

VISUAL IMPACT ASSESSMENT

TECHNICAL PAPER

5

Proposed Wellington Power Station

Visual Impact Assessment



Prepared by

Resolve Planning

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Part 1 - Wellington

1.0 Methodology of Visual Impact Assessment

The project brief was to assess the visual impact of the proposed power station on the surrounding environment and in particular the nearest and / or most impacted receptors. The tallest components of the proposed power station include four gas turbine units with stacks of 35-metre height and 6.2-metre width. In addition there will be two additional steel transmission line towers (40 m height) which will connect the power generated from the station into the adjacent substation. Other components of the development include the compressor station at Alectown which is assessed in Part 2 of this report and a gas pipeline running between the power station site and the compressor station site. The pipeline was not part of the brief for visual impact assessment and is therefore not discussed in this report.

With the crane arm in place, the assessment proceeded on the basis that all close by and pre determined residences and subdivisions were visited to make a preliminary assessment to see whether the crane or the site could be seen from the receptor. A receptor was determined to be any dwelling and for one of the sites included a café. From these preliminary assessments, the sites and receptors where there existed a clear or partial view through to the crane and or site were assessed in more detail. Where a greater visual impact was anticipated more data and pictures were recorded to facilitate the montage process. Digital photographs were taken using a 50mm zoom lens, which captures an image comparable to that perceived by the naked eye.

Prior to the site visit a desk top assessment was made looking at aerial photography and cadastre information including contour information which provided enough evidence to suggest which receptors were more likely to possibly be visually affected by the development. Owners were contacted and made aware that the site visit was imminent and permission was sought to enter property to make the assessments. In all cases consultation took place at each site with owners and or interested parties and the methodology of the assessment was explained.

A site visit was undertaken on a clear afternoon of Thursday 6th December, 2007 between approximately 12noon and 7pm. The site was visited a second time on the 21 January 2008. The site is undulating between approximately 325 m AHD and 345 m AHD.

The crane was located in the position of the third stack using a global positioning system. Reference was then made back to the site, at immediate, middle and broad distance, both at public places (roads) and private residences which were identified initially on topographic maps and aerial photos and confirmed physically on site. All residents that were consulted were explicitly told that the position of the crane was only the site of the third stack and that there were an

additional three stacks that would be located on the site. Residents were also reminded that the tops of the stacks were approximately 6 m wide at the top, much wider than the arm of the crane.

At the time of the site visit a crane was located in the position of stack number 3 on the site for four main reasons:

1. To physically locate the development into its visual context, and
2. To identify the most sensitive receptors likely to be most affected visually by the power station, and
3. To facilitate in the later production of computer generated photo montages that would realistically reveal any visual impact likely to be caused by the development, and
4. To provide a reference point for the public to site the location of the power station and one of the stacks and get a limited idea of potential effects.

The intent of this assessment was to evaluate the potential visual impact of the proposed structures at immediate, middle and broad distances. The crane exercise helped to identify the most affected receptors. Pictures were taken along with GPS points of reference to facilitate the later production of photo montages to realistically reveal the impact of the power station from the most sensitive locations. Figure 1 depicts the project site and the most sensitive receptors are marked on this plan along with some other existing built forms which exist in the vicinity of the site.

A photomontage is the accurate placement of a 3D model into a photograph using advanced GIS, GPS and 3D techniques to simulate proposed conditions in a photo-realistic manner.

To construct the photomontages, a 3D model of the structures was built to-scale from CAD site layouts. The area's terrain was then created using GIS data. Photos were taken on-site and GPS coordinates recorded so the virtual objects could be placed at the same coordinates in the 'virtual world'. The real life camera settings were then mimicked with a virtual camera (e.g. same focal length, position, height from the ground). At this point, the virtual model and photograph matched key terrain and building features, thus confirming the accuracy of the data. The 3D model was textured using reference from photos of similar power stations to create a realistic look. Once the power station reached a realistic state, the virtual scene was lit according to the conditions in the photos using an accurate sun model based on the time of day and the GPS coordinates. Using digital painting software, the 3D model was then placed into the photo and details were added while combining the 3D objects with the photo. For example, trees in the foreground were masked to occlude objects behind them and the film grain is matched. This product was an image that was both accurate and visually appealing.

The photomontages presented with this report have been produced to visually present the view expected through to the site from the most affected receptors. The photomontage work is presented with the assumption that the power station

will be placed into the existing landscape on a leveled sited. Other changes to the landscape such as vegetation clearing have not been factored into the assessment and the recommendations will reflect this aspect.

Where the impact is considered manageable, recommendations have been made to reduce the visual impact of the development through the use of landscape remedies both on and off site as well as suggestions for material use for the structures themselves. Mitigation measures are detailed collectively in section 5.



IMAGE 1: Aerial map



PHOTO 1: View towards site from Keston Rose Garden Cafe



PHOTO 2: View fom Nanima House verandah

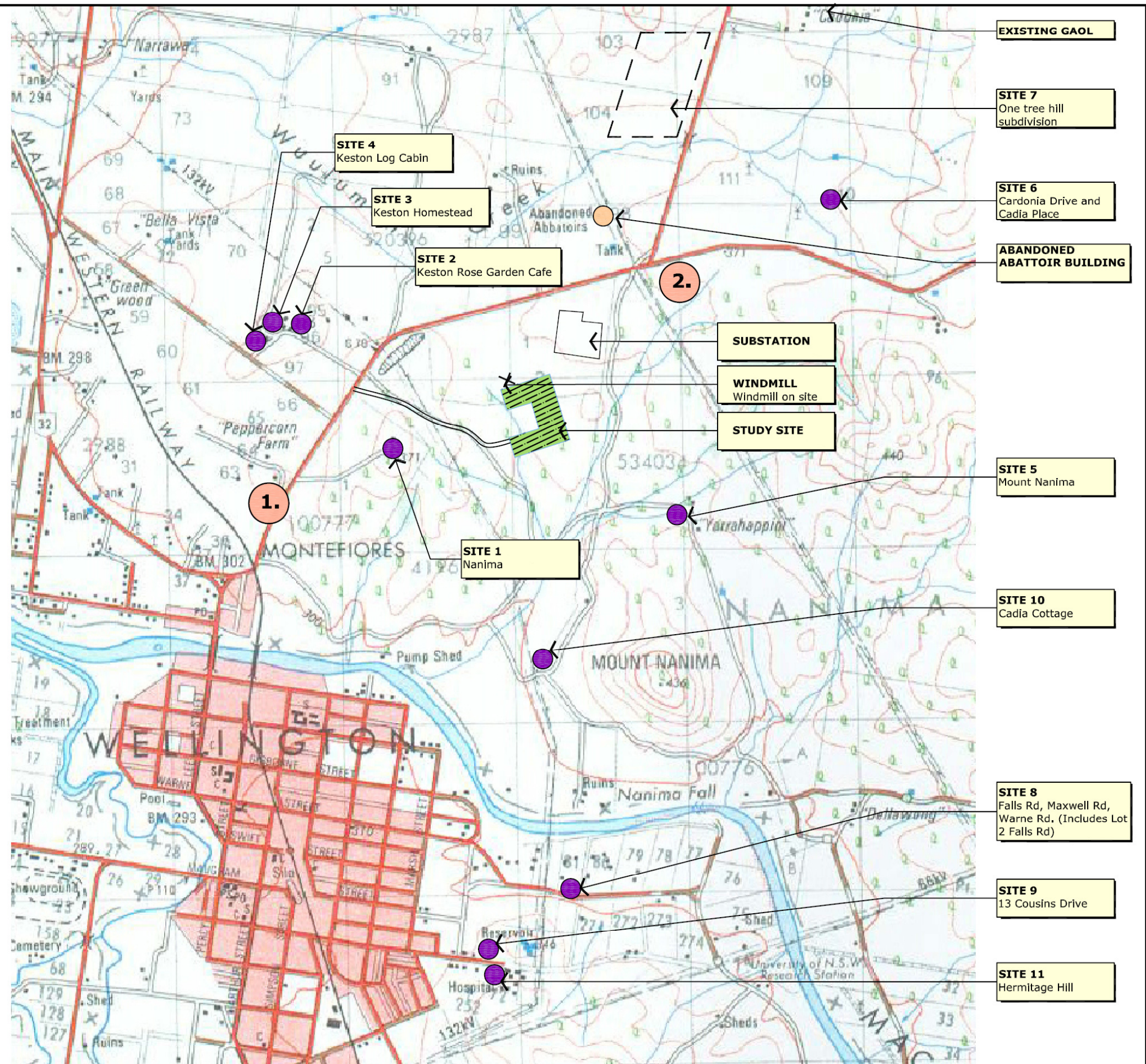


Figure 1: Location map

2.0 Context of the Project

2.1 *Visual Character and Significance of the Site and Surrounds*

To properly assess the visual character of the site and surrounds and consider impacts of the project the site and surrounds were separated graphically into close, middle and distant radius. Figure 2 details the site and its immediate surrounds. Figure 3 sets the visual context more broadly with the 1.5 and 3.5km radius. Elements of the project were then assessed within this context. Views through to the site from both public places and private receptors were analysed within the three visual radius areas (close, middle and broader distance).

The visual character of the site is one of pleasing rolling slopes and hills, which collectively form gentle folds in the landscape. Beyond this immediate landscape are more dramatic landforms and ranges which heighten the visual quality of the area. The landscape is scattered with mature remnant Eucalyptus trees that create informal patterns across the landscape with an absence of straight or contrived lines. Therefore the context of the study site has a high visual quality, whereby quality increases with the greater variation in landform, topography and mature vegetation.

The study site itself is part of a broader valley, between Mt Nanima to the east and the Catombal Ranges to its west. The functional character of the site and its context is agricultural with paddocks featuring both cropping and grazing as well as including the presence of several houses which is consistent for an area within close proximity to a town, the outskirts of which are only 2km south south-east of the site.

Within this otherwise picturesque landscape there are several built features that detract from its character and can be viewed from various points nearby and more remotely from the site. These include:

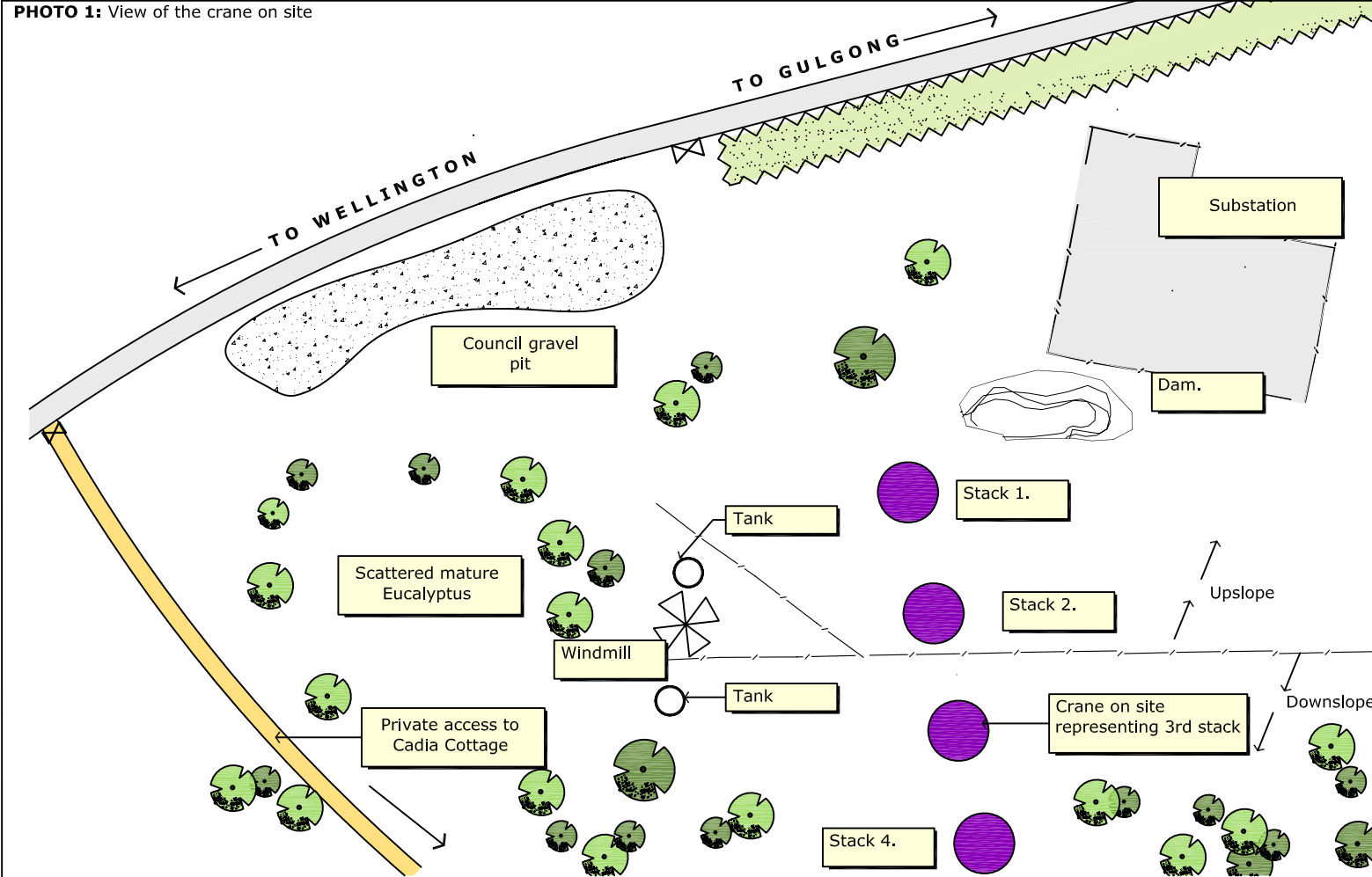
- the existing TransGrid substation immediately north of the power station site
- numerous heavy gauge power line structures running towards the site
- a new gaol which sets into the landscape as a broad and expansive grey roofed complex of buildings. The gaol site is not within the study area, however, the direction and distance to this complex is noted in Figure 1.
- an abandoned red brick building which was once an abattoir. This building is also noted on Figure 1.
- The existing quarry to the north west of the project site.

