Landscape Visual Impact Assessment
Great Lakes Battery

inspiring place

entura

Prepared for

NEOEN

JUNE 2023

Inspiring Place, 210 Collins Street , Hobart 7000
P 03 6231 1818 E adam@inspiringplace.com.au M 0407 311 812

with assistance from the GIS team at Entura (Hydro Tasmania)

Direct enquiries to:
John Hepper
Founder, Inspiring Place

Inspiring Place is a Unit Trust incorporated in Tasmania.
The Company Directors are Adam Holmstrom and Jordan Davis.

ABN 58 684 792 133 ACN 085 559 486

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16.06.23	V1	
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Inspiring Place Project No. 22-33 (22-R)

Cover photo: Existing substation looking up to the Western Tiers (Source: Inspiring Place)

We acknowledge and respect the palawa/pakana peoples of lutruwita (Tasmania) and the Aboriginal and Torres Strait Islander Peoples across Australia as the traditional custodians of our shared lands, waters, and seas. We acknowledge the Lairmairrener, Tyerrernotepanner, Paredarerme, Tommeginne, Pyemmairrener people of the central highlands area.

We recognise palawa ability to care for Country and their deep spiritual connection with the land, waters, and seas – the same land, waters and seas which are a central focus of our profession.

We honour Elders past and present and emerging whose knowledge and wisdom will ensure the continuation of Aboriginal and Torres Strait Islander cultures.

We acknowledge the deep history and living links to kooparoona naira (the Mountains of the Spirits or Great Western Tiers) – an area is rich in Aboriginal heritage.

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SECTION 1
BACKGROUND

Tasmania's landscape is highly diverse and noteworthy for its spectacular beauty. The importance of the scenery to our sense of who we are as Tasmanians has played out politically throughout the history of the State and remains a potent issue of debate in the 21st century. For this reason, due consideration needs to be given to any development that might irrevocably damage the scenic quality of Tasmania's landscape that underpins the State's brand.

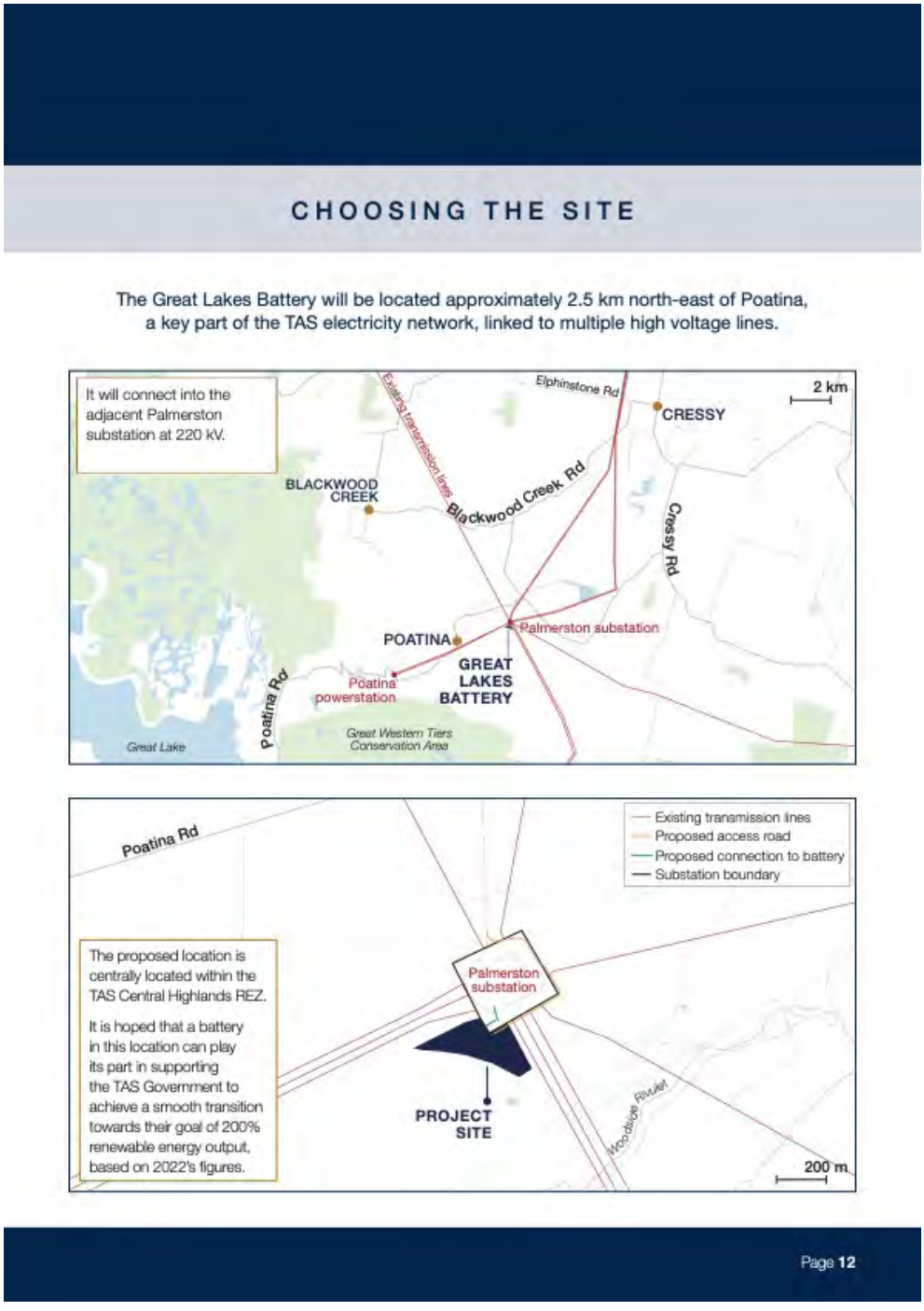
The Tasmanian Government is in the early stages of planning a renewable energy zone (REZ) in the Central Highlands.

