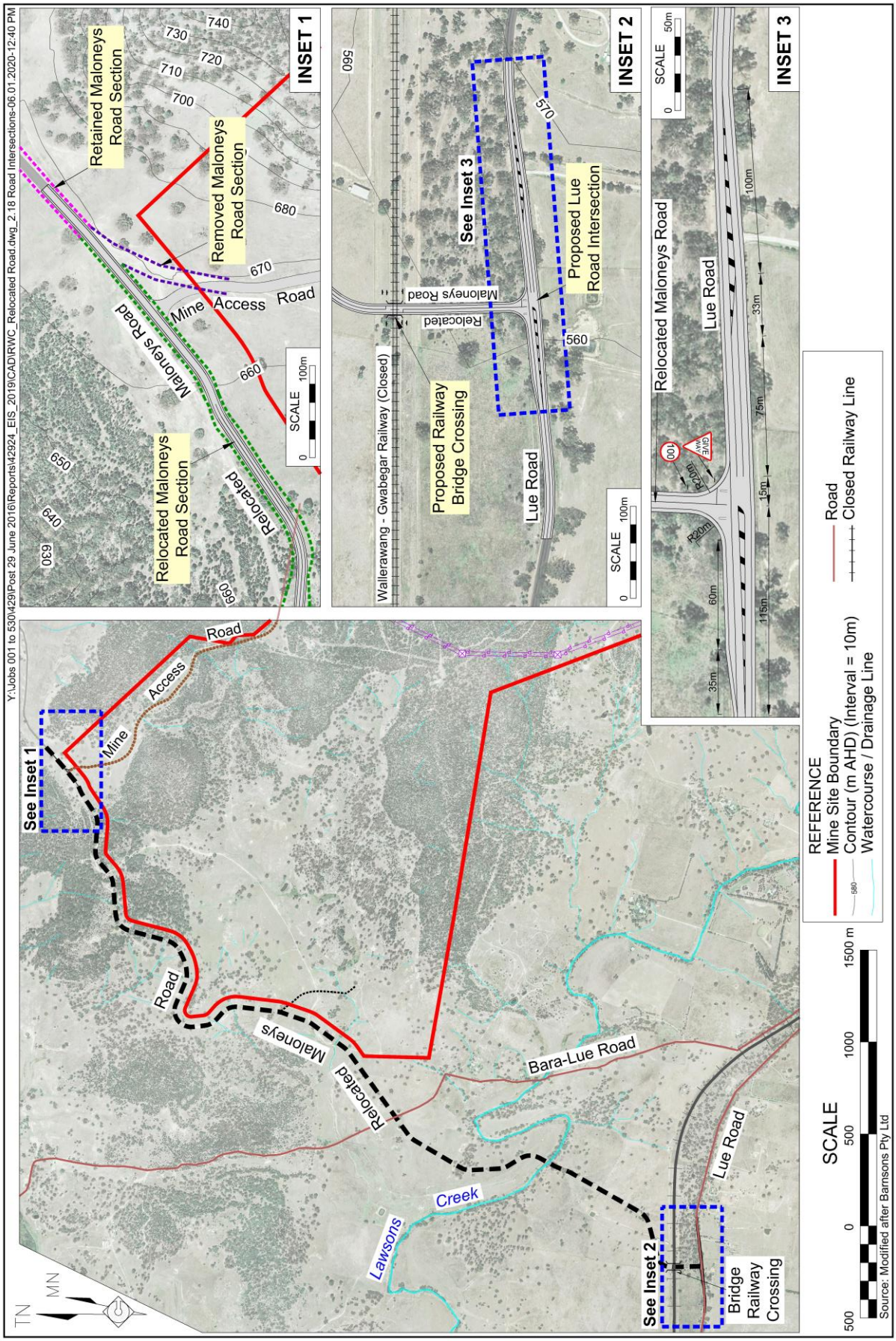
Figure 9 Road Intersections and Railway Crossing



These lanes would be created by local widening, sealing and line marking of Lue Road.

The construction of the intersection would be undertaken in Months 3 and 4 to enable vehicles access to the proposed new railway crossing.

The intersection and road widening works would be visible from a short section of Lue Road in its immediate vicinity. The intersection would also provide a narrow axial view to the north and of the roadway and deck of the immediately adjacent relocated Maloneys Road railway crossing bridge (see Section 4.2.7.3).

4.2.7.3 Relocated Maloneys Road Railway Crossing

A new railway crossing would be constructed across the disused Wallerawang-Gwabegar Railway Line (see **Figure 9**). The crossing would involve the construction of a bridge providing at least 5.8m clearance above the railway line. The bridge would be a dual lane concrete structure constructed with pre-cast concrete piles, headstocks, deck planks and retaining walls together with appropriate approach earthworks. The bridge would be completed with steel guardrails. The bridge would be visible to users of the relocated Maloneys Road but otherwise of low visibility in the locality generally, other than in an axial view from the intersection of the relocated Maloneys Road with Lue Road. Vegetation between Lue Road and the railway line easement would screen or block views from the remainder of Lue Road (see for example Plate V56 and V57 in **Annexure 1**).

4.2.7.4 Lawsons Creek Crossing

The relocated Maloneys Road would cross Lawsons Creek via a new floodway that would be constructed approximately 1.2km downstream of the current Bara-Lue Road crossing of Lawsons Creek.

Figure 2.8 in the EIS presents the indicative design elements of the floodway and the location of the proposed Lawsons Creek crossing.

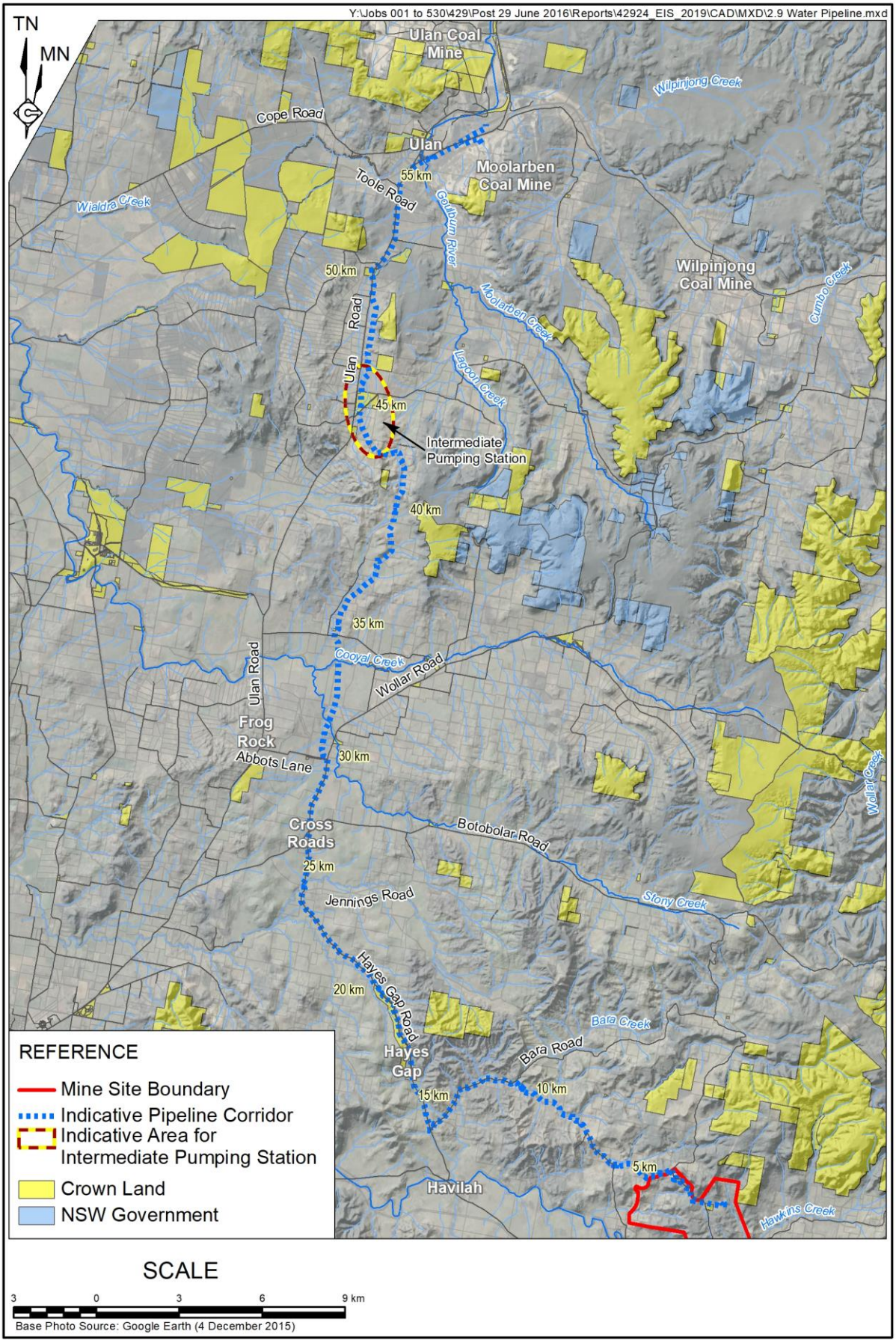
The new intersection (V56, V57), railway bridge, Lawsons Creek crossing and the road itself would be visible to users of the new section of Maloneys Road. The new section or road would also be visible from part of Bara-Lue Road (V38), which is also crossed further north by the new section of Maloneys Road (V45, V46). The road beyond the Bara-Lue Road intersection would also provide medium distance views of the TSF embankment. No other substantial aspects of the Project would be visible from the new section of Maloneys Road.

4.2.8 Water Pipelines and Power Transmission Lines

4.2.8.1 Water Pipelines and Associated Infrastructure

During the site establishment and construction stage, Bowdens Silver would construct and commission a water pipeline from the Ulan Coal Mine and Moolarben Coal Mine to the Mine Site for the supply of process water requirements. The route shown in **Figure 10** and will be refined as the Project progresses.

Figure 10 Indicative Water Supply Pipeline Corridor



The water pipeline route would cover a length of 58.5km and would be buried along the majority of its length principally within public road easements, and private lands, where required.

With the exception of each end of the pipeline and the required outlets/inspection points along the pipeline route, the pipeline would be buried approximately 0.8m below the land surface either by trenching or underbore construction or horizontal drilling methods.

In order to accommodate availability of water for firefighting purposes, water take-off points would be constructed along the water supply pipeline. The locations of the take-off points would be established in consultation with the Rural Fire Service.

The water pipeline route proposed would not be in areas of visibility to Lue or adjacent rural residences.

4.2.8.2 Power Lines

Bowdens Silver is continuing its discussions with the energy suppliers in order to finalise the route selection for the 132kV power transmission line to provide the Project's power supply. The selected route would be the subject of a Part 5 application under the EP&A Act for approval, separate to the application for development consent for the mining and related activities within the Mine Site.

4.3 MINING AND PROCESSING OPERATIONS

4.3.1 Mining Operations

Typical mining operations are described in Section 2.4.4 of the EIS, principally involving drill and blast and load and haul operations. Load and haul operations would include transportation of ore to the ROM pad within the processing area or the low grade ore stockpiles. Waste rock would be transported to either the WRE or to other locations as required for the construction of infrastructure, for example the TSF embankment and southern barrier.

Removal of vegetation, stripping of soil, extraction of friable materials, load and haul operations, the initial construction of the WRE, southern barrier, low grade ore stockpile and the initial embankment of the TSF, would initially be exposed to views from the visual catchment. Visibility of mining operations, other than the construction of two subsequent raises of the TSF embankment and the southern barrier would decline as the southern barrier and WRE are constructed, screening or blocking views into the open cut pit and processing area in the eastern part of the Mine Site. The construction of the initial embankment and subsequent raises of the TSF would be visible from limited areas, west of Lue, as noted above. A noise barrier, the lower embankment noise barrier, around the toe of the WRE and the southern barrier and oxide ore stockpile would block views of trucks hauling material to the WRE or locations other than the southern barrier, from the open cut pit. Vehicles using the haul road to the ROM pad from the northern exit of the main open cut pit would not be visible principally due to the placement (for acoustic purposes) of a number of shipping containers on the southern side of the haul road. By the time the main open cut pit is extended toward the west, the southern barrier and WRE/low grade ore stockpile would be of such a height as to block views of this area (including views of the roadside shipping containers) from the visual catchment south of the Mine Site.

4.3.2 Processing Operations

Details of the processing operations are outlined in Section 2.7 of the EIS. There would be minor visual evidence of the operations, as crushing and processing of the ore would be undertaken principally within buildings that would not be visible at all from Lue Village and would be largely beyond the horizon of views from the visual catchment to the south of the eastern section of the Mine Site. This is demonstrated in the sections in **Annexure 3**, for example **Figure A3-4**, V28-1 and V28-2 (a view from the public domain on Lue Road south of the Mine Site) and **Figure A3-7**, V47-2 (a view from Residence R47, in the private domain) and, **Figure A3-9**, V51-1 (a view from Residence R39). Further evidence of the low visibility of the structured **Figure A3-9** proposed in the processing area are shown in the sections in **Annexure 3** for public domain locations for the view from V14 (Pyangle Road), **Figure A3-1**, V14-2, for V17, also on Pyangle Road (**Figure A3-2**, V17-2) and V21 (Powells Road), **Figure A3-3**, V21-2.

As a result of this analysis, the processing area is unlikely to be of significant visibility as the close to medium range views would be screened or totally blocked by the southern barrier or WRE. There was only one elevated viewing place that was identified, which could have views over the southern barrier in an isolated view place identified at the intersection of Tongbong Road and Lue Road (V25). The structures would be difficult to discern in this view as a result of the viewing distance of over 5.6km to the closest part of the processing area. Structures proposed would also be significantly screened by vegetation retained between the northern margin of the main open cut pit and the ROM pad and where possible in other parts of the processing area generally.

4.3.3 Waste Rock Emplacement

The most substantial permanent landform structure proposed is the WRE in the eastern section of the Mine Site, generally to the west of Prices Creek. The WRE is proposed to be constructed as a series of cells (Figure 2.17 in the EIS), starting at the north and progressing toward the south over the life of the Mine. The cells are to be filled by successive lifts of waste rock and sequentially rehabilitated and contoured, to provide a semi-natural appearance. As the progress of construction generally moves southward, there would be an exposed southern face at all times that could not be fully vegetated. The face would typically be approximately 10m high until the completion of filling of Cell 5 at the end of Year 6. Low grade ore would be stored on the top of the western part of Cells 1-3 following completion of those cells in Year 3.

The advancing south face of the WRE would be initially of low visibility until the end of Year 3, the view being confined to an area generally in the vicinity of the intersection of Pyangle and Powells Road (V15-V18 and V23, V24). The height of the face would not change significantly between Years 3 and 6, but it would increase in visibility to some extent to view places further south of the Mine Site, such as V13-V17 on Pyangle Road. Cell 6 would be completed in Year 6.

Cells 7 and 8, which contains the highest volume of waste rock in the WRE, would be constructed between Years 6 and 16. The general direction of progress of construction of Cell 7 would be initially from south to north to meet Cell 6 and then west to east, to achieve a similar level to the crest of Cells 5 and 6, after which Cell 8 would be established on top of parts of the completed Cells 4, 5 and 6. Initial rehabilitation of the eastern faces of cells 1-6 would be completed by the end of Year 6. By the time Cell 7 is completed, rehabilitation of the eastern faces of Cells 1-6 would have been established for up to 10 years. Rehabilitation of Cell 7 would begin sequentially as it is constructed between Years 6 and 16, with the western, upper faces and Cell 8, the last part of the WRE to be constructed, being latest to be rehabilitated.

4.3.4 Low Grade and Oxide Ore Stockpiles

Low grade ore that is considered uneconomic to process at the time of extraction would be stockpiled adjacent to and on the northern cells of the WRE with a maximum elevation of 690m AHD. If unprocessed at the end of the Project life, it would be capped and covered as part of the WRE closure and rehabilitation. Given its elevation and light-coloured appearance, the low grade ore would need to be shielded to minimise its visual impacts (see Section 11).

Oxide ore could not be processed on the Mine Site by the processing equipment installed and is proposed to be stockpiled between the southwestern extremity of the WRE and the northeastern end of the southern barrier. If not utilised in the lifetime of the Project, it would be shaped and covered with subsoil and soil and revegetated.

The combined southern barrier, oxide ore stockpile and WRE would in time form a visual barrier to views into the open cut pit and processing area from the public domain in Pyangle Road and Powells Road (for example, V13-V18, V21-V24) and from Residence R4 (V41).

4.3.5 Tailings Storage Facility

The initial embankment of the TSF would be constructed to a height of 38m above natural ground level, with two subsequent raises of 9m each at Years 3 and 8 to achieve a final embankment height of 620m AHD, i.e. a maximum of 56m above natural ground level.

The TSF embankment would be visible from an isolated part of Lue Road (V36), part of Bara-Lue Road (V10), part of the relocated southern section of Maloneys Road (V45, V46) and Residence R81 (V48, V49) shown on **Figure 2**. There would be no significant visibility of tailings storage or management activities behind the embankment to the northeast, as there are no publicly accessible viewing places at levels that are above the embankment height.

There would not be any opportunities to progressively rehabilitate the southern faces of the TSF embankment until after the completion of the third raise in about Year 8. Subsequent to this, progressive rehabilitation utilising soil and subsoil material stockpiled downslope south-west of the TSF embankment would be undertaken to mitigate the impacts of visibility of the embankment.

4.3.6 Buildings

Other than the existing Bowdens Silver exploration office and core library, on-site buildings would be concentrated in an area north of the proposed processing plant (see **Figure 3**). The buildings are proposed within an area of relatively flat land that is of low external visibility, as a result of the screening effects of existing topography. As noted above in relation to the potential visibility of the adjacent crushing and processing area, the buildings are unlikely to be of significant visibility from the south and east visual catchment as a result of screening or blocking of views by the southern barrier and WRE.

4.4 ROAD TRAFFIC AND TRANSPORTATION

4.4.1 Mine Access

Access to the Mine Site during the early stages of the site establishment and construction stage (until approximately the end of Month 6) would be provided by the existing road network, i.e. principally using Pyangle Road (from Lue Road) and Maloneys Road. Access to the Mine Site during the latter stages of the site establishment and construction stage (from about Month 7) and the entire operational stage would be via Lue Road, relocated Maloneys Road (see Section 2.4.7 and **Figure 8**) and the mine access road.

It would be necessary for some heavy vehicles accessing the Mine Site during the site establishment and construction stage to transit through Lue. It is anticipated that the level of heavy vehicle traffic would be limited during the initial 4 to 6 months period with the bulk of heavy machinery being transported to the Mine Site for construction activities, and for the construction of the relocated Maloneys Road.

Bowdens Silver would continue to use the closed 1.2km section of the former Maloneys Road to gain access to the Bowdens exploration office and geological core library and southern side of the Mine Site, from Pyangle Road. The existing southern section of Maloneys Road would be open to public at all times until the completion of the relocation.

4.4.2 On-site Road Network

Bowdens Silver would maintain a network of internal light and off-road haul vehicle roads to provide access between the open cut pits, processing plant and other operational areas throughout the Mine Site. It is anticipated that both the northern and eastern haul roads from the open cut pit would be in use for the life of the mine.

Other internal haulage roads may be semi-permanent and re-located as required to maintain minimum haul distances and optimum grades, whilst minimising potential noise impacts.

5. BASELINE FACTORS

5.1 VIEW COMPOSITIONS

As a convention of nomenclature through this report, the Mine Site is considered to consist of an eastern and western section, approximately separated by the realigned 500kV power transmission line easement. The western side predominantly comprises the TSF and a series of temporary soil stockpile areas. The remainder of the Mine Site is in the eastern section of the Site.

The composition of views toward the Mine Site are dominated by background topography consisting of dissected plateau remnants of the Triassic Narrabeen Series sediments overlying softer and more erodible Permian Illawarra Coal Measures and Shoalhaven Group sedimentary strata on the lower slopes. Generally uncleared for agriculture because of their poor skeletal soils with low nutritional status and poor or excessive drainage, the steeper background and the horizon to views from Lue and adjacent roads in the direction of the Mine Site is largely of a partly cleared or naturally vegetated character. The valley floors on the Mine Site vary from steep and undulating in the western section to relatively flat in the eastern section, on underlying Rylstone Volcanics, which produce soils of slightly higher nutrient status, the vegetation on which has been cleared for agricultural use, predominantly grazing, in the past.

The existing view compositions in the visual catchment to the south and southeast of the eastern section of the Mine Site currently include the area proposed to be the main open cut pit and two smaller satellite pits. This area is currently partly occupied by a convex landform of a low ridge with low open vegetation in the upper sections, that falls generally from north to south. This element of the existing topography as a convex form would be replaced by concave space as the open cut pits removes the existing topography and gradually replaces the main open cut pit with a bowl-shaped individual pit and two smaller satellite pits.

An existing 500kV power transmission line in an easement crosses the eastern section of the Mine Site approximately from south to north. In external views, the power line is discernible predominantly by the lattice towers up to 50m high. The easement for the existing power line is not prominent, as within the Mine Site it has either not been fully cleared, or the former cleared easement has been naturally revegetated with shrubs and ground covers. The alignment of the proposed re-aligned power transmission line in the visual catchment of the proposed mine is largely in country with similar visual and physical characteristics to the existing line and the new line would be likely to be compatible with the appearance of the existing line and not cause any significant change to view compositions.

5.2 VISUAL CHARACTER

The existing landscape in the vicinity of the Mine Site is characterised by variety and contrast between the natural and cultural landscape attributes. The predominant character is of a natural backdrop to the views, provided by steeper and either naturally vegetated or selectively cleared hillsides and ridges, with lower, grassy cleared and flat to undulating landscape on the side slopes and valley floors. The rural character land is largely cleared on the valley floors but is variable on mid and side slopes, as it features variable amounts of residual natural vegetation, some on residual rocky land and steep slopes, as well as areas of what appears to be intact woodland.

5.3 SCENIC AND LANDSCAPE QUALITY

The combination of natural backdrops with extensive areas of natural vegetation, complex topography and defined areas of extensively cleared rural land, some displaying extensive areas of outcropping rock surfaces, is considered to result in moderate to moderate-high scenic quality. The areas of the Mine Site that would be subject to residual visual impacts of the Project are within the areas that are of moderate landscape quality.

It is in the context of this level of scenic quality that the extent of the potential visual effects of the Project must be considered.

There is a very extensive resource of land of similar attributes to the Mine Site throughout the adjacent valleys along the western side of the Sydney Basin bioregion and the catchments of the Goulburn and Upper Hunter Rivers. In that regard, although interesting and of moderate-high scenic quality in parts, the Mine Site is of no particular existing distinction and is largely not visible from main roads or Lue.

5.4 SENSITIVITY

5.4.1 View Place Sensitivity

View place sensitivity means a measure of the public interest in the view. The public interest is considered to be reflected in the relative number of viewers likely to experience the view from a publicly available location and established importance of the viewing place. Places from which there would be close or middle distance views available to large numbers of viewers from public places such as roads, or to either large or smaller numbers of viewers over a sustained period of viewing time in places such as reserves and walking tracks, are considered to be sensitive viewing places.

The Mine Site is of low view place sensitivity overall, as it is not exposed to significant views at close range or medium range from viewing places on high usage roads, reserves, lookout sites or similar places that facilitate sustained views. As analysed in more detail in Section 5.5, the Mine Site has a small visual catchment, no visibility from Lue and closer range views only from an isolated part of two local rural roads on which daily average traffic usage is below 20 movements a day, which are regarded as of low sensitivity.

5.4.2 Viewer sensitivity

Viewer sensitivity means a measure of the private interests in the effects of the Project on views. The private interest is considered to be reflected in the extent to which viewers, predominantly viewing from private residences, would perceive the effects of the Project. Residences from which there would be close or medium distance range views affected, particularly those which are available over extended periods from places such as the living rooms and outdoor recreational spaces, are considered to be places of high and medium viewer sensitivity respectively.

As analysed in detail in Section 5.5, the Mine Site is not exposed to a significant number of residences. The overall viewer sensitivity level is therefore considered to be low, however individual residences may be of higher potential viewer sensitivity.

5.5 KEY VIEWING LOCATIONS/LINKS

RLA undertook a survey of locations from which views were to be analysed and assessed, based on interpretation of topography, aerial imagery and plans of the components of the Project. Field assessment and documentation was undertaken in 2013, 2017 and 2019. Key viewing locations were identified, and photographs were taken for documentation of the views. A sample of the photographs are included in this report in **Annexure 1**. The photographs in the report were taken in 2017 or 2019, with all photographs used to analyse the likely visual exposure of the Project to private domain locations being taken in 2019.