Other recent built developments along this road include the newer rural residential subdivision of Cadia Place and Cadonia Place (Site 6 – Figure 1), which feature 15 blocks. A further 42 x 1 ha lots have been approved at One Tree Hill to the north of Goolma Road, however, these have yet to be developed (Site 7 – Figure 1 also Figure 17).

There are no known special landscape values of the site itself and Aboriginal heritage surveys have confirmed that the site contains no items or sites of Aboriginal significance. As a landscape feature, Mt Nanima (436mAHD) is recognisable from a distance and acts as a marker in the landscape from within the town of Wellington as a distinct geographic feature on this side of the Macquarie River. A further hill to the north of the site, referred to locally as 'one tree hill' (414m AHD) also stands out from a distance. To the opposite side of the river (to the west of the study site) the Catombal Range runs in a north south direction with Mt Arthur (541mAHD) in a directly westerly location from Mt Nanima. Between these two features, the Macquarie and Bell Rivers form an important geographic feature regionally. Refer to Figure 4



PHOTO 1: View of the crane on site



NOTES

1. Windmill on site is shown on Topographic map as a point of reference.
2. Mature scattered remnant *Eucalyptus albens* trees through the valley. The trees are approximately 15-20m in height.
3. The valley itself is high in scenic quality, whereby quality Increases with that of greater variation In topography, landform and natural occurrences of mature stands of native vegetation. However the power station and subsequent power lines running through and around the site lessen the overall visual quality of the area.
4. The substation is evident from the road in glimpses, as a plantation consisting of maturing *Eucalyptus sideroxylon* and *Callistris endlicheri* are screening the development site.
5. Revegetation to the boundaries of the development site itself are to be included to aid in screening the development at its source.

Figure 2:
Power station orientation

Scale: NTS
Date: 15-02-08

2.2 Close Distance Visual Assessment from Public Road

From Gulgong Road heading north, the study site is obscured by the folds in the landscape, including the hill of Nanima House (371m AHD). The development site is tucked behind the existing substation which can be seen only in glimpses from this direction; the extent of the substation is not revealed from this direction as the long side of it is parallel with the road, at the point of a curve within the road. For the traveller, the curve in the road forces the view in a more north- western line towards the abandoned abattoirs buildings. The proposed position of the stacks is also set below the level of the road and an existing council gravel pit which exists adjacent to the road. There is a large area of dumped fill on this gravel pit site which helps to shield views through to the subject site. It is anticipated that these areas of fill, whilst ideally located to aid in screening the development, are not permanent features. It is predicted that when they are removed, the tops of the stacks may be more clearly visible whilst travelling along the road in a north westerly direction.

From Gulgong Road in front of the substation itself (with the study site behind it), maturing plantings of Black Cypress Pine (*Callitris endlecheri*) and Ironbark (*Eucalyptus sideroxylon*) with an approximate height of 8-15m screen the scale of the existing development and will also help to screen the proposed development. Glimpses of silver can still be seen through the trees as the canopy is above the height of the fencing around the substation. Additional mid storey plantings would aid in further screening the existing and proposed development.



Figure 3: Existing Vegetation in front of the Substation site

When travelling along Gulgong Road towards the site from the east, the traveller is more aware of the valley landform that the study site sits within. The road gently slopes towards Wellington and with it comes a sense of arrival to the township. The numbers of power lines are more apparent on this approach and as the eye follows the lines, the view often terminates back to the substation, which again is seen mainly in glimpses along the road. It is anticipated that the tops of the stacks as a backdrop of this view may also be seen in glimpses along the road, adding to the already visually intrusive nature of this existing development. Travelling closer into town, again the long side of the substation is screened with the existing vegetation, but also the areas of silver of the fencing can be seen in places.

The close distance visual radius is presented graphically in Figure 4.

2.3 Middle and Broad Distance (between 1.5 km to 3.5km)

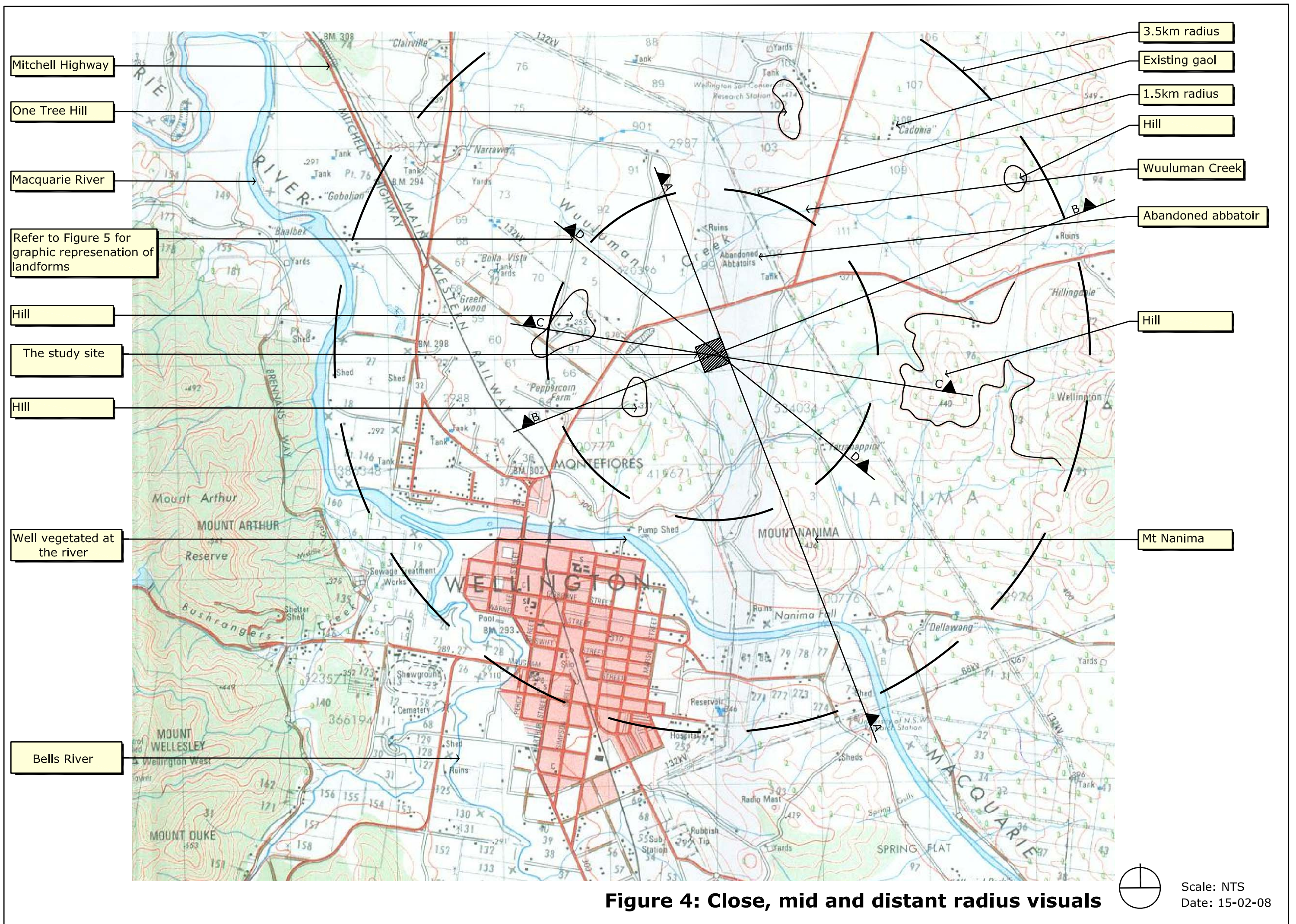
Individual residences and Hermitage Hill, which fall within this distance, are discussed separately under section 3. A new subdivision has also recently been approved for 42 x 1 ha lots (One Tree Hill) but until now undeveloped. These sites can be located in Figure 1.

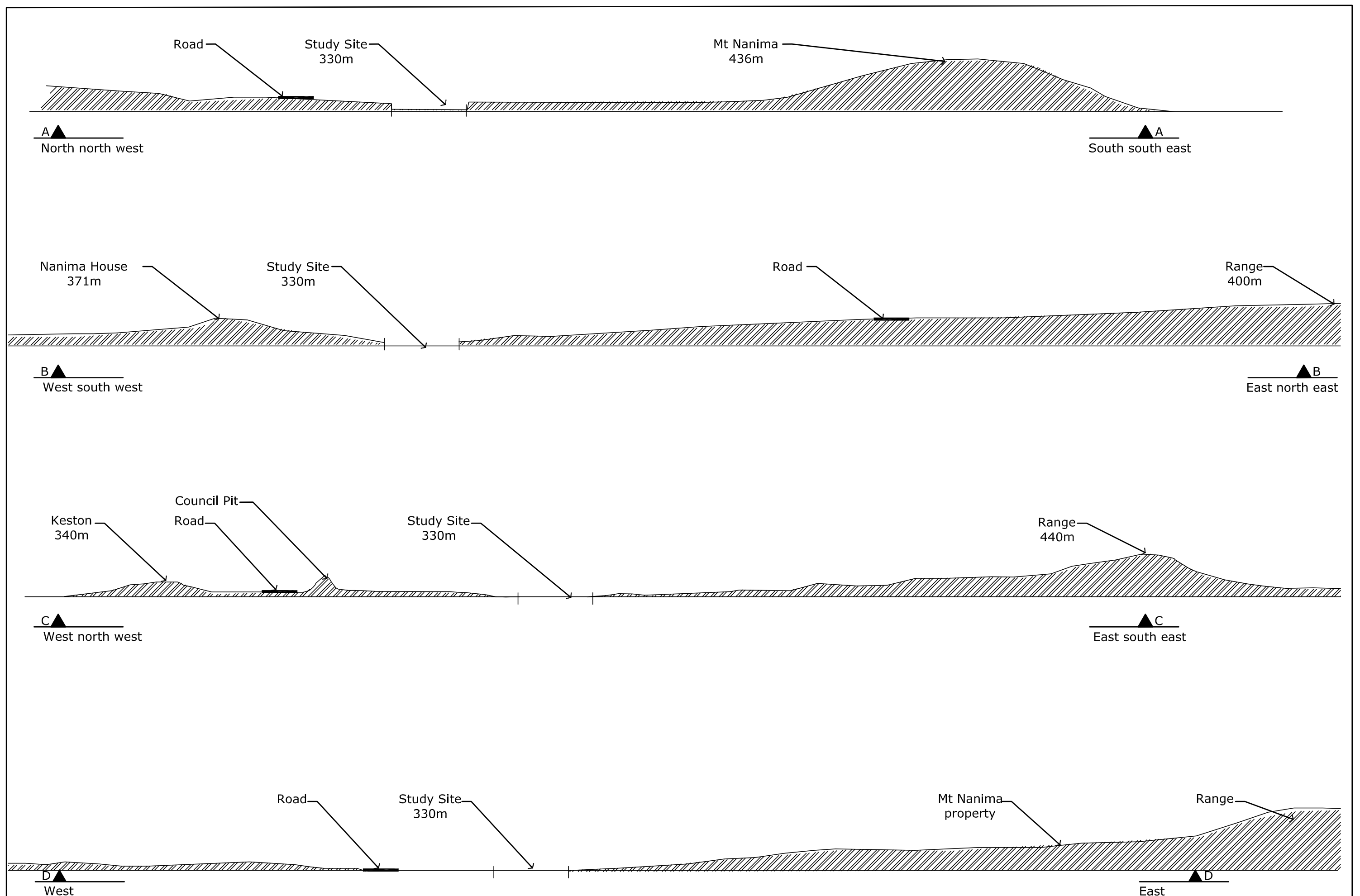
The visual catchment of the site at a broader distance is in certain places expansive, whereby it is likely that the entire development site will be seen, but it is mostly restricted due to landform and existing vegetation.

Within the township of Wellington, which is to the south south-west of the site, views from the river or within the main central commercial area are completely obscured by the vegetation along the river. Further up slope, on the western side of town, open views onto the site are evident from certain vantage points within the old hospital site at Hermitage Hill, at 346m AHD. Views from along Falls Road, Warne Road and Maxwell Road which are down slope from Hermitage Hill are all likely to have views through to the site from certain vantage points.

Views are unlikely onto the site from the Mitchell highway to the north west of the site as the Keston Hill area (371m AHD) to the west of the study site would block the development.

Views onto the study site from the Montefiores area are also unlikely as the Nanima Hill area (371m AHD) would effectively block the study site. Figure 4 presents the middle and broad distance visual radius graphically and also reveals the 4 cross sections which have been presented in Figure 5 to illustrate the varied topography of the landscape in context with the project site.





NOTES:
Refer to Figure 4 which depicts
the location and orientation of
the section lines.

Figure 5: Cross sections through the landscape

Scale: NTS
Vertical exaggeration = 10
Date: 15-02-08

3.0 Project Site Assessment

3.1 *Siting of the Power Station*

The siting of the power station is approximately 400m south of the road and south west of the existing substation. The site footprint and how the components are set into the landscape are depicted in Figure 6. Figure 7 depicts the site layout but also details the construction footprint which is significantly greater than the final development footprint.