French renewable energy developer Neoen proposes to develop a battery energy storage system (BESS) at Palmerston, located some 2.5 km from the township of Poatina in central Tasmania (Map 1.1). The development is part of Neoen's active role in the transition to renewable energy in Australia. Neoen are leading big battery projects in other states, including Queensland, Victoria, South Australia, and New South Wales. Boosting the capacity, operational flexibility and energy output in Tasmania is a key part of delivering a stable, reliable grid.

The Great Lakes Battery will be managed from Neoen's 24/7 Operational Control Centre in Canberra, which currently operates 14 existing projects across Australia. This office coordinates with local maintenance contractors for safe, effective, and compliant operations.

Neoen engaged Inspiring Place to prepare a landscape visual impact assessment (LVIA) for the proposed development. An accepted, replicable method of analysis has been applied to understand the nature and scale of impacts and to identify opportunities to eliminate or mitigate any significant impacts which affect the landscape character of the place where these occur.

This study applies the techniques of visual impact analysis management employed by multiple agencies around the world. In general, visual landscape management seeks to retain the established character of the landscape. In many landscapes, change is expected as resources are developed, and patterns of settlement evolve. While visual variety is valued, alterations that permanently or temporarily deviate from the scenic quality or significantly change the existing character are considered a negative visual impact.



Map 1.1 Proposed development location (Source: Neoen Community Information Booklet Great Lakes Battery 2023)

Section 2 outlines the method of analysis used for the LVIA. Section 3 describes the development type. Section 4 provides the analysis to determine the sensitivity of the landscape to alteration, visual impact absorption capacity of the landscape, the magnitude of the impact and the mitigation measures that can be taken. Section 5 provides the conclusion from the LVIA investigations.

SECTION 2
METHOD OF ANALYSIS

2.1 Approach to the LVIA

There is a long history of visual values assessment and management dating from the 1960s in the United States. In Tasmania, the US system was largely adopted by the Forestry Commission Tasmania (now Sustainable Timber Tasmania) to guide its practices since the 1980s. The Forestry Commission published its methods in *A Manual for Forest Landscape Management*[1] in 1990 (revised 2006).

The Forestry Commission system has since been the primary visual management tool employed by Tasmanian planning professionals, with modification over time to account for contemporary best practice techniques, including extensive use of Geographic Information Systems (GIS). Those working in the discipline have applied the system to the evaluation of the visual impact of major infrastructure including transmission lines, wind farms, telecommunications facilities, heavy industry, residential development, pumped hydro, waste disposal operations and tourism attractions and to the planning of regional landscapes.