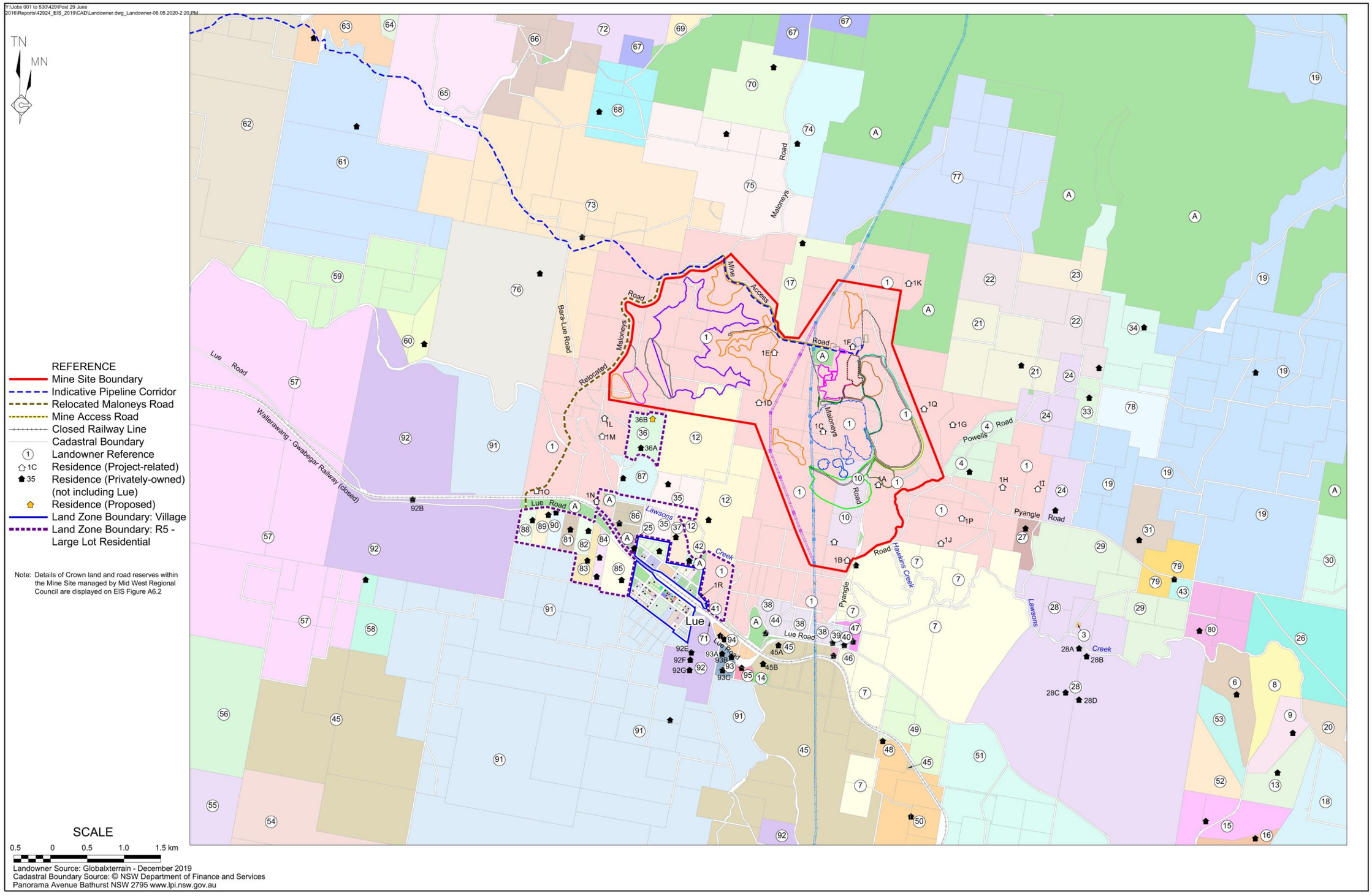
The photographs, with two exceptions, were taken by the author of this report using a professional quality digital camera, a Canon EOS 5D Mark III, with a camera-mounted GPS. The images were geotagged by the GPS so the coordinates and bearing of the photographs are shown on the metadata with the electronic image files. Two photographs were taken on the direction of RLA by staff of Bowdens Silver (V56 and V57), at the site of the intersection of the relocated Maloneys Road intersection with Lue Road.

The Mine Site has a relatively small visual catchment because of the location of bounding ridges to the north, southwest and east, which block views into the interior of the Mine Site from the majority of the public domain (see **Figure 1**). The approximate location of the Mine Site is shown on the images of **Figures 1, 2** and **3**. **Figures 1** and **2** show the locations of the viewing locations documented in this report. **Figure 11** shows the residences, views from which were documented, over a base plan of property ownership.

Lue is located to the southwest of the eastern section of the Mine Site and south of the western section. Between Lue and the eastern section of the Mine Site, where the majority of mining activities are proposed to be concentrated, are two major ridge systems, the closer of which is known locally as Bingman Ridge, to the north of which is another, which has been called Western Ridge. Another ridge is located further west from the system of which the Western Ridge is a part, for which we have adopted the name Gumarooka Ridge for the purposes of this report. This ridge is relevant to the potential visual impacts of the western section of the Mine Site in which the TSF is planned to be located.

A combination of factors lead to low overall potential visibility of activities on the Mine Site from Lue. Lue is set on relatively flat land and is elongated, and existing residential development is concentrated on the southwestern side of Swanston Street (Lue Road). Lue Road parallels the closed Wallerawang-Gwabegar railway line. The underlying subdivision pattern of the residential area southwest of Swanston Street is a grid that is largely only two blocks deep between Martin Street, at the southeastern end of the residential area and Bayly Street at the northwestern end. There is a grid-form subdivision within Lue that extends further to the southwest, between Harpur and Bayly Streets and northwest of Bayly Street. Many lots on the paper subdivisions of this part of Lue have not been developed.

Figure 11 Land Ownership and Surrounding Residences



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Many of the undeveloped lots and much of the area of larger lots on the periphery of the southwestern part of Lue feature stands of woodland-form vegetation. In addition, many of the residential lots themselves contain individual and stands of trees. As a result of the relatively flat land and extensive areas of tree vegetation retained in the part of Lue southwest of the closed railway line, there are few opportunities for views in the general direction of the Mine Site, other than from the few locations unaffected by trees, in lots directly on the Swanston Street frontage. Even for these, however, there are further features in the views that constrain potential visibility of the Mine Site.

North and northeast of the residences with frontages to Swanston Street is a wide, cleared area containing the closed railway line, beyond which is a second residential area of Lue, accessed from Cox Street, which parallels the railway line. This area is also on relatively flat land that is slightly above the flood plain of Lawsons Creek, which flows toward the northwest. At the southeastern end of this area is the Lue Hotel. In this area, is another grid-form paper subdivision, however few of the lots have been developed. Between the railway line and Cox Street is a variable width band of remnant tree vegetation. Significant groups and stands of trees exist on many of the lot's northeast of Cox Street and surrounding community facilities such as the community hall, oval and Rural Fire Service depot. Even if this vegetation was absent, there would be no visibility of the Mine Site.

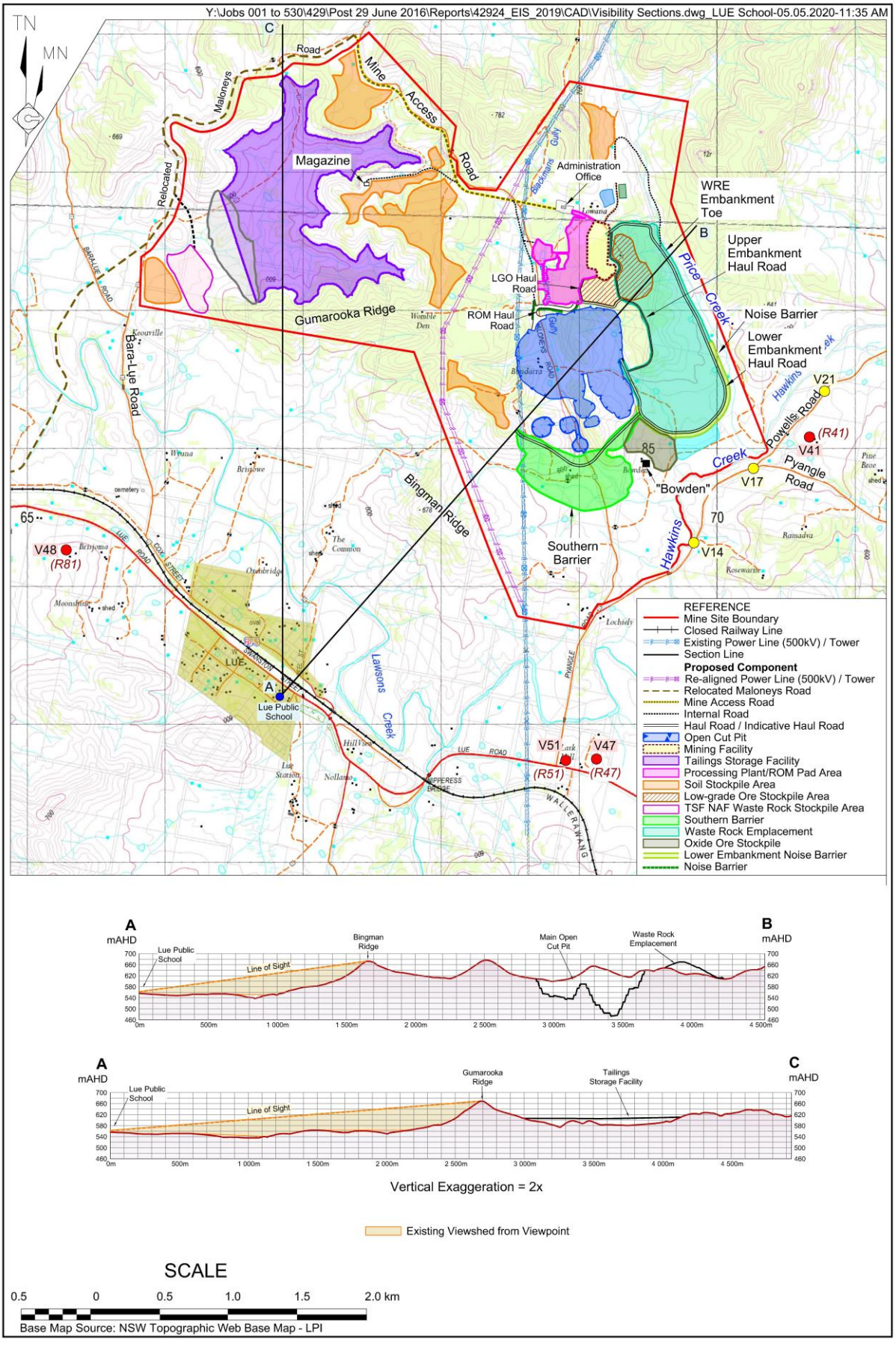
The combination of relatively flat topography and height and density of vegetation in the view lines, constrains or eliminates views in the general direction of the Mine Site from the residential areas of Lue. As a backdrop to the views above screening in the foreground by buildings and visual exposure, the ridges north and northeast of Lue prevent views of the Mine Site. **Figure 12** displays sections from the Lue Public School located immediately south of Swanston Street and the proposed open cut mine and the intervening Bingman Ridge.

The Bingman, Western and Gumarooka Ridges shown on **Figure 2** block views from the urban area of Lue into the Mine Site, including potential views of landform structures that are proposed to be constructed such as the southern barrier and WRE in the eastern section of the Mine Site (see for example V30-V37 in **Annexure 1**).

The Western, Gumarooka and un-named ridges to the west of the western section of the Mine Site also block views into the area proposed for the TSF in views from Lue. No residences in Lue are visible from a point at the maximum height of the northwestern end of the proposed TSF embankment (V9 in **Annexure 1**). Only one non-Project-related rural-residential residence (Residence R81, see V48 and V49 in **Annexure 1**) is visible from this vantage point. The likely visibility of the Project from this residence has been analysed in more detail in Section 5.5.2.1.

The majority of the land from which the operations proposed within the Mine Site would be potentially visible is to the south and southeast of the eastern section of the Mine Site. The land is of rural character. Within the rural land to the east and southeast are some minor landform features, particularly ridges, many of which are partly or extensively naturally vegetated, which are likely to provide screening effects to most views of the proposed mine from local roads and residences.

Figure 12 Visibility Section from Lue Public School



5.5.1 Public Domain

The public domain includes public roads, reserves and Lue, to the south and southwest of the Mine Site. Lue Road is the only significant public through road that is sealed. It runs approximately from southeast to northwest relative to the visual catchment of the Mine Site (see **Figures 1-3** and **13**). The effective visual catchment of the Mine Site to the public domain is indicated on **Figure 2**.

Medium to distant range views of the eastern section of the Mine Site are possible from a section of Lue Road south of the Mine Site, between the intersection of Pyangle Road in the vicinity of V29 and the intersection of Tongbong Road and Lue Road at V25. A ridge north of the road and northeast of V25 blocks views of the Mine Site between V25 and the area between V26 and V29, where partial views toward the Mine Site would be possible across the floodplain of Lawsons Creek.

Four local roads provide views of the Mine Site at close to medium range. The rural roads adjacent to the Mine Site are minor unsealed rural roads, including:

- the existing Maloneys Road, which runs through the eastern section of the Mine Site;
- Bara-Lue Road, which runs north from the western outskirts of Lue past the western section of the site;
- Pyangle Road, which runs off Lue Road south of the Mine Site, before turning southeast near the southeastern corner of the Mine Site to eventually return to Lue Road approximately 13km to the southeast of the Mine Site; and
- Powells Road, which runs northeast from its intersection with Pyangle Road adjacent to the southeastern corner of the Mine Site.

As noted, in Section 4.4.1, Maloneys Road would only provide limited Mine-related access once its southern section is relocated. Bara-Lue road would provide partial views of the TSF embankment over a small part of its alignment, as would part of the southern section of the relocated of Maloneys Road. The roads that provide close to medium range views are to the east of the Mine Site (Pyangle and Powells Roads) (see **Figure 2**). Powells Road provides access to a small number of rural properties to the northeast of the Mine Site and is not a through road. Views from Pyangle Road east of the Mine Site are confined to a short section adjacent to the intersection with Powells Road. No significant views of the Mine Site exist, for example, at V12, V22 or V53/V54 on Pyangle Road, as a result of view blocking by intervening topography and vegetation.

The likely visual exposure of the components within the Mine Site to the public domain catchments were assessed for a series of representative viewing places on relevant roads by analysis of analytic cross-sections prepared by R.W. Corkery and Co Pty Limited (RWC) (see process immediately below) and in detail in relation to Lue, Pyangle and Powells Roads by means of photorealistic photomontages representing the views from V17, V21 and V28. The photomontages are in **Annexure 2** to this report.

In order to prepare cross-sections for analysis of visibility of Project components, RLA provided RWC with a map of the Mine Site and surrounds on which the locations to be analysed were marked. RLA drew a series of bearing lines on the map with their origins at the camera locations, passing through what had been interpreted as the most visible components of the Project, for

example the main open cut pit, the WRE, southern barrier or TSF embankment. The bearings were used as the base for preparation of section lines by RWC, to analyse the likely visibility of components of the Project. The base map provided to RWC by RLA is shown as **Figure 13**.

RWC then drew cross-sections based on detailed topographic data, to indicate the locations, profiles and heights of the proposed components within the Mine Site, along each section line. The section lines take into account an estimate of the location and height of existing vegetation along the section lines, which in some cases would assist in decreasing visibility of components of the Project. The sections also indicate the changing potential visibility of components in the Project at Years 2 to 8, in comparison to existing ground level, as shown with differential colours for each stage, in the legends to each cross-section. The section line analysis was an aid to assessment of the likely visibility of components of the Project.

5.5.1.1 Analysis of Visual Effects on the Public Domain

The analysis below is based on the cross-sections in **Annexure 3**.

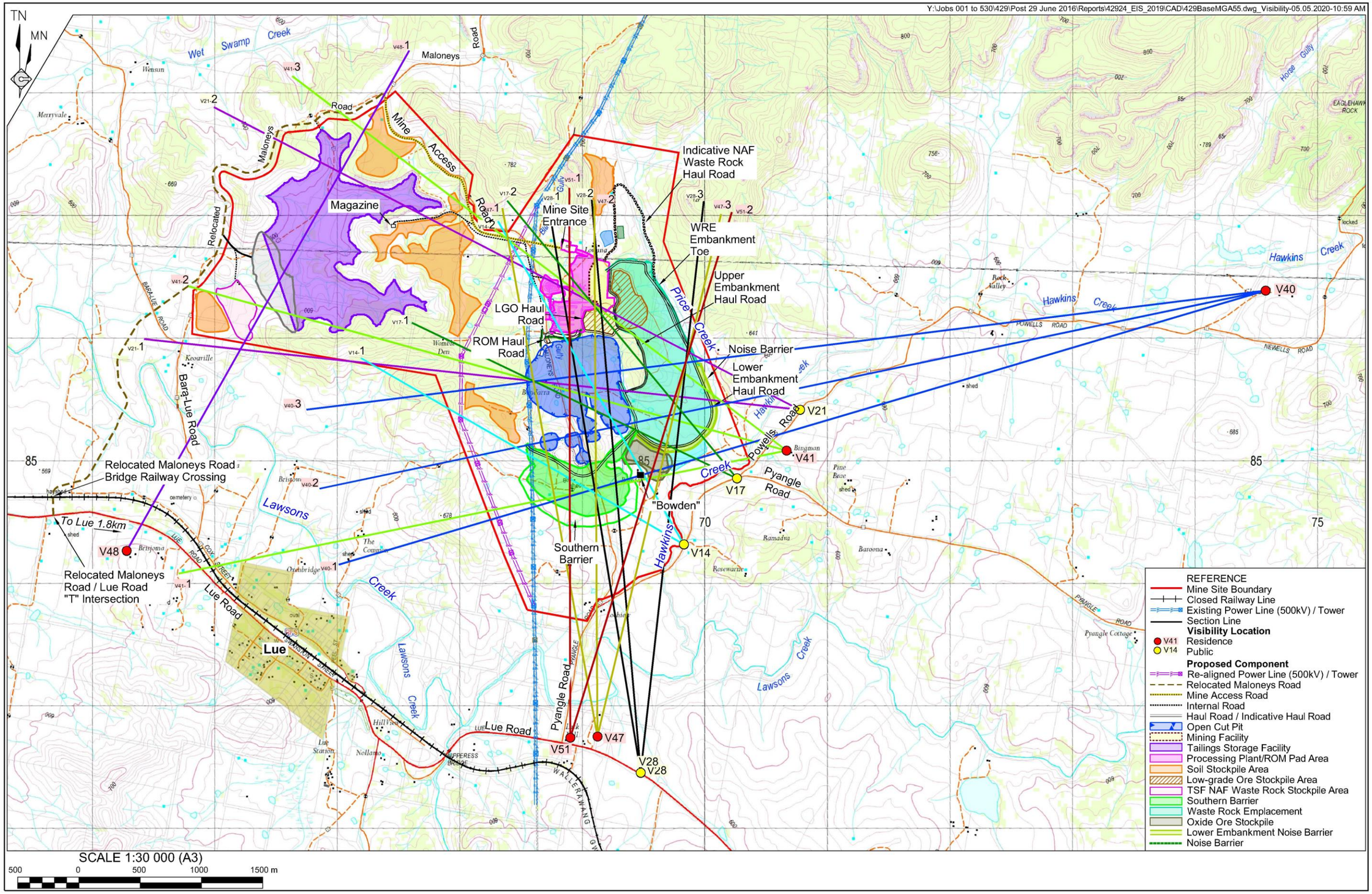
The existing and proposed topography shown on the section lines in **Annexure 3** are colour coded for ease of interpretation, as shown in the legend to each section. The height of existing vegetation is shown with a green outline based on interpretation of the 3D model of the underlying topography with vegetation included. The sections all have a vertical exaggeration of 2, to make it easier to understand the location and relative vertical scale of the proposed landform during each nominated year. The vertical exaggeration does not alter the likely visibility of component of the Project in the sections. An analysis of the likely visual exposure of the Project on the views analysed follows.

V14, Pyangle Road

The cross-sections show views looking generally to the northwest with Pyangle Road located on the left-hand side of the sections (see **Figure A3-1:V14**). Section Line V14-1 passes through the southern barrier. The initial and extended sections of the southern barrier can be distinguished from each other. The initial barrier would be constructed during the first 5 years of operation. The extended barrier would be constructed during the remaining Project life. The east-west haul road behind the southern barrier and to the south of the main open cut pit would be hidden by the inner barrier. The southern barrier would become a foreground feature of the view at medium distance from the viewer and between Years 6 and 10, and the toe of the extended barrier would progressively extend over a distance of approximately 200m toward the Pyangle Road. The construction of the extension of the southern barrier would be evident at these stages, particularly those sections under construction and not yet progressively rehabilitated.

Section V14-2 passes through the main open cut pit and western part of the processing area in the vicinity of the jaw crusher. The bearing line is drawn through the lowest foreground features in the view, so as to determine the worst-case visibility of activity in the open cut pit, as it passes through the lowest section of the southern barrier and over the relatively low oxide stockpile. By the end of Year 5, the existing landform of the open cut pit would be equivalent to or slightly below the foreground feature formed by the southern barrier. The upper edge of the western wall of the main open cut pit might be barely visible over the southern barrier. The oxide ore stockpile would gradually increase in height between the viewer and southern barrier and further reduce visibility of mining activities. The construction of the oxide ore stockpile would be visible from Pyangle Road although mitigation measures are proposed to limit its visual impacts (see Section 11

Figure 13 Base Plan with required Cross-sections



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At the end of the Project life, the southern barrier would be fully removed, and the landscape rehabilitated. This would only slightly increase the visibility of the mining activity that had been carried out in excavation of the main open cut pit, by revealing part of the upper northern wall of the pit.

V17, Pyangle Road

The two cross-sections show views looking generally to the northwest with Pyangle Road located on the left-hand side of the sections (see **Figure A3-2:V17**). Section Line V17-1 passes through a leachate management dam, the western edge of the WRE and two sections of the main open cut pit in an area where the proposed topography is lowest, to examine the worst-case visual impact of mining activities. Mining activities in the early years of operations within the main open cut pit would be visible over the WRE in this axial view. Later activities would not be visible from V17.

Section V17-2 passes through the WRE and the processing area. The bearing line is drawn through the highest foreground features in the view. The WRE would gradually replace the foreground of the view at medium range and increase in height most rapidly between Years 13 and 16. By Year 13, the WRE would be of a height sufficient to block the view of the background horizon. The activities within the processing area would not be visible at any time.

V21, Powells Road

The cross-sections show views looking generally west and to the northwest with Powells Road located on the left-hand side of the sections (see **Figure A3-3:V21**). Section Line V21-1 passes through the WRE and the main open cut pit. Existing topography between the viewer and the base of the WRE at approximately 700m distance to the lower embankment road acoustic barrier would block view of part of the construction of the WRE in Year 3. Mining activities in the main open cut pit are unlikely to be visible after about Year 13. The WRE would replace the foreground of the view at medium range between Years 13 and 16 and would block the view of the background horizon. Activities within the processing area would not be visible at any time.

Section V21-2 passes through the alignment of the WRE, low grade ore stockpile, the processing area and soil stockpiles in the western section of the Mine Site. The foreground to the east of the Mine Site would block views of the Project on this bearing.

V28, Lue Road

The view place represented in the three sections is located on part of Lue Road, from which components of the Mine Site may be visible across the Lawsons Creek valley.

The sections generally show views looking northwards with the Lue Road view place located on the left-hand side of the sections (see **Figure A3-4:V28**). Section Line V28-1 passes through the southern barrier, the main open cut pit and the processing area. Existing topography and vegetation in the view line between the viewer and the base of the southern barrier at a distance of approximately 2.1 km would screen part of the construction of the barrier during the site establishment and construction stage. By the end of Year 3, the southern barrier would permanently screen views of mining activities within the main open cut pit. The construction of the extended southern barrier would be most evident between Years 3 and 16 although the progressive rehabilitation of the barrier would limit its visual impacts.

At the end of the Project life, the southern barrier would be fully removed, and the landscape rehabilitated. There would be a minor and localised increase in the visibility of the mining activity that had been carried out behind, such as the uppermost section of the north wall of the open cut pit.

Section V28-2 passes through the same components as Section V28-1 but also through two parts of the southern barrier and the low grade ore stockpile adjacent the processing area. The section shows that by the end of Year 3, the initial section of the southern barrier would block views of activities behind. The southward extension of the barrier between Years 5 to 16 would be visible but not add significantly to the screening effect.

The removal of the southern barrier at the end of the Project life would not significantly change the visibility of the residual landscape on this section line.

Section V28-3 passes northward through the WRE. The line of sight is such that the construction of this component of the Project would be visible from approximately Year 3, ultimately rising approximately 70m above the existing ground level at the toe. The WRE would not block views of the background horizon.

5.5.2 Private Domain

Activities within the Mine Site would not be visible from the residential area of Lue but was assessed as potentially being visible from a small number of rural residences. Analysis of the likely visibility of aspects of the Project from these residences was initially assessed on the basis of observations in the field, both from VLAMP within and beyond the Mine Site and interpretation of topography data and aerial images.

The closest non-Project-related residences, referring to **Figure 13**, Land Ownership and Surrounding Residences are, R4, R7 and R27. Initial assessment indicated that views may not be possible from Residences R5 and R27, as the view lines may be intersected by the ridges and vegetation east of the intersection of Pyangle and Powells Roads. The dwellings could not be discerned in views from the Mine Site. By observation from the Mine Site and Pyangle Road, it was established that Pyangle Cottage (see V22) is unlikely to have views of the Mine Site. A residence that appears to be 1T, north of Pyangle Road from approximately V12, was visible from the Mine Site at the former ‘Lowana’ residence north of the proposed ROM Pad, indicating that there may be potential views to the upper, eastern section of the Mine Site from this residence. It is, however, noted that this residence is located on land owned by Bowdens Silver.

More distant views down the Hawkins Creek valley were considered to potentially exist for Residences R21 (V42), R22 and R19 (V40). Analysis and observations showed that Residence R33 would not have views of the activities of the Mine Site as the view would be blocked by topography and vegetation. The view from Residence R19 was assessed again in 2019, having been initially photographed in 2013. There was observed to be a direct line of sight to part of the Mine Site, in particular the western face of the open cut pit area and part of the southeast face of the WRE which would be exposed to view from adjacent to the Glendos homestead.

In the Lue Road catchment area, east of the township, are three residences with possible views; Residence R39 (V50 and V51), Residence 40, (V29)and R47 (V47). West of the residential area of Lue, one elevated rural residence was visible from a location equivalent to the north-west end of the TSF embankment, which was confirmed to be Residence R81 (V48 and V49).

The number of potential residences with views was refined to those shown on **Figure 13** by red circles. The likely visibility of the proposed components within the Mine Site were assessed at these non-Project-related residences where access was granted to Bowdens Silver and RLA by the owners. A list of the residences and their reference numbers on **Figure 13**.

- Residence R4 (V41)
- Residence R5 (V44)
- Residence R7 (Access not granted)
- Residence R19 (V40)
- Residence R21 (V42)
- Residence R27 (V43)
- Residence R22 (Access not granted)
- Residence R39 (V50, V51)
- Residence R47 (V47)
- Residence R81 (V48, V49)

The residences where access was granted were visited by RLA and Bowdens Silver staff and where owners were present, the potential visual exposure of the Project was explained. Representative geotagged photographs were taken from each location. RLA subsequently provided the photographs to RWC who established the location and elevation of the view camera at each view place based on the metadata on the electronic image files. The potential visibility of component of the Project was then analysed by means of cross-sections prepared in the same manner as for public domain locations, as in Section 5.4.3.