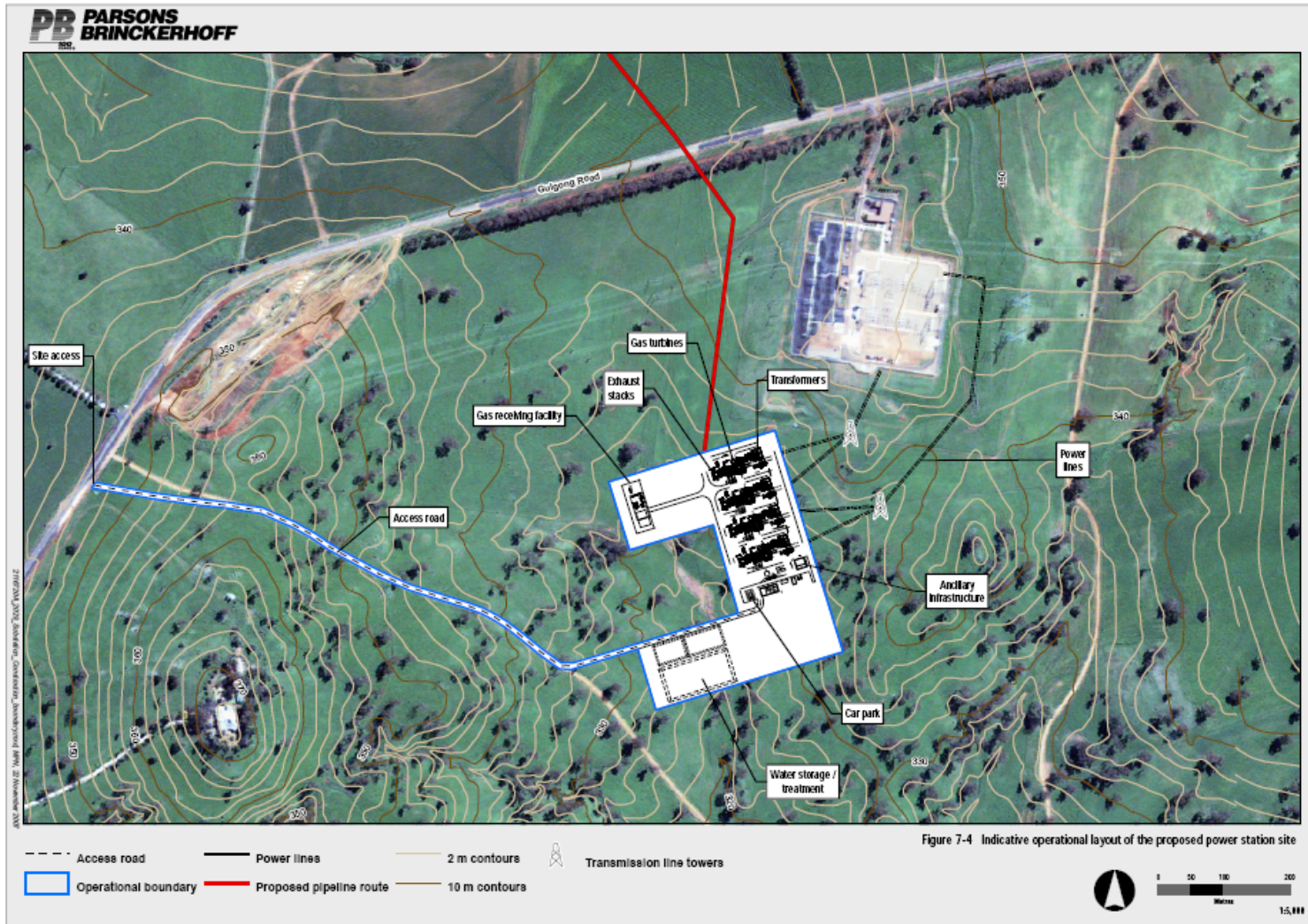


Figure 6: Operational Boundary of Power Station

Detail about the components within the layout is depicted in Figure 8. The more bulky aspects of the project include the four turbines which are encased within structures approximately 25 m wide and 10 to 21 m high. These turbines will be located at an RL of 331m are connected each to a 35 metre high stack which is approximately 6 m wide at its highest point.

The power station will connect to the substation via a short overhead lines comprising pole and lattice steel tower structures. Two lattice steel towers about 40m tall will be erected adjacent to the power station and joined the output of two of the generating units into a single connection.

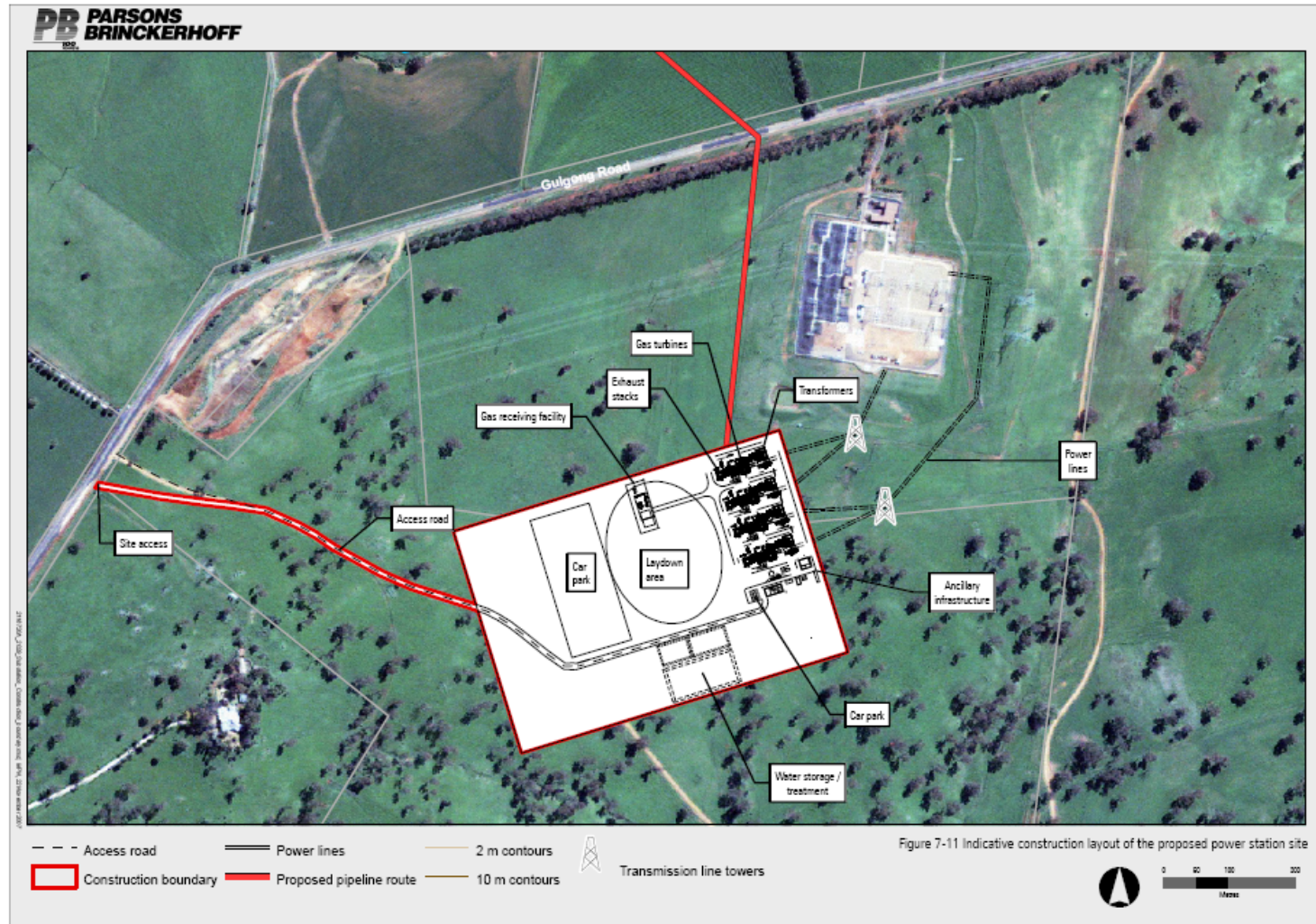


Figure 7: Construction Boundary of Power Station

PO Box 1417
Wagga Wagga NSW 2650
Ph: 02 6971 7799
Fax: 02 6921 1155
Email: nik@resolveplanning.com.au



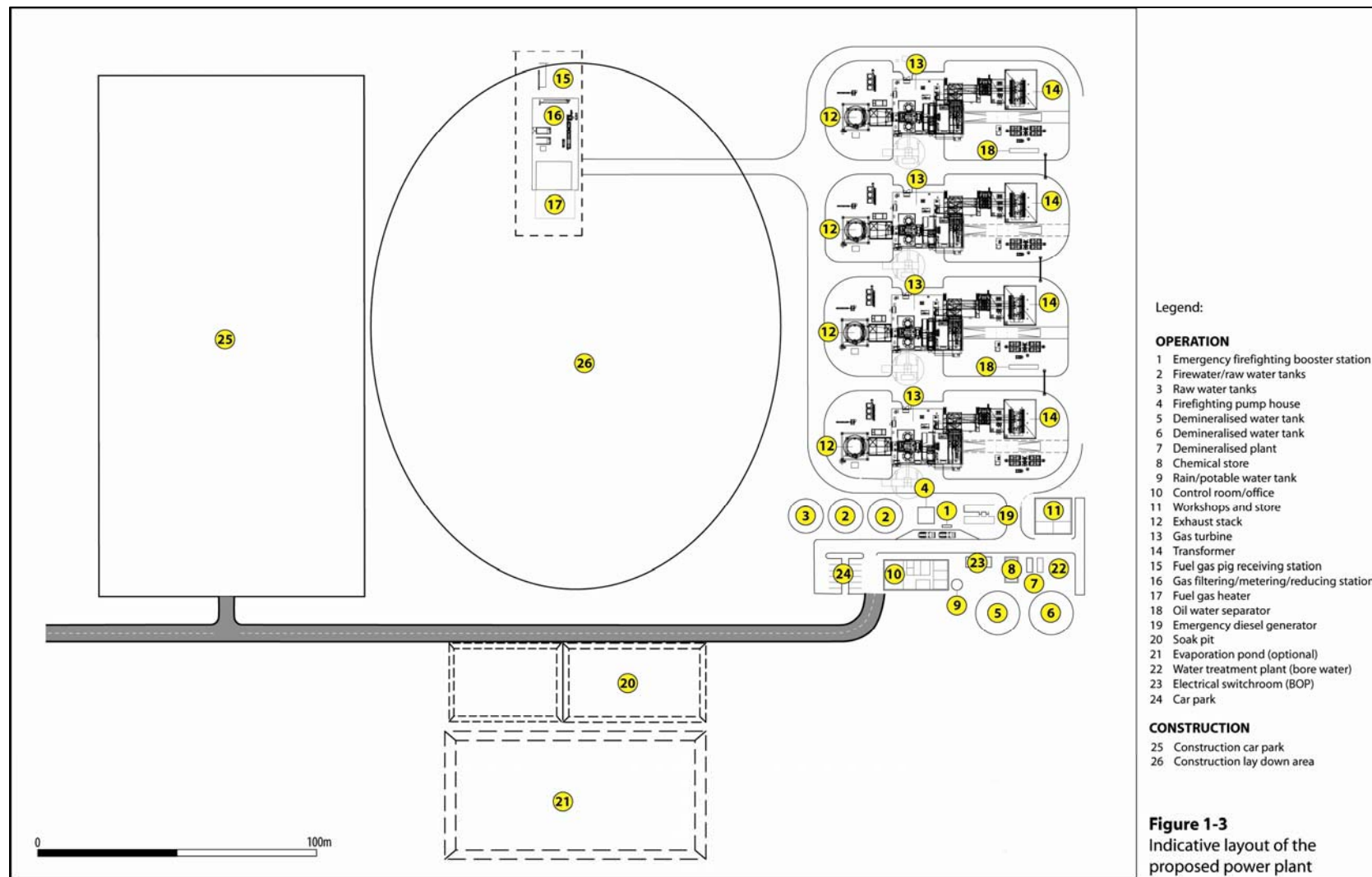


Figure 8: Indicative layout of the proposed power plant

3.2 Bulk, Scale and Appearance of the Development

The general appearance of the turbine and stack components of the development is depicted in the model below (Figure 9). The closest similar element in the agricultural landscape would include bulk grain silos which are approximately 20 m in height. It is suggested that materials with low reflectivity characteristics should be considered to reduce any potential glare from the structures, at immediate, middle and broad distances.

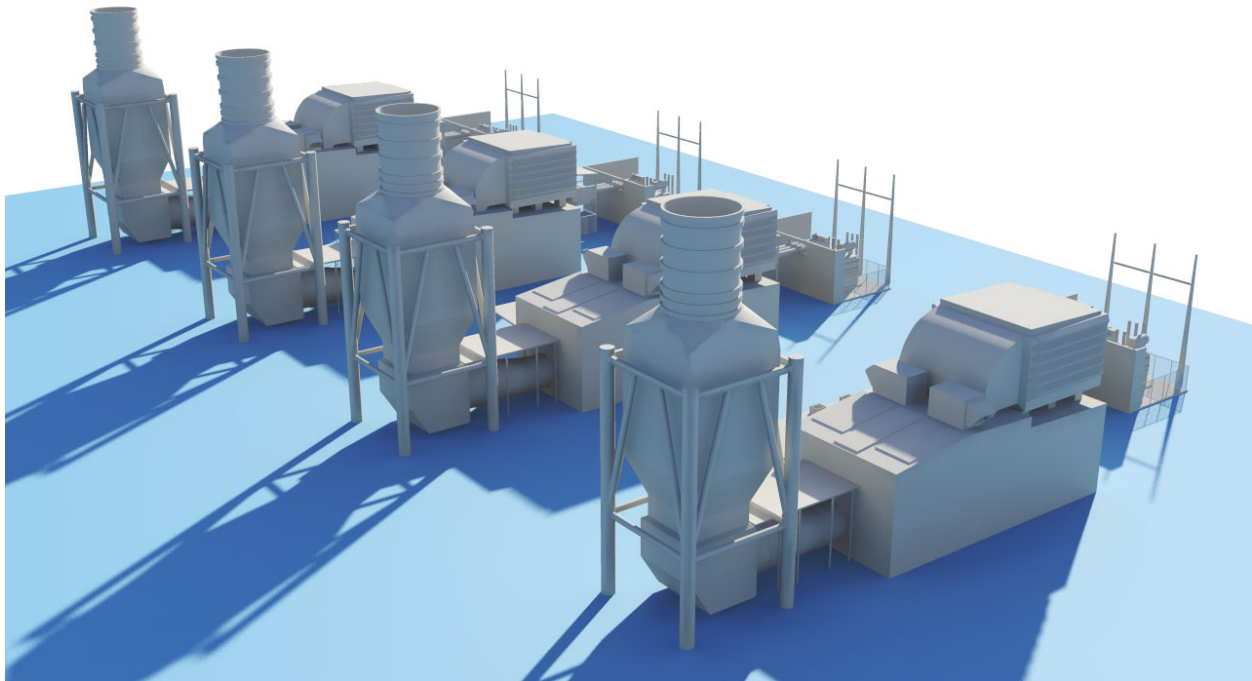


Figure 9: Model of gas-fired turbines that would be developed for the project

The heights of the proposed stacks at 35 m are in excess of the mature heights of the vegetation within and around the power station site, which are estimated at heights between 15 and 20m. The scale of the existing power poles running through the study site are either 27 m (H Towers) or 41 m (steel towers). The windmill within the study site itself is 8.5 m in height.

