

Snowy 2.0 Transmission Connection Project

Supplementary Landscape and Visual Impact Assessment

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1. Background

Transgrid is the manager and operator of the major high-voltage electricity transmission network in New South Wales (NSW) and the Australian Capital Territory (ACT).

Transgrid is seeking approval under Part 5 Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of an overhead transmission connection and substation to enable the grid connection of the Snowy 2.0 pumped hydro generation project (Snowy 2.0).

The Snowy 2.0 Transmission Connection Project (the project) has been declared critical State Significant Infrastructure (SSI) under the State Environmental Planning Policy (State and Regional Development) 2011 and is subject to assessment and determination by the Minister for Planning. Jacobs Group Pty Ltd (Australia) was engaged by Transgrid to prepare an Environmental Impact Statement (EIS) which has considered the environmental impacts of the project which included the assessment of landscape and visual impacts of the project from a range of locations within the Kosciuszko National Park (KNP) and Bago State Forest. The EIS was published in February 2021.

Following the public exhibition, Transgrid commissioned a comprehensive review and further analysis of the options included in the EIS as well as other potentially feasible options raised in submissions and in consultation with the Department of Planning, Industry and Environment (DPIE) and National Parks and Wildlife Service (NPWS). This options assessment and analysis is documented in the *Transmission Connection Project for Snowy 2.0 - Options Report* (EMM, 2021) (Options Report).

1.1 Preferred option

The Options Report confirms and reinforces the initial EIS options assessment work and clearly demonstrates that an overhead transmission connection, substation and cut-in to Transgrid's existing Line 64, is the preferred option as it is the optimal solution that balances technical feasibility, cost and environmental impacts. This was the preferred option assessed in the EIS.

The preferred option would involve the construction and operation of a dual 330 kV double circuit overhead transmission connection and substation to meet the grid connection requirements of Snowy 2.0. The two overhead double circuit transmission lines would be located side-by-side, spanning from the Snowy 2.0 cable yard through KNP to the new substation located in Bago State Forest, adjacent to Transgrid's existing Transmission Line 64. The total length of the overhead transmission connection is approximately 9 km. Key features of the connection relevant to this assessment are summarised below:

- Construction of two 330kV overhead transmission lines.
- Each line would comprise approximately 21 steel lattice structures up to 75 metres in height.
- Part of the transmission connection will span the Talbingo Reservoir.
- The transmission lines would be located within an easement varying in width from approximately 120 metres to 150 metres, inclusive of the hazard tree zone.

The project design has sought to reduce vegetation clearing along the easement through the siting of towers on elevated locations (hills and ridgetops). This allows transmission lines to span larger sections of vegetation in the underlying valleys.

1.2 Landscape Character and Visual Impact Assessment

The Snowy 2.0 Transmission Connection Project - Landscape Character and Visual Impact Assessment (Jacobs, 2021) (the LCVIA) was prepared as part of the EIS and responded to the Secretary's Environmental Assessment Requirements (SEARs) issued for the project on 15 January 2020 by the Planning Secretary of the NSW Department of Planning, Infrastructure and Environment (DPIE). The SEARs required the LCVIA to undertake:

an assessment of the visual impacts of the project for visitors to the KNP and key vantage points in the public domain.



The LCVIA assessed the project from a range of locations from publicly accessible areas within the KNP. Locations subscribing to this classification of *key vantage points* included Lobs Hole Ravine Campground and Wallace Creek Lookout. The LCVIA included additional views from a range of additional locations within KNP that are not considered to be *Key Vantage Points*.

From the *key vantage points* the LCVIA considered that the project would not be a discernible feature in views from the Wallace Creek lookout. The project would however be visible from locations within the Lob-Hole Ravine Campground and in views that include existing structures.

Other observations of the LCVIA relevant to this supplementary report are set out below:

- Views selected and assessed within the LCVIA include a range of viewing locations where the project was demonstrated as having the potential to be visible based on a desktop analysis of topography.
- All viewpoints included in the assessment were from within KNP and Bago State Forest, although not all viewpoints
 were considered to be of equal significance. Although all views were from within sensitive and significant areas,
 several views were from tracks and trails where breaks in pre-Dunn's Road fire settings permitted views across the
 KNP.
- Although views from these locations are over a sensitive and significant landscape, they are not considered to be key
 vantage points. Views from these locations allow for occasional and fleeting views and are afforded where existing
 transmission easements have been cleared and permits views from these locations. Some of these views included
 existing transmission lines within the KNP.
- Consideration to both pre-and post-fire conditions associated with the 2019 Dunn's Road Fires bushfires (bushfires) which resulted in the depletion of vegetation cover which previously filtered or completely screened views from such locations. In May 2020, a follow-up site visit was conducted to re-capture views included in the original report.
- The change in views contributed to by the effects of vegetation removal though the bushfires would be temporary
 only, and available until such a time that nearby vegetation close to viewing locations re-establishes and filtering
 views.

1.3 Purpose of this report

The purpose this report is to:

- Review mitigation measures that are available to the preferred alignment.
- Prepare photomontages showing the outcomes of the mitigation measures.
- Undertake a qualitative review through the photomontages.
- Provide recommendations based on the qualitative review.



2. Mitigation Options

Visual impact is contributed to by several factors which include but is not limited solely to visibility of the proposed structures. Other factors include the nature and duration of views that may include the project, visual scale or prominence attributed to distance, the number of people who may see the project.

The first principle for mitigating visual impact relates to siting of the alignment to avoid significant landscapes such as the KNP, key viewing locations and sensitive receptors. It is understood through the EIS, and supported by the review of options, that the project (Snowy 2.0) cannot avoid the KNP. Therefore avoidance of significant and sensitive landscapes is not possible.

Following siting of the alignment, mitigation measures for transmission connection projects must then consider the change in views that may contribute to visual impact, and locations or the setting from where views of the project changed may be afforded.

2.1 Cleared easements

The extent of clearing required within new easements has been partly avoided and minimised through the proposed overhead alignment, the proposed siting of structures and structure heights.

The overhead alignment avoids the requirement to clear vegetation within the whole of the easement which would be required to support construction of an underground transmission line. Following construction, the parts of the easements where cleared during construction of the Project would remain cleared of taller vegetation for routine inspections and maintenance.

The requirement to clear easements has been further minimised by positioning structures on hilltops and ridgelines allowing the transmission connection to span large areas and vegetation areas resulting in greater retention of vegetation on hillsides and valleys. Further detail on the environmental and technical considerations for the location of the preferred easement, siting and design considerations of the proposed structures is set out in the EIS and the Options Report.

2.2 Supporting Structures

Based on the preference for an above ground transmission connection design, the visibility and visual impact of transmission towers is therefore un-avoidable. Where structures are visible, they would be visible over several kilometres.

The project assessed by the EIS proposed a double circuit 330 kV alignment comprising steel lattice towers up to 75 m in height. The structure heights have been since been further refined to limit structure height where practicable (Refer to Section 4.3.8.1 of the Snowy 2.0 Transmission Connection Project -Submissions Report) whilst achieving the principal objective of avoiding and minimising environmental impacts.

Mitigation options available for the supporting structures include structure design and pre-treatment to advance natural dulling of galvanising or painting.

2.2.1 Structure design

The project assessed as part of the EIS considered double circuit steel lattice towers. A second option available for part of the alignment is double circuit steel monopoles. Figure 2-1 shows the design and scale considerations of structure types and transmission line designs available to the project.