5.5.2.1 Analysis of Visual Effects on the Private Domain

The analysis below is based on examination of photographic plates showing views from the camera locations used and on analysis of the cross-sections in **Annexure 3**. The convention adopted in the cross-sections is with the camera location on the left. The bearing of each section line in relation to the camera location at the residence is shown on the key map.

V40, Residence R19

The cross-sections are from a point adjacent to and approximately 50m west of the residence at the fence to the house paddock and are displayed on **Figure A3-5:V40** in **Annexure 3**. A photographic plate showing a view from the camera location used to construct the cross-sections is shown on **Plate 42** in **Annexure 1**. The view is in the distant class range with the nearest components of the Project that are likely to be visible at a distance of approximately 4.7km. The sections show a view looking slightly south of west.

Section Line V40-1 passes through the oxide ore stockpile and the southern barrier. Existing topography and vegetation in the view line between the viewer and the proposed oxide stockpile would be likely to prevent visibility of the stockpile and the construction of the southern barrier until between Years 6 and 15. However, the barrier would only increase in height over that period by approximately 20m.

Section Line V40-2 passes through the WRE and the main and satellite open cut pits. Intervening topography and vegetation would screen views of the WRE until between Years 10 and 16 when the upper section would come into view. Prior to this time, a small section of the western wall of the open cut pit may be visible from adjacent to the residence.

Section V40-3 passes through the WRE and main open cut pit. Intervening topography and vegetation in the view line would block views of activities within the Mine Site other than part of the WRE, which would come into view between Years 10 and 16.

V41, Residence R4

The cross-sections from a point adjacent to and approximately 50m northwest of the residence at the fence to the house paddock are displayed in **Figure A3-6:V41**. A photographic plate showing a view from the camera location used to construct the cross-sections is shown on **Plate 43** in **Annexure 1**. The views are in the medium distance class range with the nearest components of the Project that are likely to be visible at a distance of approximately 700m. The sections show a view looking southeast.

Section Line V41-1 passes through the oxide ore stockpile and part of the southern barrier. As the view is slightly downward, the construction over time of both the oxide ore stockpile and the southern barrier would be clearly evident in the foreground. Existing higher topography to the west would remain as the background horizon.

Section Line V41-2 passes through the WRE and the main open cut pit. The construction of the WRE over time would be clearly evident in the foreground between Year 6 and 16, the structure increasing in height most between Years 10 and 16. Mining activity would be visible in the open cut pit until the end of Year 3 and a small section of the western faces of the main open cut pit may be visible. Subsequent activities in the main open cut pit would not be visible, as they would be blocked by the sequential construction of the WRE.

Section V41-3 passes through the WRE, two low grade ore stockpile areas and the processing area. The construction of the WRE over time would be clearly evident in the foreground with the structure increasing in height most between years between Years 10 and 16. Mining activity would be visible in the main open cut pit until the end of Year 6 and a small section of the western face of the main open cut pit may be visible between Years 3 and 6. Subsequent activities in the main open cut pit would subsequently not be visible, as they would be blocked by the increasing height and location of the bulk of the WRE.

V47, Residence R47

The sections are from a point adjacent to the northwest and rear corner of the residence, looking north as displayed on **Figure A3-7:V47**. A photographic plate showing a view from the camera location used to construct the cross-sections is shown on **Plate 54** in **Annexure 1**. The view is in the distant class range with the nearest components of the Project that are likely to be visible at a distance of approximately 1.9km. The sections show a view looking principally to the north.

Section Line V47-1 passes through the southern barrier, the satellite Year 5 open cut pit and the main open cut pit. Intervening topography would block the view of the extended section of the southern barrier in Year 10. Activities in the open cut pits would not be visible.

Section Line V47-2 passes through the southern barrier, main open cut pit, low grade ore stockpile and the processing area. Approximately the lower 30m of the extended southern barrier and more than half of the height of the initial southern barrier would be obstructed by foreground topography and vegetation. The construction of the extended southern barrier after Year 6 would be partly visible. Activity elsewhere in the Mine Site would not be visible at any time.

When the southern barrier is removed at the end of the Project life, and the landscape rehabilitated, there would be no significant increase in the visibility of the areas previously disturbed or the residual landscape of the main open cut pit.

Section V47-3 passes through the oxide ore stockpile and the WRE. The construction over time of the two structures would be partly evident, with the taller WRE increasing most in height at the south end, where it would be most visible, between Years 10 and 16.

V48, Residence R81

The view analysed is from the veranda on the northern side of the residence, looking east-northeast. The view is in the distant class range with the nearest components of the Project that are likely to be visible at a distance of approximately 2.4km

Section Line V48-1 displayed on **Figure A3-8:V48** passes through the TSF embankment only, as this is the only component of the Project other than part of the relocated Maloneys Road that would be likely to be visible from this residence. A photographic plate showing a view from the camera location used to construct the cross-sections is shown on **Plate 55** in **Annexure 1**.

Intervening topography and vegetation would be likely to screen up to 30m of the 38m high initial embankment, which is proposed to be constructed to 601.5m AHD at the end of the site establishment and construction stage. The second raise of the TSF embankment in Year 3 is proposed to increase the embankment to a height of 611m AHD, or 47m above natural ground level, exposing a total of 17m of the embankment. The third and similar raise in Year 8 is proposed to be to 620m AHD, i.e. 56m above natural ground level, exposing a further 9m vertical, or a total of 26m of the upper section of the embankment. There would not be any opportunities to progressively rehabilitate the southern faces of the TSF embankment until after the completion of the third raise in about Year 8.

V51, Residence R39

The cross-sections from a point adjacent to the northeast of the residence and rear corner of the property, looking north are displayed on **Figure A3-9:V51**. A photographic plate showing a view from the camera location used to construct the cross-sections is shown on **Plate 58** in **Annexure 1**. The view is in the distant class range with the nearest components of the Project that are likely to be visible at a distance of approximately 1.9 km. The sections show a view looking generally north.

Section Line V51-1 passes through the southern barrier, the satellite Year 6 open cut pit and the main open cut pit and the processing area. Intervening topography and vegetation would block the view of all Project components and activities and the Project would not be visible.

Section Line V51-2 passes through the oxide stockpile and the WRE. The section indicates that the base of the oxide stockpile would be visible. Inspection of the photograph taken from V51 shows that vegetation on the mid-slope above Lawsons Creek in the foreground of the view, which is outside the Mine Site, is fully screening the existing topography behind. The bearing for the section line from V51 would be passing approximately through the group of corn plants in the garden in the foreground. It appears therefore that the vegetation would be likely to screen the stockpile in the view from adjacent to the residence.

The section shows that the upper part of the WRE would be visible as a structure finally achieving a maximum height of up to 70m in height, constructed between Years 5 and 16, with the greatest increase in its apparent height occurring between Years 13 and 16. As noted above, the lower part of the WRE is likely to be screened by vegetation between the viewer and the Mine Site.

6. ASSESSMENT OF VISUAL EFFECTS

6.1 EFFECTS ON VIEW COMPOSITIONS

The existing view composition of the western section of the Mine Site would remain essentially intact as the only new landform component of the view would be the TSF embankment, which, as explained in more detail below, would be of low visibility to the public and private domain generally, despite being up to a maximum of 56m above natural ground level at the end of the Year 9 and approximately 800m long at the crest when completed. The presence of the embankment would not significantly alter the view compositions affected, as there are limited opportunities to see into or perceive the character or qualities of the valley behind, which would ultimately be hidden by the embankment.

The embankment would however remain visible with the southern face of the embankment being rehabilitated from Year 9 onwards. Until that time, the light colour, texture and form of the embankment between two existing low ridges would tend to increase its visibility.

Changes to view compositions in the eastern section of the Mine Site would occur as a result of the lowering of the topography as the open cut pit is excavated and expands progressively from east to west. Convex form would be replaced by concave space, the back wall of the Pit, depending on the view direction, becoming a feature of the view replacing the existing partially vegetated hillside. The composition could potentially feature views of some of the mining activity itself in the site establishment and construction stage and until the end of Year 6, when viewed from the visual catchment southeast of the Mine Site, from locations such as V16-V18, V23 and V24 on Pyangle Road and V21 on Powells Road (see **Figure 2**). Substantial change to the composition of the view into the northern valley in the eastern section of the Mine Site would be caused by the WRE and southern barrier construction, as the potential height and face gradients of these components could result in a loss of view of the horizon to the north and northwest when viewed from V13-V15, on Pyangle Road.

The existing topography of approximately 75% of the eastern section of the Mine Site would be transformed by the Project into an altered character when seen from the south, east of Lue but outside its visual catchment and from some limited locations to the southeast and east (see **Figure 2**). The landform during mining activities would be dominated by the topography of the southern barrier and the sequential construction of the WRE, filling a significant part of the existing Blackmans Gully and creating landforms with proposed finished heights of 660m AHD and 640m AHD for the WRE and southern barrier, respectively, with face gradients of approximately 1:3 (V:H). Given the observations above with respect to the colour of excavated faces, it is likely that during their construction the WRE and southern barrier would be of a contrasting colour to the surrounding weathered rock and vegetated environment and would require special care in progressive rehabilitation to avoid high visibility as a result of the colour and contrasting texture of the material.

The horizontal line of the embankments formed by the southern barrier and the WRE would be evident crossing the open country between two minor ridges when viewed from part of Pyangle Road and Powells Road and their intersection (e.g. locations V16, V17, V23, V24). The crest of the WRE may be visible from the northeast within the Hawkins Creek valley, for example from Residence R19 at the property Glendos (V40), a short section of Lue Road southeast of the town (in the vicinity of viewing places V26 -V28) and from Residence R39 (V50 and V51), R40 and Residence R47 (V47), shown on **Figure 2**.

The processing plant, jaw crusher, ROM pad and associated buildings are proposed to be situated in an area of relatively low potential external visibility, assuming appropriate levels of retention of a significant screen of existing vegetation to the south and southwest of the two components. These structures are not likely to have significant effects on view compositions if appropriately coloured and screened. The analysis of cross-section studies in **Annexure 3** shows that the processing area is unlikely to be of significant visibility to any private domain locations.

6.2 EFFECT ON SCENIC CHARACTER

There would be a low level of visual effect on scenic character caused by the Project to the western section of the Mine Site as a result of the construction of the TSF embankment and although outside the Mine Site, the relocation of the southern section of Maloneys Road. The TSF embankment would be an engineered structure that when considered in isolation would contrast in line, form, character, texture and colour with the existing predominantly rural landscape setting. The visual effects would however be confined to a small visual catchment and would not have significant effects on views from Lue Road, Lue or individual residences.

The relocated road would be consistent with road construction generally in rural land and with Lue Road in particular and would be in a location that is not exposed to significant traffic volumes or likely to significantly change the rural character of Lue Road or the landscape through which it runs.

There would be a high level of change to the scenic character of the eastern section of the Mine Site as a result of the removal of existing vegetation and topography and the construction of a number of landform features that are visible at close range to some viewing places and in most cases are likely to be permanent, such as the WRE, oxide ore stockpile and to a lesser extent, the low grade ore stockpiles. Temporary but long-lived landform structures such as the southern barrier and its extension and noise barriers associated with major internal roads would eventually be removed and the landscape rehabilitated, including the ROM pad and processing areas. Rehabilitation is proposed for the upper benches of the open cut pit, while the satellite pits and part of the southeastern section of the main pit would be back-filled. Rehabilitation as proposed would not result in a significant increase in visibility of the residual landform of the open cut pits when considered over the whole visual catchment.

Similarly, to the TSF embankment, the structure such as the WRE and ore stockpiles would retain a manufactured and engineered appearance, notwithstanding the intention of the proponent to provide a near-natural landform as described in Section 2.16 of the EIS, which would reduce contrasts of line and form. Rehabilitation of the final landforms should assist in mitigating the impacts of colour and texture of stockpiles and the WRE and the TSF embankment on views, however there may be a practical limit to this imposed by the light colour of the materials and resistance to weathering until the landforms are fully revegetated.

In general, as analysed with the assistance of the cross-sections in **Annexure 3**, the mining activities other than landform construction noted above would be of low visibility. Existing topography would be removed in the areas of the open cut pits, but this would not appear likely to result in extensive exposure of walls and benches of the pits to views from the visual catchment identified in this report.

6.3 EFFECT ON SCENIC QUALITY

There would be a significant and negative change to the scenic quality of part of the landscape caused by the temporary and also the permanent changes within the Mine Site, in particular the residual landscape of the open cut pit and WRE, which may incorporate low grade ore and oxide ore stockpiles in the final landform. The stockpiles of the southern barrier would be removed at the end of the Project life to provide material for the rehabilitation of the TSF impoundment, WRE and oxide ore stockpile. The residual landform would have an impact on the availability of views of existing scenic features of the landscape which would be removed or replaced by these components, either individually or when combined.

Considered in relation to the local and sub-regional resource of similar landscapes to the Mine Site, which is very extensive, the area changed by the visual effects of the mine is small in area and would not significantly impact on that resource. It is concluded that there would be a localised significant and negative change to scenic quality of the Mine Site, but that the sub-regional and regional resource of landscapes of a similar quality would not be significantly affected.

6.4 EFFECT ON KEY VIEWING LOCATIONS

6.4.1 Public Domain

As a part of the view analysis process in the methodology adopted in this Visibility Assessment, the visual catchment of the Project has been identified (Section 5.4 above) and a detailed analysis made of 53 individual view places (**Figures 1** and **4**) in the public and the private domain to aid in determining the visual catchment of the Mine Site.

It has been confirmed that there is no significant visual exposure of the Mine Site to the urban area or the public domain of Lue.

The Project is of low exposure to views from Lue Road, the most trafficked and only regional road in the vicinity of the Mine Site. The most direct visual exposure of the public to the Project would be the view of the intersection of the relocated Maloneys Road, west of Lue (see V56 and V57). The effect would be localised, would not significantly change the character of the road and would not significantly expose the Project to view.

A short section of Lue Road slightly east of Lue provides potential views of part of the eastern section of the Mine Site. Analytical cross-sections in **Annexure 3** and photorealistic photomontages from location V28 on Lue Road have been prepared to further visualise the likely visual effects on this view. Only one elevated view place was identified on Lue Road, (V25), at the intersection of Tongbong Road and Lue Road.

This is in the distant range category approximately 4km away from the nearest landform structures proposed on the Mine Site at an elevation of approximately 660m. As a result, the view may include part of the eastern section of the Mine Site, such as part of the upper section of the northern wall of the main open cut pit at approximately 650-660m AHD, seen over the southern barrier, which is proposed to be constructed to a level of 640m AHD. The western part of the WRE and the oxide stockpile would also be partly visible, with the remainder of the WRE significantly screened by a rocky and vegetated knoll between the viewer and the southeastern

corner of the Mine Site south of the intersection of Pyangle and Powells Road. Taking into consideration an estimated typical vegetation height of up to 15m, the knoll rises to a maximum height of approximately 655m out of the surrounding landscape, which has a typical level or around 600m AHD. It would significantly screen view of the WRE behind, which rises to 660m AHD.

It is possible that buildings in the processing area north of the main open cut pit could be partly visible from V25. However, at the distance involved which is greater than 6km, it is unlikely that structures could be clearly identified and when coloured as proposed, visibility would be low.

Minor rural roads characterise the remainder of the visual catchment as confirmed by field assessment, in particular Pyangle Road and Powells Road. The visual catchment from these roads is also limited by topography, vegetation and land use. Cross-section studies in **Annexure 3** and photomontages (**Annexure 2**) have been employed as aids to interpretation of the visual effects on key viewpoint on these roads. The roads are rated as of low view place sensitivity, as set out above in Section 5.4 in this assessment report.

Motorists travelling on the road generally east of the Mine Site on Pyangle Road and Powells Road in the area shown as affected on **Figure 2**, would experience variable impacts. On the majority of both roads, there would be no significant visibility.

Along the first section of Pyangle Road, travelling northeast (V13), there would be a view of the proposed southern barrier, followed by an opening of views across the lower part of the eastern section of the Mine Site toward the proposed oxide ore stockpile (V14), integrated with the southeastern part of the WRE. Further toward the intersection with Powells Road, where Pyangle Road turns southeast (V15-V17, V23 and V24) the view would gradually become dominated in the foreground by the WRE as it is sequentially extended toward the south and toward the road. Subject to the establishment of more substantial tree belts as recommended in Section 11, the visibility of the Mine Site would be significantly reduced from the road.

In views from Powells Road, northeast of the intersection with Pyangle Road (V18 and V21), there would be close range views adjacent to the Mine Site with similar composition to those from the adjacent section of Pyangle Road, but views further to the northeast (V19, V20) are screened by vegetation and topography until the road reaches an area on Quaternary alluvium in the vicinity of the property, Glendos (V40), where the land has better soil structure, is extensively cleared and the area is of flatter landform, providing the opportunity for more open views.

Topography and vegetation, on the eastern section of Pyangle Road from the intersection with Powells Road (V23, V24), confine views of the Mine Site to close to the intersection itself. There is no visibility of the Mine Site from locations further east including the vicinity of Pyangle Cottage (Residence R30A (V22) or the entrance to Elephant Mountain House (V53, V54).

One representative view place on each of Lue Road, Pyangle and Powells Roads was chosen for the preparation of photomontages to assist in visualising the potential visual effects (V28, V17 and V21, respectively). The views are representative of the closest public domain viewing places assessed in this report.

6.4.1.1 Public domain photomontages

For the preparation of photomontages, a 3D model of the Mine Site at four stages of the Project (Year 1, Year 8, Year 16 and at final landform) were combined with stitched LiDAR surveys[i] to create models of the topographic surface (DEM). Point cloud data[ii] was also gridded to simulate the maximum height of vegetation on that surface (DSM). The DEM model at each stage was overlain on the existing topography and viewed from the virtual camera location provided by the coordinates on the metadata of the photographs used in preparation of the photomontages. The model was then rotated to align with known features visible on the survey and in the photographs. The model was then merged with the photographs for each viewing location and a check of vegetation occluding the line of site made using the DSM. Two different kinds of photomontages were prepared, i.e. analytical and photorealistic photomontages.

The analytical photomontages show the components of the Mine Site layout (**Figure 3**) brightly coloured, to distinguish them individually, so the location of each can be understood in relation to each viewing place. The colour coding is shown on the legend of each analytical photomontage in **Annexure 2**. The analytical photomontages are not intended to provide a realistic impression of the effects of the Project on the views, but to accurately represent the location, relative scale and changes to the views of the components of the Mine Site that are proposed, at the stages represented.

The photorealistic photomontages are intended to provide a realistic impression of the views from each viewing location at each of the four stages represented. These photomontages were prepared based on the 3D topography model that underlies the analytical photomontages and were rendered electronically to show realistic colour and texture at each stage of the Project. The colours and textures used to render the photomontages were aided by photographs of extractive industry and mine sites in similar topography and underlying geology in the region.

Analytical and photorealistic photomontages have been prepared for three locations that are representative of views from roads that would include elements of the eastern section of the Mine Site (**Annexure 2**). The viewing places represented are V17, Pyangle Road; V21, Powells Road and V28, Lue Road (see locations on **Figures 2** and **13**).

The base photographs used to prepare the photomontages were taken by RLA and are in **Annexure 1**.

- V17, Pyangle Road (RLA image 1705)

  The analytical photomontage for Year 1 shows the location of the lower embankment noise barrier, part of a soil stockpile behind, the leachate management dam wall and a section of the open cut pit wall. The lower embankment noise barrier would hide truck movements behind, day and night. The embankment remains in place until Year 16, when it is removed and rehabilitated. The photorealistic photomontage shows realistic colour and texture for the embankment and early appearance of the leachate management dam wall.

  The analytical photomontage for Year 8 shows new landform elements of the WRE (dark blue) and exposure of a more extensive area of the main open cut pit wall. The photorealistic photomontage shows the likely appearance of the early cells of the WRE, the rehabilitation of the lower embankment noise barrier outer face and the likely colour of the main open cut pit faces.

The analytical photomontage for Year 16 shows the new landform element of the WRE (dark blue) which has extended from north to south-west and toward the viewer. The photorealistic photomontage shows the likely appearance of the benching on the outer face of the final cells of the WRE, with stabilising vegetation on the outer faces. The WRE hides most of the main open cut pit.

The analytical photomontage for the final landform shows the overall form of the WRE which is the same as at Year 16 and removal of the southern barrier. The photorealistic photomontage shows the likely appearance of the reshaped and rehabilitated WRE. The WRE hides most of the evident of the main open cut pit.

- V21, Powells Road (RLA image 1707)

  The analytical photomontage for Year 1 shows the lower embankment noise barrier, part of a soil stockpile behind, the leachate management dam wall and a small section of the main open cut pit wall. The photorealistic or photorealistic photomontage shows realistic colour and texture for the embankment, the early appearance of the leachate management dam wall and the main open cut pit wall.

  The analytical photomontage for Year 8 shows a small part of the WRE (dark blue), the oxide ore stockpile (olive green) and the southern barrier (light green). The photorealistic photomontage shows the rehabilitation of the lower embankment noise barrier and southern barrier and the likely colour of the main open cut pit faces.

  The analytical photomontage for Year 16 shows the new landform element of the WRE (dark blue) which has extended from north to southwest, from right to left and increase in height of the oxide ore stockpile. The photorealistic photomontage shows the likely appearance of the rehabilitation of the eastern side of the WRE, with stabilising vegetation on the outer faces. The WRE hides the main open cut pit.

  The analytical photomontage for the final landform shows the final form of the WRE and removal of the southern barrier. The photorealistic photomontage shows the likely appearance of the reshaped and rehabilitated WRE and the location of the former southern outer and inner barriers.

- V28, Lue Road (RLA image 7677)

  The analytical photomontage for Year 1 shows minimal visibility of Mine elements. The photorealistic or photorealistic photomontage shows a small area of light coloured ore stockpile.

  The analytical photomontage for Year 8 shows a small part of the WRE (dark blue), the southern barrier (light green), ore stockpiles and a small part of the main open cut pit wall. The likely location of the relocated power line towers is shown. The photorealistic photomontage shows the rehabilitation of the southern barrier and the likely colour of the ore stockpiles and WRE.

  The analytical photomontage for Year 16 shows the larger element of the WRE (dark blue) which has extended from north to south-west, but otherwise no significant landform changes from Year 8. There would be no increase in visibility of the open cut pit. The photorealistic photomontage shows the likely appearance of the rehabilitation of the southern side of the WRE and southern outer barrier.

The analytical photomontage for the final landform shows the final form of the WRE and removal of the southern barrier. The photorealistic photomontage shows the likely appearance of the reshaped and rehabilitated WRE and the exposure of a small area of the open cut as a result of removal of the southern barriers.

6.4.2 Private Domain

Closer analysis has also been undertaken on the potential for visual effects on key locations in the private domain, i.e. residences. The refined list of residences from which views were analysed and assessed is in Section 5.5.2.1. Following ground assessment of views from the residences where access was granted, views from the residences in the list below were analysed in greater detail, if views of the Project were found to be likely.

It was determined that views of the activities within the Mine Site would not affect the occupants of the following residences, for reasons summarised after each entry.

- Residence R5 (V44)

  Three photographic plates are provided showing views from and in the vicinity of the residence (V44) (**Plates 49-51** in **Annexure 1**). The house is set substantially lower in level than a higher, rocky knoll to its southwest and is orientated toward the northeast. The house and garden have no view of the Mine Site. The crest of the knoll southwest of the house provides a highly restricted view west toward the Mine Site generally toward the main open cut pit area, however it is heavily screened by native vegetation in the foreground.

- Residence R21 (V42)

  Two photographic plates are provided showing views from in the vicinity of the residence and from the road into the property from Powells Road (**Plates 44** and **45** in **Annexure 1**). The house is predominantly orientated toward the east and surrounded by gardens. The house does not have a view of the Mine Site from itself or from the garden as a result of vegetation in the immediate setting. The landscape southwest of the house in the direction of the Mine Site, blocks views, as a result of the combination of topography and vegetation.

- Residence R27 (V43)

  Three photographic plates are provided showing views in the vicinity of the residence (**Plates 46-48** in **Annexure 1**). The residence is orientated to the east, with a formal garden and swimming pool to the north. The back of the house faces a low hill to the west, beyond which, although not visible from the setting of the house, there is higher topography in the vicinity of Residence R5. There would be no visual impact of the activities within the Mine Site from this residence.

  The remaining five residences have potential views of parts of the Mine Site. The likely visual effects on each have been analysed above with the aid of the cross-sections in **Annexure 3**. Based on analysis of both the cross-sections and photographs taken from each residence, a summary of the likely visual effects of the Project is provided for each residence.

- Residence R4 (V41)

  This residence is the closest to the Mine Site, as shown in the key map to the cross-sections in **Annexure 3**. A representative photograph taken from the edge of the house paddock looking northwest is provided (**Plate 43** in **Annexure 1**). On the day the photograph and some others in the vicinity was taken in 2019, there was the residue of a significance dust storm in the air, accounting for the unusual sky colour.

  The likely effects of the Project on views from the residence have been analysed in Section with the aid of the cross-sections in **Annexure 3**. There would be a high level of change to the visual character and quality of the view from this residence, as this view would be transformed by activities in the Mine Site over and beyond the Project life. With the exception of the western section of the Mine Site and the TSF, which would not be visible, substantial aspects of the site establishment and construction stage including vegetation removal, soil and subsoil stripping, extraction of friable materials, load and haul of materials and the construction of the southern barrier, oxide ore stockpile and the WRE would be visible.

  We understand that it is likely that this residence would be required to be acquired or a negotiated agreement entered into, by Bowdens Silver as a result of potential noise impacts.

- Residence R19 (V40)

  This residence is the furthest from the Mine Site that was analysed and assessed in this report. The closest components of the Project that would be likely to be visible at any stage from adjacent to the residence would be approximately 4.7km away. The likely visibility of components has been aided by the analysis of the cross-sections in **Annexure 3**. The view from adjacent to and west of the residence is shown in **Plate 42** and is panoramic in extent and bounded on the north, or right side, by naturally vegetated escarpments and low hills, on the left by cleared land with residual vegetation and in the distance by higher topography west of Lue. At the approximate centre of the photographic image, part of the proposed main open cut pit area is visible above foreground vegetation and topography, while behind this is a ridge near the west boundary of the eastern section of the Mine Site. The higher ridges that would remain unaffected are visible on the cross-sections for V40.