The relationship of scale and height between these elements will be altered depending on where they are located in relation to the proposed stacks, e.g. up slope or down slope. The height relationship between these elements is illustrated in Figure 10.

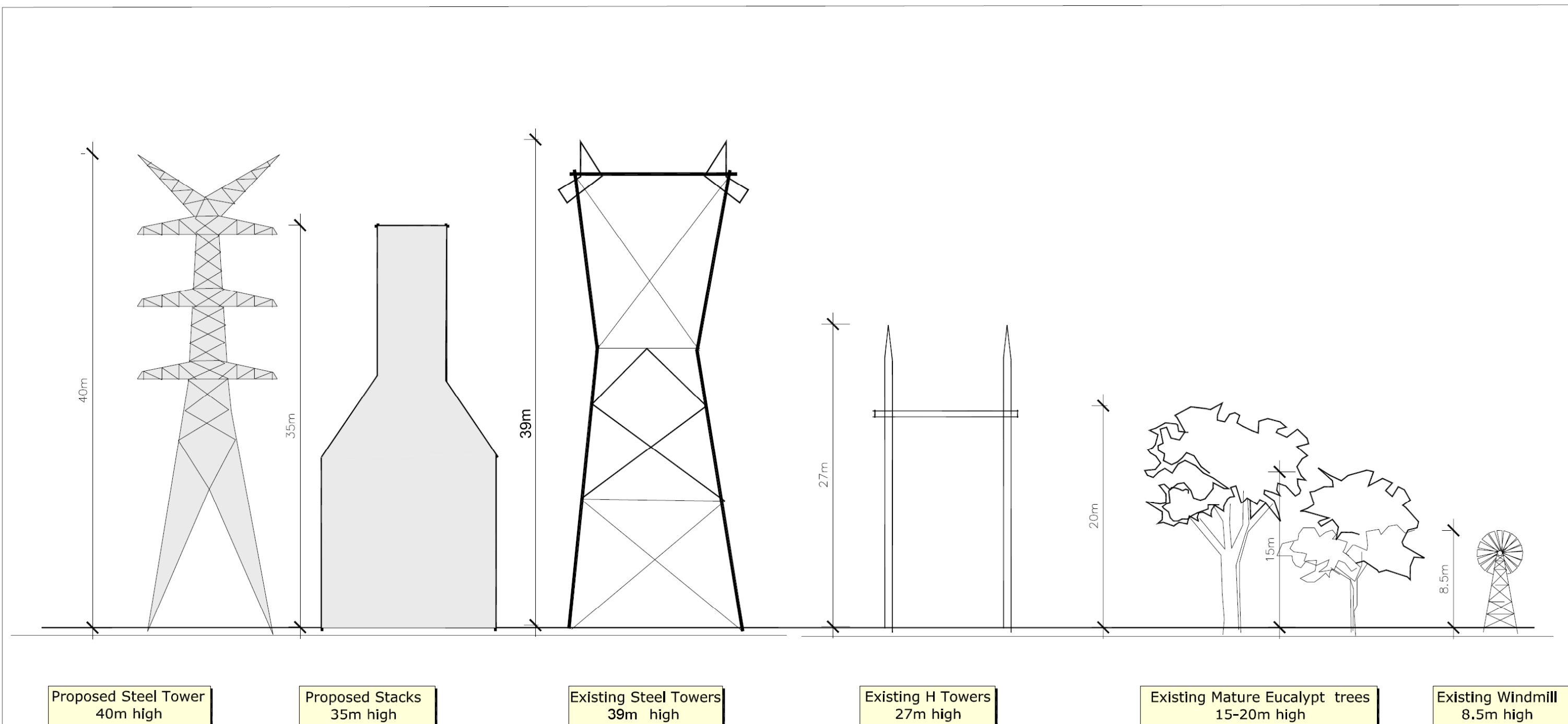


Figure 10: Vertical elements in the landscape

Scale: NTS
Date: 21-02-08

3.3 Skyline and Tree Line

As the development is sited in a vegetated valley, its impact on the skyline is less than if it were located on a treeless hill. The ability to view the site from a lower point, whereby the site would be up on the horizon is at best possible from the Cadia cottage site which can be located in Figure 1. Cadia cottage is down the valley to the south west of the site. The existing mature vegetation between this area and the proposed development site aids in obscuring almost the entirety of the stacks as only a glimpse of the top section of the crane could be seen.

The informal patterns of existing vegetation at varying heights of between 15 and 20m form a diverse tree line which from most vantage points forms the middle ground view with a higher landform behind it, as is illustrated at the sections (Figure 5).

The ability for this landscape to absorb the visual impact is greater than say a treeless flat site.

Due consideration should be given to the conservation and protection of as many trees as possible in and around the development site. Especially during the construction stage, care should be taken to avoid clearing vegetation for temporary components of the project such as the carpark and construction lay down area. (see Figure 7).

4.0 Visual Impact Assessment of Sensitive receptors

Initial investigations into the visual impact assessment revealed 10 sensitive receptors which would potentially be visually impacted by the project. These sites were more closely investigated on the day of the site visit. Observations were made as to whether the crane could be sited from the receptors and GPS locations were taken to facilitate an electronic recreation of the power station model which could be dropped into a photograph of the view from the receptors to see what the actual impact would be.

The closest receptors are mapped and shown in Figure 11.

The site visit concluded that four of the 10 sites were the most likely to be affected and these were the sites for which photo montages have been created. These locations are depicted in Figure 12.



Photo 1: View from Keston Rose Garden Cafe



Photo 2: View from Keston homestead



Photo 3: View from Keston log cabin

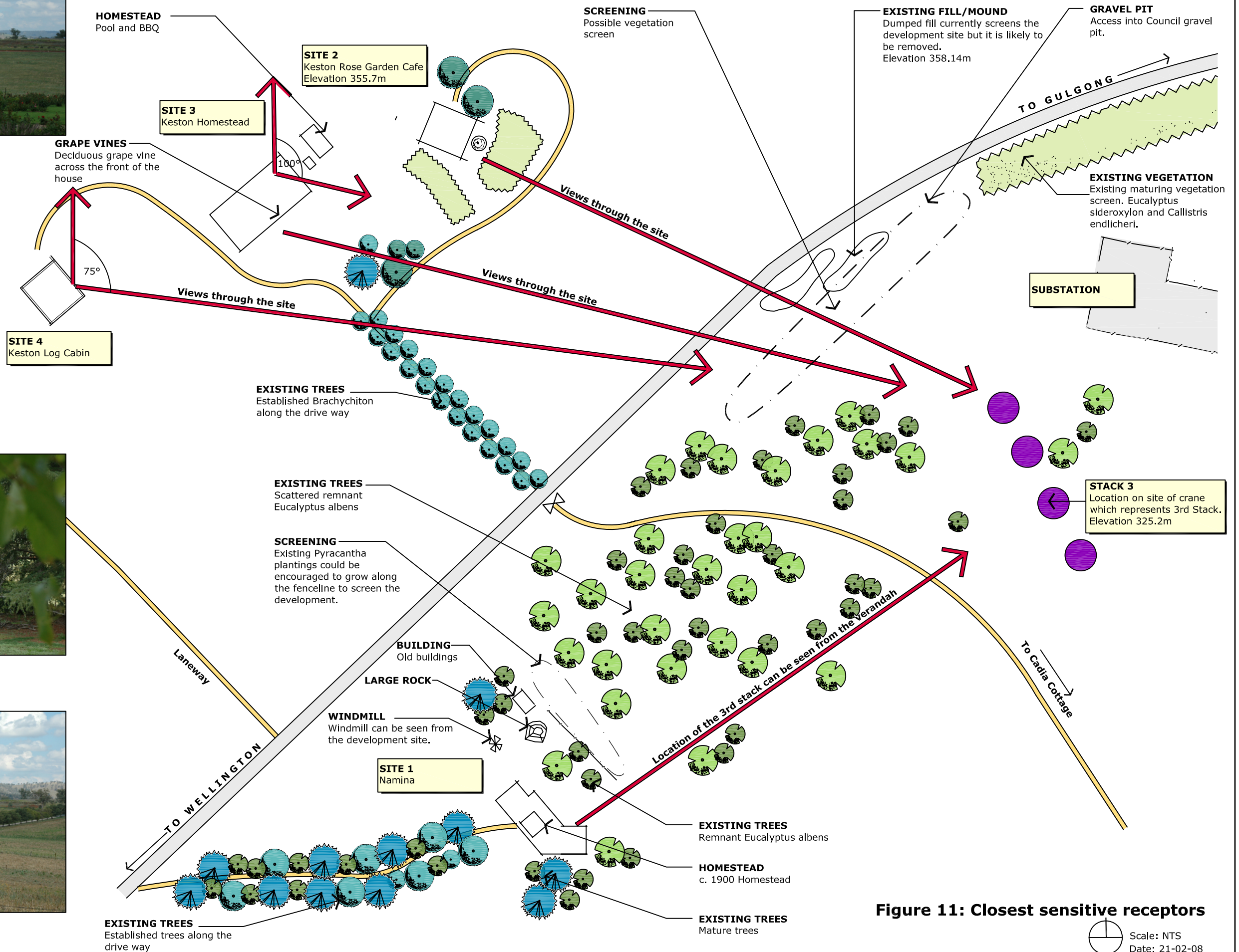


Figure 11: Closest sensitive receptors

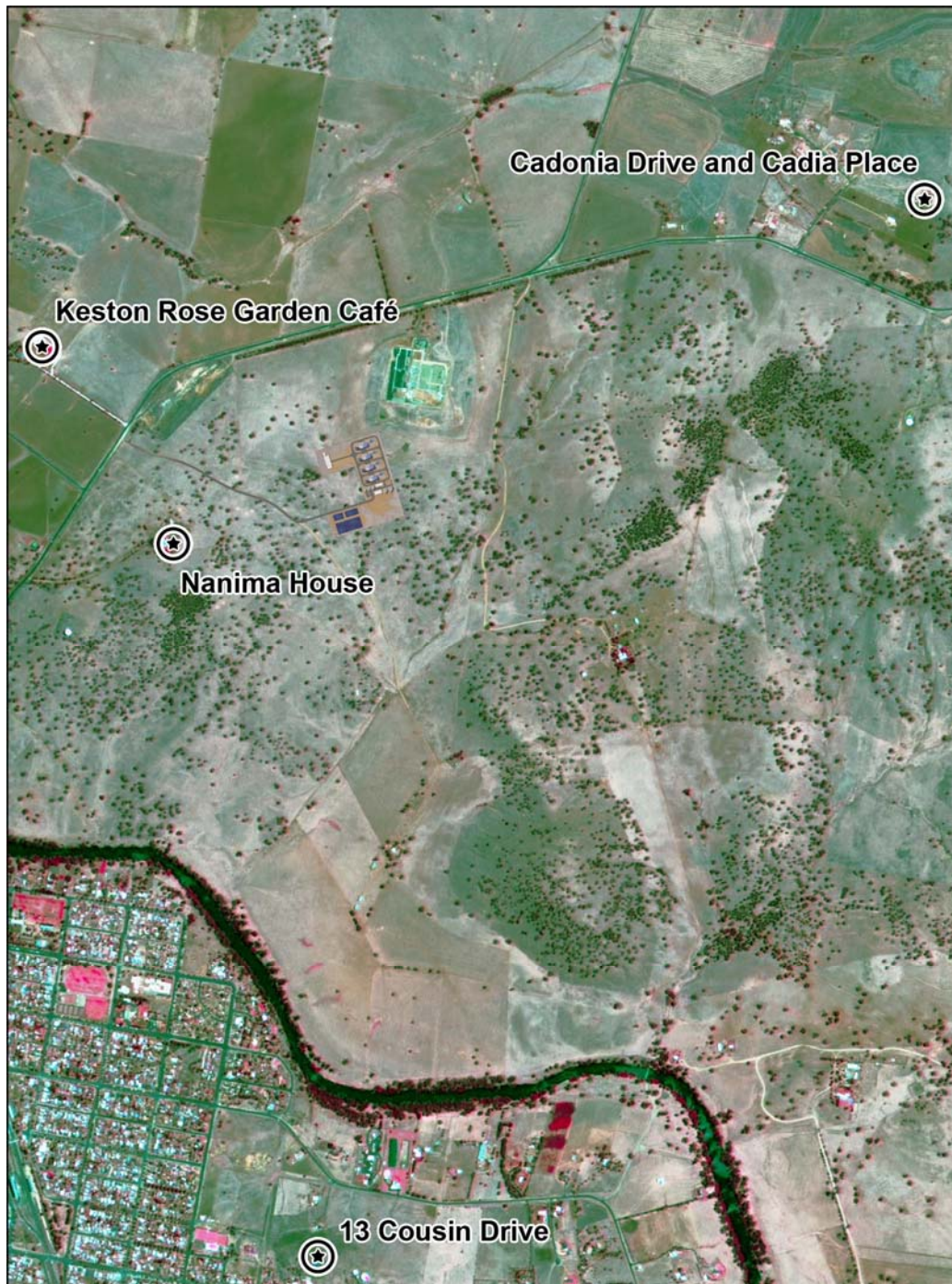


Figure 12: Aerial photograph depicting locations sensitive receptors for which photomontages have been created

4.1 Site 1 Nanima House

Nanima House is an impressive Edwardian building (est.c.1907), noted in the Local Heritage listings as 'one of the most interesting and intact examples in New South Wales.' The building has impressive proportions replete with high ceilings and generous verandahs as well as a large top lit central living hall. The building is set within an established garden that features mature trees, including a trio of remnant White Box (*Eucalyptus albens*) to the north of the house. The driveway also features mature trees such as Kurrajong (*Brachychiton populneus*) and Silky Oak (*Grevillea robusta*). A subsidiary building and windmill are set in the garden to the east of the main homestead. The windmill can be seen from the development site. The building is depicted in the vicinity of the Power Station Site in Figure 12 and the orientation of the view through to the site can be seen in Figure 11.