The system of analysis draws heavily on these works (Figure 2.1) and is premised on an analysis of factors that determine how people react to changes to the visual qualities of a place. The method evaluates several influences including the:

alteration type –the scale, character, and location of the proposed development (Section 3);

landscape context - the biophysical and social factors that combine to create the landscape character (Section 4.1) and scenic quality of the setting (Section 4.2);

viewing disposition - who sees what, from where and how often (Section 4.3);

the inherent capacity of the landscape to incorporate an alteration without impact or its 'visual absorption capability' (Section 4.4);

1 Forestry Commission Tasmania 1990 (reprinted 2006). A Manual for Forest Landscape Management Forestry Commission of Tasmania, Hobart.

landscape sensitivity – a gauge of the contribution a landscape makes to the sense of place, and the sensitivity of an area to the alteration of its character (Section 4.5); and

magnitude of impact – the degree to which a proposed alteration changes the scenic attributes of the landscape that alter the viewing experience (Section 4.6).

Together these factors lead to an understanding of the significance of the impact and the need for targeted mitigation.

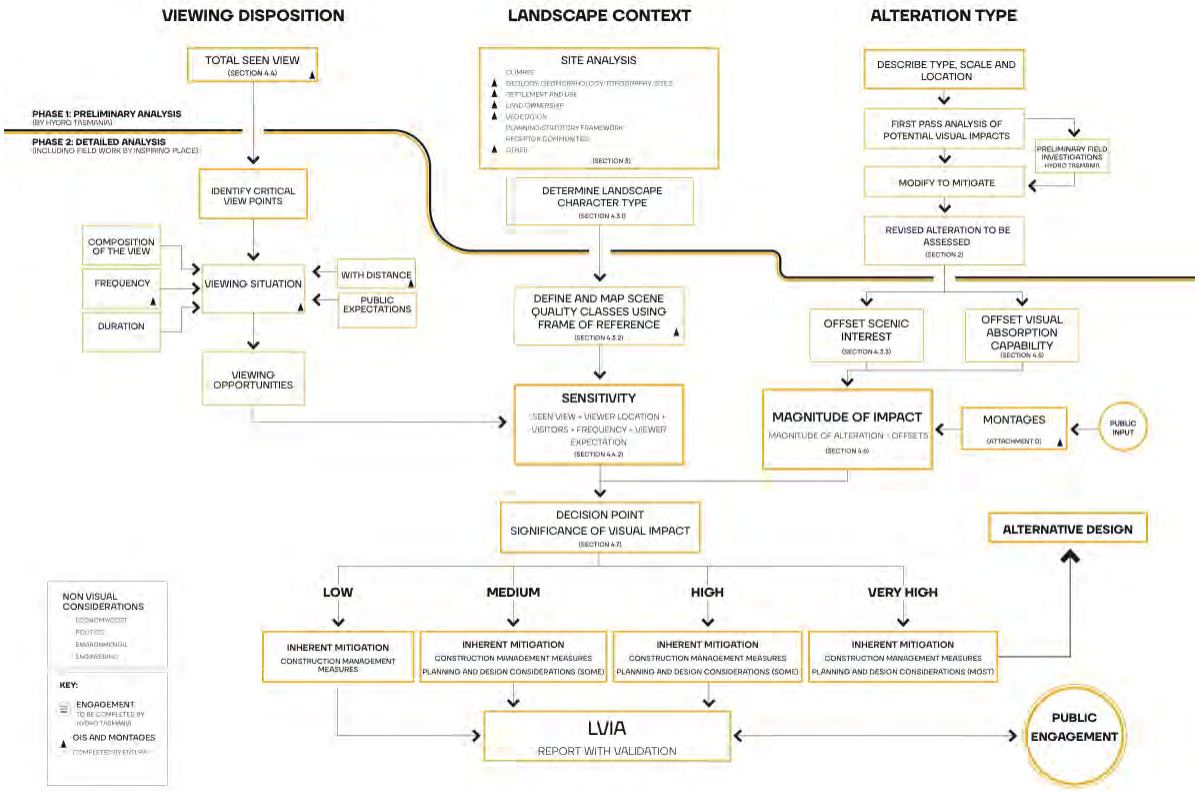


Figure 2.1 LVIA Process

The analysis has been supported by Entura including:

- the technical specification of the GIS analysis for the seen view (Attachment A);
- seen view analysis maps for Stage 1 and Stage 2 of the development (Attachment D); and
- preparation of geo-spatially accurate photomontages from key viewpoints (Attachment E).

Note that the mapping is limited by the resolution and scale of the presentation format. The maps in this report result from a GIS analysis that has a much greater resolution that can only be interrogated on screen or in larger format maps.