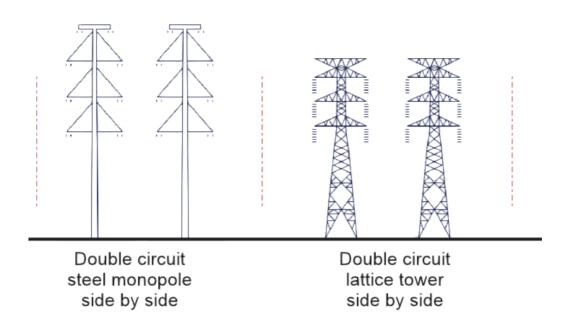


Figure 2-1Transgrid Tower Designs - modified from https://www.transgrid.com.au/media/b2hpaiso/high-voltage-transmission-line-factsheet.pdf

For completeness, another transmission connection design includes a single circuit transmission line. This option was not pursued due primarily to environmental impacts associated with increased clearing. The following considerations are relevant to the discussion of structure design and the following discussion regarding visual clutter.

A single circuit design may assist to reduce the overall height of structures. This is achieved by 'flattening' transmission wire across a wider easement rather that 'stacking' the wires vertically through a double circuit configuration. To achieve this, a single circuit transmission line would however require four towers side by side within a wider easement, approximately double the width of a double circuit option. This is shown in Figure 2-2 below.



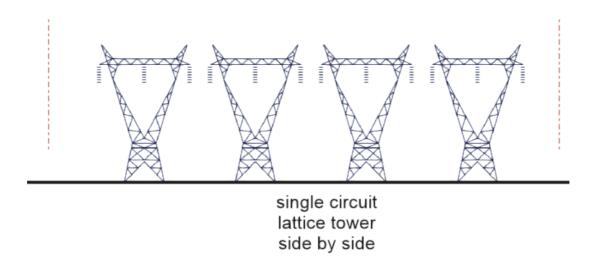


Figure 2-2 single circuit configuration - modified from https://www.transgrid.com.au/media/b2hpaiso/high-voltage-transmission-line-factsheet.pdf

Shorter towers may also require additional vegetation clearing, which is avoided or reduced through taller structures within a double circuit configuration. The additional towers required for a single circuit configuration would also introduce further visual clutter.

2.2.2 Visual clutter

Visual impact should also consider the potential of visual clutter created through tower design, and multiple tower types (i.e. steel monopoles and lattice towers) visible in the same view.

Visually, steel monopoles may appear less cluttered than lattice towers. For some viewers, monopoles can appear visually similar to spun concrete or timber poles often utilised within the local electrical distribution network when viewed from a distance. Typically, Steel monopoles are limited in the maximum span width (tower spacing) when compared to steel lattice towers. Due to span limitations, a double circuit monopole design can require additional structures than would be required through a lattice tower design. For larger spans such as ravines or Talbingo Reservoir or others area under high tension, multiple poles (four) may be required to withstand high loading.

For some viewers, steel monopoles may reduce visual clutter, however any improvement to views through a simpler structure design may not materially change (reduce) the overall visual impact of the project. As stated earlier in this review, the determination of visual impact is only partly contributed to by the introduction of a structure to a view. The overall visual impact must also consider other factors such as the scale and prominence of the structure and the sensitivity of the viewing location. The implication and outcomes of structure designs and treatments will be undertaken through photomontages in the following section.

Similarly, a change in structure types over short distances (e.g. steel lattice towers to steel monopoles poles or double circuit to single circuit design) or the addition of steel monopoles to a view that includes existing lattice towers may also contribute to visual clutter. Similarly, the addition of monopoles to sensitive or key views that already includes lattice towers within existing transmission connections may assist to highlight or emphasise the addition of new project elements to an area. Figure 2-3 shows one such example where a steel monopole has been added to a section of duplicated transmission.





Figure 2-3 Steel monopole added through line duplication

An example where this may occur is Lobs Hole Ravine Campground. This area is a publicly accessible campground which include lattice towers along the existing line 2. This area will have been closed to the public for several years (up to ten) to allow construction of the project.

Upon reopening of the campground, the layout and setting will have changed significantly through the layout and configuration or trails and tracks, preferred camp sites and new infrastructure. In this area, campers or visitors who are familiar with this location will remember the presence of lattice towers. For these users, and new visitors to this area, the inclusion of steel monopoles has the potential to highlight the addition of new structures through the project rather than be absorbed into the area and views that include lattice towers.

2.2.3 Pre-dulling - galvanised steel.

Another mitigation measure explored by this supplementary LVIA is pre-treatment of structures to assist in reducing the obviousness of structures. Options include pre-dulling of hot-dip galvanised steel sections and painting.

Steel work used for transmission structures are traditionally hot dip galvanized for protection against corrosion to increase structure service life.

Freshly galvanised steel has a bright reflective sheen. This lustre makes new structures often more noticeable in views due to the bright and sometimes reflective surfaces. When galvanised steel is exposed to the environment, galvanising will revert to a matte dull grey appearance reducing the apparent obviousness and reflectivity of coated surfaces. Weathering can be accelerated at the coating stage, to reducing contrast and visual prominence that would otherwise be achieved overtime.

Painting of structures (over galvanized coating) can also be applied to further assist structures to 'blending' into the surrounding landscape where block colours are selected from background elements in views such a vegetation. Painting is less common due to requirement for access and on-going maintenance.

Figure 2-4 shows an example of partially constructed galvanised steel structure adjacent to an existing aged in place lattice tower.





Figure 2-4 New galvanised structure adjacent to existing structure

The freshly galvanised coating of the new structure is more apparent than the existing transmission line which has been allowed to dull naturally. This example also demonstrates ability for duller structures to be visually absorbed when viewed against a backdrop of vegetated and cleared hills. This is further demonstrated by the tower to the right of the view.

This method can be suitable where towers are visible against a vegetated backdrop or landscape. Pre-dulling is usually less effective where towers will silhouette against skyline and is highly dependent on atmospheric conditions and the position of the sun. For example, towers will vary from black, when the sun is behind the structures, to largely invisible when the sun shines on grey or galvanised steel.

Freshly galvanised steel is often shiny, can be highly reflective and will contribute to obviousness of components in views by contrasting against background elements in views such as darker vegetated hills within the KNP.

Overtime, galvanising will dull naturally, timeframes vary. Dulling of galvanised steel can be advanced and undertaken prior to delivery of the steel components or once constructed.

2.2.4 Painting

Another method that can assist with structures to visually "blend" with background elements is by painting the structures a similar colour to the vegetated hills. In areas such as the KNP, dark or olive greens are typically applied. Figure 2-5 shows the existing 220 kV Dartmouth - Mount Beauty transmission line within the Alpine National Park near Mount Beauty.



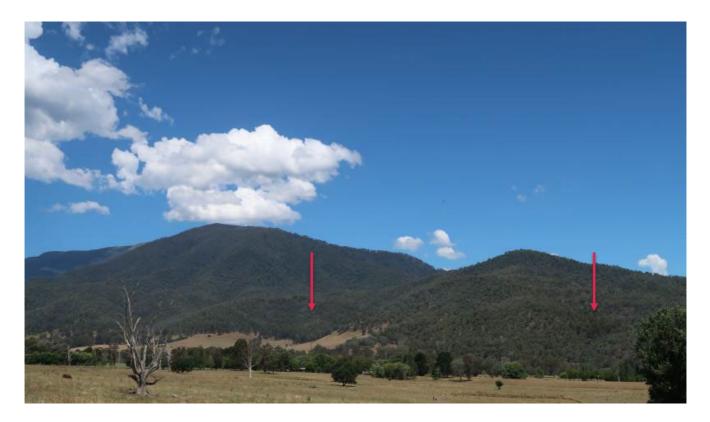


Figure 2-5 220 kV Dartmouth - Mount Beauty transmission line - Alpine National Park (Source Tetra Tech Coffey)

The lattice towers, which are low in the landscape and painted olive green. In this view the towers are barely discernible. Figure 2-6 shows another example from a similar location of the same alignment.