The homestead is upslope (371m AHD) to the south-west of the development and approximately 700m away. The crane was not visible from the north eastern corner of the house due to topography and the scattered mature Eucalyptus trees that exist within the paddock below the house. From the angled section of the verandah to the western end of the house, approximately the top third of the crane could be seen. A Photo Montage (figure 13) has been prepared to demonstrate the anticipated view through to the power station from this location. The montage demonstrates that all four stacks of the power station are partially visible from the verandah to the residence. While this view will possibly be the most clear and certainly the closest view of the project, it was noted that the location on the verandah was not an outdoor entertainment area and there were no windows from the house taking advantage of this view at this point. As no major living areas or outside entertainment areas appear to actively enjoy this vantage point, it was considered that only minor landscaping works would need to be taken to mitigate this view.



Figure 13: Photomontage of the proposed power station from Nanima House.



Figure 14: The location on the verandah where the picture was taken. Note no windows or views through to the site from within the residence.

4.2 Site 2 Keston Rose Garden Cafe

The three Keston receptors can be located on aerial photograph Figure 12 and their view lines through to the site can be observed on Figure 11.

The Keston Rose Garden Cafe is a relatively new development (c2005) to the western side of Gulgong Road at approximately 355m AHD. It is approximately 1.5km to the west north west of the development site. It has been purpose designed as a café with wide verandahs along the north and east of the building. The building is set within an impressive rose garden which features maturing trees and a centrally located water feature. The shared driveway between the tea house and the homestead features a mature avenue of Kurrajong (*Brachychiton populneus*). Views from the building feature the top section of Mt Nanima to the south east, cluttered views to the west due to the existing power substation, open views to the north across the surrounding pastoral landscape and enclosed views to the south due to the prolific rose gardens and arbors.

The building is at approximately the same height as the proposed development site and the top of the crane could be seen from the eastern facing verandah. A photo montage was recreated at this point (Figure 15) and only the top ¼ of one stack could be seen from this location. It is noted that the mound of soil in the middle ground is only a temporary mound and the view of this stack and possibly one other may be opened up if this mound is removed.

Landscape mitigation measures have been suggested both at the receptor and on site to mitigate the view from this location. An important element in the current screening of view through to the site from the Café includes the dirt

mound within the council gravel pit area that exists between the project site and the Café property. The applicant should seek Council's approval to either purchase this property when the gravel pit is no longer required or at least plant out part of the gravel pit site, or private land directly behind to ensure that views do not further open up to the development over time.



Figure 15: Photomontage of the proposed power station from Keston Rose Garden Café

4.3 Site 3 Keston Homestead (also known as Bella Vista)

Keston Homestead is accessed via the same Kurrajong flanked driveway as the café. It is an example of Victorian Italianate style, built in (c.1900) by Nancarrow who was prominent in the development of the town and district of Wellington. The homestead features verandahs to the east and northern side of the building as well as a foundation stone that shares the same detailing as others at the Old Hospital Building. A pool and BBQ area are to the north of the house and the café (Site 2) is also to the north of the house beyond plantings to the boundary of the homestead block. The garden features mature trees and plantings including an individual Pine (*Cedrus sp*). and overgrown Grape vine (*Vitus vinnnifera*) along the east facing verandah.

The house is slightly more elevated than the café and appears to be parallel to the road (the café is skewed more to the north). The top third of the crane could be viewed from two areas along the verandah, although during summer when the vines are rampantly growing the view is diluted. It is anticipated that similar proportions of the other stacks may be seen from this site.

A montage was not considered necessary from this location due to the existing vegetation in the Keston garden which well screens the site from the dwelling.

4.4 Site 4 Keston Log Cabin

The cabin is accessed via the same road as the café and homestead. It is a new house and at this stage has a minimal garden. The cabin is set at a slightly lower elevation than the homestead, which is probably similar to the café. The crane arm could be easily seen from the front of the house and it is anticipated that the remaining stacks would also be seen from this site.

Again a montage was not considered necessary as the suggested treatments to remedy views through to the site from the Keston Rose Garden Café will equally facilitate the reduction of view from the Log Cabin.

4.5 Site 5 Mt Nanima

The entrance to Mt Nanima is approximately 1 Km to the north east of the development site, which is situated just prior to the fork in the road to Gulgong. This receptor can be viewed in context with the project site on Figure 12. The driveway into the site is scenic as it travels along a valley featuring mature remnant stands of Eucalyptus albens. The scenic quality of the site is disturbed by the three sets of transmission lines that traverse the drive within the space of 500m as well as open views onto the substation both on approach and departure to the homestead. The crane was visible from the entrance and as such, the stacks will also form part of the visual disruption on approach and departure from the Mt Nanima House.

The house of Mt Nanima exists further down the valley which features a mature garden and solid fence to the northern side of the house. Assessment has confirmed that the power station would not be visible from this location.

Mitigation measures are recommended for the driveway section into the Mt Nanima property and can be viewed on Figure 22. (see section 5)

4.6 Site 6 32 Cadonia Drive, Cadia Place and One Tree Hill Subdivision

These streets are part of the newer subdivision area to the north east of the development site on the opposite side of the road.

The highest dwelling facing in a south westerly direction is #32 Cadonia Drive. There is a clear view from this vantage point across the top of the subject site through to Nanima House. A ridgeline with trees is located between this site and the power station site that masks the view through to site. Figure 16, reveals that in fact the existing vegetation and ridgeline will fully screen the

development from view. An assumption was made that if the crane and the taller existing transmission towers were not visible from this high point, the dwellings set down slope would be less likely to see the development.

There is still a possibility that glimpses of the site and development may be seen along Cadia Place, however it is not anticipated that these views will present an issue that requires mitigation measures.



Figure 16: Photomontage of the proposed power station from Cadonia Drive.

Consultation with Wellington Council revealed that the Cadonia Drive Development had not reached its full potential when the Gaol purchased the adjoining land. The land was subsequently zoned 1(a) Rural and there will be no further rural residential development at this location. However, land further north known as One Tree Hill (also known as Westerns) subdivision has been rezoned to permit 42 x 1ha lots. A picture across this site and towards the project site was taken and it is likely that glimpses of the development will be seen from this location (refer to figures 17 & 18). However, as no receptors currently exist it was considered unnecessary to make further assessment and recommendations for this future subdivision.

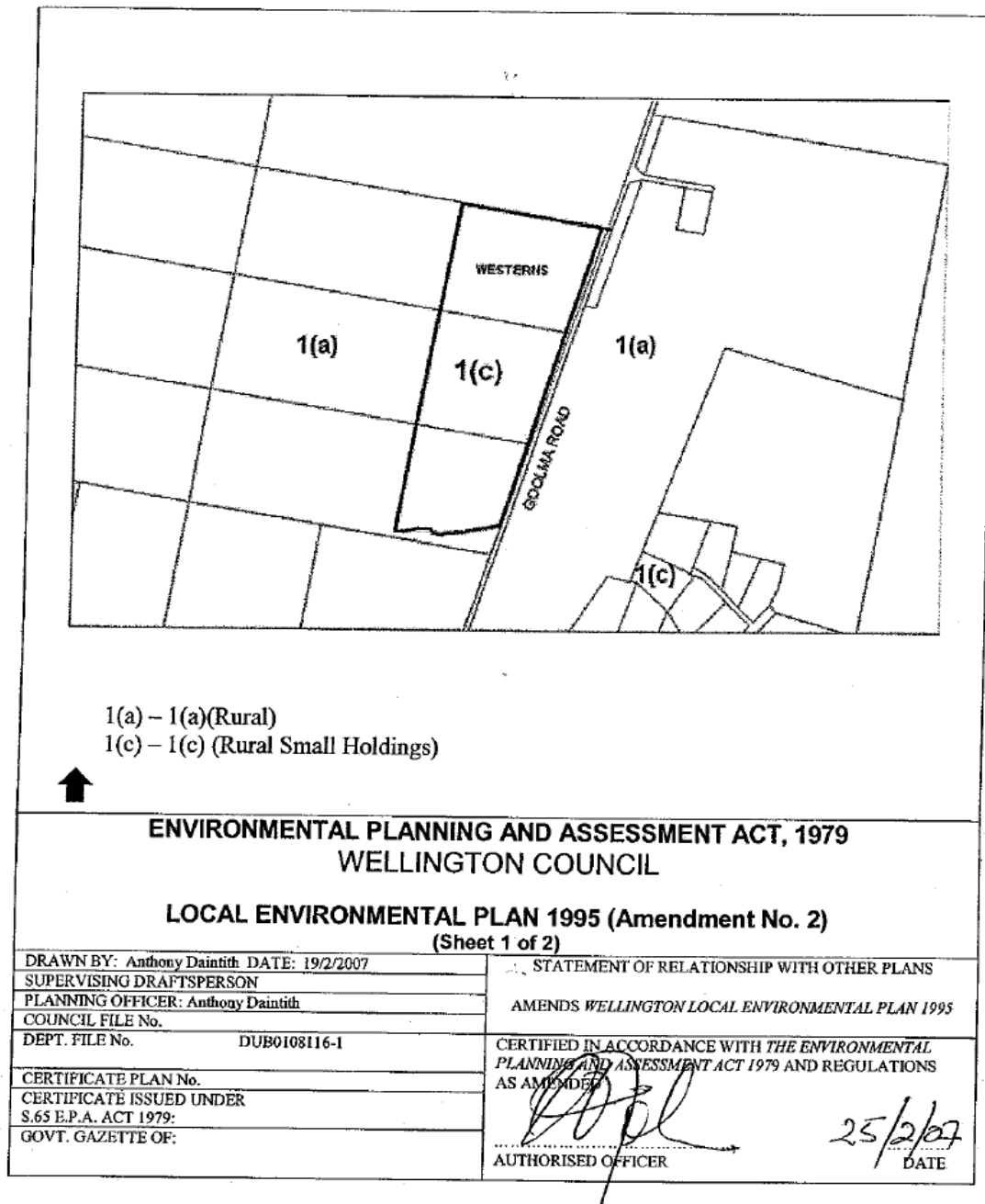


Figure 17: One Tree Hill / Westerns zoning



Figure 18: One Tree Hill Subdivision, Nanima House in background on hill. Abattoir building to the right of the picture.

4.7 Site 7 Falls Road, Maxwell Road and Warne Road

The top end of Maxwell Street (down slope from Hermitage Hill) is likely to have houses with rear views facing north towards the study site. Glimpses from Falls Road is likely to be possible through to the site from along the road, although vegetation associated with the river corridor is likely to screen much of the development.

One site visited was Lot 2 Falls Road, where the crane could be seen, but due to the angle that the development is viewed from at this position, it is more likely that only one or two stacks would be visible.

Due to the greater distance between the site and these vantage points it is suggested that informal mitigation measures are offered on an as needed or required basis. Within a specified period of time during and post construction, homeowners could seek trees and shrubs to be supplied by the developer to plant out in their garden to help mitigate views through to the site. This would be similar to what Transgrid offers to people affected by views through to transmission towers.

4.8 Site 8 — 13 Cousin Drive

13 Cousin Drive is situated on the eastern side of Wellington, just down slope of Hermitage Hill. The house, pool and entertaining area are all facing north towards the site. The view catchment is broad from this site, including Mt Nanima, 'One tree hill', the township of Wellington and the Macquarie River below. This site is located on Figure 12.

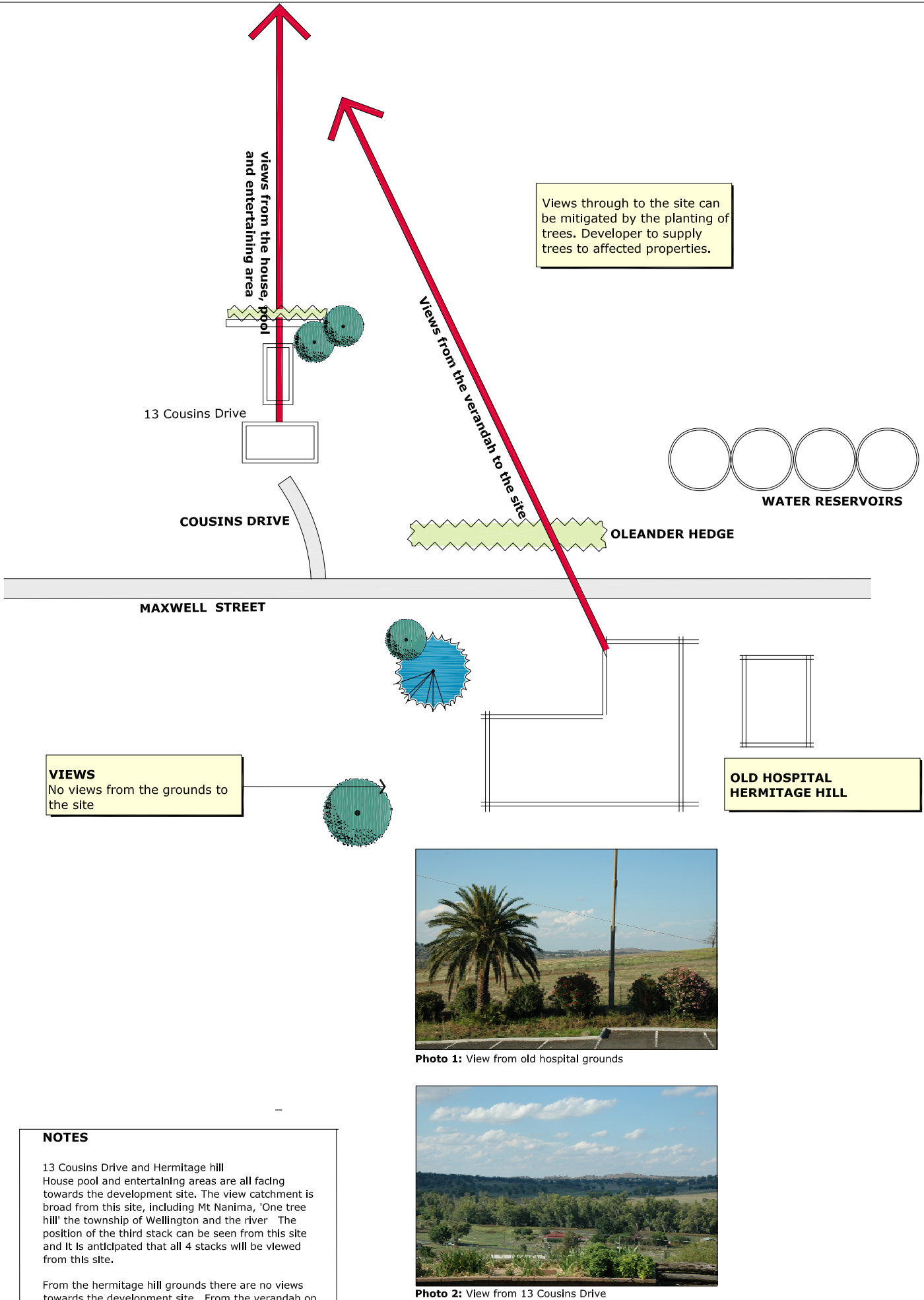
The position of the third stack could be clearly seen from this site and as expected the photo montage (figure 19) reveals that all 4 stacks will be viewed from this site. The view however, is from a considerable distance and is partially screened by mature vegetation. It was also noted on site, that a vacant block just down slope from this site was soon to be developed as a house site.