Four montages were developed for this project from public locations where the battery will be most visible in the landscape. Figure 4.1 shows the locations and Attachment E the montages from these locations. One location is from Poatina village and three others are on Poatina Road at locations with a clear view across rural land to the proposed battery and associated facilities. The montages were chosen for their capacity to illustrate some of the potentially more impactful views from public accessible locations. Montages are not an assessment method but do illustrate a point in time under a particular lighting condition. As such, they aid in illustrating to the community the scale and form of the proposed development at specific public viewpoints.

The reader should be aware that the visual quality of the landscape is only one element of how it is seen. Researchers have consistently shown that people's emotional attachments and the cognitive meanings they perceive in the landscape affect their judgement of the beauty of a place. Multiple sensory inputs, cultural background and personal experiences can all affect how a viewer responds to a scene[2].

To fully understand the aesthetics of a place requires a multi-dimensional analysis that:

- defines and analyses the physical attributes of the place;
- examines the social attachments people have with it; and

[2] Van Heijgen, E. 2013. Human Landscape Perception: Report on Understanding Human Landscape Perception and How to Integrate and Implement this in Current Policy Strategies report to the AONB High Weald Unit, United Kingdom.

looks at how human activities and the nature of the place combine to make a cultural landscape.

In professional planning three interrelated skill sets have developed to cover this range of activities:

visual management that systematically analyses the compositional elements of the landscape (as in this report);

social values assessment that uses a phenomenological approach[3] to the evaluation of personal meaning to the appreciation of the visual value of the landscape (information typically gleaned from community engagement, review of artistic sources, myth, legend, and local folk lore); and

cultural landscape assessment that uses historical analyses to understand the layers of activity that influence a landscape setting.

The detailed analysis of the latter two of these variables are outside the scope of this report. However, social values have been considered to some degree based on the consultant's understanding of these values gleaned through their long attachment and residence in Tasmania, through numerous community engagement processes in planning, recreation and tourism undertaken over 30 years of practice work and 1500 projects in the State including some across the study area.

Nonetheless, by focusing on the visual elements of the landscape and the contrast between what is and what could be, the visual management system used in this report aims to provide a reliable, valid, and representative mechanism for evaluating the aesthetic of the landscape and potential impacts to it.

2.2 Planning approvals

Development must comply with the *Land Use Planning and Approvals Act 1993* for local government planning approval under the *Tasmanian Planning Scheme – Northern Midlands*. The study site falls into the Agriculture zone (Section 21 of the Scheme) and has the following overlays: electricity transmission infrastructure protection (Section 4 of the Scheme), local historic heritage code (Section 6 of the Scheme), waterway and coastal protection aera (Section 7 of the Scheme) and bushfire-prone areas (Section 13 of the Scheme). The land on which the proposed

[3] Phenomenology is the study of human experiences, behaviours, situations, and meanings as they arise in a person's everyday life i.e., their lifeworld, which is taken for granted, normally unnoticed and thus hidden as a 'phenomenon'. Various techniques of evaluating people's 'lifeworld' have enabled an identification of those places that have 'social value' to someone's daily life and therefore of consideration in an investigation of the impacts of a development.

development is permanently registered as a Local heritage place (THR 5072, Woodside, 4740 Poatina Road, Cressy) under the Northern Midlands Local Provisions Schedule.

SECTION 3
THE PROJECT AND ALTERATION TYPE

This project is planned in two stages, where each stage will consist of installing up to 140 MW of capacity, with up to two hours of storage duration. The battery will connect into TasNetwork's Palmerston substation at 220 kV and be capable of storing energy and reinjecting it into the grid when it is most needed. The battery will provide a variety of services including frequency control and load shifting, which are both necessary for the development of Tasmania's renewable energy capacity.

The BESS stores energy that can be used in the future. When there is excess energy, the battery will charge, and when there is high demand for energy, the battery will discharge. The battery can discharge power provided by the sun and wind at times when these resources are not available. The battery will also charge/discharge electrical power into the network in response to frequency changes. The battery will lower the cost of these service markets which results in lower electricity prices for Tasmanian consumers. The location and connection voltage of the battery (Palmerston substation at 220 kV) will help to minimise electrical losses on the system and reduce the amount of additional electricity infrastructure required to support Tasmania in reaching its renewable energy target.

Figure 3.1 shows the proposed layout of the development indicating how the layout will be developed in two Stages.

The main infrastructure in Stage 1 includes:

- battery storage containers and invertors (height 2.35 m);
- high voltage substation and 33 KV switchroom (heights 3.0 m)
- operations/control building (height 5.5 m);
- lightning masts (height 25 m); and
- maintenance shed (height 5.0 m).