  The interior of the residence appears unlikely to have significant views to the west toward the Mine Site, based on external observations. The adjacent area to the west of the house would perceive change in the view during the site establishment and construction stage, with removal of soil, subsoil and friable materials from the southern part of the main open cut pit area, potentially exposing light-coloured material, however the remainder of the pit area would be screened by topography and vegetation further north. Intervening topography and vegetation would screen views of construction of the WRE until between Years 10 to 16 when the upper section would come into view and block out any potential residual view of the open cut pit. Prior to this time, a small section of the western wall of the main open cut pit may be visible.

  The horizontal and vertical angles of view occupied by visible components within the Mine Site from this view place is very small in the context of the panoramic view that is available. It is considered that the visual effects of the Project on this view would be low.

- Residence R39 (V50, V51)

  Two photographic plates show aspects of the view from adjacent to the residence (V50 and V51). This residence is to the south of the Mine Site and relatively close to and west of Residence R47. The house faces the street in a formal way and not toward the Mine Site, but has landscaped areas to the rear, a pool area and gardens, that are orientated to the northeast. Views from the rear of the house and garden are across a part of the floodplain of Lawsons Creek and limited on the left by two vegetated ridges, one perpendicular to and one parallel to Pyangle Road.

  The low ridge on the left side of the view in V51 blocks a potential view into the main open cut pit area, as shown in the cross-sections for V51 and there would be no change to the appearance of the majority of the view. As noted in the discussion of the cross-sections, the effect of vegetation on the ridge in the centre of the view appears to be likely to cause greater blocking of views toward the WRE, which would be partly visible in later stages of the Project, than is predicted in the cross-sections. In Years 10 to 16, the upper part of the WRE would become visible above the vegetation screening on the right side of the view. Although the cross-sections predict that the oxide stockpile would be visible, this seems unlikely, based on interpretation of the actual photographs, the low height of the stockpile relative to the view line and the likely screening effect of vegetation.

- Residence R47 (V47)

  A photographic plate shows the view from the rear of Residence R47.

  In the photographic plate, the house at “Lochiely” is visible at the approximate centre of the image. Behind it and slightly to its left is the crest of a naturally vegetated ridge. This is outside the area proposed to be affected by construction or mining activities in the Mine Site and would regain its existing character. To its right, the intermediate vegetated hill is in part of the area proposed as the open cut pit.

  Toward the centre of the view but below the background horizon, the southern barrier would be constructed and to its right, the WRE. The initial sections of the southern barrier, largely completed by the end of Year 5, would block views of activities in the open cut pits. Later stages would extend the outer toe and height of the southern barrier but would not increase the blocking effect. Further right in the view and approximately below the most prominent vegetated hill in the background, the oxide ore stockpile might be partly visible after about Year 8, with the WRE behind it gradually increasing in height throughout the Project life. The naturally vegetated escarpment behind would remain the dominant feature of the view.

  Notwithstanding there would be visibility of some components of the Mine Site from Residence R47, the owner, expressly stated that he had no concerns about visual impacts of the Project.

- Residence R81 (V48, V49)

  As noted in refining the visual catchment, Residence R81 is the only one residence on the outskirts of Lue that is visible from the Mine Site, the view from which has been analysed by way of the cross-section studies in **Annexure 3**.

Two photographic plates are included in this report that show views from Residence R81 (V48 and V49), one from the house (V48) and one from an adjacent high point (V49). A photomontage has been prepared using an image from V48, the veranda of the residence.

Viewers at Residence R81 would see construction of the TSF embankment and of parts of the relocated Maloneys Road between Lue Road and its intersection with Bara-Lue Road, from which the residence is visible. There is a detailed analysis of the likely visibility of the TSF embankment in Section 5.4.1.2. The view of the TSF embankment from Residence R81 is oblique to its wall alignment, reducing its apparent length it the view and the southern part of the wall would be hidden by topography and vegetation at the west end of the Gumarooka Ridge. Viewers would also see part of the construction and later the use of the relocated Maloneys Road. The areas of cut and fill on the side slopes northwest of the TSF may initially be prominent, however the structures would appear relatively small at the distance involved of approximately 3km and in time would be likely to become integrated into the adjacent landscape. It is considered that there would be low visual effects on this view.

6.4.2.1 Private domain photomontages

- V40, Residence 19 (RLA image 1697)

  The analytical photomontage for Year 1 shows there would be minimal visibility of any Mine elements other than soil stockpiles. The photorealistic or photorealistic photomontage show that the stockpiles would be unlikely to be discernible.

  The analytical photomontage for Year 8 shows a small part of the WRE (dark blue), the southern barrier (light green), a small part of the main open cut pit wall (purple) and soil stockpiles. The likely location of the relocated power line towers is shown. The photorealistic photomontage shows the likely appearance of the visible part of the WRE and main open cut pit wall.

  The analytical photomontage for Year 16 shows the larger element of the WRE (dark blue) which has extended from north to southwest, hiding the open cut pit. The photorealistic photomontage shows the likely appearance of the rehabilitation of the southern side of the WRE and southern outer barrier.

  The analytical photomontage for the final landform shows the final form of the WRE and removal of the southern barrier. The photorealistic photomontage shows the likely appearance of the reshaped and rehabilitated WRE.

- V48, Residence 81 (RLA image 1687)

  The analytical photomontage for Year 1 shows there would be visibility of the Mine elements comprising the TSF impoundment and embankment, TSF spillway and earthworks associated with the relocated Maloneys Road), The photorealistic photomontage shows the initial light colours of the elements.

  The analytical photomontage for Year 8 shows no significant change in visibility, but the increase in height of the TSF embankment. The photorealistic photomontage shows the likely appearance of the visible part of the TSF embankment and the rehabilitation of the road works for the relocated Maloneys Road.

The analytical photomontage for Year 16 shows no significant change in visibility of elements. The final height of the TSF embankment hides any view of the impoundment behind. The photorealistic photomontage shows the likely appearance of the visible part of the TSF.

The analytical photomontage for the final landform shows the final form of the TSF embankment. The photorealistic photomontage shows the likely appearance of the reshaped and rehabilitated embankment which is recontoured and revegetated at final landform.

- V47, Residence 47 (RLA image 1684)

  The analytical photomontage for Year 1 shows there would be minimal visibility of any Mine elements other than the lower embankment noise barrier. The photorealistic photomontage shows the likely appearance of this element visible because of the light colour of the initially placed material used to construct it.

  The analytical photomontage for Year 8 shows part of the WRE (dark blue), the southern barrier (light green), low grade ore stockpiles (brown) and part of the oxide ore stockpile (olive green). The likely location of the relocated power line towers is shown. The photorealistic photomontage shows the likely appearance of each of these elements. The southern inner and outer barriers are vegetated, while only the lower slopes of the low grade ore stockpile and the eastern slopes of the WRE (which would not be visible from this residence) are proposed to be vegetated at this stage.

  The analytical photomontage for Year 16 shows similar visibility or element other than the larger scale of the WRE element (dark blue) which has been extended from north to southwest. The photorealistic photomontage shows the likely appearance of the rehabilitation of the southern and southwestern side of the WRE.

  The analytical photomontage for the final landform shows the final form of the WRE, removal of the southern outer and inner barriers and the resultant exposure of a small section of the upper main open cut pit wall. The photorealistic photomontage shows the likely appearance of the reshaped and rehabilitated WRE and small section of main open cut pit wall that would be visible.

6.5 EFFECT OF VIEWING LEVEL AND DISTANCE

As set out in the Assessment Methodology (**Annexure 4**), it is considered that the visual effects of a development are related to the relative viewing level and distance. Where views are possible over and beyond the Project, this decreases the visual effects, whereas views from level with and close to the development, dependent on viewing distance, may experience higher effects, particularly if landform or structures intrude into horizons.

Most of the viewing places analysed and assessed are level with or relatively below components of the Project and at medium or distant classes (100m-1000m or beyond). As a result, in the majority of viewing places, viewing level and distance does not significantly change the level of visual effects assessed. With regard to distance, a small number of viewing places were assessed in the medium distance range, some of which are relatively below the Mine Site. This applies to views from the closest part of Pyangle Road and a short section of Powells Road (e.g. V13-V18, V21-24).

It is important to note that there is redundancy among these, as the views of the Mine Site are similar in composition among groups of views from relatively close locations (for example V13-V15 and V16-V18) and there are other views or images that were taken either to show specific details (V23) or at wide angle specifically to include a greater proportion of the Mine Site, for potential use in preparing photomontages (V18, V21 and V24). It is important therefore not to over-sample similar views in assessing the overall level of visual effects. No greater weight should be given to similar views simply because several similar views in a small area were sampled.

In summary, there is a small number of individual viewing places at medium distance that are mostly below the height of the Mine Site in relative elevation, which slightly increases the effect of viewing level and distance on the level of visual effects assessed.

6.6 EFFECT OF VIEWING PERIOD

Viewing period means the influence on the visual effects of the Project which is caused by the time available for a viewer to experience the view. The longer the potential viewing period, experienced either from fixed or moving viewing places such as dwellings or roads, the higher the potential the visual effects of the Project. Repeated viewing periods, for example views repeatedly experienced from roads as a result of regular travelling, or long term viewing, for example by tourists, or from lookouts, reserves or cultural sites, increase perception of the visual effects of the Project.

There do not appear to be public domain locations in the visual catchment such as lookouts, cultural tourism sites and reserves, for example, which would provide the circumstances for sustained views of the Project. The low overall visibility of the Project Site to main roads also means that the opportunities to view it for sustained periods or repeatedly, are limited. It was considered in summary that the effect of viewing period does not justify increasing the assessment of visual effects of the Project.

7. OVERALL EXTENT OF VISUAL EFFECTS

The visual effects of the Project are relatively confined as there is a small visual catchment for each of the two sections of the Mine Site and nowhere in which both the eastern and western sections would be visible at the same time.

The overall extent of visual effects of the western section of the Mine Site is confined to Lue Road, part of Bara-Lue Road and one residence. The effect on limited views from Lue Road in the vicinity of the proposed new intersection and on the local road and is considered to be low, including views of the TSF, relocated Maloneys Road and the probable appearance of the realigned 500kV power transmission line.

The overall level of visual effects on the visual catchment for the eastern section of the Mine Site is considered to be medium on views from the short section of Lue Road from which it is visible. The overall level of visual effects is considered to be high in a very small area of Pyangle Road and the adjoining section of Powells Road. Although a large number of viewpoints was sampled, this conclusion would apply to several of them, meaning that the number of samples does not increase the importance of the result.

The overall extent of visual impacts at private residences is also considered to be low, given the low number affected and low overall visibility of components of the Project to most of the residences analysed. No residence would have views wholly or largely affected by the Project other than Residence R4, which we understand is likely to be acquired by Bowdens Silver. The analysis of cross-sections and images taken from the residences indicates that mining activities in the main open cut pit would be of low or no visibility at private residences. The highest visual exposure would be to construction of and the extension of the southern barrier and the two raises in the height of the WRE. It does not appear likely that the low grade ore stockpile would be widely visible. The removal and reuse of the waste rock within the southern barrier does not appear likely to cause significant exposure of the walls of the main open cut pit to views from residences, based on analysis of the views observed, the photographic plates and the cross-sections in **Annexure 3**.

8. VISUAL IMPACT ANALYSIS

The overall extent of the visual effects summarised in Section 7 is the baseline assessment against which to judge the visual impacts.

Whether a visual effect is an impact of potential significance cannot be equated directly to the extent of the visual effect. For example, a high visual effect can be acceptable and a small one can be unacceptable. Thus, it is necessary to give a weighting to the assessed levels of visual effects to arrive at an assessment of the significance of the impact. This method therefore does not equate visual effects directly to visual impacts. In this way, the relative importance of impacts is distinguished from the size of the visual effect.

We consider that two weighting criteria are appropriate to the overall assessment of visual impacts, i.e. Visual Absorption Capacity and Visual Compatibility. Each of these address the primary question of the acceptability of the visual effects and changes caused by the Project.

8.1 VISUAL ABSORPTION CAPACITY

Visual Absorption Capacity (VAC) means the extent to which the existing visual environment can reduce or eliminate the perception of the visibility of the components of the Project.

An indicative rating table that describes what is considered a low, medium and high impact on VAC is shown in the Methodology section.

VAC includes the ability of existing elements of the landscape to physically hide, screen or disguise the Project. It also includes the extent to which the colours, material and finishes of landform and built structures such as building and the scale and character of these allows them to blend with or reduce contrasts.

Prominence is also an attribute with relevance to VAC. It is assumed in this assessment that higher VAC can only occur where there is low to moderate prominence of the Project in the scene. The meaning of prominence is set out in the Methodology section in **Annexure 4**.

Design and mitigation factors are also important to determining the VAC. Appropriate colours, materials, building forms, line, geometry, textures, scale, character and appearance of landform structures buildings, rehabilitation and revegetation are relevant to increasing VAC and decreasing prominence.

VAC is related to but distinct from Visual Compatibility (see below).

It is considered that the western section of the Mine Site has a high VAC for the Project overall. The TSF embankment would be of moderate prominence and have a similar character to a dam wall, albeit of a greater than typical size. The light colour of the waste rock used to construct the outer face of the TSF embankment would be apparent given the contrast with the adjacent landscape, however the surface would be rehabilitated mid-way through the Project life following the construction of the third raise. It is also considered that Lue Road has a high VAC for construction of the relocated Maloneys Road, which would also be of high compatibility with rural features (see below).

The eastern section of the Mine Site would have a high VAC for some aspects of the Project, such as the processing area and soil stockpiles, which would either not be visible or would be of low visibility and prominence. It would have a low VAC for other components of the Project, such as the site establishment and construction phase involving removal of vegetation, soil and subsoil, extraction of friable materials and initial extraction in the main open cut pit. The VAC for these components would rise as construction of the southern barrier and WRE screen views into the Mine Site beyond. There would be a low VAC for the southern barrier and WRE, which would be the feature of highest prominence in the views at all distance ranges. Towards the end of the Project life, the southern barrier would be removed and used in closure and rehabilitation of infrastructure, leading to a minor increase in views across the Mine Site and of background topography in some views, but not a significant increase in exposure of landform structure such as the walls of the main open cut pit. In other words, the VAC would not significantly decrease at this time.

In effect, the southern barrier and the WRE would be of low VAC in themselves but would also act as visual impact mitigation devices for the eastern section of the Mine Site, by screening views into the main open cut pit and of other activities behind other than the construction of the structures themselves.

Overall, there would therefore be low VAC for the eastern section of the Mine Site.

8.2 VISUAL COMPATIBILITY

Visual Compatibility is not a measure of whether the Project can be seen or distinguished from its surroundings but rather whether the Project can be constructed and utilised without the intrinsic scenic character of the locality being unacceptably and permanently changed assuming a moderate to high visibility of the Project to some viewing places. An indicative rating table that describes what is considered a low, medium and high impact on the compatibility factor is shown in the Assessment Methodology (**Annexure 4**). Novel elements which presently do not exist in the immediate context can be perceived as visually compatible with that context, provided that they do not result in the loss of or excessive permanent modification of the visual character of the locality.

Because the Mine Site is located on the interface between rural and more natural land, with components on each, the question of its visual impacts also depends on its perception both as an entity and in regard to its compatibility with the major scenic character attributes. In this regard, both the rural environment and the natural environment are attributes of relevance. Hence, it is considered that there are two relevant measures of Visual Compatibility, i.e. Compatibility with Rural and Natural Features.

Visual compatibility with rural and natural features

This assessment is a measure of the extent to which the visual effects of the Project are compatible with rural and natural features. It is assumed that in some views, some components of the Project can be seen and clearly distinguished from their surroundings. Compatibility does not require that identical or closely similar features to those which are proposed exist in the immediate surroundings.

It is considered that the Project in the western section of the Mine Site is of high compatibility with rural and natural features, including the relocation of Maloneys Road and its visual effects on Lue Road and the intersection with Bara-Lue Road. The TSF embankment would be a new feature of views from a very limited visual catchment that would not be incompatible with structures associated with mining and extraction Projects in the locality and the region and not intrinsically incompatible with the rural setting. It would have a minor impact on adjacent more natural landscapes which would remain unaffected.

It is considered that the Project in the eastern section of the Mine Site is of medium compatibility. The land use proposed is clearly different from adjacent rural uses, but not intrinsically incompatible with mining and extraction projects in similar settings in the region, which are typically in the interface between the lower strata of the Sydney Basin and underlying geologies, for example coal and limestone extraction projects. The Mine Site is also in a landscape character type and quality as set out above, which is not unique to the locality.

9. EXTENT OF VISUAL IMPACT

Based on the inspection of the pattern of the assessment ratings for the above factors for each part of the visual catchment and each viewing location, an overall rating is arrived at which represents an overall extent of visual impacts for a sensitivity zone.

Three visual sensitivity zones are identified in the Methodology, which are based on the view place sensitivity or viewer sensitivity as identified in Section 5.4. These are also related to the distance zones from the Mine Site and whether views are from significant public domain or private viewing locations. Visual effects on public and private domain locations were analysed in detail in Section 5.5. Views from key viewing places were analysed further in Section 6.4, where the effect of viewing distance, viewing level and viewing period were also considered.

9.1 APPLYING THE WEIGHTING FACTORS

An overall impact rating for each of the two relevant visual sensitivity zones (medium and distant zones) is arrived at by applying the weighting factors of VAC and Compatibility to the overall extent of visual impacts. An upweight increases the significance of the impact, while a down-weight decreases it.

The view place sensitivity of the Project was considered overall to be low for all sensitivity zones, resulting in a down-weight in the significance of visual impacts. The viewer sensitivity was found overall to be low, but variable between residences affected, leading to a neutral weighting on the significance of visual impacts on all views on the sensitivity factor.

As the two sections of the Project are not visible in the same visual catchment from any viewing locations that was assessed, it is considered appropriate to treat them separately, rather than arriving at an overall level of visual impact, which in effect would be an average between the two and therefore not representative of the visual impacts.

The western section of the Mine Site was found to have a high VAC and high visual compatibility for the Project, leading to a down-weight on the significance of visual impacts. The east section was found to have a low initial VAC, which would increase over time with construction and progressive rehabilitation of landform structures of the southern barrier and WRE. However, the structures themselves would have a low VAC and as noted in Section 6.3, would have negative effects on scenic quality and character of the eastern section of the Mine Site, most of which effects would be permanent. This justifies applying an up-weight to the significance of impacts on the VAC factor.

With regard to compatibility, the western section of the Mine Site is considered to be of high visual compatibility and the eastern section of medium compatibility.

The western section of the Mine Site is considered to be of low visual impact when the weighting factors relevant to that section are applied to the overall level of visual effects for that section which was considered to be low. The resulting level of visual impact would also be low, as all the weighting factors are all down-weights.

The eastern section of the Mine Site was rated to be of low view place sensitivity, justifying a down-weight in significance of impacts on that factor. This section of the Mine Site was rated as having an overall medium level of visual effects on views from an isolated section of Lue Road, where the effects on the views would be similar to those on Residences R39 and R47 and one of high, for the short section of Pyangle and Powells Road in the immediate vicinity of the Mine Site. The low overall VAC is considered to justify an up-weight on the significance of impacts on those views. Compatibility was judged to be medium for the eastern section of the Mine Site, resulting in a neutral weighting on that factor.

When the weightings are applied to the eastern section of the Mine Site, the result is no change from the overall level of visual effects. The resulting visual impact of the eastern section of the Mine Site is medium on the distant range views or high on the medium range views from the immediate vicinity in Pyangle and Powells Road. This is because there is one up, one down and one neutral weighting.

10. ANALYSIS AGAINST SEARS AND PLANNING PRINCIPLES

There are two planning principles from the Land and Environment Court of New South Wales that are relevant to the visual assessment of the Project, i.e. *Tenacity Consulting v Warringah [2004] NSWLEC 140 - Principles of view sharing: the impact on neighbours (Tenacity)* and *Rose Bay Marina Pty Limited v Woollahra Municipal Council and anor. [2013] NSWLEC 1046 (Rose Bay)*.

Tenacity concerns view sharing in the private domain and is the most widely referenced planning principle according to Land and Environment Court of New South Wales records. In analysing the viewer sensitivity above, views from the residences assessed and the cross-sections in **Annexure 3**, it was concluded that it is unlikely that private domain views would be significantly affected by view loss of the kind relevant to *Tenacity* caused by the proposed development.

Rose Bay is relevant to view loss in the public domain. The principle in *Rose Bay* contains a recommended approach based first on a quantitative and secondly on a qualitative assessment. It also emphasises the need to consider views that have been identified as of specific importance, such as documented heritage views or views identified in planning instruments and policies as requiring protection.

The analysis of views and the photomontages in **Annexure 2** include views as required in the SEARs which were identified by RLA following analysis of aerial imagery and fieldwork. The analysis of potential view loss that could be caused by the proposed development in each of the quantitative and qualitative assessment issues mentioned in *Rose Bay*, shows that the Project does not have the potential to block some items of view from the public domain. However, while there would be localised blocking of views caused by landform structures in the eastern section of the Mine Site, the items blocked are not identified or recognised in planning instruments and principles as significant items and are also extensively represented in other views from the same locations and in the adjacent landscape. It is therefore concluded that the planning principle in *Rose Bay* has no work to do in assessment of the Project.

In summary, in relation to view sharing or blocking, it is concluded that the Project would not cause significant view loss.

11. MITIGATION OF VISUAL IMPACTS

Visual impact on character and quality of the views of the Project would largely be caused by landform construction rather than removal of topography caused by extraction of the ore and waste rock in the open cut pits. The temporary but long term southern barrier, oxide ore stockpile and WRE would be the most prominent structures, constructed with materials of a generally similar, light-coloured rock.

Based upon our observations of drill core materials, there would be likely to be some variation in colour of the materials when newly exposed and some material is likely to weather to darker colours when exposed to atmospheric oxidation of minerals. This would assist in reducing a potential consistent appearance of stockpiles of material. However, overall the colour would be light cream to buff, requiring a strategy of progressively covering the exposed materials as construction is completed, to reduce the visual impacts.

The visibility of walls of the main open cut pit are unlikely to cause significant impacts overall, with limited visibility or only the uppermost benches visible in some views at Project completion. Benches that would become visible, need to be rehabilitated and vegetated once completed to provide at least partial screening of the residual walls by vegetation, as well as providing areas on which vegetation would grow and provide shade to the walls. One important objective of the rehabilitation undertaken across the Mine Site is to provide variety of vegetation cover in height and density across each visible bench, rather than a solid band.

Rehabilitation of quarry and mine benches requires considerable effort to achieve with success. Advice from experts in rehabilitation would be necessary, taking into account the physical, chemical and biological constraints. As a general principle, the benches should be covered with a deep layer of weathered NAF waste rock sufficient to support tree and shrub vegetation. Sufficient space needs to be left on the benches for access to the rehabilitation areas until vegetation establishment is assured.

Material to be placed on the benches can be of any kind that is appropriate for the rehabilitation, but ideally should be capped with material from the darkest possible stockpiles or material that can be relied on to weather to ochre, brown or black colours.

Tree and shrub species would ideally be chosen from the selection of indigenous native species recommended for tree screens below, however expert advice on rehabilitation may suggest beginning with or including an inert cover crop or early successional species. The species range should reflect the natural vegetation present on the existing landform that is to be extracted, or the vegetation type of adjacent landscape at similar elevations.

The following recommendations are made with respect to mitigation of impacts on visual character and quality of the Mine Site.

- Emphasis should be placed upon the progressive construction and rehabilitation of the TSF embankment, southern barrier until its removal at the end of the Mine life and of the WRE, to limit the area of light-coloured material that would be visible from the public road network and affected local residences.
- Maximise retention of existing natural vegetation on the Mine Site, to assist in minimising visibility of buildings and structures and to reduce the ‘spill’ of the visual effects of construction activities outside mining areas, such as outside the open cut pits and around the processing and material stockpile areas.

- Protect and maintain areas of natural vegetation between the main open cut pit and crushing and processing area, to provide a natural setting and reduce the visibility of structures, break up the line and texture contrasts of buildings with the existing environment and increase natural VAC.
- Include in the Biodiversity Management Plan control of weeds and enhancement planting of buffers to the south of the Processing Plant, Crusher/ROM Pad and at the feet of the WRE, oxide ore stockpile and southern barrier.
- Continue and expand the existing buffer tree planting program adjacent to Powells Road and Pyangle Road frontage of the Mine Site to minimise visibility of the WRE and southern barrier.
- Adopt planting schedules that maximise the use of appropriate indigenous native tree and shrub species such as:

Acacia linearifolia	*Eucalyptus camaldulensis*
Angophora floribunda	*Eucalyptus crebra*
Brachychiton populneus	*Eucalyptus fibrosa*
Callitris endlicheri	*Eucalyptus goniocalyx*
Callitris glaucophylla	*Eucalyptus melliodora*
Casuarina cunninghamiana	*Eucalyptus mollucana*
Casuarina cristata	*Eucalyptus oblonga*
Casuarina luehmanii	*Eucalyptus punctata*
Eucalyptus albens	*Eucalyptus sideroxylon*

- Upgrade existing fencing of buffer plantings to rabbit-proof status and provide rabbit-proof fencing to new vegetation buffer areas, to ensure higher establishment rates and to control incidental damage to vegetation.
- Provide irrigation for at least 2 years to buffer plantings to assist in initial establishment.
- Re-plant or replace dead or unhealthy plants on a two-year cycle.
- Place subsoil/topsoil on strategically placed rock walls to establish pasture grasses to limit views of operational areas where the light-colour materials are being stockpiled or placed.
- Advance plant a permanent tree buffer to the east, south and southwest of the southern barrier and WRE, to break up and disguise visibility of the foot of the barriers and provide a permanent softening to views of the residual landscape and also to increase the VAC of the activity of removal of the southern barrier at the end of the Project.
- Place NAF waste rock and soil/subsoil and plant trees and shrubs on upper terminal benches within the main open cut pit above 578m AHD, the maximum final predicted water level within the main open cut pit.
- Paint buildings and structures within the Mine Site in appropriate colours to integrate them into existing view contexts, consistent with and darker than the colours of shade within adjacent natural vegetation. Metal sheeting for walls or prefabricated items supplied powder coated should be in the same colour range. As sheet material for buildings and other structures can be supplied in Colorbond colours, Colourbond colours such as Ironstone, Woodland Grey and Basalt are appropriate. Small structures should be in the darkest colours, Ironstone or Monument.