The views and relationship of Site 8 and 10 are depicted on Figure 20. Figure 20 also notes some other areas which could be planted out to reduce visual impact. However, these areas are neither on the project site or the receptor site. Negotiation would have to take place with other land holders to achieve this outcome which may be difficult.

Similar to the site 7, Cousin Drive and other similarly affected residences may seek the developer to supply trees to facilitate mitigating the view through to the site.



Figure 19: Photomontage of the proposed power station from 13 Cousin Drive.



NOTES

13 Cousins Drive and Hermitage hill House pool and entertaining areas are all facing towards the development site. The view catchment is broad from this site, including Mt Nanima, 'One tree hill' the township of Wellington and the river. The position of the third stack can be seen from this site and It is anticipated that all 4 stacks will be viewed from this site.

From the hermitage hill grounds there are no views towards the development site. From the verandah on the north facing building views to the site are possible. It is assumed that the views from the building are important historically and as such It is proposed that a more concentrated effort is included to screen the development on the actual site.

Figure 20: Landscape remedies Cousins Drive



Scale: NTS
Date: 21-02-08

4.9 Site 9 Cadia cottage, part of the Macquarie Stud

The cottage is accessed off the Gulgong Road just to the south of the existing substation and site of the proposed power station. The cottage is sited down slope of the development site, through several paddocks.

During the site analysis, the cottage was visited and the top half of the crane could be seen from the site, above the mature Eucalyptus south and downward slope of the development site.

Due to this site being located downslope of the development and the fact that the small cottage is orientated away from the development the anticipated effect of the power station is considered minimal and definitely manageable. Paddock trees could be strategically planted between the house and the power station site and would provide a visual impact solution within the shortest period of time.

4.10 Site 10 Old Hospital Site

The hospital site, known as Hermitage Hill is located on a hill to the south of the development site on the other side of the Macquarie River, above the township of Wellington. Hermitage Hill is a registered Heritage Trust Building and is 16 acres in area. This receptor can be seen in relation to the project site and other receptors in Figure 12. The orientation of the building and viewlines through to the site are depicted in Figure 20.

The main building's north facing balcony has views towards the site and approximately half of the crane's height was visible. From the grounds themselves and from other buildings on site, the crane could not be seen as the hill in front of the hospital (which features the reservoir) screens the development site.

This building was chosen for further assessment not because the view was any greater or more direct than other vantage points from Wellington Township but due to the heritage significance of the site. However, given the distance from the power station and the fact that views to the site were only from one balcony within the Hermitage complex the conclusion was drawn that the effect was minimal and no specific mitigation measures are proposed for this receptor site.

5.0 Visual Mitigation Measures

The majority of recommendations below relate to the planting of trees and shrubs that will aid to mitigate the visual impact over time. In this regard it is best to plant endemic species that are hardy in the local climate. Appendix 1 outlines a list of suitable species and Appendix 2 attaches the brochure from the Bird on a Wire program.

The Bird on a wire scheme is one between Transgrid and Greening Australia which involves the production and distribution of a series of brochures recommending suitable species for planting across southern New South Wales and identifies the local native birds that could be expected to benefit from these plantings.

5.1 On and near Site

- Under plant existing trees with mid storey shrubs in front of the substation as far west as possible.
- Liaise with Wellington Shire Council regarding utilisation of the quarry site for vegetation planting to visual screen the proposed power station site. Utilise. Include the area directly behind the quarry which includes the small hill with an elevation of 350m AHD
- Encourage regeneration of existing vegetation on project site by removing all grazing pressure to the power station site itself. Include additional plantings in informal groupings which are reflective of the existing vegetation character.
- Include an additional grouping of vegetation on the Gulgong Road between the Mt Namina driveway and the existing plantings fronting the substation. (See Landscape concept Figure: 21)
- Liaise with Transgrid regarding tree and vegetation plantings under and around power lines (see Appendix 2: Bird on a Wire)
- Include planting to the site itself to aid in ameliorating the visual impact of the development at a broader visual catchment scale (see Landscape concept Figure 21).
- Prior to the construction stage, a tree management plan should be lodged and approved by the consent authority showing that all due care is being taken to avoid clearing vegetation for temporary components of the project such as the car park and construction lay down area. (see Figure 7)

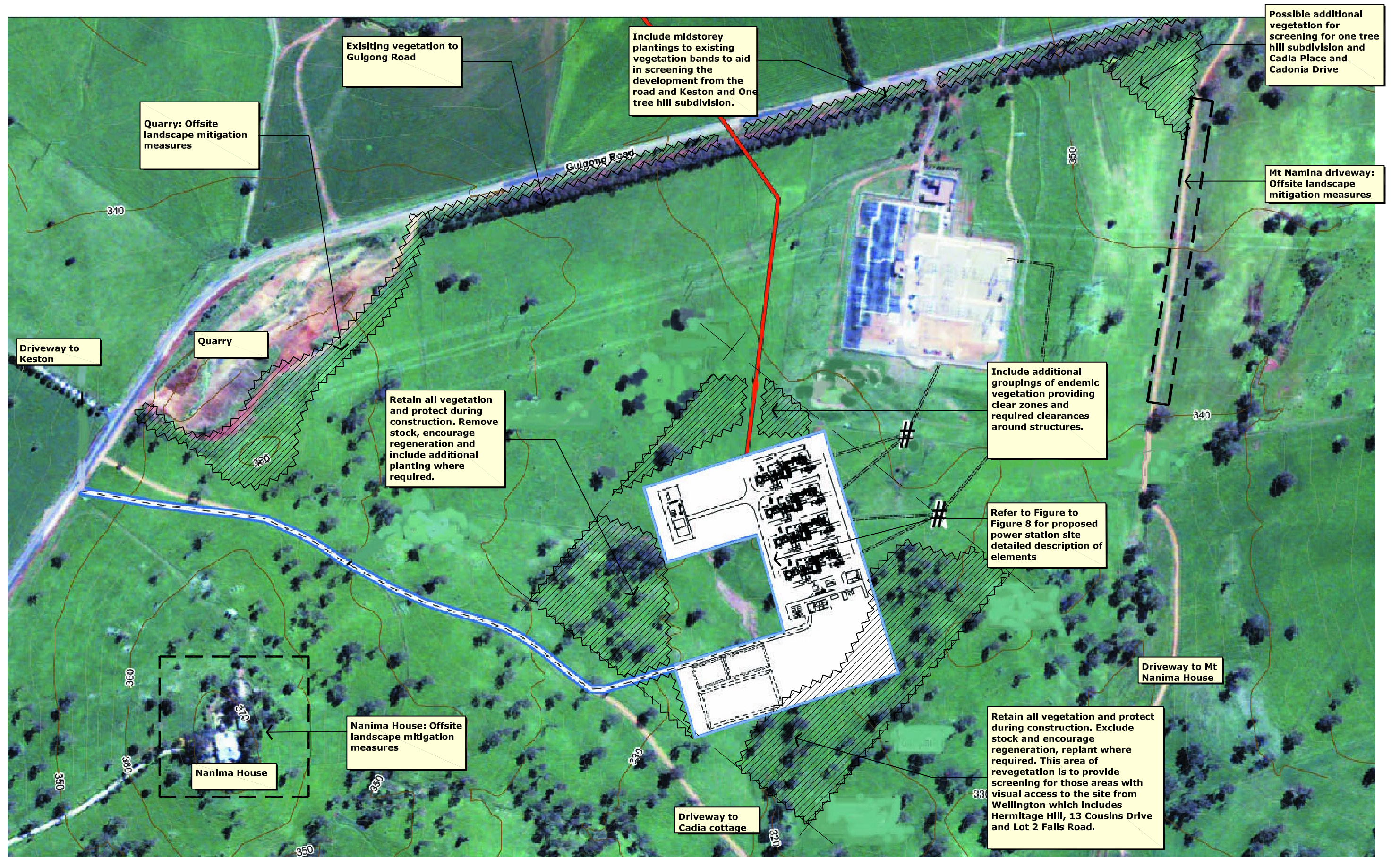


Figure 21: Landscape Concept

- Use neutral colours with low reflective quality for the power station infrastructure. It is considered that darker colours generally blend well with the landscape particularly at distance. Suggested colourbond colours include Ironstone Blue (for features) and Matt Grey (for the bulk of the station) for the bulk of the power station is recommended.
- Ensure a minimalist approach is taken to external lighting to achieve safety and security on the development site but minimise off site impacts to receptors as well as conserve energy.

5.2 Off Site

The type and style of offsite plantings and other mitigation measures would be determined in consultation with residents / owners of the sensitive receptors. Similar consultation would be undertaken with Transgrid and Wellington Shire Council and any other third party owners. The following recommendations are considered appropriate:

Site 1: Nanima House:

There is an old segment of *Pyracantha* hedge to the boundary of the garden which could be encouraged to grow in front of the existing mature *Eucalyptus albens* to screen out the development, but the historical connection between the homestead and the landscape may be severed by this. Additional strategically placed scattered trees beyond the garden fence in the paddock may be more effective at screening out the development site.

Recommendation:

- Encourage hedge growth to the eastern side of the Nanima House, to a height of 3 to 5m to reduce views through to the site.

Site 2: Keston Rose Garden Café

- Three to 5 row plantation on the western side of the council quarry as well as the land immediately behind the quarry (see Landscape Concept Figure 21), which appears to be located at a slightly higher elevation than the cafe.

Site 3 and Site 4: Keston Homestead and Log Cabin

- As per the café proposals and perhaps some individual plantings of evergreen trees in the position where there are currently an Ash (*Fraxinus* sp.). To continue the pine theme, *Cedrus atlantica* could be included, although they are slow growing.

Site 5: Mt Nanima

- Tree and shrub planting in a single row to the western side of the Mt Nanima farm driveway as per the following landscape concept. Protect

and enhance vegetation to the east of the project site which will further mitigate the view from Mt Nanima property.

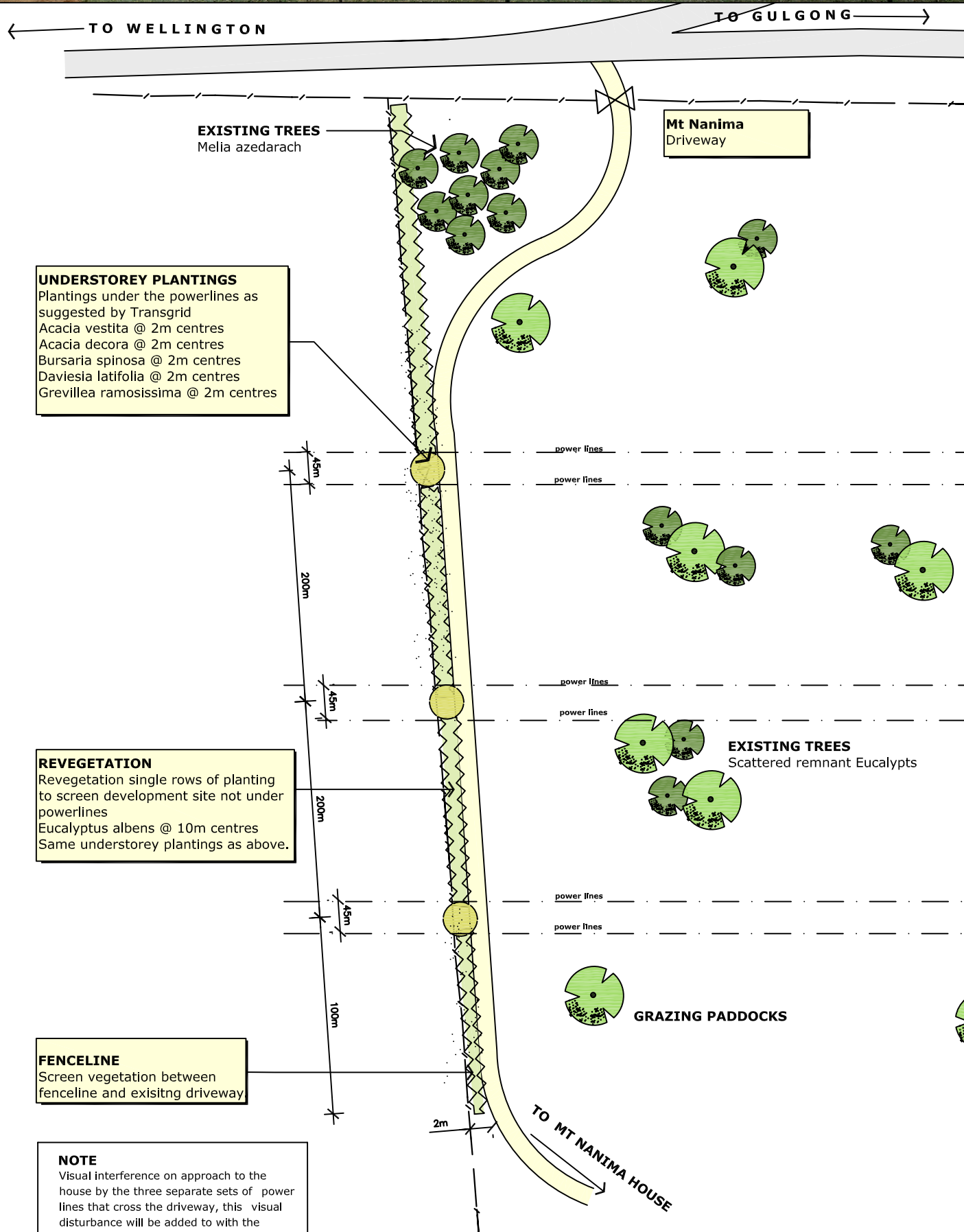


Figure 22: Proposed landscape concept Mt Nanima driveway



Scale: NTS
Date: 21-02-08

Site 6: No. 32 Cadonia Drive, Cadia Place and One Tree Hill subdivision

- Locate strategically placed plantings between the Cadonia Drive, Cadia Place and One tree hill subdivisions and the development site if required. See landscape concept Figure 21.
- On site measure already suggested should improve visual amenity to all these areas.