Figure 2-6Figure 3-5 Painted lattice structures

The painted lattice tower is just visible where the background vegetation comprised cleared grasses.

There are limited to no measures that can assist to mitigate structures that silhouette against the sky such as area where towers are located along a ridgeline or escarpment and viewed at low angles. This is partly due to constantly changing factors such as sun angle and cloud cover. When the sun is behind structures, the visible part of the structure will be in



shade and will always appear black. When the sun is in front and shining on structures, the structures will contrast against a blue sky. Lighter structures such as dull galvanised steel can be absorbed into a background of cloud-covered sky.

The same treatments (pre-dulling and painting) can be applied to steel 330 kV double circuit monopoles. The effects of which are demonstrated through photomontages included from selected viewpoints in the following section.

2.2.5 Summary of mitigation options

The preferred project comprises a dual circuit overhead transmission line comprising two side by side lines. The preferred alignment, placement of structures and relative heights have been established based on technical studies undertaken as part of the EIS, part of which seeks to avoid or to minimise the requirement to remove vegetation under the preferred alignment. This alignment and design considerations have been confirmed by the Options Report and the preferred project configuration.

For most viewers, where a transmission tower is visible, the height of the tower is not readily discernible, i.e. the difference in height between a 50 m high tower and 75 m is not perceptible. Where structures are visible, it is the visibility of structures to views that will contribute to the visual impact, rather than height of the structure.

Where towers would be visible, a double circuit configuration will result in fewer, but slightly taller towers, when compared to a shorter single circuit configuration towers.

Steel monopoles may reduce visual clutter when viewed in isolation or as a stand along object, however their inclusion in the project should consider the proximity of existing transmission lines.

Recognising that the preferred project is an overhead transmission connection, residual options that are available to assist with mitigating the visual impacts of the project are limited to structure design and surface treatment.

The following section will review and assess the qualitative considerations of mitigation measures available to the project and described in this section.

2.3 Photomontages

The LCVIA included photomontages from five locations where the project would be visible. Some of these views include existing transmission lines within the KNP. Photomontages have been prepared from these same locations to assist in the comparative and qualitative assessment of mitigation options which have been reviewed in the following section.

It is recognised that the small photographs and the A3 photomontages included within this assessment whilst technically accurate are not perceptually accurate. The A3 images, which are annexed to this report (Annex A), are clearer than the smaller images in the text, as these are larger. A0 photomontages will provide a clear indication of the actual visual impact – these are perceptually accurate.



3. Review of Mitigation Options

The LVIA included in the EIS prepared photomontages from five locations within the KNP that are publicly accessible. For consistency, this review of mitigation options will be undertaken through the same five locations.

3.1 Viewpoint 7- Ravine Road

Viewpoint 7 (VP 7) is from Ravine Road.

The proposed transmission connection is shown in red is approximately 3.1 km to the north of VP 7.

The existing Line 2, shown in yellow comprising double circuit steel lattice towers is approximately 250 m to the west of VP 7.

Figure 3-1 shows the view looking west to north prior to the bushfires.





Figure 3-1 Ravine Road looking west to north

The existing Line 2 transmission infrastructure is screened from views by existing vegetation. Figure 3-2 shows the same view following the bushfires. In this altered view post bushfire, the existing transmission lines are visible through the denuded trunks of remnant trees.



Figure 3-2 Ravine Road looking west to north, post-bushfires

Figure 3-3 shows a photomontage of the post bush fire view included in the EIS which is showing 75 m high, dull grey lattice towers.





Figure 3-3 VP 7 – Photomontage

Figure 3-4 to Figure 3-6 show enlargements of the view focussing on the visible section of the project with mitigation (dulling of the structures, painting, and the use of steel monopoles).

The first view (Figure 3-4) shows the structures as a dull grey, galvanised lattice tower. The second view (Figure 3-5) shows the view with the lattice towers painted Olive Green. While the third view (Figure 3-6) shows the steel monopoles also painted olive green.

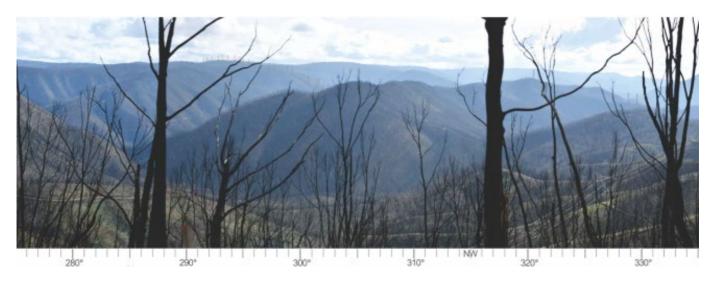


Figure 3-4 The project with dull lattice structures

The nearby towers within Line 2 are visible to the right of the view. The projects dull grey lattice towers contrast the skyline in the background of the view. The dull grey lattice towers are less noticeable when viewed against the hilly backdrop as the transmission line descends into the valley in the background of the view.

Lattice towers within Line 2 are less noticeable than structures shown in photomontages. Photomontages tend to be conservative and over-state the visibility of proposed structures.

Figure 3-5 shows the project alignment with lattice towers painted olive green.



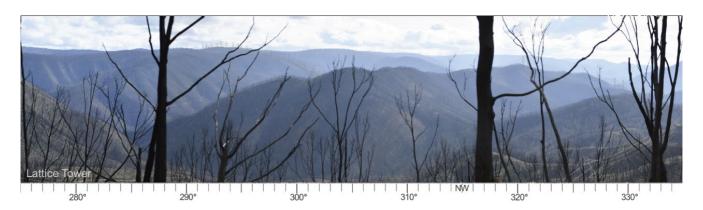


Figure 3-5 The project - Lattice Tower - Olive Green

In this view, the nearby towers within Line 2 are still visible to the right. Similar to dull grey towers, the painted lattice towers also contrast against the skyline in the background of the view. The painted lattice towers are no less noticeable when viewed against the hilly backdrop where the transmission line descends into the valley.

Figure 3-6 shows the project alignment with painted steel monopoles.

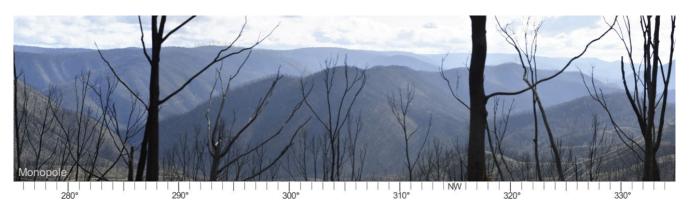


Figure 3-6 The project - Steel Monopole - Olive Green

Nearby towers associated with Line 2 are still visible to the right. Similar to the dull grey and painted lattice towers, the steel monopoles are noticeable where they contrast against the skyline in the background of the view and similarly noticeable where the painted steel monopoles descend into the valley.

For all options, structures are noticeable features in views where they silhouette or contrast with background elements in the view. There is little apparent change or reduction in the visual prominence between the dull grey and painted lattice towers, or the painted lattice towers and steel monopoles.



3.2 Viewpoint 9- Ravine Road

Viewpoint 9 (VP 9) is also located on Ravine Road.

The proposed transmission connection shown in red is approximately 950 m to the north of VP 9.

The existing Line 2, shown in yellow comprising double-circuit steel lattice towers is approximately 600 m to the west of VP 9.

Figure 3-7 shows the view looking west to north prior to the bushfires.





Figure 3-7 Ravine Road, looking west to north

The existing Line 2 transmission infrastructure is partially screened and filtered in views by existing vegetation. Figure 3-8 shows a similar view following the 2019 Dunn's Road bushfires. Following the bushfires, the existing transmission infrastructure is visible through the bared trunks of remnant trees.