12. RESIDUAL VISUAL IMPACTS AND CONCLUSION

There would be some residual impacts of the Project in both the eastern and western sections of the Mine Site.

In the western section, assuming rehabilitation of the appropriate batters of the relocated Maloneys Road, consistent with other new road projects in the local area, the residual impact would primarily be the visibility of the TSF embankment and the construction of a total of three raises during the Project life. As the embankment would be raised and the toe extended outward on each occasion, the construction activities would be visible, and the newly emplaced NAF material would also be visible. It is not practical to require rehabilitation of the embankment until construction is completed after about Year 8.

There would be likely to be residual impacts and negative effects on character and scenic quality of the constructed landforms of the WRE and the TSF embankment, which would not have a natural appearance, as a result of the relatively constant side slopes. Removal of the southern barrier at the end of the Project life would provide material to assist in rehabilitation and integration of components that may be residual, such as the low grade ore and oxide ore stockpiles, with adjacent landform of the WRE.

Efforts should be made to include some variations in slope and surface topography to break up the potential linearity and smooth texture of the side slopes of these structures, to give a semi-natural appearance. If possible, rehabilitation should include planting of indigenous native or other appropriate species to re-establish some woodland or forest vegetation, to integrate with the residual natural landscape at the margins of the pit and WRE areas.

Annexures

(Total No. of pages including blank pages = 90)

Annexure 1* Photographic Plates (34 pages)

Annexure 2 Photomontages (26 pages)

Annexure 3 Cross-section Studies (10 pages)

Annexure 4* Assessment Methodology (12 pages)

Annexure 5 Photographic Plates Log Table (2 pages)

Annexure 6* Curriculum Vitae (4 pages)

* This Annexure is only available on the digital version of this document

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Annexure 1

Photographic Plates

(Total No. of pages including blank pages = 34)

Note: This Annexure is only available on the digital version of this document

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Plate 2 View south-west toward Lue from V1, west of proposed Processing Plant

Plate 3 View from V2

Plate 4 View from V3 toward approximate location of ROM Pad looking east

Plate 5 V4, approximate location of Primary crusher, looking southwest toward Lue

Plate 6 View from V5, former residence Lowana, looking south-east

Plate 7 View from V6 looking northwest

Plate 8 View from V7 toward the south- west

Plate 9 View from V8 to the south

Plate 10 View from V9, the high point north of proposed TSF embankment, toward Lue

Plate 11 View from V9, the high point north of proposed TSF embankment, toward Lue

Plate 12 V10, Bara-Lue Road, toward proposed TSF site

Plate 13 V11, View north toward Mine Site in the vicinity of shed at Residence 1H

Plate 14 View north from V12 Pyangle Road, toward Residence 1T

Plate 15 View from V13, Pyangle Road

Plate 16 View from V14, Pyangle Road

Plate 17 View from V15, Pyangle Road

Plate 18 View from V16, Pyangle Road

Plate 19 View from V17, Pyangle Road

Plate 20 View from V18, Powells Road

Plate 21 View from V19 of Residence R33 Powells Road

Plate 22 View from V20, Powells Road

Plate 23 View from V21, Powells Road

Plate 24 View from V22, Pyangle Road near Pyangle Cottage

Plate **25** View from V23, Pyangle Road

Plate 26 View from V24, near intersection of Pyangle and Powells Roads

Plate 27 View from V25, near the intersection of Tongbong and Lue Roads

Plate 28 View from V26, Lue Road in the vicinity of No. 1130

Plate 29 View from V27, Lue Road in the vicinity of No. 3144

Plate 30 View from V28, Lue Road

Plate 31: View from V29, Lue Road, adjacent to Residence R40

Plate 32 View from V30 to the north east from Martin Street, Lue

Plate 33 View from V31, intersection of Martin and Swanston Streets, Lue

Plate 34 View from V32, intersection of Harpur and Swanston Streets, Lue

Plate 35 View from V33, intersection of Bayly and Swanston Streets, Lue

Plate 36 View from V34, Lue Road, adjacent to No. 2654

Plate 37 View from V35, Lue Road, toward Residence R81

Plate 38 View from V36, Lue Road

Plate 39 View from V37, Swanston Street, Lue

Plate 40 View from V38, Bara-Lue Road

Plate 41 View from V39 toward TSF embankment

Plate 42 View from V40 Residence R19

Plate 43 View from V41, Residence R4, at house paddock fence

Plate 44 View from V42, Residence R21, south side of house, viewing west

Plate 45 View from V42, entrance drive to Residence R21, viewing west

Plate 46 View from V43, Residence R27, viewing southwest

Plate 47 View from V43, Residence R27, viewing west

Plate 48 View from V43, Residence R27, view northwest toward Mine Site

Plate 49 View from V44, Residence R5, view northeast form veranda

Plate 50 View from V44, Residence R5, view north from knoll west of house

Plate 51 View from V44, Residence R5, view of house from knoll in Plate 49

Plate 52 View from V45, Bara-Lue Road crossing of relocated Maloneys Road viewing south

Plate 53 View from V46, Bara-Lue Road crossing of relocated Maloneys Road viewing north

Plate 54 View from V47, Residence R47, viewing north

Plate 55 View from V48, Residence 81, veranda, viewing north

Plate 56 View from V49, Residence R81, adjacent to water tank east of house

Plate 57 View from V50, Residence R39, viewing north

Plate 58 View from V51, Residence R39, garden on east side viewing north

Plate 59 View from V52, Electricity stanchion west of open cut pit, viewing south

Plate 60 View from V53, Pyangle Road entry to Elephant Mountain House

Plate 61 View from V54, Pyangle Road, viewing northwest

Plate 62 View from V55, Lue Road, near Residence R47, viewing north

Plate 63 View from V56, Lue Road, site of intersection of relocated Maloneys Road, north view

Plate 64 View from V57, Lue Road, site of intersection of relocated Maloneys Road, west view

Annexure 2

Photomontages

(Total No. of pages including blank pages = 26)

View 17: Pyangle Road, looking northwest

View 21: Powells Road, looking northwest

View 28: Lue Road, looking north

View 40: Residence No.19, looking west

View 47: Residence 47, looking north

View 48: Residence 81, looking northeast

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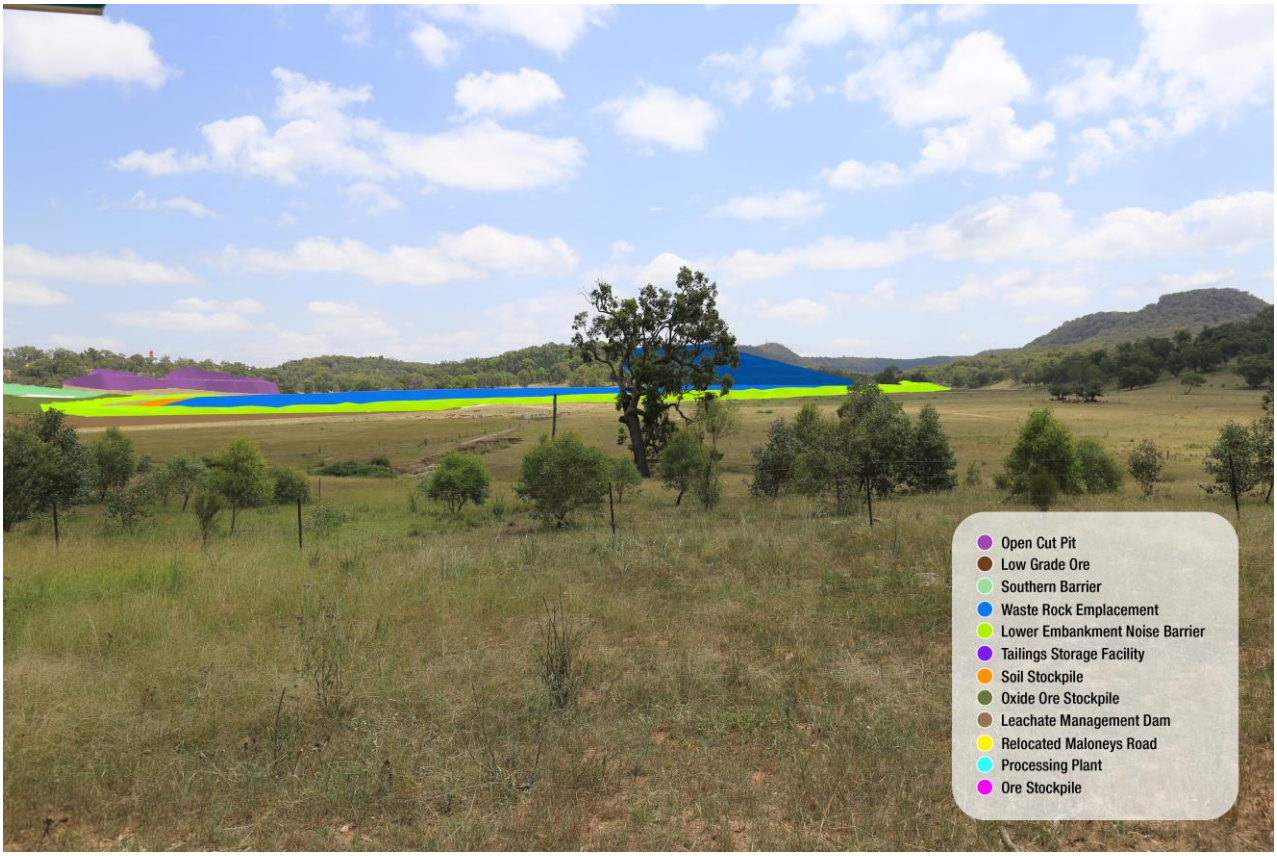
Analytical Photomontage