Stage 2 duplicates the functional layout with battery storage containers, inverters, medium voltage transformers, one additional switchroom and power transformer.

The precise site layout will slightly vary depending on the technology suppliers chosen for this project. In the absence of finalising a technology supplier, the below provides a reasonably indicative layout of the layout.

Figure 3.2 is an indicative layout of the battery site. This figure shows a scenario where each power conversion skid comprises of two 4.39 VA inverters and one MV transformer with a total capacity of 8.8 MVA. The dimensions of the containers will be finalised with the battery technology supplier, but each container of batteries will be anywhere up to the size of a 20-foot container of length. The plant layout uses several identical BESS blocks, optimised to reduce cable length. Each BESS block will be anywhere up to the dimension of 36.3 m x 10.3 m. The block can be rotated if needed to optimise the fit of the infrastructure to the site.

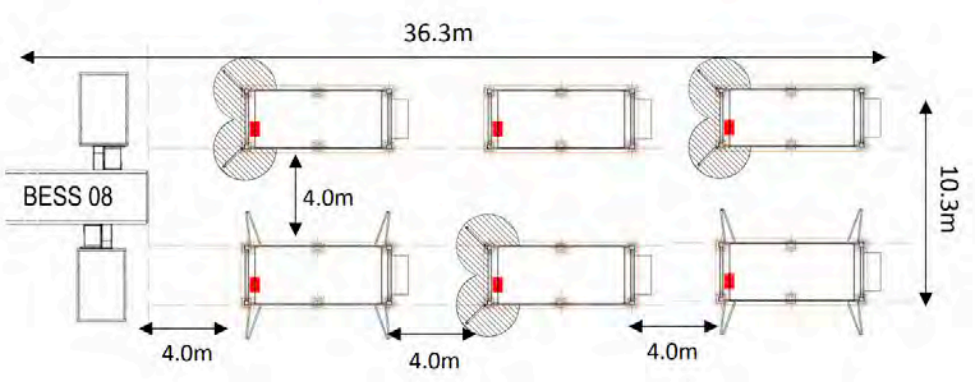
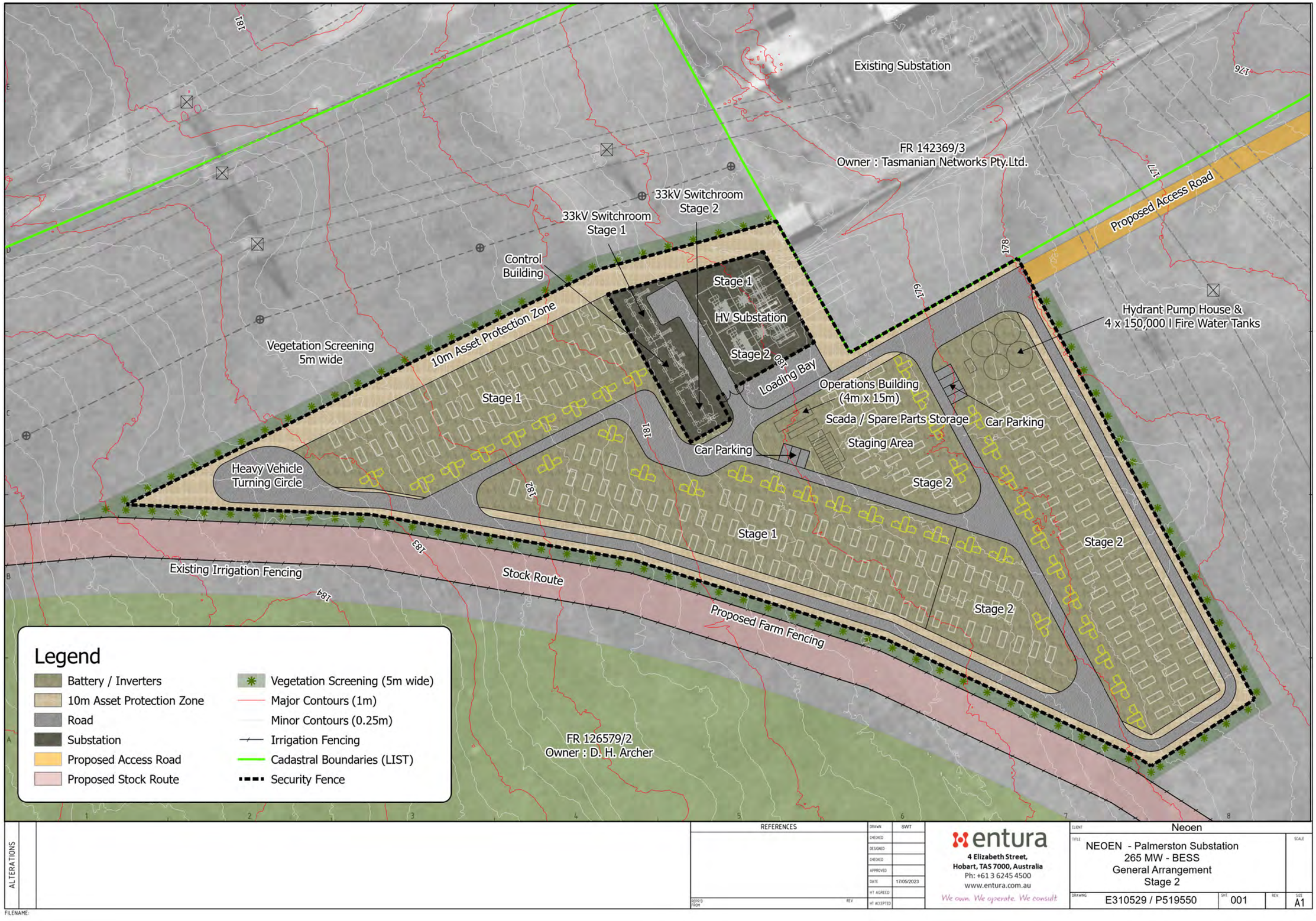