Figure 3-8 Ravine Road looking west to north, post-bushfires

Figure 3-9 shows a photomontage of the post bush fire view included in the EIS which is showing 75 m high steel lattice towers.



Figure 3-9 VP 9 – Photomontage

Figure 3-10 to Figure 3-12 show enlargements of the view focussing on the visible section of the project with mitigation (dulling of the structures, painting, and the use of steel monopoles).

The first view (Figure 3-10) shows the structures as a dull grey, galvanised lattice tower. The second view (Figure 3-11) shows the view with the lattice towers painted Olive Green. While the third view (Figure 3-12) shows the steel monopoles also painted olive green.

Figure 3-10 shows an enlargement of the photomontage showing the project alignment as a dull galvanised lattice tower.



Figure 3-10 The project with dull lattice structures

The dull grey lattice towers contrast the skyline and the darker hilly backdrop modified in this view by bushfires.

Figure 3-11 shows the same view, with the lattice towers painted olive green.



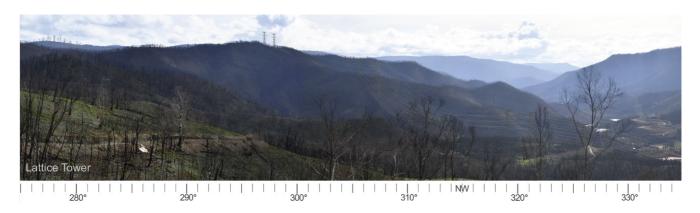


Figure 3-11 The project - Lattice Tower - Olive Green

The lattice towers are still noticeable features in view where they silhouette or contrast with background elements in the view. Painted towers are less noticeable when viewed against the darkened hills modified by fire.

Figure 3-12 shows the same view modified to include steel monopoles painted olive green.

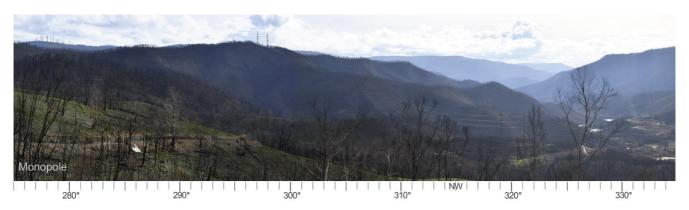


Figure 3-12 The project - Steel Monopole - Olive Green

The painted steel monopoles are visually less cluttered than lattice towers. There are however still noticeable features in view where they silhouette or contrast with background elements in the view, and less noticeable when viewed against the darkened hills modified by fire.

For all options, structures are noticeable features in view where they silhouette against the horizon. The appearance of steel monopoles are visually less cluttered. This is evident due to the closer proximity of the project to this location. With regards to impacts, there is little apparent change or reduction in the visual prominence between the dull grey and painted lattice towers, or the painted lattice towers and steel monopoles. Noting that visual impact considers several criteria in additional to project visibility, the level of visual impact assessed for either option would not alter.



3.3 Viewpoint 11 – Lobs Hole-Powerline Road, Ravine Campground

Viewpoint 11 (VP 11) is located along Lobs Hole-Powerline Road and the Ravine Campground. This area is a remote publicly accessible campground. Access to the grounds is currently prohibited due to construction activities associated with Snowy 2.0. This area will be re-opened to the public.

The proposed transmission connection is approximately 250 m to the south of VP 11 shown in red.

The existing Line 2 comprising steel lattice towers runs roughly north to south through the centre of the campgrounds is shown in yellow. The existing transmission line is approximately 100 m to the west of VP 11.



Figure 3-13 shows the view looking south to west prior to the bushfires. In this image, the existing Line 2 to the west is visible in the left of this image. This view demonstrates the screening effects of topography and vegetation even at close distances.



Figure 3-13 Lobs Hole-Powerline Road, Ravine Campground looking south to west prior to the bushfires

Figure 3-14 shows an existing view looking south to north from a similar location to the view seen in Figure 3-13. Access to the location seen in Figure 3-13 was impeded by construction activities at the time of the follow-up site visit.





Figure 3-14 Existing view from Lobs Hole-Powerline Road, Ravine Campground - Existing view post bushfires

The existing tower to the left of Figure 3-13 is the same tower seen in the left of Figure 3-14 associated with the existing Line 2. The existing tower seen in the right of the view is also part of Line 2 to the north.

Figure 3-15 shows the photomontage for VP11 as presented in the EIS



Figure 3-15 VP11 Photomontage

Figure 3-16 to Figure 3-18 show enlargements of the view focussing on the visible section of the project with mitigation (dulling of the structures, painting, and the use of steel monopoles).

The first view (Figure 3-16) shows the structures as a dull grey, galvanised lattice tower. The second view (Figure 3-17) shows the view with the lattice towers painted Olive Green. While the third view (Figure 3-18) shows the steel monopoles also painted olive green. In all views, existing lattice towers within Line 2 transmission lines are visible to the left of the view.



Figure 3-16 Project with dull lattice structures

The proposed towers visible to the left of the existing transmission tower to the south of the campground are visible, albeit filtered by regrowth on the nearby rise. The lattice towers visible to the southwest contrast the skyline and hilly backdrop previously modified by fire.

Figure 3-17 shows the same view, with the lattice towers painted olive green.





Figure 3-17 The project - Lattice Tower - Olive Green

The lattice towers are still noticeable features in view where they silhouette or contrast with background elements in the view, and less noticeable when viewed against the hilly backdrop.

Figure 3-18 shows the same view modified to include steel monopoles painted olive green.



Figure 3-18 The project - Steel Monopole - Olive Green

Similar to the observations made at VP 9, the steel monopole configuration is visually less cluttered than the painted lattice towers, the painted steel monopoles are still visually noticeable features in views.

There is the potential however for steel monopoles to contribute to visual clutter where views would include proposed monopoles and existing lattice towers.

For all options, structures are visually noticeable elements where they silhouette or contrast with background features in the view. Steel monopoles are less cluttered, however, there is little apparent change or reduction in the visual prominence between the dull grey and painted lattice towers. The simpler design of monopoles would not materially alter the level of assessed visual impact. The addition of monopoles to views which include lattice towers must also consider visual clutter through a change or additional type of visual component.

Similar observations are made regarding the visual prominence of existing structures within Line 2 and those shown within photomontages. Although the existing structures within Line 2 are closer to views than those within the proposed project, existing structures are less noticeable than those shown in photomontages. This is partly due to photomontages tend to be conservative and over-state the visibility of proposed structures, and also due to the contrast in the painted structures against background elements.



3.4 Viewpoint 12 – Mine Road Clearing

Viewpoint 12 (VP 12) is located on Mine Road at the southern end of Lobs-Hole Ravine Campground where Mine Trail access track enters the southern end of the campgrounds.

VP 11, roughly central to the campgrounds is approximately 970 m to the northwest of VP 12.

The nearest structure within the Preferred alignment would be approximately 400m to the north of VP 12. The project alignment is shown in red.

The existing Line 2 comprising double circuit steel lattice towers is shown in yellow, and approximately 700 m to the west of VP 12.



Figure 3-19 shows the view looking east along Mine Road where it enters the campgrounds through south prior to the bushfires.



Figure 3-19 Existing view looking east to south prior to the bushfires

 $Figure \ 3-20 \ shows \ the \ view \ looking \ south \ to \ west \ from \ the \ same \ location \ following \ the \ bush \ fires.$





Figure 3-20 Existing view looking east to south post bushfires

In both views, the existing Line 2 to the west is screened by topography and vegetation.

Figure 3-21 shows the view looking east along the mine access track to south from a similar location to the view seen in Figure 3-20.



Figure 3-21 Existing view looking south to west

The existing Line 2 is just visible to above the hills to right of the view.

Figure 3-22 shows the existing view looking south to west from the same location following the bushfires. Looking west, towers in the existing Line 2 are visible above topography and bared trunks of remnant trees.