Photorealistic Photomontage

View 17: Pyangle Road, looking northwest

Year 1

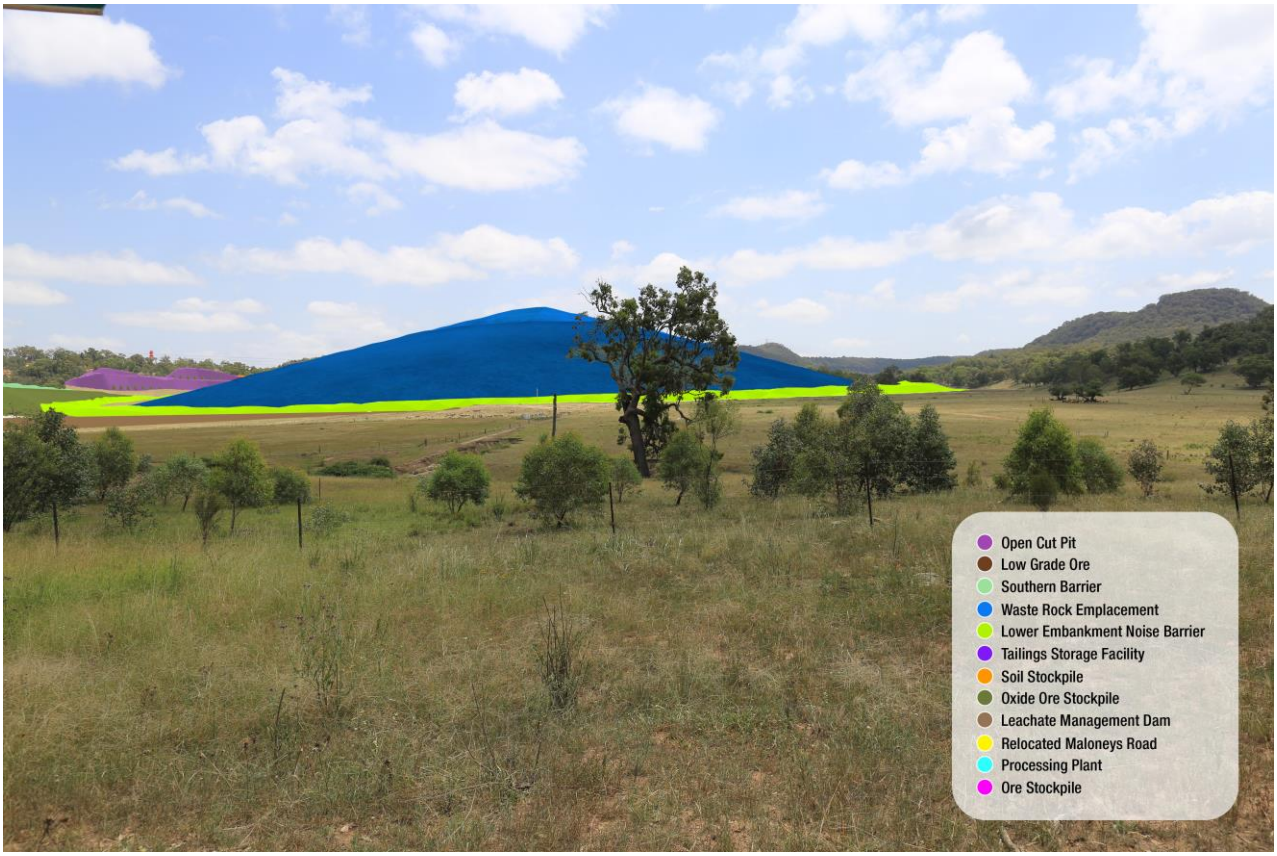


Analytical Photomontage

Photorealistic Photomontage

View 17: Pyangle Road, looking northwest

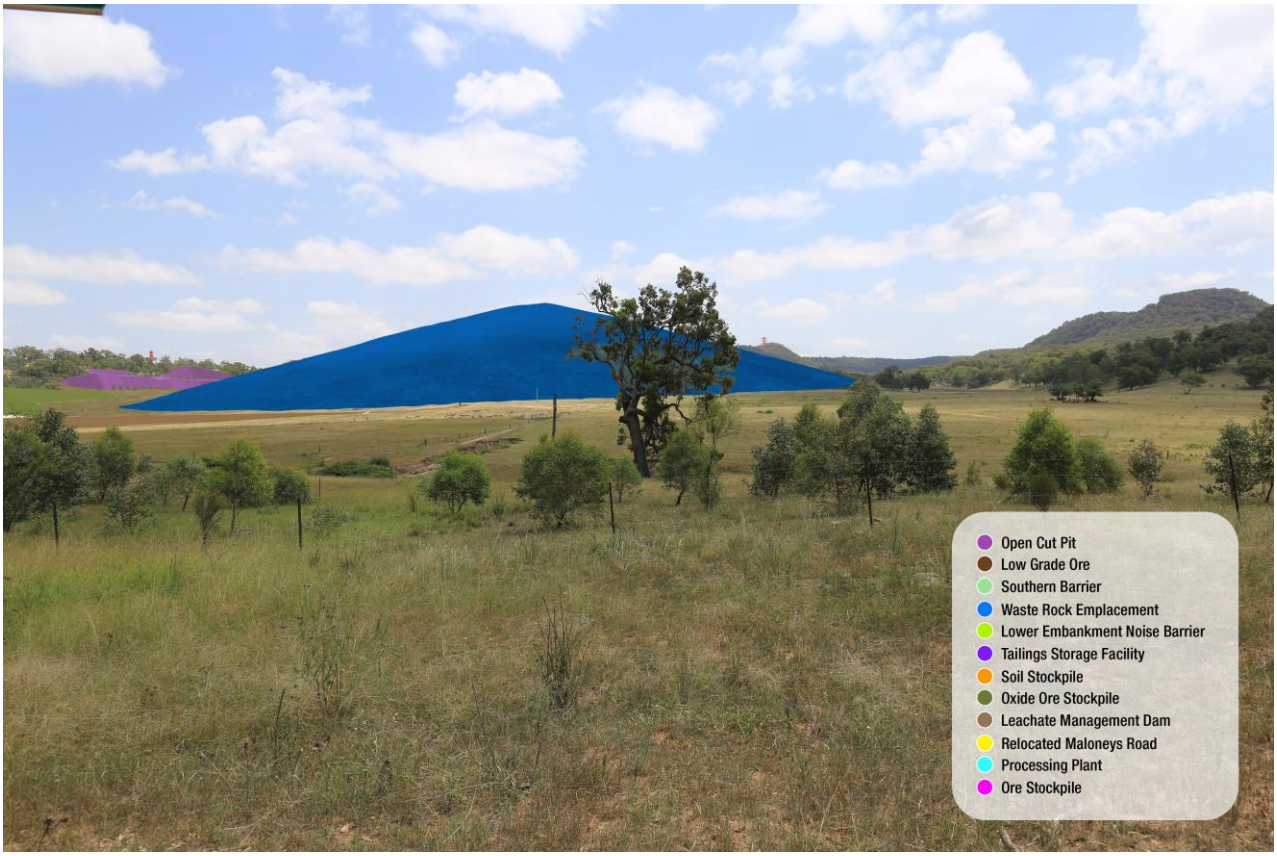
Year 8



Analytical Photomontage

Photorealistic Photomontage

View 17: Pyangle Road, looking northwest — Year 16



Analytical Photomontage

Photorealistic Photomontage

View 17: Pyangle Road, looking northwest

Final Landform

Analytical Photomontage

Photorealistic Photomontage

View 21: Powells Road, looking northwest — Year 1

Analytical Photomontage

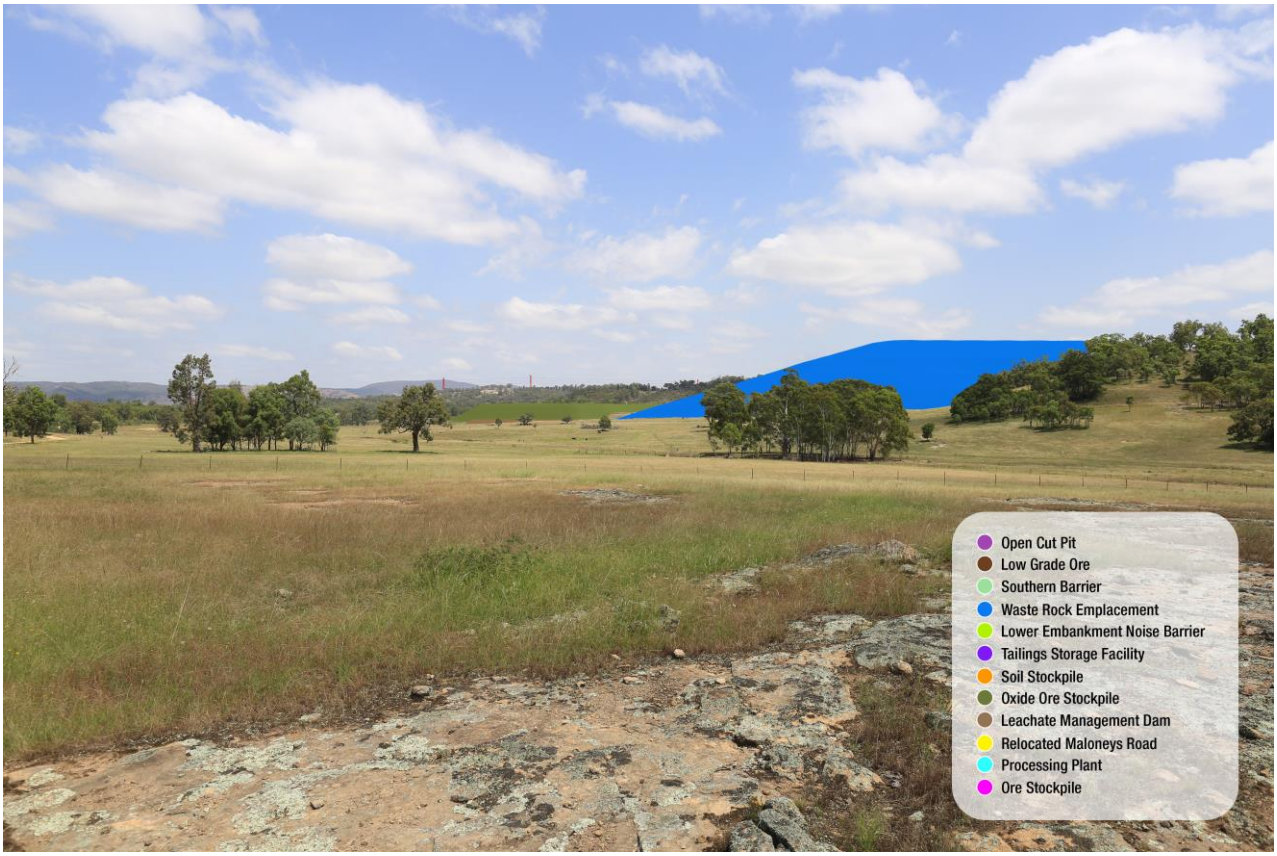
Photorealistic Photomontage

View 21: Powells Road, looking northwest — Year 8

Analytical Photomontage

Photorealistic Photomontage

View 21: Powells Road, looking northwest — Year 16



Analytical Photomontage

Photorealistic Photomontage

View 21: Powells Road, looking northwest

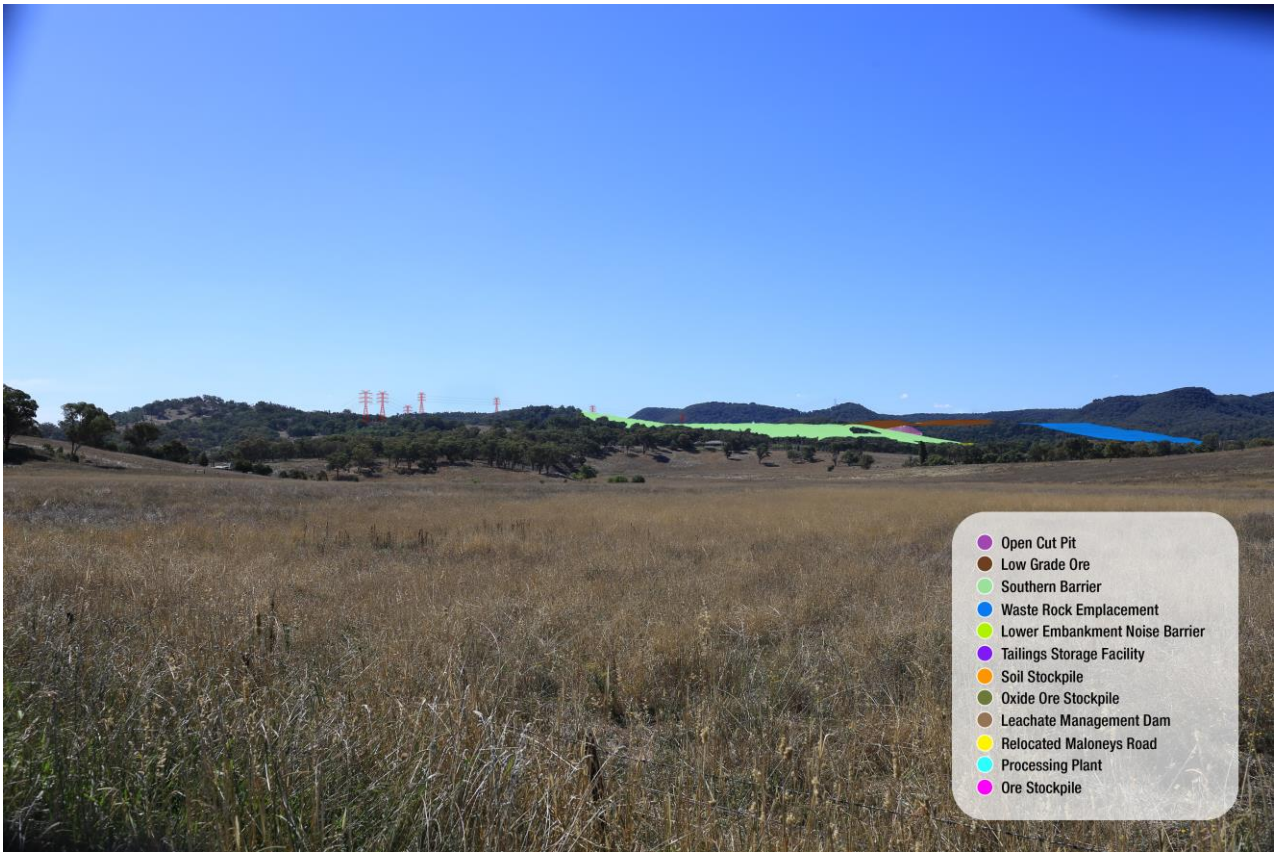
Final Landform

Analytical Photomontage

Photorealistic Photomontage

View 28: Lue Road, looking north

Year 1

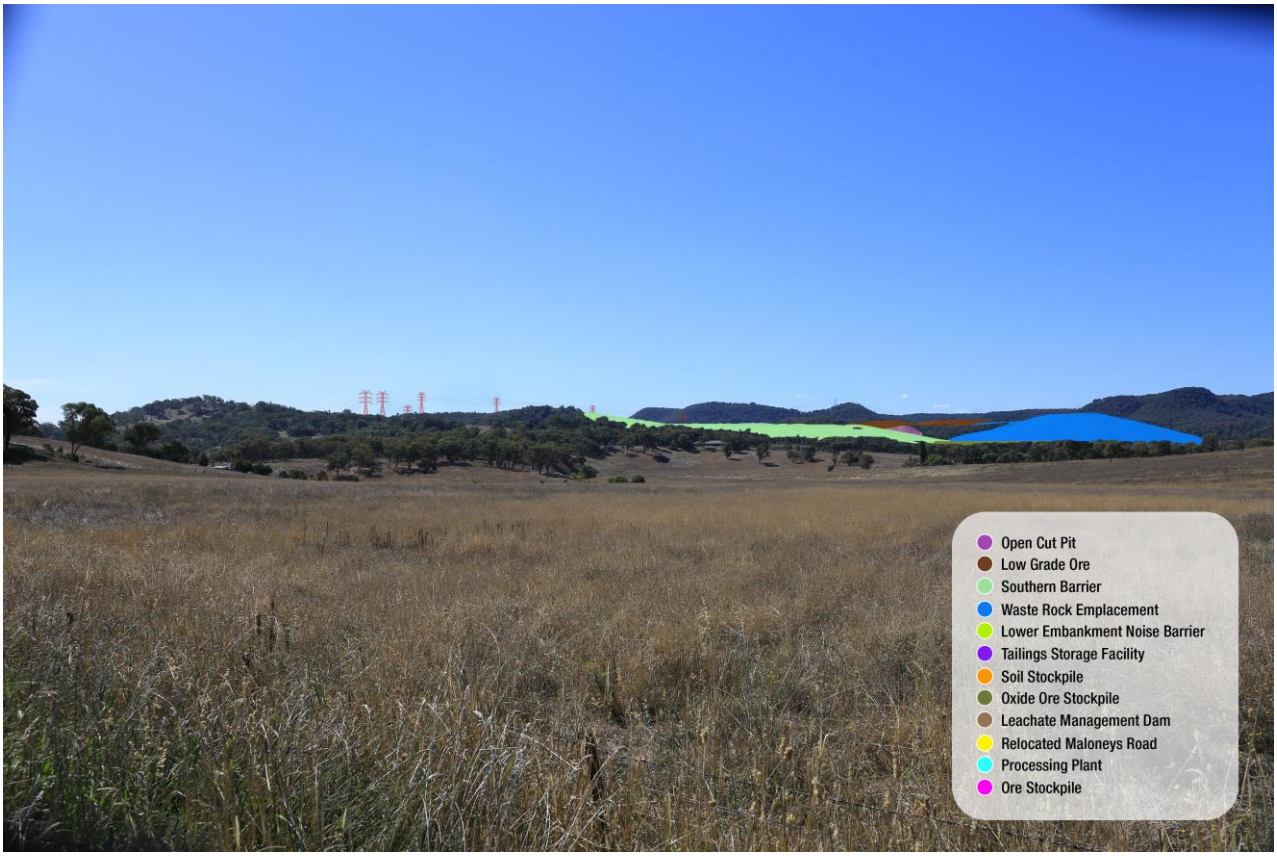


Analytical Photomontage

Photorealistic Photomontage

View 28: Lue Road, looking north

Year 8



Analytical Photomontage

Photorealistic Photomontage

View 28: Lue Road, looking north

Year 16

Analytical Photomontage

Photorealistic Photomontage

View 28: Lue Road, looking north

Final Landform

Analytical Photomontage

Photorealistic Photomontage

View 40: Residence No.19, looking west

Year 1

Analytical Photomontage

Photorealistic Photomontage

View 40: Residence No.19, looking west

Year 8

Analytical Photomontage

Photorealistic Photomontage

View 40: Residence No.19, looking west — Year 16

Analytical Photomontage

Photorealistic Photomontage

View 40: Residence No.19, looking west

Final Landform

Analytical Photomontage

Photorealistic Photomontage

View 47: Residence 47, looking north

Year 1

Analytical Photomontage

Photorealistic Photomontage

View 47: Residence 47, looking north

Year 8

Analytical Photomontage

Photorealistic Photomontage

View 47: Residence 47, looking north

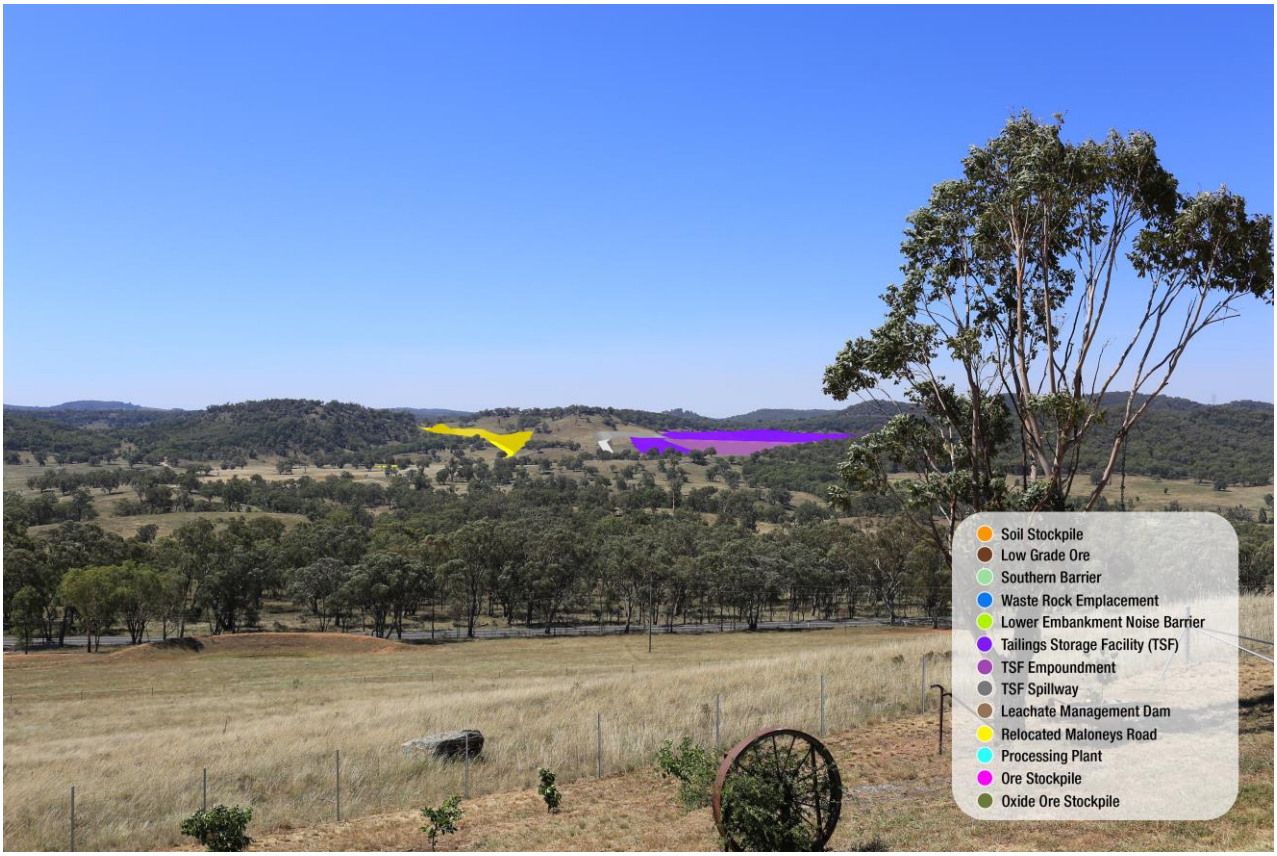
Year 16

Analytical Photomontage

Photorealistic Photomontage

View 47: Residence 47, looking north

Final Landform

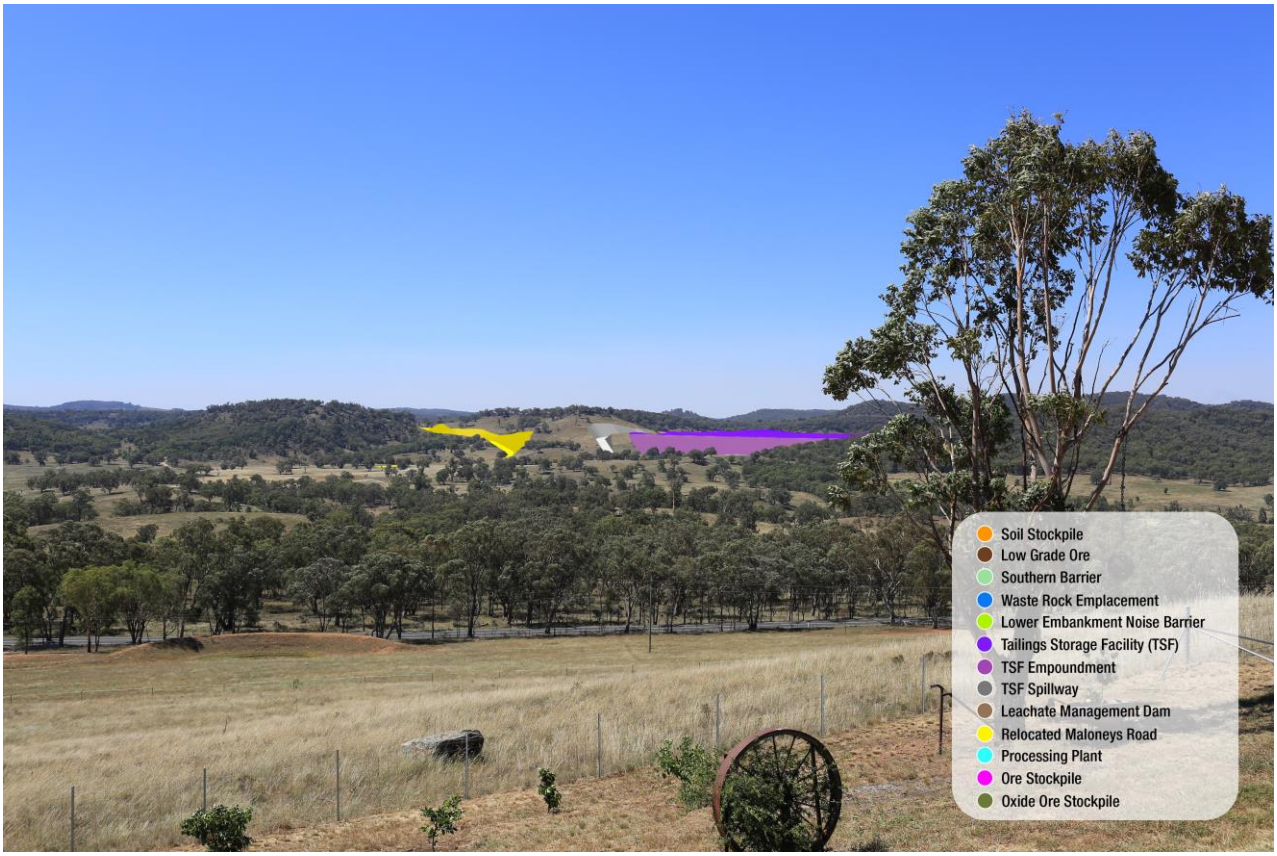


Analytical Photomontage

Photorealistic Photomontage

View 48: Residence 81, looking northeast

Year 1

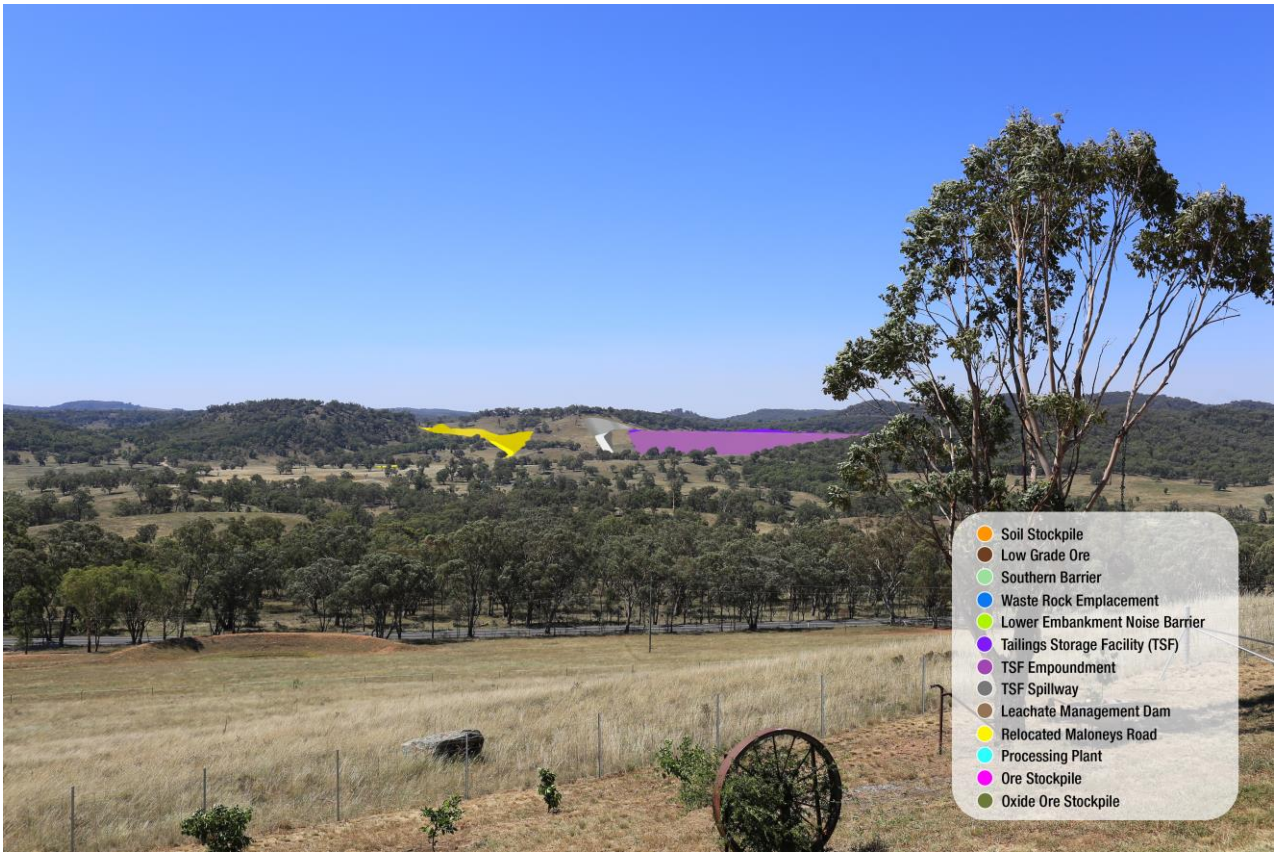


Analytical Photomontage

Photorealistic Photomontage

View 48: Residence 81, looking northeast

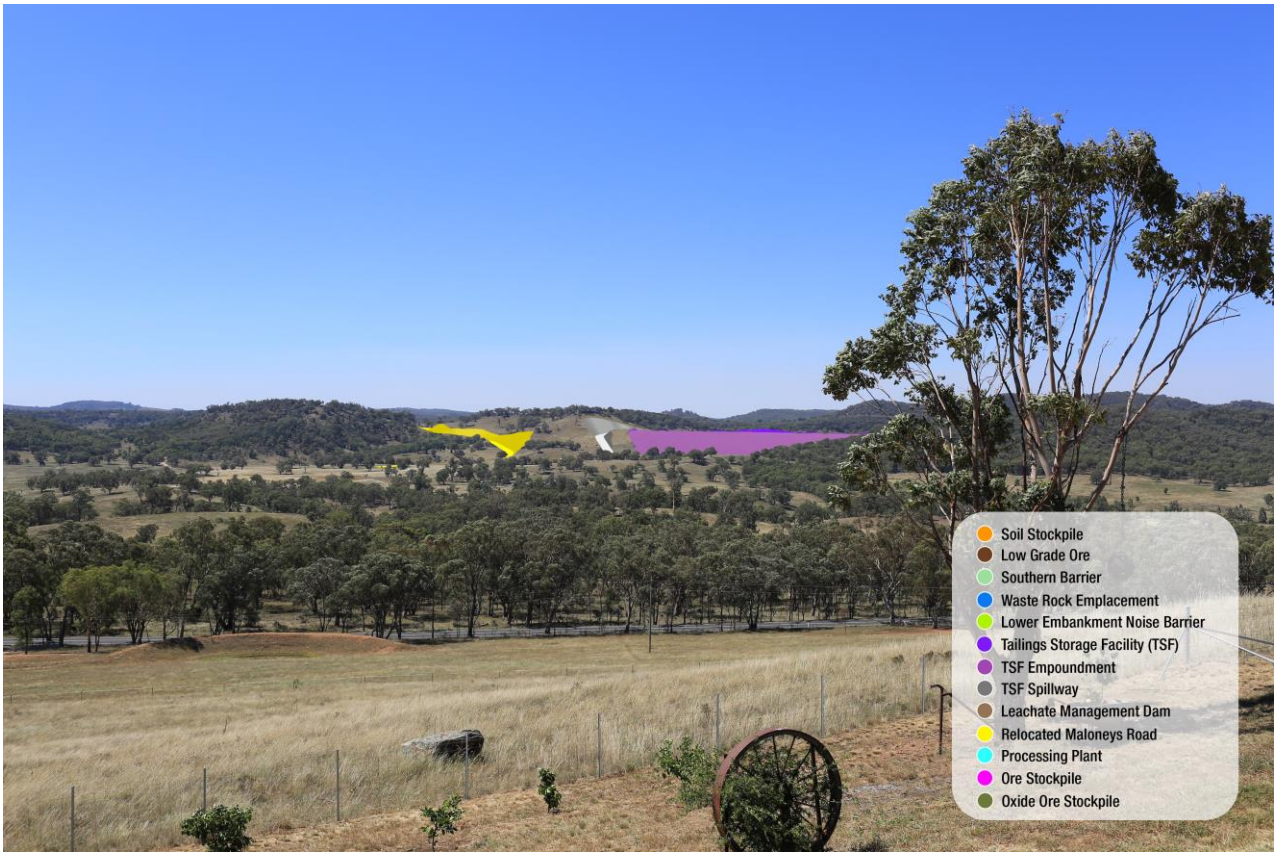
Year 8



Analytical Photomontage

Photorealistic Photomontage

View 48: Residence 81, looking northeast — Year 16



Analytical Photomontage

Photorealistic Photomontage

View 48: Residence 81, looking northeast

Final Landform

Annexure 3

Cross-section Studies

(Total No. of pages including blank pages = 10)