Site 7 and 8: Falls Road, Maxwell Road and Warne Road and Cousin Drive

Suggest to condition consent to allow affected residents to seek the developer to supply trees and shrubs to plant out important sections of their garden if views through to the site are to be blocked. This could occur over a specified period (say three years) during and post construction.

Site 9: Cadia Cottage

- Potential for strategic paddock trees to be planted in the short to middle distance between the house and the power station.

Site 10: Old Hospital Site

- No site specific mitigation measures proposed for this receptor site, however a concentrated effort to preserve existing trees and enhance regeneration on and around the power station site will facilitate view mitigation from this and other sites south of the river.
- Strategic planting of individual trees to the area to the north of the Hermitage Hill, the Cousin Drive site and the Falls Road site.

6.0 Summary and Conclusion for Wellington

The visual character of the site is one of pleasing rolling slopes and hills, which collectively form gentle folds in the landscape. Beyond this immediate landscape are more dramatic landforms and ranges which heighten the visual quality of the area. The landscape is scattered with mature remnant Eucalyptus trees that create informal patterns across the landscape with an absence of straight or contrived lines. Therefore the context of the study site has a high visual quality, whereby quality increases with the greater variation in landform, topography and mature vegetation.

Within this otherwise picturesque landscape there are several built features that detract from its character, including the existing TransGrid substation and with it numerous power lines running towards the site as well as the new gaol which can be seen from various aspects within the valley and an abandoned red brick building which was once an abattoir. These elements can be located in Figure 1.

Other recent built developments along this road include the newer subdivision of Cadia Place and Cadonia Place.

The visual catchment of the site is summarised as following:

From an immediate distance (within 1.5km of the site) views onto the site from public places are limited due to the topography and existing vegetation. Within this same distance there are a number of private properties that will experience a greater visual intrusion, but they are more likely to only see parts of the development, for example the top third of the stacks. These sites include: Nanima House, Keston Rose Garden Cafe, Keston Homestead, Keston Log Cabin and Cadia Cottage.

From a broader distance (between 1.5km and 3.5km) views into the site are also limited but at certain public vantage points it is likely that the entire development will be seen, these sites include: Maxwell St, Warne St and Falls Road and Hermitage Hill. Within this same distance there are also several private sites from which it is likely that they will be able to view the entire development. These sites include Lot 2 Falls Road and 13 Cousin Drive.

Notwithstanding the scenic values of the valley, it is considered that the development can be absorbed into the landscape and will tie in with the other structural elements of the landscape. A satisfactory outcome will be achieved if:

- due consideration is given to tree planting and vegetation conservation, both during construction and after (See on and near site mitigation measures), and that
- Suggested off site actions are taken to mitigate views to and across the development (See off site mitigation measures)
- Appropriate colour selection for the infrastructure of the power station is actioned as per the on site mitigation measures.

Part 2 - Alecstown

1.0 Methodology of Visual Impact Assessment

The project brief was to assess the visual impact of the proposed compressor station location on the surrounding environment and in particular the nearest and / or most impacted receptors. The components of the proposed compressor station development includes two compressor structures (approximately 4 m in height) a vent stack (approximately 5 m in height) and associated office building, carpark, and a shed and oil store.

To assess the visual impact of the proposed structures in relation to their visual context, the site was visited and other structures in the general area were assessed and measured to gain an understanding of how tall the proposed structures are in relation to these existing structures.

The study was carried out on a clear morning of Friday 7th December, 2007 between the hours of 10 and 11am. The site is located at approximately 320m AHD.

The structures opposite the site, which included silos and a grain storage shed at the same elevation of the proposed development, were measured to gain an understanding of their scale in relation to the proposed development.

The intent of this assessment is to evaluate the visual impact of the proposed development at immediate (within 1km) and middle distances (within 3km). assessing impacts on receptors in the vicinity. Broad distances were not considered as part of this assessment as it was assumed that the position of the development and its height would not be seen from distances further than 3km.

Where the impact is considered manageable, recommendations are then made to reduce the visual impact of the development through the use of landscape remedies both on and off site as well as suggestions for material use for the structures themselves.

2.0 Context of the Project

2.1 Visual character of the site and its context

The approach to the site travelling west along Alecstown West Road is generally an unsealed narrow country road, featuring several sharp bends and turns. The road verges are sprinkled with remnant stands of Box/ Native Pine vegetation (*Eucalyptus microcarpa*, *Callitris glaucophylla*) communities including understorey species (*Danthonia* sp., *Wahlenbergia* sp. and Chenopod communities).

The road has a remote, isolated character which is heightened by the vegetation character which is consistent with that of an old stock route. The road and study site has very little variation in topography. Surrounding paddocks towards the site are all generally flat, broadacre farming paddocks, featuring either crops or pasture. On approach to the site, only a few houses or built features can be seen from the road which heightens the sense of isolation. These include a cluster of buildings approximately 2km to the north east of the site, 'Mountain View' which is sited just off the road to the south east of the site and the grain storage and silo structures directly to the south of the site on the Parkes Narromine Railway line. This complex includes structures to an approximate height of 18 m, a dirt access way into the site and associated warning signs for the rail crossing itself.

The site of the compressor station is approximately 500m x 200m which includes the existing fenced offtake station, with a height of 2 -3 m, within an open flat paddock that has recently been cropped. There are several individual scattered Box and Native Pine trees within the paddock, with estimated heights of approximately 15-20m.



Figure 23: Alecstown offtake station

2.2 Visual catchment of the site

The study site and its immediate surrounds within 1km are all of a similar height at 320m AHD. There are several rises in topography to the south east and south west of the site to 340m. As both of these rises are beyond the opposite side of the road, the proposed structures and these landforms cannot be seen in the same view catchment from the south, east or west. From the north these landforms will form the backdrop of the proposed development. The landscape to the north of the site gently slopes away and includes many interlinking ephemeral watercourses which include land that is subject to seasonal inundation.

The proposed structures are approximately half the height of the existing mature vegetation and as such the full form of the vegetation's canopy can still be appreciated even at close distance to the development site.

2.3 Immediate distance (within 1km)

The 1km radius of the site includes those areas between Mickibri Road and the private drive to the property 'Mickibri' to the west of the site as well as a 1km stretch of road on the unsealed road to Parkes. At this distance all of these roads are the same elevation as the study site at 320m AHD and as such it is expected that there will be views onto the development from these roads. Some of the existing vegetation may aid in screening it from certain points, but it is more likely that it will be seen from these roads. Other elements of the existing view include the silo and grain storage sheds, which are at a similar height and scale to the proposed development and scattered mature Eucalyptus and Cypress Pine trees with heights of between 15 and 20m.

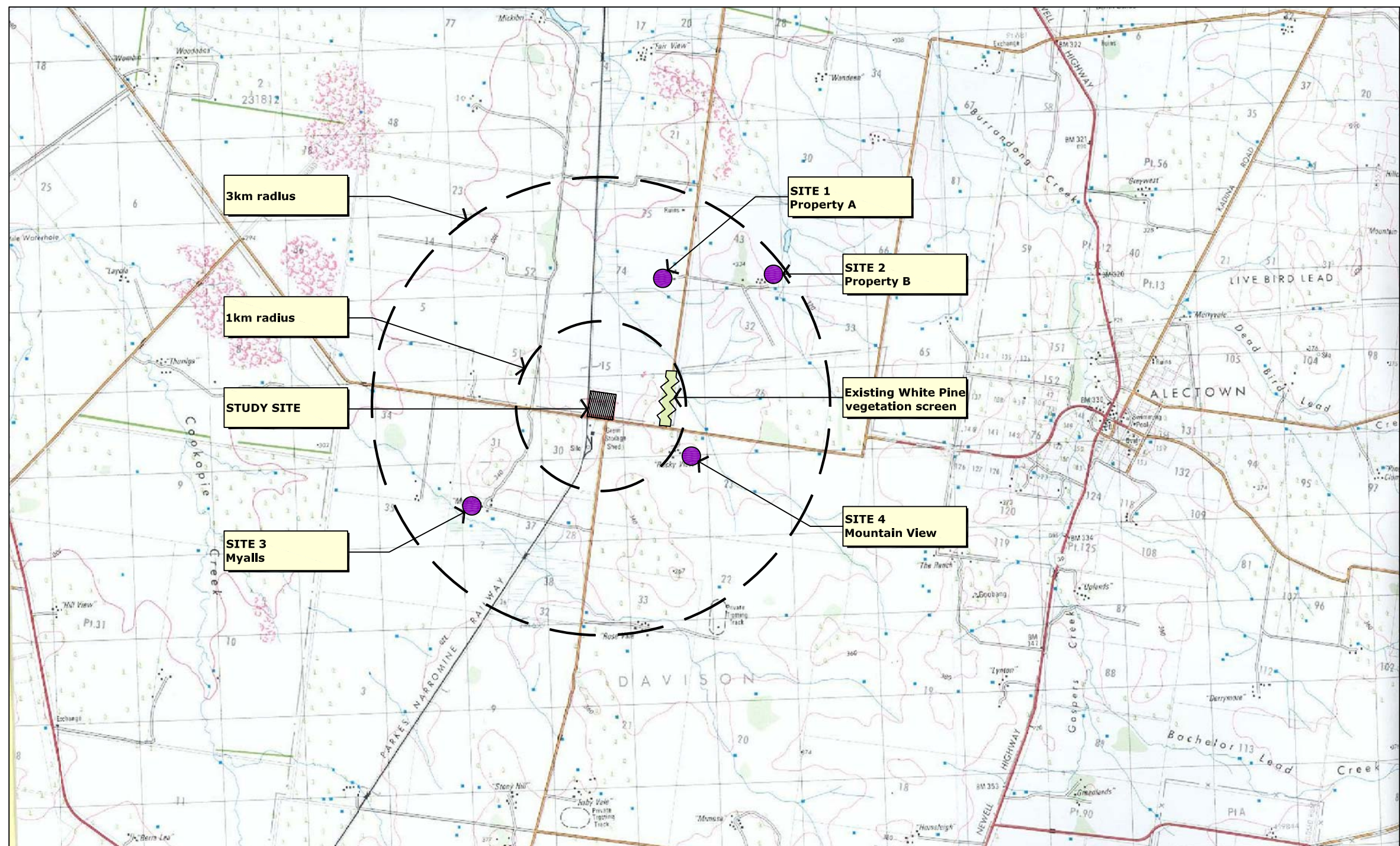


PHOTO ONE: Silo grain storage complex on the rail.



PHOTO 3: The study site including the existing substation.



PHOTO 2: Existing tree screen along Mickibri Rd

Figure 24 : Alectown visual catchment 1 & 3 km radius

2.4 Middle distance (1-3km)

The closest cross road to the site is Mickibri Road, which is 1km to the east of the site. Along the western side of the road there is a mature line of Native Cypress Pine (*Callitris glaucophylla*) with a height of between 15 and 20m, which would screen the development site on approach to the site from this direction. The trees are located at the same elevation as the development. It is assumed that broad distances beyond this point back towards Aleetown will not have visual access to the site because of these trees.

From the western side, on approach to the site, there is a slight rise in topography which is well vegetated. These features would also screen the development from this position. It is assumed that broad distances beyond this point to the west of the study site will not have any visual access to the site because of this rise and associated vegetation.

Travelling towards the site from the south along the dirt road to Parkes, (name unknown) there would be some views onto the site, although part of this view would also be the existing storage grain shed and silos which are of similar height to the proposed development. It is unknown how well used this road is.

3.0 Project Site Assessment

3.1 Siting, Bulk and Scale of the Development

The proposed development as shown in Figure 25, includes two compressors with a height of 4 m and a vent stack with a height of 5 m. Other associated buildings as part of the development include an office building, shed and carpark. It is unknown what colour any of these items are proposed as.