Figure 3-22 Existing view looking south to west, post-bushfires

Figure 3-23 shows a photomontage of the post bush fire view showing the project alignment looking east to west through south. This photomontage shows the lattice towers in dull grey.



Figure 3-23 The Project with dull lattice structures looking east to west through south

Figure 3-24 to Figure 3-26 show enlargements of the view focussing on the visible section of the project with mitigation (dulling of the structures, painting, and the use of steel monopoles).

The first view (Figure 3-24) shows the structures as a dull grey, galvanised lattice tower. The second view (Figure 3-25) shows the view with the lattice towers painted olive green. While the third view (Figure 3-26) shows the steel monopoles also painted olive green. In all views, existing lattice towers within Line 2 transmission lines re visible to the left of the view.

Figure 3-24 shows an enlargement of the photomontage showing the project alignment as a dull galvanised lattice tower.





Figure 3-24 The project with dull lattice structures

The lattice towers contrast the skyline and hilly backdrop previously modified by fire. Towers seen in the left of the view are less noticeable when viewed against a clear sky as opposed to the darker background comprising hills, re-growth and silver tree trunks. The cleared easement under the project transmission line is also noticeable.

Figure 3-25 shows the same view, with the lattice towers painted olive green.

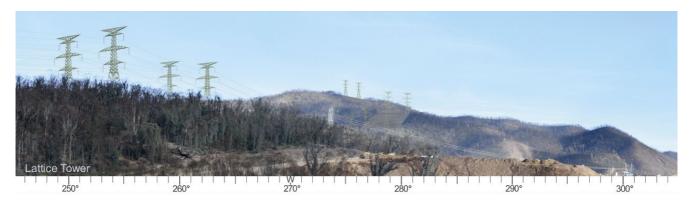


Figure 3-25 The project - Lattice Tower - Olive Green

In this view, the darker painted lattice towers are more noticeable where they contrast against the lighter skies, and less obvious when viewed against the hills darkened by the recent bush fires. The cleared easement under the transmission line in the background of the view is also noticeable.

Figure 3-26 shows the same view modified to include steel monopoles painted olive green.





Figure 3-26 The project - Steel Monopole - Olive Green

The steel monopole configuration is visually less cluttered than lattice towers. In this view, the monopoles are still noticeable where they contrast against the lighter skies, and less obvious when viewed against the hills darkened by the recent bush fires. Similar to the observations made at Viewpoint 11, introduction of monopoles to views that include lattice towers must also consider visual clutter. Although this is not as prominent in this particular view, this is more noticeable from other locations where lattice towers are more noticeable.

For all options, structures are visually noticeable where they silhouette the horizon or contrast with background elements. In these views, the painted monopoles and lattice towers are more noticeable due to the darker tones contrasting against the lighter skies. There is little reduction in visual prominence between the simpler design of the monopoles and the lattice towers. The change in structure design would also contribute to visual clutter through visibility or multiple structure types.



3.5 Viewpoint 13 – Lobs Hole-Powerline Road

Viewpoint 13 (VP13) is located on Lobs Hole Powerline Road approximately 2.0 km north of the preferred alignment. The preferred alignment is shown in red.

The location looks along the cleared easement of the existing Line 2 shown in yellow.

Figure 3-27 shows the view looking south prior to the bushfires.





Figure 3-27 View looking south prior to the bushfires.

Existing lattice towers are highly visible where they cross Lobs Hole – Power Line Road. Towers in the background are partially screened or filtered by topography and vegetation.

Figure 3-28 shows a similar view following the bushfires. In this altered view post bushfires, the existing transmission lines, access roads and other features are visible through the bared trunks of remnant trees. These exposed views would be temporary only and available until vegetation recovers.





Figure 3-28 VP 9 – Lobs Hole – Power Line Road looking south, post-bushfires

Figure 3-29 shows a photomontage of the post bush fire view showing the project alignment with dull grey lattice towers.

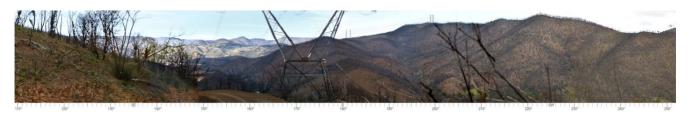


Figure 3-29 The project with dull lattice structures

Towers would be visible due to their position on the ridgeline where they silhouette against the horizon. This view is opportunistic as it is not from a roadside stop, pull-out bay or location with interpretive information. As demonstration in figure 3-27 above, this view is also temporary and available until such a time that vegetation recovers screening and filtering views.

Figure 3-30 to Figure 3-32 show enlargements of the view focussing on the visible section of the project with mitigation (dulling of the structures, painting, and the use of steel monopoles).

The first view (Figure 3-30) shows the structures as a dull grey, galvanised lattice tower. The second view (Figure 3-31) shows the view with the lattice towers painted olive green. While the third view (Figure 3-32) shows the steel monopoles also painted olive green. In all views, existing lattice towers within the existing Line 2 transmission lines are visible to the left of the view.

Figure 3-30 shows an enlargement of the photomontage showing the project alignment with dull galvanised lattice tower.



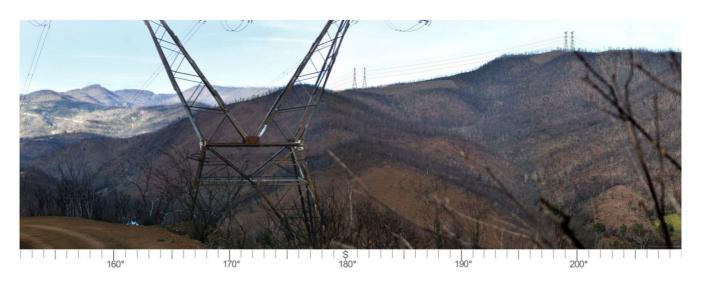


Figure 3-30 The project with dull lattice structures

The lattice towers contrast the skyline and hilly backdrop previously modified by fire. Figure 3-31 shows the same view, with the lattice towers painted olive green.



Figure 3-31 The project - Lattice Tower - Olive Green

The lattice towers are still noticeable features in view where they silhouette or contrast with the sky.

Figure 3-32 shows the same view modified to include steel monopoles painted olive green.





Figure 3-32 The project alignment - Steel Monopole - Olive Green

The steel monopole configuration is visually less cluttered than the painted lattice towers, the painted steel monopoles are still visually noticeable features in views.

In all views, towers are noticeable features in view where they silhouette or contrast with background elements in the view. Due to the closer distance to the proposed towers, the steel monopoles are less cluttered, however there is little apparent change or reduction in the visual prominence between the dull grey and painted lattice towers, or the painted lattice towers and steel monopoles.



4. Summary or mitigation options review

From close distances, is apparent that steel monopoles are visually simpler and therefore less cluttered through their simpler design than steel lattice towers. Where structures of either design are visible in longer range views or where silhouetted against the skyline, there is little apparent difference is visual scale or prominence between a steel lattice tower or steel monopole. In some views, the photomontages demonstrated that the painted lattice towers were less obvious in views than dull galvanised structures. This would be dependent on background elements, time of day or sun angle and atmospheric conditions.

For both close range and distant views, the assessed level of impacts would not change materially through the inclusion of either steel lattice towers and steel monopoles. This is due to the installation and visibility of supporting structures in a landscape and views that are considered to be highly sensitive due to the scenic quality and amenity of the area, and the high sensitivity of the key user groups who would take in views of the project.