Figure A3-1: V14 - Visibility Sections from V14

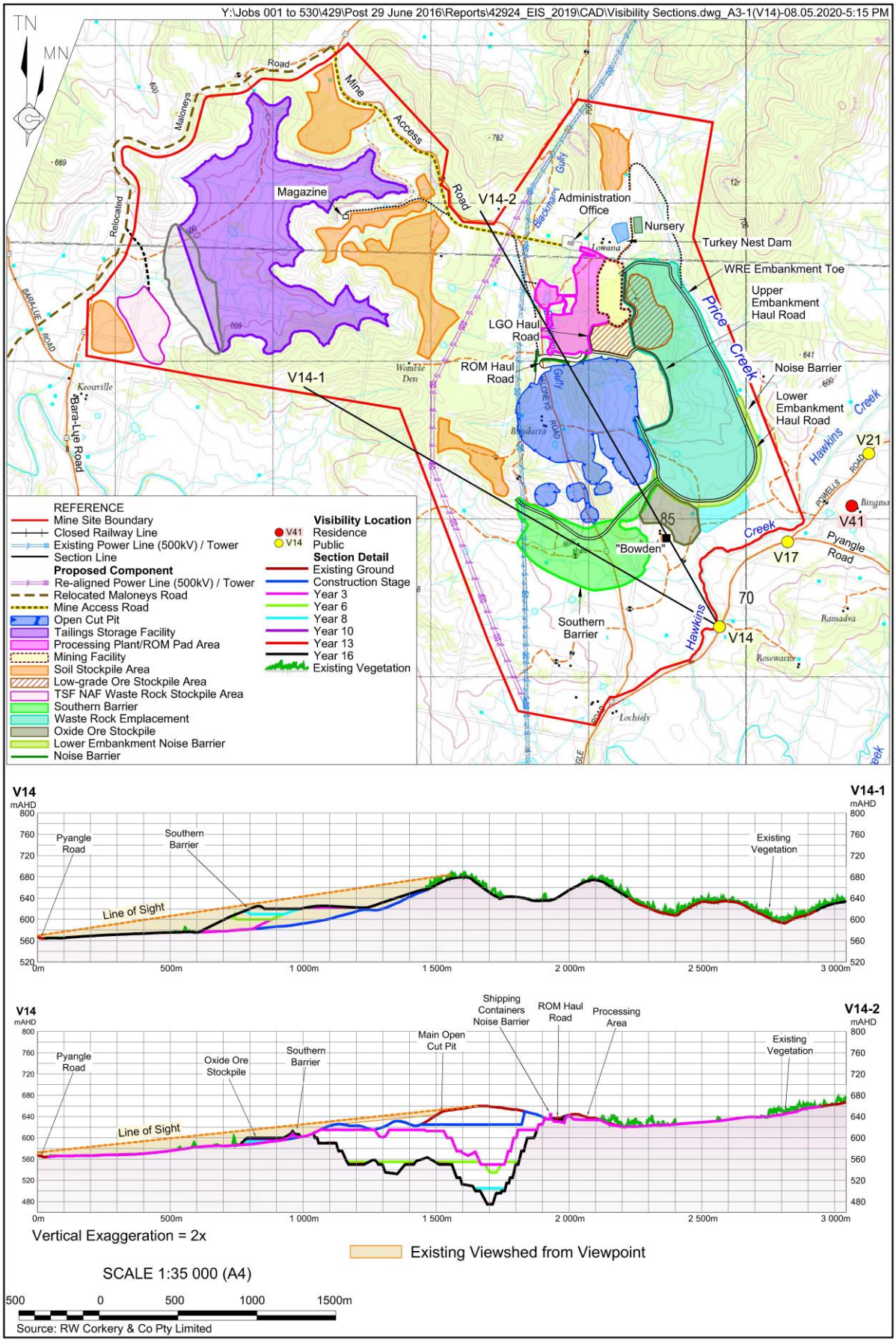


Figure A3-2: V17 - Visibility Sections from V17

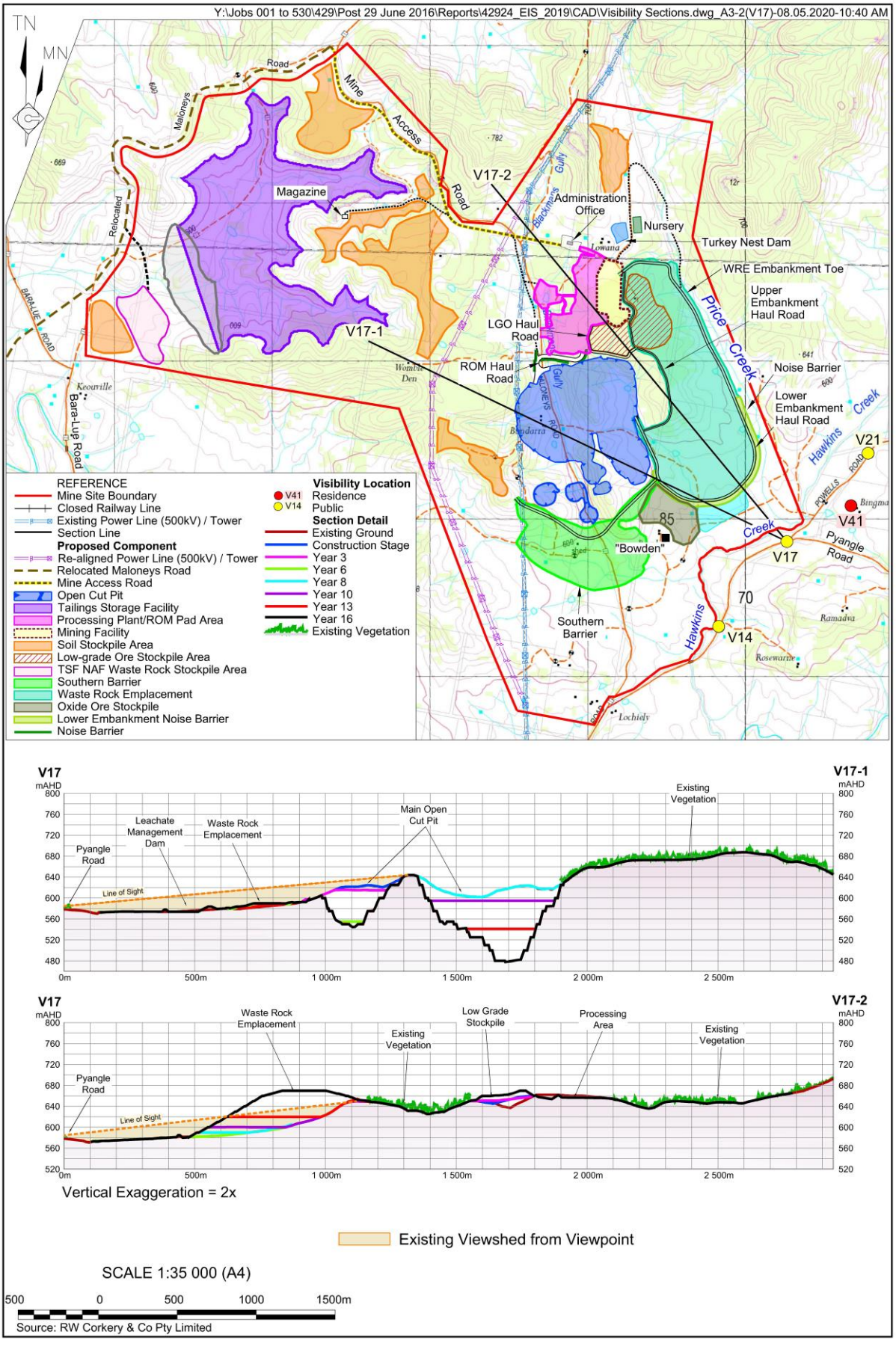


Figure A3-3: V21 - Visibility Sections from V21

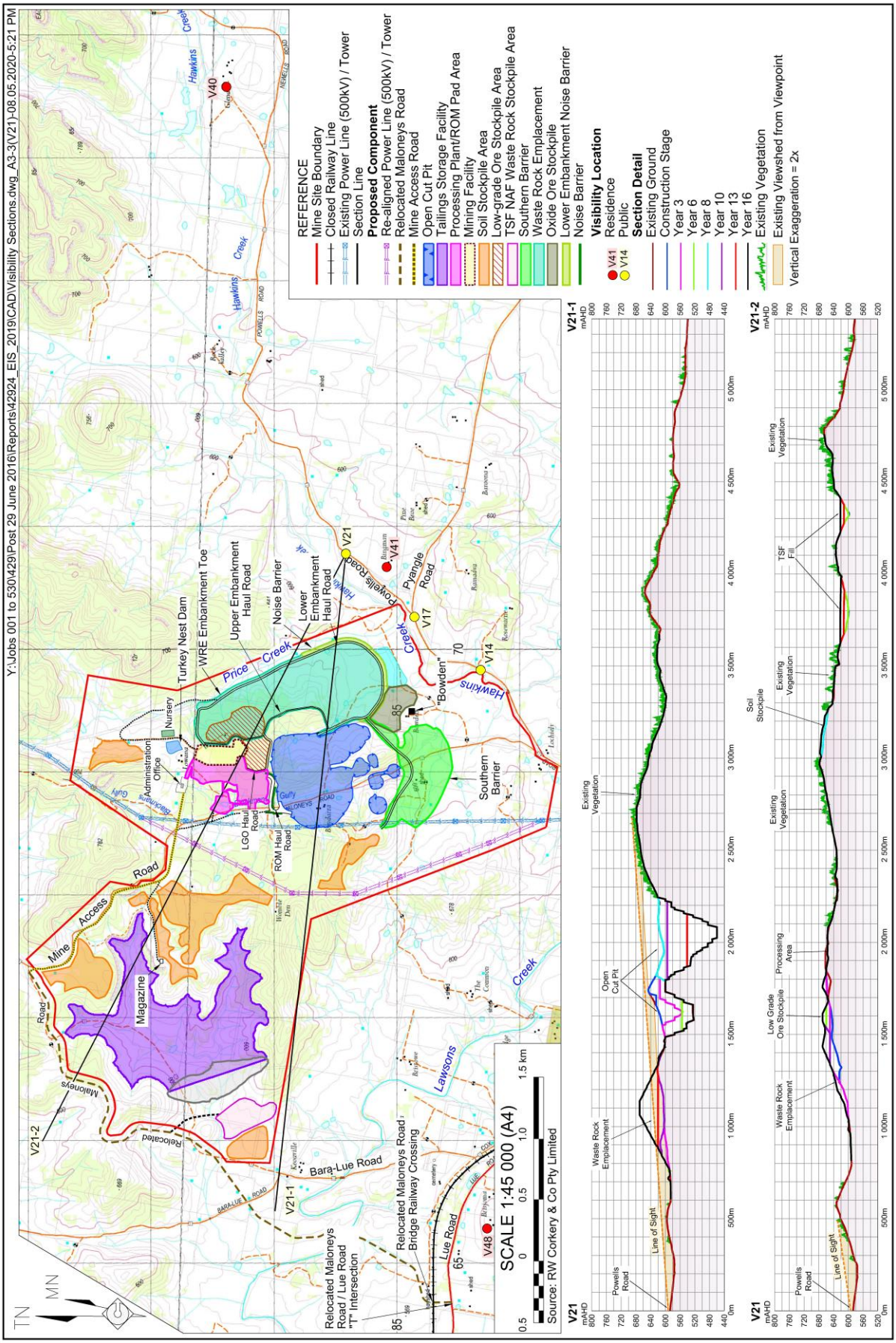


Figure A3-4: V28 - Visibility Sections from V28

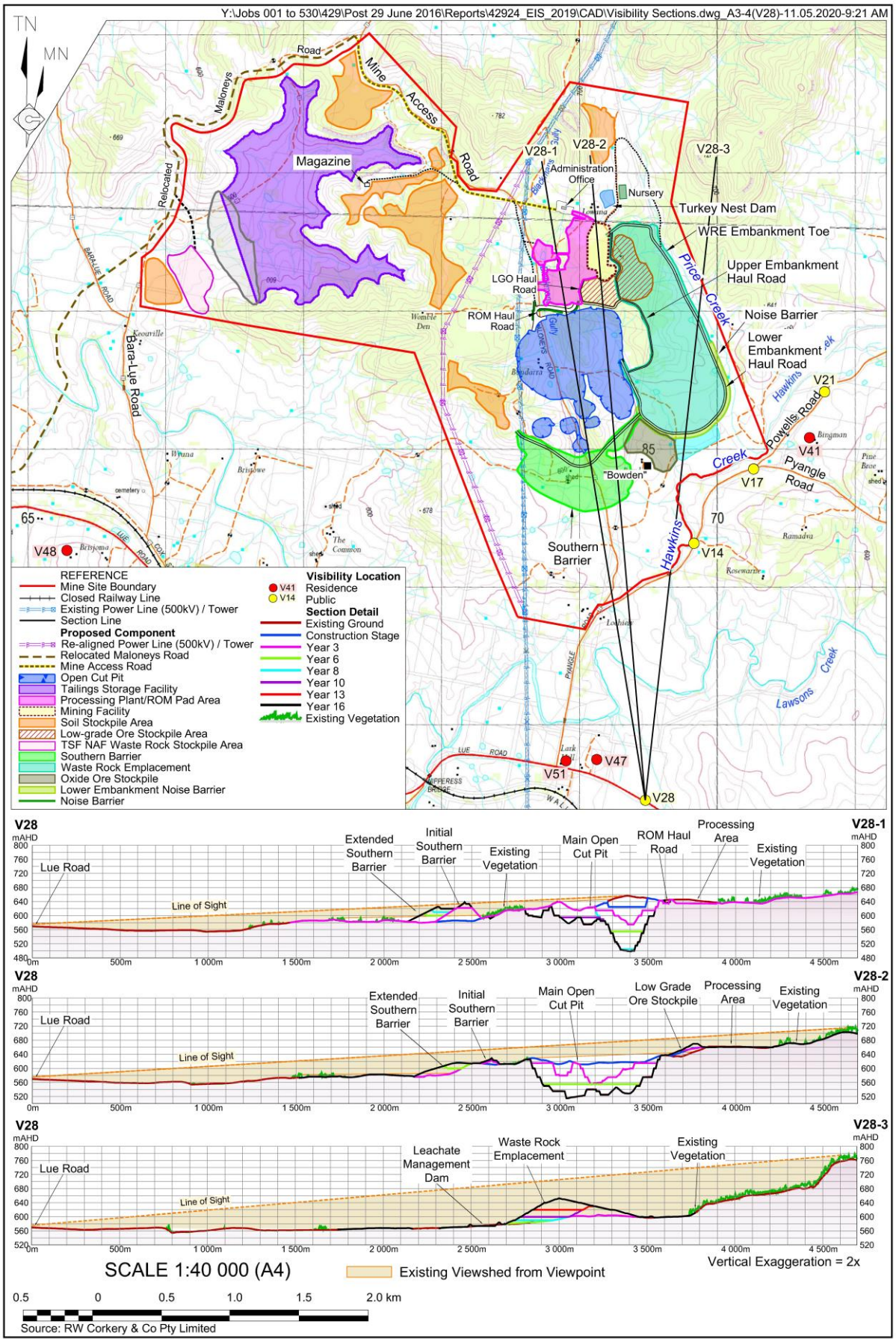


Figure A3-5: V40 - Visibility Sections from V40

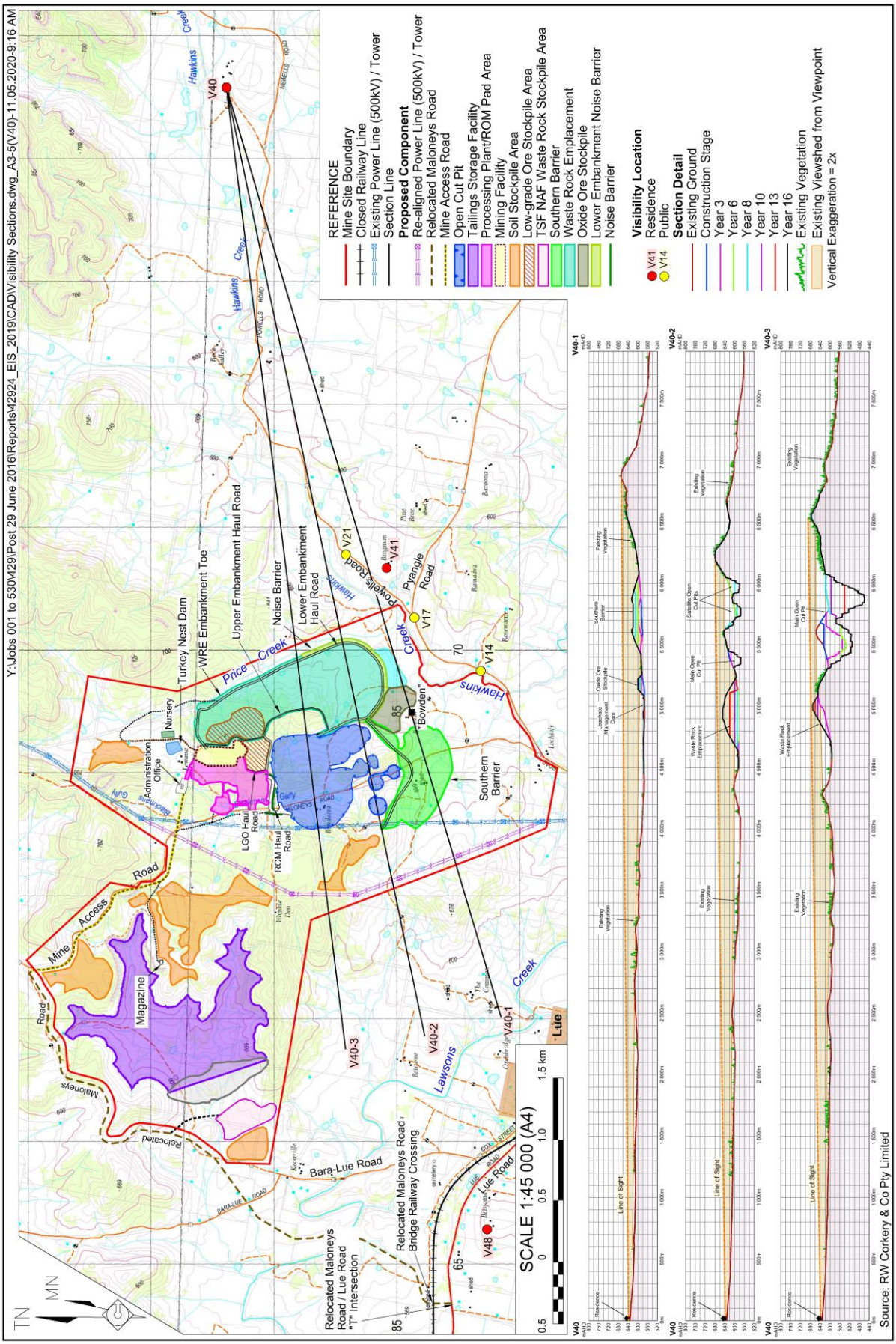


Figure A3-6: V41 - Visibility Sections from V41

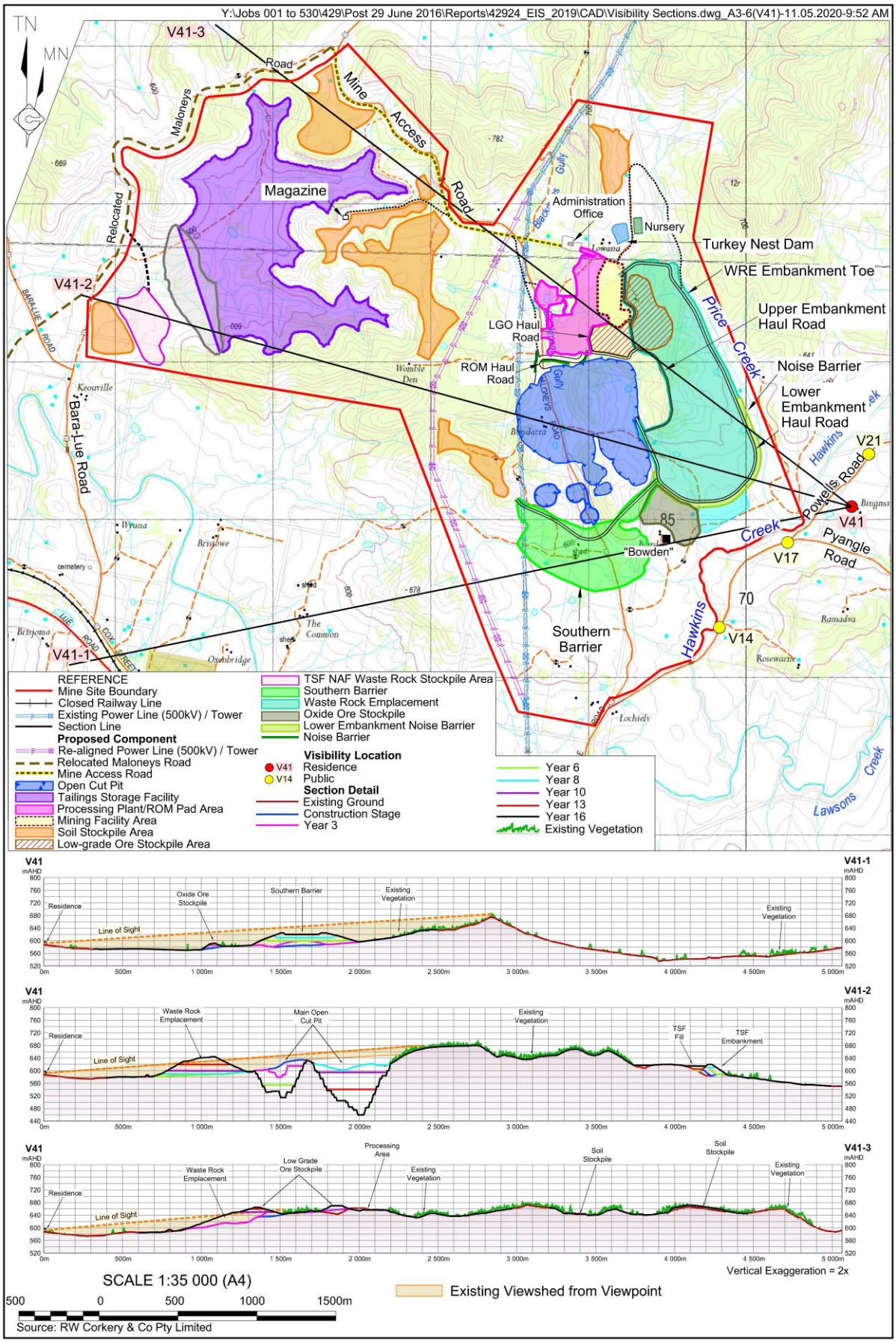


Figure A3-7: V47 - Visibility Sections from V47

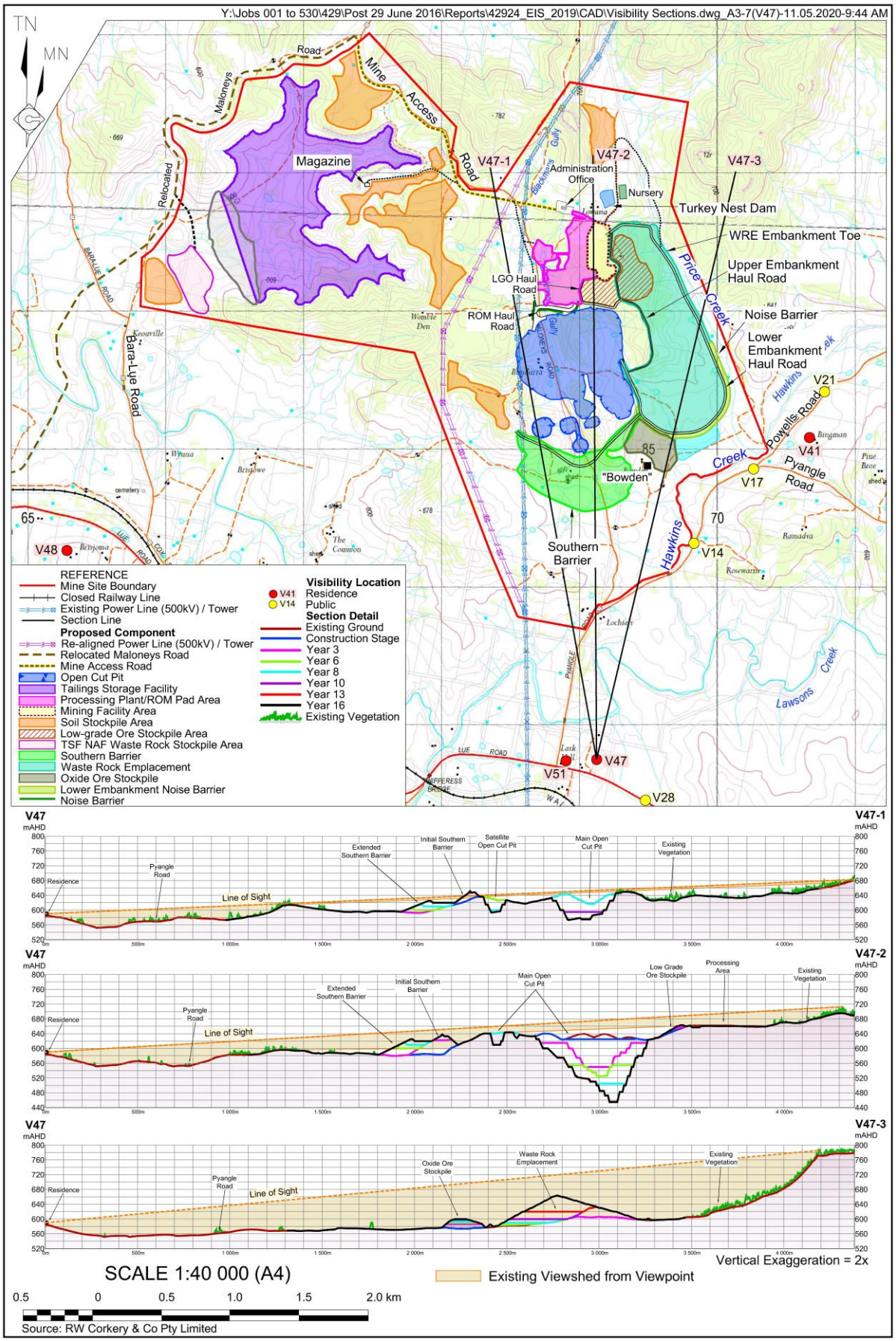


Figure A3-8: V48 - Visibility Sections from V48

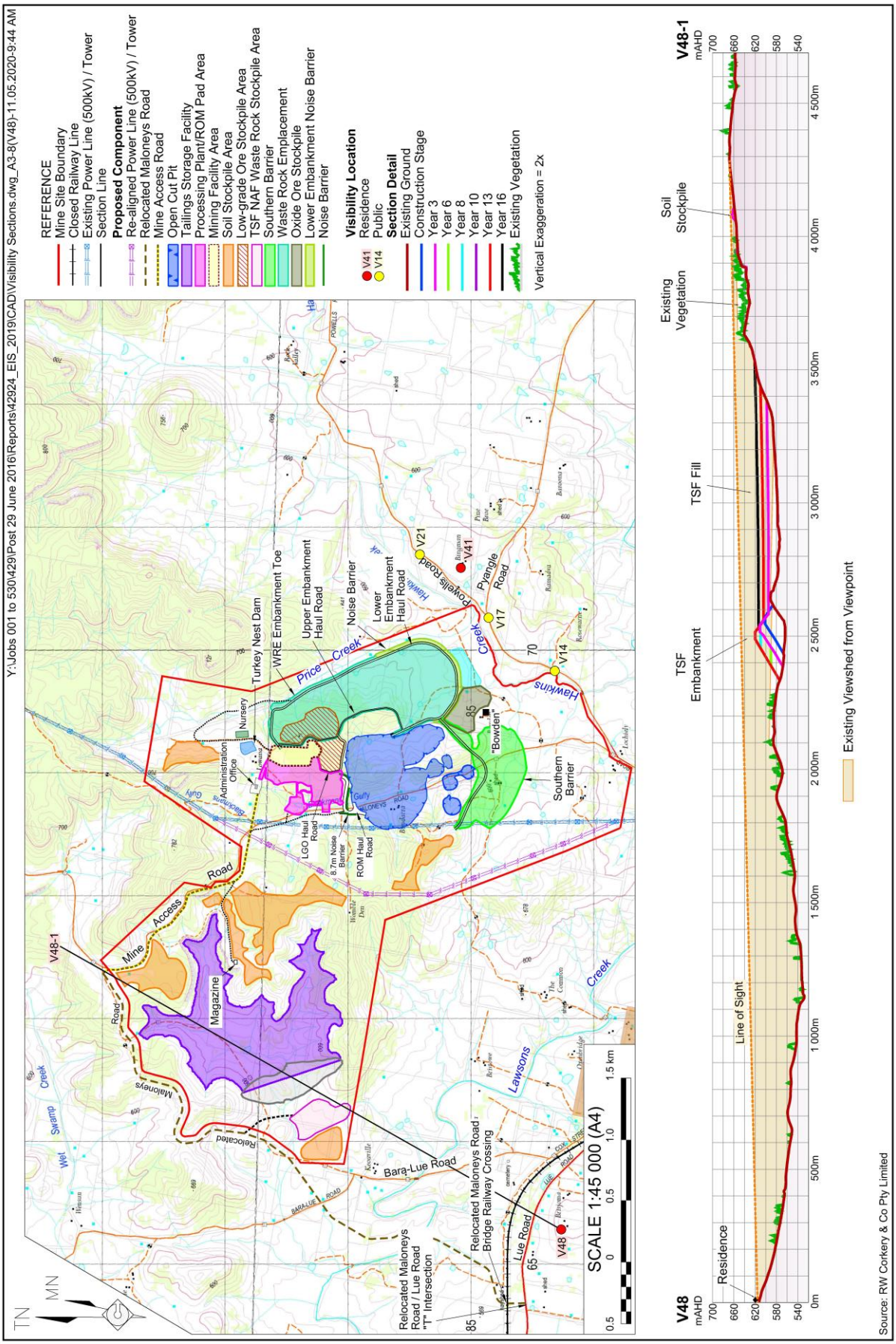
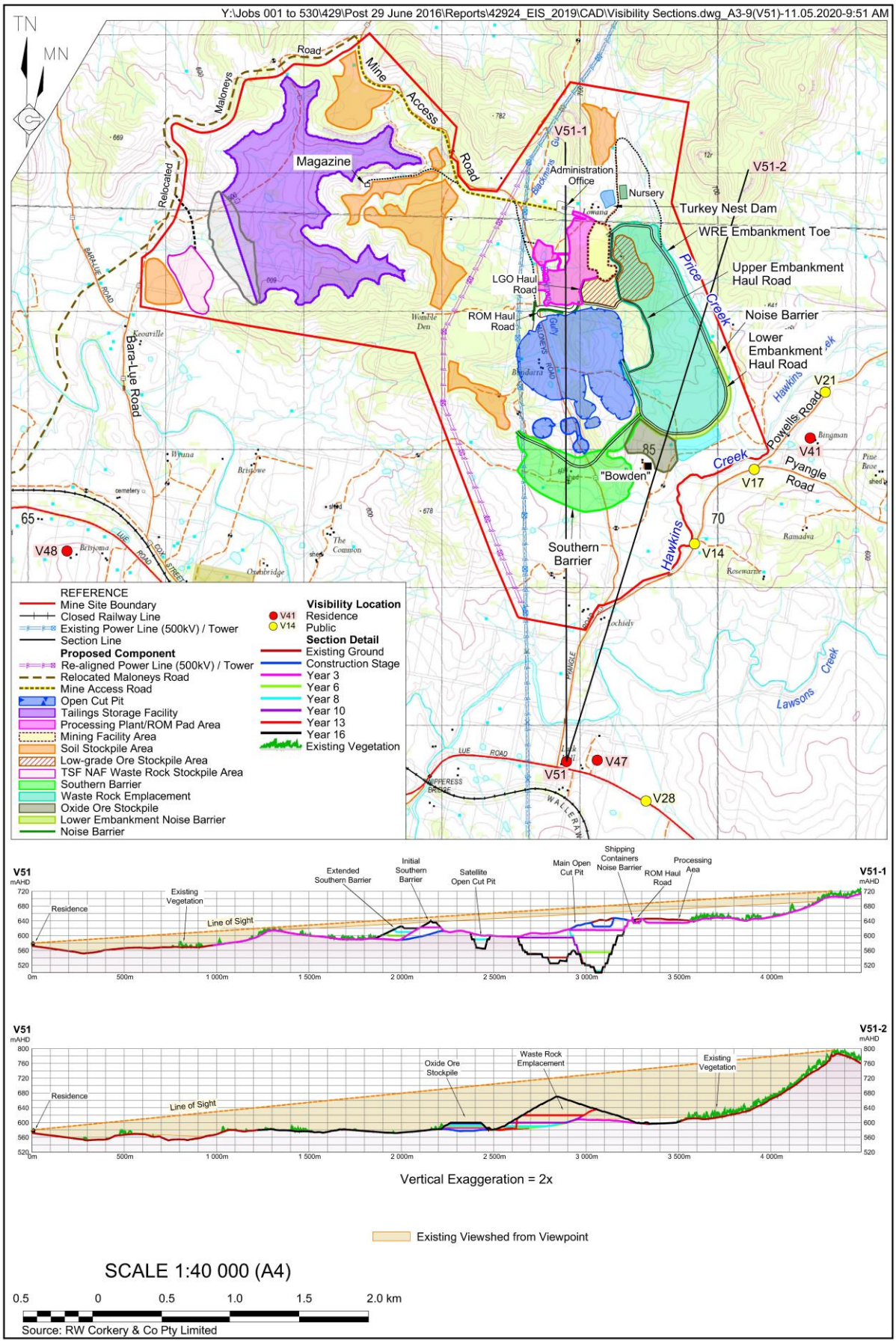


Figure A3-9: V51 - Visibility Sections from V51



Annexure 4

Assessment Methodology

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1 INTRODUCTION

The assessment of visual impacts is a field that requires a degree of subjective judgement and cannot be made fully objective. It is therefore necessary to limit the subjectivity of the work by adopting a systematic, explicit and comprehensive approach. This has the aim of separating aspects that can be more objective, for example the physical setting, visual character, visibility and visual qualities of a Project, from more subjective elements, such as visual absorption capacity and the compatibility of the Project with the setting.

The methodology used in the present assessment has been developed over several years and uses relevant aspects of methods accepted in landscape assessment, extended and modified to adapt to urban and maritime environments. The modifications introduced are informed by visual perception research that has been carried out by RLA and others in natural, urban and rural contexts.

The flow chart at **Figure 1** indicates the relationships among the parts of the visual impact assessment methodology.

2 COMPONENTS OF THE METHODOLOGY

Overall, the major components of the visual impact assessment are determining the concept for the development, and general strategic planning principles, view analysis, visual effects analysis, visual impact evaluation and assessment of significance of residual visual impacts. This assessment is also supplemented with an assessment of the merits of the Project in relation to visual and related amenity impacts, relevant planning principles and the mitigation measures that have been undertaken or could be proposed to reduce or eliminate residual impacts.