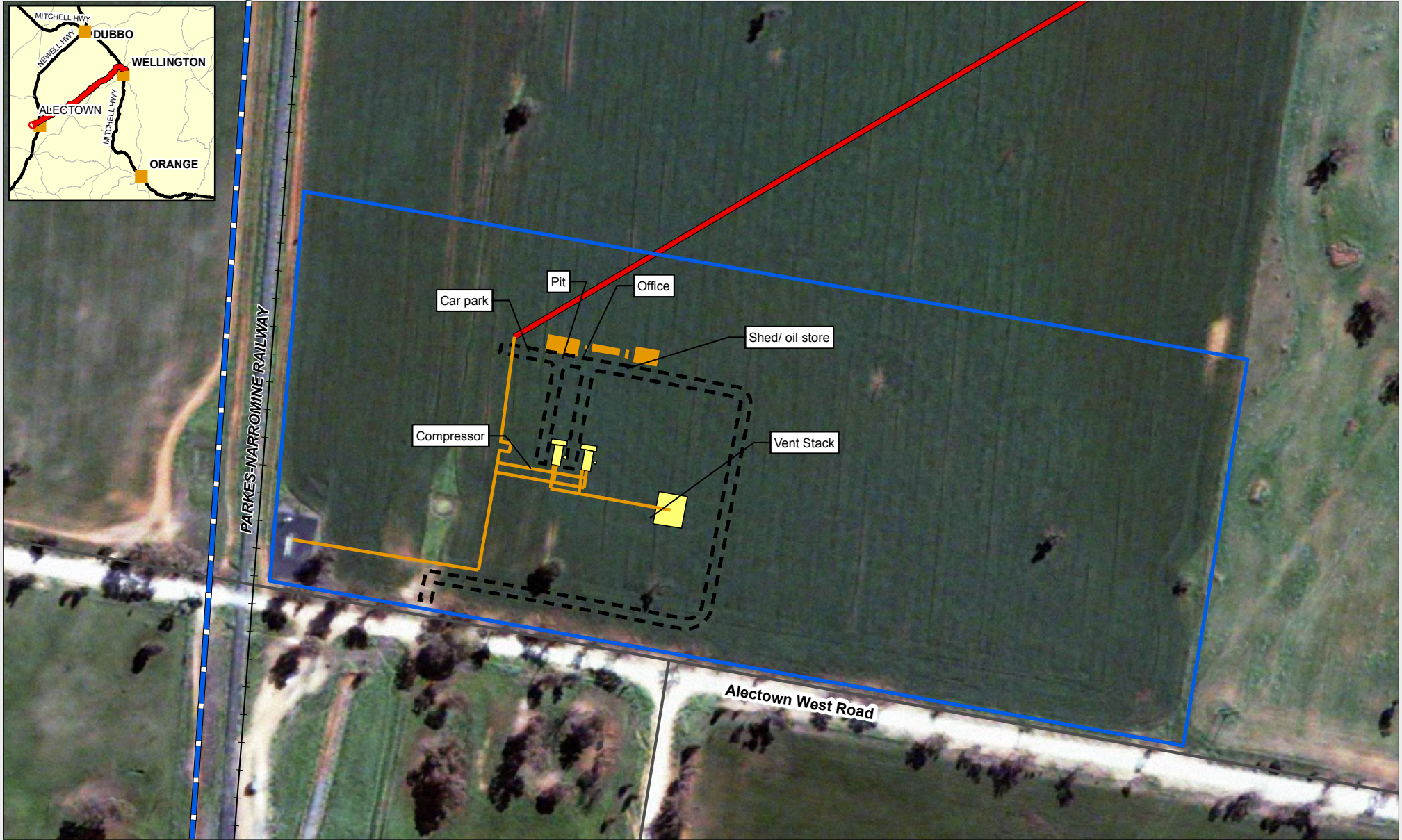
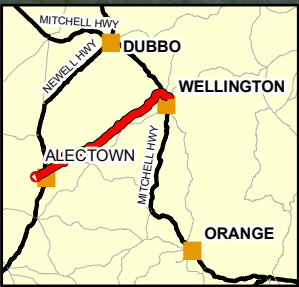


Figure 25: Picture of Similar Compressor Station

3.2 Skyline and Tree Line

As the development is sited in an area that includes remnant mature trees, at a similar elevation or slightly lower elevation than the surrounding landscape, its impact on the skyline is less than if it were located on a treeless hill. The ability to view the site from a lower point, whereby the site would be up on the horizon, may be possible from down slope to the north of the site, but the two rises in topography to 340m AHD, sit directly behind the development site, forming the skyline instead.

The tree line at a distance appears as a solid line of canopy, but at closer distance, the individual trees are more noticeable. As the development is approximately half the height of the existing mature vegetation the impact of the development is more likely at a trunk level, rather than at a canopy level. The proposed screening vegetation around the study site is to include understorey planting that can adequately screen out the height of the development.



- Proposed pipeline route
- Proposed site boundary
- Access roads
- + + Rail line
- Central West Pipeline

Figure 26

Indicative layout of the proposed compressor station



4.0 Assessment of Sensitive Receptors

Within the 3km visual catchment of the site, there are four sites located; two to the north east of the site, 'Myalls' to the south west of the site and 'Mountain View' to the south of the site. Another site 'Rose Vale' to the south of the site is located within this radius but there is a vegetated rise in the landscape (to 340m AHD) between this site and the study site. These are all located on Figure 24.

4.1 Site 1 — Property A

Directly opposite the access road in for site 1, there are several buildings shown on the topographic map approximately 1800 m from the compressor station site.. This site was not ground truthed and it could not be seen from the study site or Alectown West Road. It is located beyond a non perennial water course that can inundate and in general this area was well vegetated with mature remnant vegetation.

4.2 Site 2 — Property B

receptor site is set approximately 2km off Alectown West Road, approximately 3500 m from compressor station site with its access of Mickibri Road at an elevation of 320m AHD. The site appears to have mature vegetation around it and the screen of Native Cypress Pines along Mickibri Road would effectively screen any views onto the site. The receptor site and surrounds were viewed from Alectown West Road and topographical maps were utilized to make the assessment.

4.3 Site 3 — Myalls

'Myalls' is approximately 2km to the south west of the compressor station site with an elevation of 320m AHD. Between this property and the compressor station site there are scattered remnant trees, but it is likely from this site that the grain and silo complex at the rail siding could be seen, effectively blocking the major view through to the study site. This assessment was arrived at from assumptions made from Alectown West Road and from topographic maps. The property was not visited as part of the assessment.

4.4 Site 4 — Mountain View

'Mountain View' is the closest receptor at approximately 1.2km from the site. It is set on the southern side of Alectown West Road at 320m AHD. There is scattered vegetation between this site and the study site. It is anticipated that this house will have views through to the site.

5.0 Visual Mitigation Measures

The effect of the compressor station site in terms of visual impacts and intrusion on nearby receptors is considered minimal (refer to figure 26 for graphic representation). It is however felt appropriate that especially mid storey trees and shrubs should be planted around the site to make a more positive visual influence on the landscape. Suggested species are located in Appendix 1.

The following specific recommendations are made:

- Include vegetation around the study site itself on all sides, to screen off any potential views.
- Include vegetation with varied heights around the sub station site using species that are endemic to the area to reduce maintenance requirements.
- Include stock proof fencing.
- Use only essential external lighting to the facility
- Materials with low reflectivity characteristics should be considered to reduce any potential glare from the structures, at immediate, middle and broad distances

6.0 Summary and Recommendations

The context of the study site is distinctly rural in character with a sense of isolation which is heightened by the narrow dirt roads, a limited number of houses that can be seen from the road and the vegetation character which is consistent with that of an old stock route. The study site itself includes an existing fenced offtake station within an otherwise flat paddock which features several scattered isolated trees. Directly opposite the site is a railway siding which features a grain silo storage shed and silos.

The proposed development site at 320m AHD is likely to be seen from the road within a 1km radius of the site. It is unlikely that the structures will be seen beyond this distance due to the height of the structures and existing landform and vegetation. Four potential sensitive receptors were located within a 3km radius to the site, the closest of which is likely to have views onto the site.

Appendix 1

Proposed vegetation for Wellington site - see Figure 25 for landscape concept.

Endemic vegetation of area should be considered as the main theme for planting.

Trees

Brachychiton populneus (Kurrajong) (on site)
Callitris endlecheri (Black Cypress Pine) (has been planted at substation)
Eucalyptus albens (White box)(on site)
Eucalyptus melliodora (Yellow Box)
Eucalyptus microcarpa (Grey Box)
Eucalyptus sideroxylon (Mugga Ironbark) (has been planted at substation)

Shrubs

Acacia doratoxylon
Acacia vestita
Acacia decora (Western Golden wattle)
Bursaria spinosa (Sweet Bursaria)
Dodonea viscosa (Hop Bush)
Daviesia latifolia (Broad leaved Bitter Pea)
Grevillea ramosissima (Fan Grevillea)
Hakea leucoptera (Needlewood)
Indigofera australis (Native Wisteria)
Pittosporum angustifolium (Butterbush)
Prostanthera lasianthos (Mint Bush)
Senna artemisioides (Silver Cassia)

Vegetation list for Alectown site

Mixed box woodland with White Cypress Pine/ Bulloak on slightly undulating plains (Source Burrell Creek Subcatchment vegetation profile for tree list only)

Trees

Callitris glaucophylla (White Cypress Pine)
Eucalyptus microcarpa (Grey Box)
Eucalyptus intertexta (Inland Red Box)
Eucalyptus populnea (Bimble Box)
Casuarina leuhamii (Bulloak)

Shrubs

PO Box 1417
Wagga Wagga NSW 2650
Ph: 02 6971 7799
Fax: 02 6921 1155
Email: nik@resolveplanning.com.au

Acacia vestita (Hairy Wattle)
Acacia decora (Western golden wattle)
Atriplex nummularia (Salt bush)
Bursaria spinosa (Sweet Bursaria)
Daviesia latifolia (Broad leaved Bitter Pea)
Grevillea ramosissima (Fan Grevillea)
Senna artemisioides (Senna)

Appendix 2

Safety Warning Information

Trees too close to high voltage lines can cause major electricity interruptions and start bushfires.

Sensible tree planting can add beauty and value to your property. Unwise planting can become a fire risk to the properties of both yourself and others.

When planting trees within an easement area, select species that mature to a height not exceeding four metres. Do not plant trees that could eventually touch or fall across high voltage lines. **If you are in any doubt, please call TransGrid.**

Transmission lines are designed to safely transmit electricity at a very high voltage. However, electricity at these voltages can spark through the air across a gap. Close approach either personally or with something that you are touching or holding is **EXTREMELY DANGEROUS**.

*A tree or shrub should never touch, overhang or be capable of falling across a transmission line. Trees or shrubs that are too close to transmission lines can infringe on high voltage safety clearances which could cause: Major electricity interruptions • Electrocution • Fire hazards.

Tall growing trees and shrubs can add beauty and value to your property. BUT, when planted too close to transmission lines, they can become hazardous to you, your family and your property. "

TransGrid

Orange
McLachlan Street
Orange NSW 2800
PO Box 906, Orange NSW 2800
Telephone : (02) 6360 8711 – 906 + Ext (99 Switch)
Fax : (02) 6360 8798

Metropolitan (Wallgrove)
200 Old Wallgrove Road
Wallgrove NSW 2175
PO Box 87, Horsley Park 2164
Telephone : (02) 9620 0777 – 900 + Ext (99 Switch)
Fax : (02) 9620 0728
www.transgrid.com.au

Greening Australia

Knowledge Exchange
1300 886 589
Email : exchange@greeningaustralia.org.au
www.greeningaustralia.org.au

Easement Planting
WITH NATIVE BIRDS IN MIND

Greening Australia

TransGrid

TransGrid

CENTRAL WEST

Transgrid easement planting with native birds in mind list 'Bird on a wire' program – page 1

PO Box 1417
Wagga Wagga NSW 2650
Ph: 02 6971 7799
Fax: 02 6921 1155
Email: nik@resolveplanning.com.au



A Typical Transmission Line Easement



This brochure has been produced by TransGrid in partnership with Greening Australia to assist land holders when selecting plants for safe and environmentally suitable revegetation of electricity transmission line easements.

Suitable plants for Transmission lines...

NOTE: Always contact TransGrid prior to planting easements.



Weeping Boree
Acacia vestita 1-3.5m
Bright golden globular flowers (Aug-Oct)
Bushy shrub with graceful weeping branches. Leaves small blue-green, hairy. Provides dense cover for small birds and animals. Hardy, adaptable to a variety of soils.



Western Silver Wattle
Acacia decora 1-3 m tall
Bright yellow flowers clustered at the end of branches (July-Sept).
Blue-grey foliage, showy flowers. Good cover for small birds and animals. Widespread, hardy, various soil types.



Sweet Bursaria
Bursaria spinosa 3-4 m tall
Small, creamy flowers, sweet-scented (Nov-Feb)
Spiny, good cover for small birds, host to the wasp parasitic on Christmas beetles. Versatile situations, including rocky, poor soils.



Superb Fairy-wren
Small bold bird with long tail held erect. Male metallic light and dark blue, female brown. Found in family groups wherever there is dense cover. Quick to colonise and breed in shrub plantings, no matter how small or isolated. Eats mostly insects.



Eastern Rosella
Bright, colourful parrot. Bell-like calls; harsh alarm calls or soft chattering. Pairs or flocks. Feeds largely on the ground, also in shrubs and trees on various plant matter. Will utilise shrubs for feeding and as flight paths when crossing open farmland.



Yellow-rumped Thornbill
Small but distinctive bird with bright yellow rump most visible in flight. Bright tinkling song. Feeds on insects, mostly on the ground in the open, bobbing and jerking as it hops along. Flying for shelter when disturbed. Commonly breeds in shrubs.

What is an Easement?

An easement is a 'right-of-way' along the route of a transmission line. They are acquired to protect members of the public by controlling activities under or near a line that potentially could create an unsafe environment or situation. They are also necessary to enable TransGrid to operate, repair and maintain the lines in perfect working order.

Easements can vary in width from 45m to 75m depending upon the operating voltage and design of the transmission line running along them. A typical easement is shown in the diagram above.



Broad-leaved Bitter-pea
Daviesia latifolia 1-2 m tall
Yellow and brown pea-shaped flowers, long dense heads (Sep-Dec)
Broad, net-veined leaves. Triangular pods, seeds eaten by rosellas in summer. Hardy, versatile situations, including rocky, poor soils.



Rufous Whistler
Male with white throat and rufous underparts. Glorious spindled song, particularly in the breeding season. Spring-summer migrant to the region. Has been declining in agricultural areas, but will recolonise areas planted with trees and shrubs.



Fan Grevillea
Grevillea ramosissima 0.3-3m
Flowers in long creamy spikes (Aug-Oct).
Low spreading shrub with rigid, prickly holly-shaped leaves. Good cover for small birds and animals.



Yellow-faced Honeyeater
Plain olive grey honeyeater with a yellow facial stripe, cheery 'chick-up chick-up' song. Feeds on nectar and insects. Spring-summer migrant to the region. In autumn it departs in flocks of tens to hundreds, following defined routes and corridors using any tree or shrub cover on the way.

Plant photos courtesy of the Australian National Botanic Gardens, www.anbg.gov.au

Bird Photos courtesy of Doreen Chapman, Graham Stevenson and Geoffrey Clark

Transgrid easement planting with native birds in mind list 'Bird on a wire' program – page 2