The SEARS required the assessment of views and visual impact from key vantage points within the KNP. Of the thirteen viewpoints included in the original LCVIA, Lobs Hole Ravine Campground was the only key or sensitive location identified within the KNP where visitors would take in views of the project for an extended period of time. Views from all other locations were opportunist and fleeting from tracks and trails in the KNP. Based on the review of photomontages, there appears to be little to no improvement in structure visibility or visual impact that might be gained through either an altered structure design or applied finishes. There may be benefit however through the pre-treatment of the hot dip galvanising to remove the sheen of hot-dip galvanising.

The photomontages prepared from locations within the Lobs Hole Ravine campground have demonstrated that the inclusion of painted steel monopoles would result in a reduction of visual clutter associated with the structure type when viewed in close proximity. Although they are of a simpler design, it is also apparent that the poles would still be highly visible. For the assessment of landscape and visual impact, which must consider several other criteria to visibility, there would be no material change (reduction) in the overall visual impact assessed between lattice towers or steel monopoles. This introduction of steel monopoles may contribute to visual clutter where existing views include steel lattice towers. This is discussed in section 4.1 below.

The review of photomontages have also demonstrated where dull- galvanised structures located on ridgelines or elevated locations or silhouette against the horizon are less noticeable than painted structures. This was apparent for both lattice towers and steel monopoles.

Where structures would be viewed against a vegetated backdrop, those that were painted were less apparent than structures that were pre-dulled or existing lattice towers that have weathered naturally.

4.1 Lobs Hole Ravine Campground

What is apparent through the assessment of views and photomontages is the visibility of existing lattice towers within the Line 2 from many locations within the Lobs Hole Ravine campground. The obviousness of which has been exacerbated by the 2019 Dunn's Road bushfires.

Lobs Hole Ravine campground is an area that was previously publicly accessible and well used for camping, four-wheel driving and a base for hiking and day trips. Campers and visitors to the KNP who are familiar with this area will remember the presence of lattice towers in this area and other locations on approach.

This area will have been closed to the public for several years to allow construction of the Snowy 2.0. Upon reopening, existing structures within Line 2 will remain, however the layout and setting of the campground will have changed through the reconfiguration of trails and tracks, locations of preferred camp sites and other works. The impacts of the 2019 Dunn's Road fires would also be noticeable, however less evident than impacts seen in views included in this report through re-establishment of vegetation. From some locations, views will also be altered to include transmission structures installed through this project.



What was also apparent is the potential for steel monopoles to contribute to visual clutter through colocation with existing lattice towers within Line 2, despite their simpler design. The addition of steel monopoles to these views would highlight the project as a latter inclusion to the area and contribute to visual clutter.

For users who are familiar with this area, and new visitors the inclusion of steel monopoles has the potential to highlight the addition of the project and new structures to this setting as contrasting visual elements to a backdrop of existing lattice towers within Line 2. In this context, lattice towers may assist the project to be absorbed into the setting and memories that include lattice towers.

The inclusion of lattice towers through in this area, would assist to diminish the distinction between existing Line 2 and those added to views through Snow 2.0 thereby reducing the cognitive distinction between projects and therefore visual clutter.

As mentioned above, it is understood that a Landscape Rehabilitation and Recreational Master Plan forms part of the Snowy 2.0 Main Works approval. There would be benefit in the project infrastructure being considered in the preparation of the Landscape Rehabilitation and Recreational Master Plan to assist screening of towers assist with mitigation views and visual impacts. Such consideration would include design and layout of the future recreational and camping area, including orientation of recreational assets, camp sites and planned revegetation.

For the reasons outlined above, there is the potential for visual impacts at Lobs Hole Ravine to be mitigated through the inclusion of lattice towers rather than steel monopoles. Mitigation is not attributed to a reduction visual clutter through a simpler design, rather a design that mimics the design of existing structures, which would assist new structures installed to be absorbed into the existing setting of the area.

The review of photomontages has also demonstrated that the obviousness of structures may be improved (reduced) through painting of towers that are lower in the landscape and that would be viewed against and vegetated backdrop, and pre-dulling of towers visible against the sky. This contrast was best demonstrated in the views examined at Viewpoint 12 – Mine Clearing Road.

The following section will review photomontages prepared from Viewpoint 12 Mine Clearing Road demonstrating the change in views and noticeability of structure treatments in the one view.



5. Re-examination of Viewpoint 12 – Mine Road Clearing

Figure 5-1 shows the numbered structure pairs of the project in proximity to Lobs Hole Ravine Campground and their proximity to Viewpoint 12 – Mine Clearing Road. The yellow line shows the alignment of Line 2 is also shown.



Figure 5-1 Numbered structure pairs

The view shown at Viewpoint 12 – Mine Clearing Road included the panorama looking south-east through west. The photomontage shown at Figure 3-25 of Viewpoint 12 showed an enlargement of the view looking directly west. This enlargement is reproduced below.

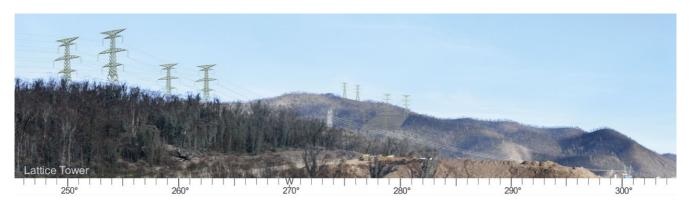


Figure 5-2 The project - Lattice Towers - Olive Green

This view also demonstrated the obviousness of painted structures when viewed against the sky. This same view also demonstrated the contrast of the existing naturally weathered dull-grey lattice towers within Line 2 when viewed against a contrasting backdrop of vegetated hills. The cleared easement under the transmission line in the background of the view is also noticeable.

Nearby towers are numbered structure pairs 6 and 7. Structures in the background of the view include numbered pairs 8, which are views against a vegetated backdrop, and pairs 9 and 10 which silhouette against the sky.



Figure 5-3 shows the same view modified to show elevated towers to be pre-dulled galvanised steel, and structures that are lower in the landscape to be painted olive green.



Figure 5-3 Galvanised and painted towers

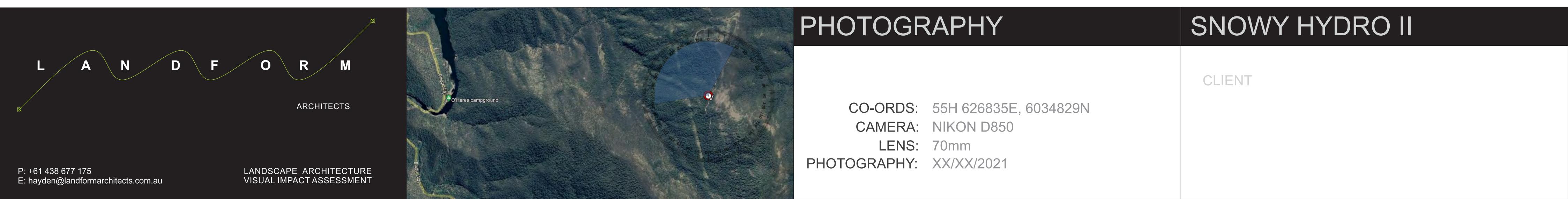
Lattice towers on elevated and prominent locations, even those that are nearby are less apparent when left galvanised but pre-treated to remove the sheen of hot-dip galvanised steel. Similar reductions are gained through painting of lattice towers viewed against a vegetated backdrop. This reduction would also be partly contributed to through distance.

Based on this examination of views and proposed structures through Lobs Hole Ravine, the following treatments are proposed to each numbered pair to assist with reducing the visual obviousness of structures based on background elements.