2.1 THE COMPONENTS OF THE VIEW ANALYSIS

2.1.1 The development proposed and detailed field assessment

This includes a thorough understanding of the proposed development including its location, scale and extent to understand the scale and spatial arrangement of the development. The next step is to carry out a detailed field assessment by identifying the potential viewing locations, visiting the representative locations, documenting the Project's approximate location on a base map, photographing representative locations and rating overall assessment of the visual effects and relative visual impacts factors. The assessment factors are explained in Section B2.2 and B2.3. The factors were in three ranges; Low, Medium and High. An indicative rating table that describes what is considered a low, medium and high effect and impact on each factor is shown in Tables B2.1 and B2.2, respectively.

2.1.2 Identifying and mapping viewing locations and situations

The representative viewing locations and situations sampled and visited during the field assessments are mapped including the ones for which analytical sections and photomontages have been prepared to represent the likely visual effects and impacts of the Project. (see Photographic Plates in **Annexure 1** and Photomontages in **Annexure 2**). A viewing location

means any place from which an aspect of the Project can be viewed. A viewing situation means the circumstances that apply to viewing the Project, such as a road, moving sequence of views, residence, etc.

2.1.3 Identification of the visual catchment

We identify the area within which the Project would be identifiable and where it could cause visual impacts by assessing its likely visibility in the view analysis stage.

Visibility means the objectively assessed extent to which the Project would be physically visible to the extent that it could be identified, for example as a new, novel, contrasting or alternatively a recognisable but compatible feature. Features such as infrastructure, buildings, intervening topography and viewing distance can affect the degree of visibility.

The potential total visual catchment means the physical area within which the Project would be visible and identifiable if there were no other constraints on that visibility, such as intervening vegetation and buildings. Within the potential total visual catchment, the visibility of the Project would therefore vary.

We identify the effective visual catchment as the area within the total visual catchment where visual impacts could occur. This area is smaller than the total catchment.

2.2 THE COMPONENTS OF THE VISUAL EFFECT ANALYSIS

2.2.1 Baseline Factors

These are the criteria that remain predominantly constant and independent of the nature of viewing locations and factors which condition the viewing situation.

2.2.1.1 Visual Character

The visual character of the locality in which the development would be seen is identified. It consists of identification of the physical and built components of the area and the setting of the Project that contribute to its visual character. The character elements include topography, vegetation, land uses, settlement pattern, urban and built form, interfaces of elements, and topographic constraints on visibility.

Visual character is a baseline factor against which the level of change caused by the Project can be assessed. The character of the locality is relevant to assessing the extent of acceptable change to character.

2.2.1.2 Scenic Quality

Scenic quality is a measure of the ranking, which the setting of the Project either is accepted to, or would be predicted to have, on the basis of empirical research carried out on scenic beauty, attractiveness, preference or other criteria of scenic quality.

Scenic quality is a baseline factor against which the visual impacts caused by the Project are assessed.

2.2.1.3 View Place Sensitivity

View place sensitivity means a measure of the public interest in the view. The public interest is considered to be reflected in the relative number of viewers likely to experience the view from a publicly available location and established importance of the viewing place. Places from which there would be close or middle distance views available to large numbers of viewers from public places such as roads, or to either large or smaller numbers of viewers over a sustained period of viewing time in places such as reserves and walking tracks, are considered to be sensitive viewing places.

2.2.1.4 Viewer Sensitivity

Viewer sensitivity means a measure of the private interests in the effects of the Project on views. The private interest is considered to be reflected in the extent to which viewers, predominantly viewing from private residences, would perceive the effects of the Project. Residences from which there would be close or medium distance range views affected, particularly those which are available over extended periods from places such as the living rooms and outdoor recreational spaces, are considered to be places of medium and high viewer sensitivity respectively.

2.2.2 Variable Factors

These are the assessment factors that vary between viewing places with respect to the extent of visual effects.

2.2.2.1 View Composition Type

View composition type means the spatial situation of the Project with regard to the organisation of the view when it is considered in formal pictorial terms. The types of view composition identified are:

- *Expansive* (an angle of view unrestricted other than by features behind the viewer, such as a hillside, vegetation and buildings.)
- *Restricted* (a view which is restricted, either at close range or some other distance, by features between or to the sides of the viewer and the view such as vegetation and buildings.)
- *Panoramic* (a 360 degree angle of view unrestricted by any features close to the viewer who is surrounded by space elements).
- *Focal* (a view that is focused and directed toward the Project by lateral features close to the viewer, such as road corridors, roadside vegetation, buildings, boats etc.)
- *Feature* (a view where the Project is the form element that dominates the view, for example in close range views.)

It is considered that the extent of the visual effects of the Project is related to its situation in the composition of the view. The visual effect of the Project on the composition of the view is considered to be greater on a focal or a feature view, cognisant of the distance effect, compared to a restricted, panoramic or expansive view.

2.2.2.2 Relative Viewing Level

Relative viewing level means the location of the viewer in relative relief, compared to the location of the Project. It is conventional in landscape assessment to assess views from locations above, level with and below the relative location of the Project.

It is considered that the visual effects of a development are related to the relative viewing level and distance. Viewing levels above the development where views are possible over and beyond it decrease the visual effects, whereas views from level with and close to the development, dependent on viewing distance, may experience higher effects, particularly if landform or structures intrude into horizons.

2.2.2.3 Viewing Period

Viewing period in this assessment means the influence on the visual effects of the Project which is caused by the time available for a viewer to experience the view. It is assumed that the longer the potential viewing period, experienced either from fixed or moving viewing places such as dwellings or roads, the higher the potential for a viewer to perceive the visual effects of the Project. Repeated viewing period events, for example views repeatedly experienced from roads as a result of regular travelling, are considered to increase perception of the visual effects of the Project.

2.2.2.4 Viewing Distance

Viewing distance means the influence on the perception of the visual effects of the Project which is caused by the distance between the viewer and the development proposed. It is assumed that the viewing distance is inversely proportional to the perception of visual effects: the greater the potential viewing distance, experienced either from fixed or moving viewing places, the lower the potential for a viewer to perceive and respond to the visual effects of the Project.

Three classes of viewing distance have been adopted which are close range (<100m), medium range (100-1000m) and distant (>1000m).

2.2.2.5 View Loss or Blocking Effects

View loss or blocking effects in this assessment means a measure of the extent to which the Project is responsible for view loss or blocking the visibility of items in the view. View loss is considered in relation to the principles enunciated in the Land and Environment Court of NSW by Roseth SC in *Tenacity Consulting v Warringah [2004] NSWLEC 140 - Principles of view sharing: the impact on neighbours*. Although Tenacity concerned view losses from residential properties, the matter of what could be construed to be a valuable feature of the view which could be lost, e.g. specific features of views such as whole views and iconic elements viewed across water, alluded to in Tenacity, are of some relevance to the public domain also. View loss in the public domain specifically has been considered in relation to the planning principles in *Rose Bay Marina Pty Limited v Woollahra Municipal Council and anor. [2013] NSWLEC 1046*.

It is assumed that view loss and blocking effects increase the perception of the visual effects of the Project. View loss and view blocking are important matters for consideration regarding short range views from the public domain as identified in the SEARs.

An indicative rating table that describes what is considered a low, medium and high visual effect on each factor is shown in **Table 2.1**, below.

Table 2.1
Indicative Ratings of Visual Effects Factors

Visual Effects Factors			
Factors	**Low Effect**	**Medium Effect**	**High Effect**
Scenic quality	Project does not have negative effects on features which are associated with high scenic quality, such as the quality of panoramic views, proportion of or dominance of natural vegetation and topography, appearance of interfaces and composition of the view.	Project has the effect of reducing any or all of: the extent of panoramic views, the proportion of or dominance of vegetation and topography, without significantly decreasing their presence in the view or the contribution that the combination of these features make to overall scenic quality.	The Project significantly decreases or eliminates perception of the integrity of any of: panoramic views, dominance of extensive areas of vegetation and topography or composition of important focal views. The result is a significant decrease in perception of the contribution that the combinations of these features make to scenic quality.
Visual character	Project does not decrease the presence of or conflict with existing visual character elements such as land use, settlement pattern, natural/rural interfaces and settings.	Project contrasts with or changes the relationship between existing visual character elements in some individual views by adding new or distinctive features but does not affect the overall visual character of the setting.	The Project introduces new or contrasting features which conflict with, reduce or eliminate existing character features. The Project causes a loss of or unacceptable change to the overall visual character of individual items or the locality.
View place sensitivity	Public domain viewing places providing distant views, and/or with small number of users for small periods of viewing time (Glimpses-as explained in viewing period).	Medium distance range views from roads, recreation areas and socially significant locations with medium number of viewers for a medium time (a few minutes or up to half day-as explained in viewing period).	Close distance range views from roads, recreation areas, foreshores and waterways with medium to high numbers of users for most the day (as explained in viewing period).
Viewer sensitivity	Residences providing distant views (>1000m)	Residences located at medium range from site (100-1000m) with views of the development available from bedrooms and utility areas.	Residences located at close or middle distance (<1000m as explained in viewing distance) with views of the development available from living spaces and private open spaces.
View composition	Panoramic views unaffected, overall view composition retained, or existing views restricted in visibility of the Project by the screening or blocking effect of topography, vegetation or buildings.	Expansive or restricted views where the restrictions created by new work do not significantly reduce visibility of important features of the visual environment.	Feature or focal views significantly and detrimentally changed
Relative viewing level	Elevated position such as ridge top, building or structure with views over and beyond the site.	Slightly elevated with partial or extensive views over the site.	Adjoining roads, land or reserves with view blocked by Project.
Viewing period	Glimpse (e.g. moving vehicles or boats).	Few minutes up to half day (e.g. tourism use, recreation in reserves).	Majority of day (e.g. adjoining residence or workplace).
Viewing distance	Distant Views (>1000m).	Medium Range (100-1000m).	Close Range (<100m).
View loss or blocking effect	No view loss or blocking	Partial or marginal view loss compared to the expanse/extent of views retained. No loss of views of scenic icons.	Loss of majority of available views such as interface, horizons, in a restricted or focal view. Loss of views of scenic icons.

2.2.3 Overall Extent of Visual Effect

Based on the inspection of the pattern of the assessment ratings for the above factors on each viewing location an overall rating is arrived at which represents an overall extent of visual effects for a viewing location.

2.3 THE COMPONENTS OF THE VISUAL IMPACT ANALYSIS

The criteria in 2.2 concern assessment of the extent of the visual effects of the Project when seen from specific viewing places. The extent of the visual effects is the baseline assessment against which to judge the visual impacts.

Whether a visual effect is an impact of potential significance cannot be equated directly to the extent of the visual effect. For example, a high visual effect can be quite acceptable, whereas a small one can be unacceptable. Thus, it is necessary to give a weighting to the assessed levels of effects to arrive at an assessment of the impact.

This method therefore does not equate visual effects directly to visual impacts. The approach is to assess visual effects as in 2.2. above to arrive at an overall level of visual effect of the Project for each kind of viewing place and then to assess the level of impact, if any, by giving differential weighting to impact criteria. By this means, the relative importance of impacts is distinguished from the size of the effect. We consider that two weighting criteria are appropriate to the overall assessment of visual impacts, Physical Absorption Capacity and Visual Compatibility. Each of these addressed the primary question of the acceptability of the visual effects and changes caused by the Project.

2.3.1 Visual Absorption Capacity

Visual Absorption Capacity (VAC) means the extent to which the existing visual environment can reduce or eliminate the perception of the visibility of the proposed redevelopment.

VAC includes the ability of existing elements of the landscape to physically hide, screen or disguise the Project. It also includes the extent to which the colours, material and finishes of buildings, the scale and character of these allows them to blend with or reduce contrast with others of the same or closely similar kinds to the extent that they cannot easily be distinguished as new features of the environment.

Prominence is also an attribute with relevance to VAC. It is assumed in this assessment that higher VAC can only occur where there is low to moderate prominence of the Project in the scene.

Low to moderate prominence means:

- *Low*: The Project has either no visual effect on the landscape or the Project is evident but is subordinate to other elements in the scene by virtue of its small scale, screening by intervening elements, difficulty of being identified or compatibility with existing elements.

- *Moderate*: The Project is either evident or identifiable in the scene, but is less prominent, makes a smaller contribution to the overall scene, or does not contrast substantially with other elements or is a substantial element, but is equivalent in prominence to other elements and landscape alterations in the scene.

Design and mitigation factors are also important to determining the VAC. Appropriate colours, materials, building forms, line, geometry, textures, scale, character and appearance of buildings and other structures are relevant to increasing VAC and decreasing prominence.

VAC is related to but distinct from Visual Compatibility (see below).

2.3.2 Visual Compatibility

Visual Compatibility is not a measure of whether the Project can be seen or distinguished from its surroundings. The relevant parameters for visual compatibility are whether the Project can be constructed and utilised without the intrinsic scenic character of the locality being unacceptably changed. It assumes that there is a moderate to high visibility of the Project to some viewing places. It further assumes that novel elements which presently do not exist in the immediate context can be perceived as visually compatible with that context provided that they do not result in the loss of or excessive modification of the visual character of the locality.

A comparative analysis of the compatibility of similar items to the Project with other locations in the area which have similar visual character and scenic quality or likely changed future character can give a guide to the likely future compatibility of the Project in its setting.

Because the development proposed is on the interface between rural and more natural land, with components on each, the question of its visual impacts also depends on its perception both as an entity and in regard to its compatibility with the major scenic character attributes. In this regard, both the rural environment and the natural environment are attributes of relevance. Hence, it is considered that there are two relevant measures of Visual Compatibility, i.e. Compatibility with Rural Features, and Compatibility with Natural/Industrial Features.

2.3.2.1 Visual compatibility with rural and natural features

This assessment is a measure of the extent to which the visual effects of the Project are compatible with rural and natural features. It is assumed that in some views the Project can be seen and clearly distinguished from its surroundings. Compatibility does not require that identical or closely similar features to those which are proposed exist in the immediate surroundings.

Compatibility with Rural and Natural Features means that the Project responds positively to or borrows from within the range of features of character, scale, form, colours, materials and geometrical arrangements of urban and natural features of the surrounding area or of areas of the locality which have the same or similar existing visual character.

An indicative rating table that describes what is considered a low, medium and high impact on each factor is shown in **Table 2.2**, below.

Table 2.2
Indicative Ratings Table of Visual Impacts Factors

Visual Impacts Factors			
Factors	**Low Impact**	**Medium Impact**	**High Impact**
Visual absorption capacity	Existing elements of the landscape physically hide, screen or disguise the Project. The presence of topography, vegetation buildings and associated structures in the existing landscape context reduce visibility. Low contrast and high blending within the existing elements of the setting and built forms.	The Project is of moderate visibility but is not prominent because its components, forms and line and its textures, scale and structures if visible have low to moderate contrasts with existing features of the scene.	The Project is of high visibility and it is prominent in some views. The project has a high contrast and low blending within the existing elements of the of the setting.
Compatibility with rural/natural features	High compatibility with the character, scale, form, colours, materials and geometrical arrangements of existing rural and natural features in the immediate context. Low contrast with existing elements of the built environment.	Moderate compatibility with the character, and geometrical arrangements of the rural and natural features in the immediate context. The Project introduces new industrial features, but these features are compatible with the scenic character and qualities of facilities in similar settings.	The character, scale, form and spatial arrangement of the Project has low compatibility with the rural features in the immediate context or which could reasonably be expected to be new additions to the setting when compared to other examples in similar settings.

2.4 OVERALL EXTENT OF VISUAL IMPACT

Based on the inspection of the pattern of the assessment ratings for the above factors for each viewing location, an overall rating is arrived at which represents an overall extent of visual impacts for a sensitivity zone.

Three visual sensitivity zones are identified which are based on the view place sensitivity or viewer sensitivity as explained above in Section 2.2.1. These are related to the distance zones from the development site and whether views are from significant public domain or private viewing locations. Viewing places within the high or medium visual sensitivity zones are further assessed as explained below.

2.4.1 Applying the Weighting Factors

An overall impact rating for each of the two relevant visual sensitivity zones is arrived at by applying the weighting factors of VAC and Compatibility to the overall extent of visual impacts. An up-weight increases the significance of the impact, while a down-weight decreases it.

2.5 ANALYSIS AGAINST SEARS AND PLANNING POLICIES

The proposed development and its overall impacts are analysed against the relevant criteria provided in the SEARs and any relevant planning principles.

2.6 SIGNIFICANCE OF RESIDUAL VISUAL IMPACTS

Finally, after the visual effects of the mitigation factors are assessed, a relevant question is whether there are any residual visual impacts and whether they are acceptable in the circumstances. These residual impacts are predominantly related to the extent of permanent visual change to the immediate setting.

In terms of the urban component of the development, residual impacts relate to individuals' preferences for the nature and extent of change which cannot be mitigated by means such as colours, materials and rehabilitation of vegetation cover. These personal preferences are also a result of people's resistance to or resilience towards change to the existing arrangement of views. Individuals or groups may express strong preferences for either the existing, approved or proposed form of development.

The significance of these residual impacts is assessed based on the relative sensitivity of viewing places that may experience these impacts. Whether overcoming these impacts would result in undermining of the potential capacity of the development site to economically support the intended use in the Project is not the focus of a visual impacts assessment

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Annexure 5

Photographic Plates Log Table

(Total No. of pages including blank pages = 2)

Bowdens Silver Project photographs for Visual Impact Assessment				
Viewpoint number	RLA image	Full image file name	Photomontage/ priority (Public/Private)	Residences
V1	RLA_7642	RLA_7642 V1		
V2	RLA_7643	RLA_7643 V2		
V3	RLA_7644	RLA_7644 V3		
V4	RLA_7645	RLA_7645 V4 south		
V5	RLA_7647	RLA_7647 V5 SE View		
V6	RLA_7648	RLA_7648 V6 NW view		
V7	RLA_7651	RLA_7651 V7 S view		
V8	RLA_7652	RLA_7652 V8 S view		
V9	RLA_7654	RLA_7654 V9 S view		
V9	RLA_7655	RLA_7655 V9 SSW view		
V10	RLA_7656	RLA_7656 V10 N view		
V11	RLA_7657	RLA_7657 V11 R26		
V12	RLA_7659	RLA_7659 V12 R25 Pyangle Rd		
V13	RLA_7660	RLA_7660 V13 Powells Rd		
V14	RLA_1703	RLA_1703 V14 in 2019 24mm		
V15	RLA_7662	RLA_7662 V15 Powells Rd		
V16	RLA_7663	RLA_7663 V16 Powells Rd		
V17	RLA_1705	RLA_1705 V17 in 2019 Powells Road 24mm	1 Public domain	
V18	RLA_1706	RLA_1706 V18 in 2019 24mm		
V19	RLA_7666	RLA_7666 V19 R33 Powells Rd		
V20	RLA_7667	RLA_7667 V20 R21 Powells Rd		
V21	RLA_1707	RLA_1707 V21 in 2019 24mm	1 Public domain	
V22	RLA_7669	RLA_7669 V22 Pyangle Rd		
V23	RLA_7670	RLA_7670 V23 Pyangle Rd adj No1130		
V24	RLA_1710	RLA_1710 V24 Powells Road in 2019 24mm		
V25	RLA_7672	RLA_7672 V25 Lue and Tongbong Rds		
V26	RLA_7673	RLA_7673 V26 Lue Rd adj No1130		
V27	RLA_7674	RLA_7674 V27 Lue Rd adj 3144		
V28	RLA_7676	RLA_7676 V28 Lue Rd 2	1 Public domain	
V29	RLA_7678	RLA_7678 V29 R40 Lue Rd		
V30	RLA_7679	RLA_7679 V30 Martin St Lue		
V31	RLA_7680	RLA_7680 V31 Martin and Swanston St Lue		
V32	RLA_7681	RLA_7681 V32 Harpur and Swanston Streets Lue		
V33	RLA_7682	RLA_7682 V33 Bayly and Swanston Streets Lue		
V34	RLA_7683	RLA_7683 V34 Lue Road adj 2654		
V35	RLA_7684	RLA_7684 V35 Lue Rd No2604		
V36	RLA_7686	RLA_7686 V36 Lue Road 2		
V37	RLA_7687	RLA_7687 V37 Swanston Street Lue		
V38	RLA_7688	RLA_7688 V38 Bara-Lue Road 1		
V39	RLA_7691	RLA_7691 V39 Bara-Lue Rd 2		
V40	RLA_1697	RLA_1697 V40 R19 house paddock fence West	1 Private domain	R19 Mills
V41	RLA_1663	RLA_1663 V41 R4 NWest corner house paddock	2 Private domain	R4 Robinson
V42	RLA_1664	RLA_1664 V42 R21 NE corner of house		R21 Hornery
V42	RLA_1666	RLA_1666 V42 R21 150m north of entry gate view west		R21 Hornery
V43	RLA_1667	RLA_1667 V43 R27 detail of house view SW		R27 Friend
V43	RLA_1668	RLA_1668 V43 R27 detail back of house view South		R27 Friend
V43	RLA_1669	RLA_1669 V43 R27 rear of house view west twd pit		R27 Friend
V44	RLA_1676	RLA_1676 V44 R5 verandah view north		R5 Hughes
V44	RLA_1677	RLA_1677 V44 R5 Knoll West of house view North		R5 Hughes
V44	RLA_1678	RLA_1678 V44 R5 house from knoll view SE		
V45	RLA_1681	RLA_1681 V45 Bara_Lue road crossing view twd Lue Rd		
V46	RLA_1682	RLA_1682 V46 Bara_Lue road crossing view twd site		
V47	RLA_1684	RLA_1684 V47 R47 View NNEast	1 Private domain	R47 Walsh
V48	RLA_1687	RLA_1687 V48 R81 SW end verandah view NNE	1 Private domain	R81 Jones
V49	RLA_1690	RLA_1690 V49 R81 SW hilltop east of house view NNE		R81 Jones
V50	RLA_1692	RLA_1692 V50 R39 garden view North		R39 Tubnor
V51	RLA_1693	RLA_1693 V51 R39 garden east side view North	2 Private domain	R39 Tubnor
v52	RLA_1695	RLA_1695 V52 Stanchion site view East		
V53	RLA_1708	RLA_1708 V53 Elephant Mountain House entry Pyangle Rd		
V54	RLA_1709	RLA_1709 V54 Pyangle Cottage Pyangle Rd view west		
V55	RLA_1711	RLA_1711 V55 Lue Road near R47 view North		
V56	DSC_1127	DSC_1127 V56 Intersection of Maloneys Rd and Lue Rd		
V57	DSC_1128	DSC_1128 V57 Intersection of Maloneys Rd and Lue Rd 2		

Annexure 6

Curriculum Vitae

(Total No. of pages including blank pages = 4)

Note: This Annexure is only available on the digital version of this document

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Summary Curriculum Vitae: Dr Richard Lamb

Summary

- Qualifications
  - Bachelor of Science - First Class Honours, University of New England in 1969
  - Doctor of Philosophy, University of New England in 1975

- Employment history
  - Tutor and teaching fellow – University of New England School of Botany 1969-1974
  - Lecturer, Ecology and environmental biology, School of Life Sciences, NSW Institute of Technology (UTS) 1975-1979
  - Senior lecturer in Landscape Architecture, Architecture and Heritage Conservation in the Faculty of Architecture, Design and Planning at the University of Sydney 1980-2009
  - Director of Master of Heritage Conservation Program, University of Sydney, 1998-2006
  - Principal and Director, Richard Lamb and Associates,1989-2019

- Teaching and research experience
  - visual perception and cognition
  - aesthetic assessment and landscape assessment
  - interpretation of heritage items and places
  - cultural transformations of environments
  - conservation methods and practices

- Academic supervision
  - Undergraduate honours, dissertations and research reports
  - Master and PhD candidates: heritage conservation and environment/behaviour studies

- Professional capability
  - Consultant specialising in visual and heritage impacts assessment
  - 30 year's experinence in teaching and research on environmental assessment and visual impact assessment.
  - Provides professional services, expert advice and landscape and aesthetic assessments in many different contexts
  - Specialist in documentation and analysis of view loss and view sharing
  - Provides expert advice, testimony and evidence to the Land and Environment Court of NSW on visual contentions in various classes of litigation.
  - Secondary specialisation in matters of landscape heritage, heritage impacts and heritage view studies
  - Appearances in over 275 Land and Environment Court of New South Wales cases, submissions to Commissions of Inquiry and the principal consultant for over 1000 individual consultancies concerning view loss, view sharing, visual impacts and landscape heritage

A full CV can be viewed on the Richard Lamb and Associates website at www.richardlamb.com.au

[i] MUDGEE, 2kmx2km 2 metre Resolution Digital Elevation Model Metadata - The coverage of this dataset is over the MUDGEE region. The 2 metre Digital Elevation Model (DEM) is produced using TIN (Triangular Irregular Network) method of averaging ground heights to formulate a regular grid. This data set contains a ground surface model in grid format derived from Spatial Services Category 2 (Classification Level 3) LiDAR (Light Detection and Ranging) from an ALS50 (SN101). The model is not hydrologically enforced. The data used to create this DEM has an accuracy of 0.3m (95% Confidence Interval) vertical and 0.8m (95% Confidence Interval) horizontal (note: less control points are used to validate this accuracy than Spatial Services Category 1 LiDAR data). For more information on the data accuracy, please refer to the lineage provided in the data history

[ii] MUDGEE, 2kmx2km Point Cloud Metadata - The coverage of this dataset is over the MUDGEE region. Data of this specification (Spatial Services Category 2 LiDAR) contains point data in LAS format sourced from a LiDAR (Light Detection and Ranging) ALS50 (SN101) sensor. The processed data has been manually edited to achieve ICSM Classification Level 3 whereby the ground class contains minimal non-ground points such as vegetation, water, bridges, temporary features, jetties etc. This data has an accuracy of 0.3m (95% Confidence Interval) vertical and 0.8m (95% Confidence Interval) horizontal (note: less control points are used to validate this accuracy than Spatial Services Category 1 LiDAR data) with a minimum point density of 0.25 points per square metre. For more information on the data accuracy, refer to the lineage provided in the data history.