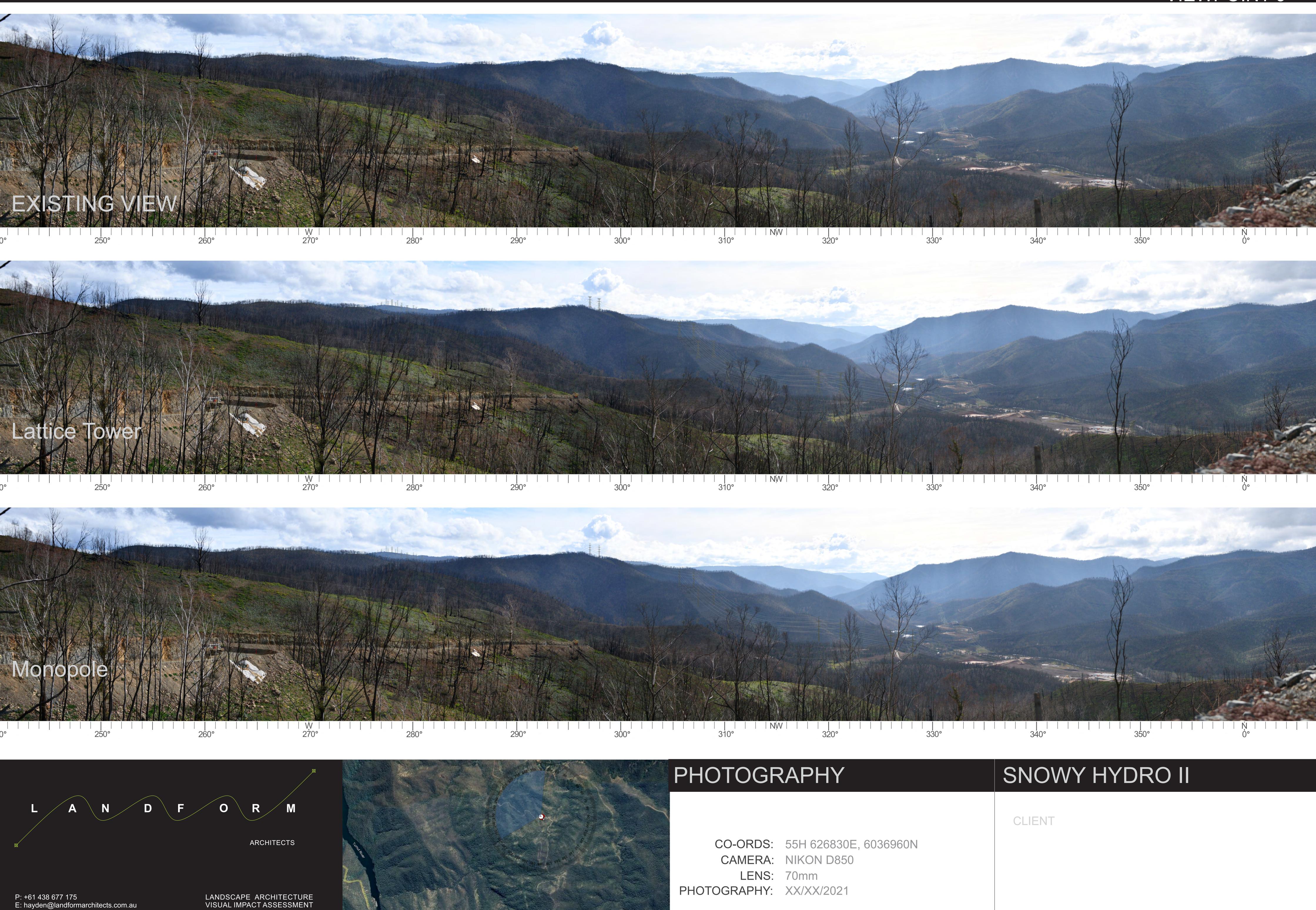
Numbered Pairs	Background	Treatment type
1L & 1R	Vegetated Hills	Olive Green
2L & 2R	Vegetated Hills	Olive Green
3L & 3R	Vegetated Hills	Olive Green
4L & 4R	Part sky	Dull-Grey
5L & 5R	Sky	Dull Grey
6L & 6R	Sky	Dull Grey
7L & 7R	Vegetated Hills	Olive Green
8L & 8R	Vegetated Hills	Olive Green
9L & 9R	Sky	Dull Grey
10L & 10R	Sky	Dull Grey



Appendix A - Photomontages





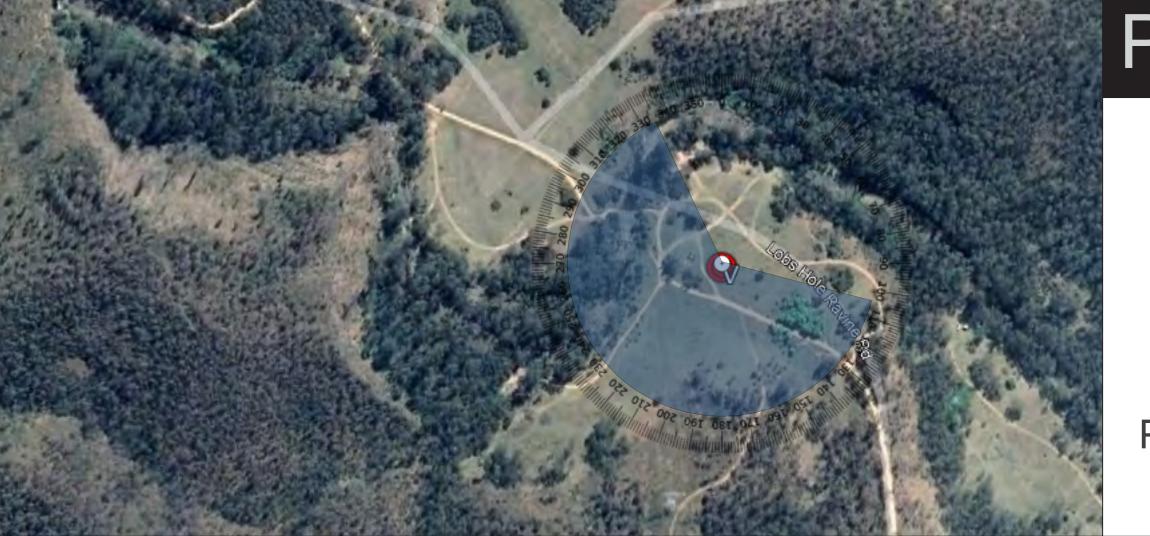












PHOTOGRAPHY

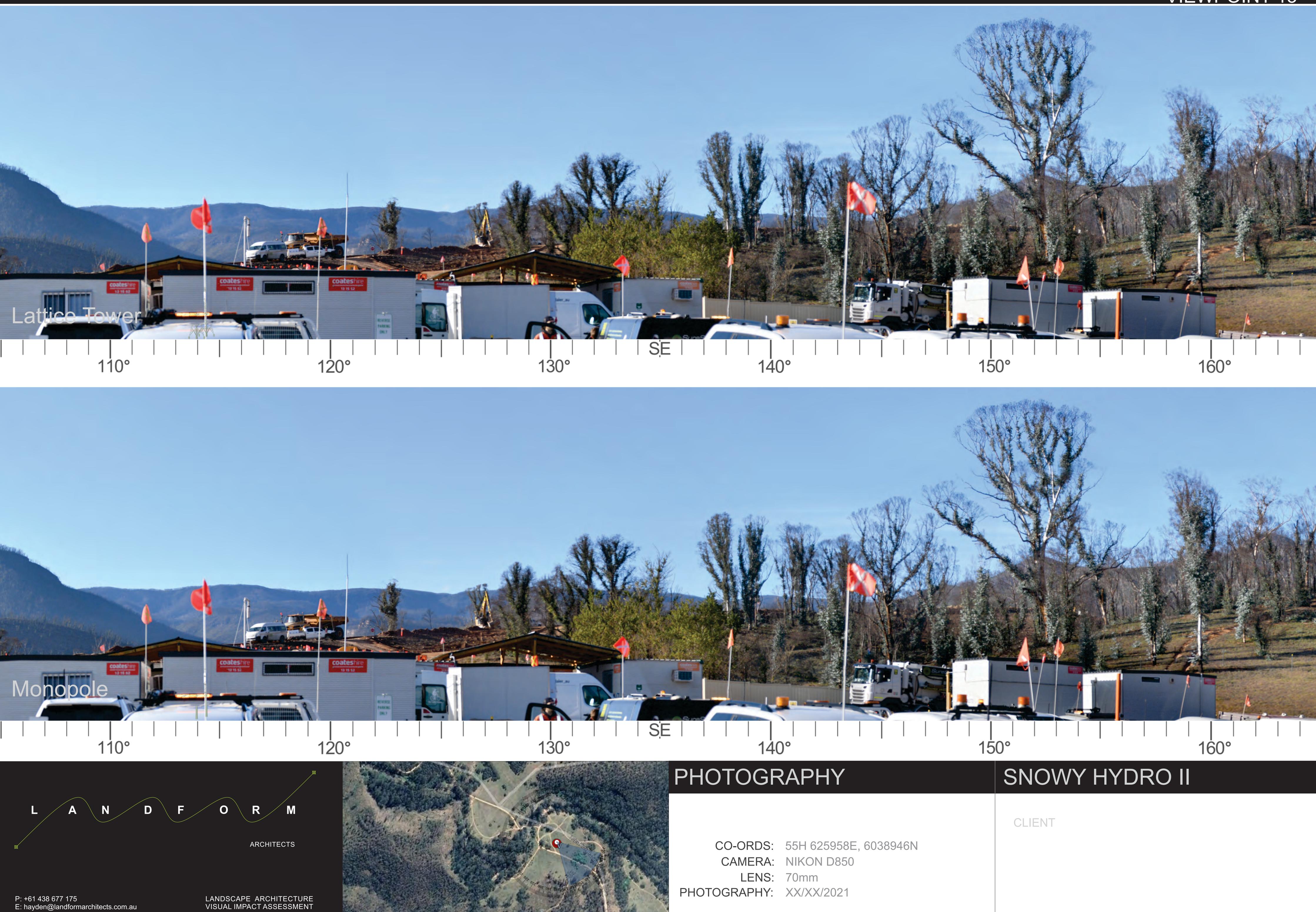
SNOWY HYDRO II

CO-ORDS: 55H 625958E, 6038946N

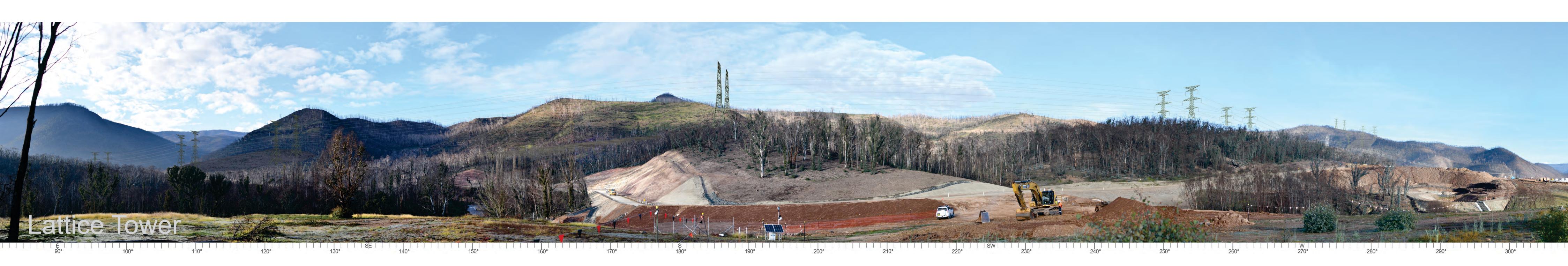
CAMERA: NIKON D850 LENS: 70mm

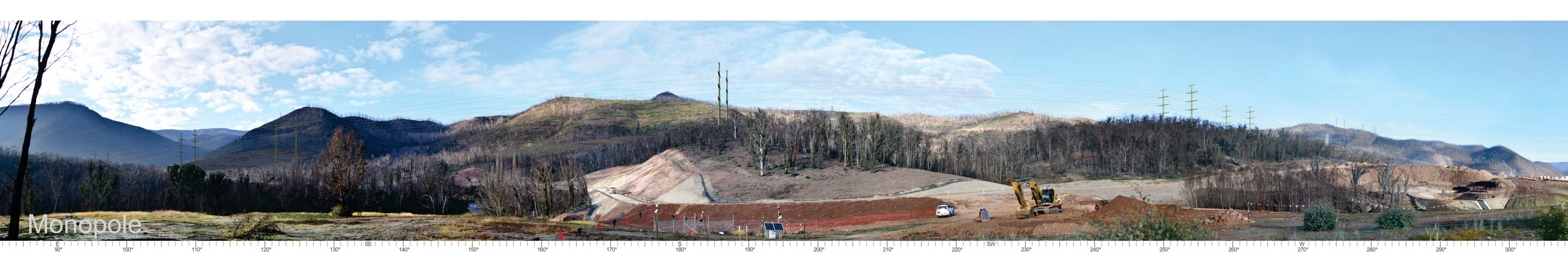
PHOTOGRAPHY: XX/XX/2021

CLIENT

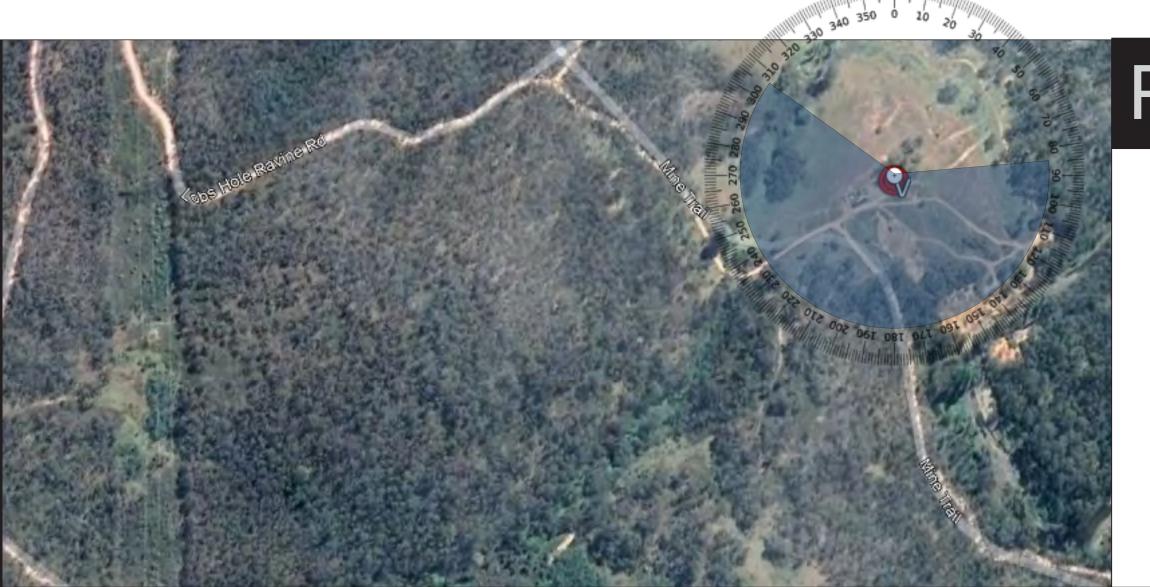












PHOTOGRAPHY

SNOWY HYDRO II

CO-ORDS: 55H 626702E, 6038252N

CAMERA: NIKON D850

LENS: 70mm
PHOTOGRAPHY: XX/XX/2021

CLIENT