Figure 3.2 BESS block showing the configuration of the six containers.

Vehicle access will be on a new access road off the existing entry road to TasNetwork's Palmerston substation. The proposed access road provides vehicle access to the site with a heavy vehicle turning circle and a site for car parking (3 spaces). A buffer area is located around the infrastructure and provides for asset protection. A 5m wide area outside of the security fence is set aside for vegetation screening, to which a landscape plan has been prepared to identify the proposed planting species.


Existing Substation
FR 142369/3
Owner : Tasmanian Networks Pty.Ltd.
Proposed Access Road
33kV Switchroom
Stage 2
33kV Switchroom
Stage 1
Control
Building
Stage 1
HV Substation
Stage 2
10m Asset Protection Zone
Vegetation Screening
5m wide
Hydrant Pump House &
4 x 150,000 l Fire Water Tanks
Loading Bay
Operations Building
(4m x 15m)
Scada / Spare Parts Storage
Car Parking
Staging Area
Car Parking
Heavy Vehicle
Turning Circle
Stage 1
Stage 2
Stage 1
Stage 2
Stage 2
Existing Irrigation Fencing
Stock Route
Proposed Farm Fencing
FR 126579/2
Owner : D. H. Archer
Legend
Battery / Inverters
10m Asset Protection Zone
Road
Substation
Proposed Access Road
Proposed Stock Route
Vegetation Screening (5m wide)
Major Contours (1m)
Minor Contours (0.25m)
Irrigation Fencing
Cadastral Boundaries (LIST)
Security Fence
ALTERATIONS
REFERENCES
DRAWN SWT
CHECKED
DESIGNED
CHECKED
APPROVED
DATE 17/05/2023
HT AGREED
HT ACCEPTED
entura
4 Elizabeth Street,
Hobart, TAS 7000, Australia
Ph: +61 3 6245 4500
www.entura.com.au
We own. We operate. We consult
CLIENT Neoen
TITLE NEOEN - Palmerston Substation
265 MW - BESS
General Arrangement
Stage 2
SCALE
DRAWING E310529 / P519550
SHT 001
REV
SIZE A1
FILENAME:

SECTION 4
VISUAL IMPACT ASSESSMENT

4.1 Site Analysis – factors influencing the visual setting

4.1.1 Biophysical setting

A variety of biophysical factors influence the visual setting and sensitivity of the development within the landscape, as shown in Table 4.1.

Factor	Comment	Influence on the Visual Setting of the Development
Climate	Cool temperate climate; average min 1.7C and average max 12.1C High precipitation at 925mm per annum	The cool climate and nearby hills can create striking ephemeral atmospheric effects with frequent winter fogs and occasional snowfall and frosts.
Geology, Geomorphology and Topography	Sedimentary arenaceous rock of Quaternary age. Land System of Tasmania – Undulating Plains.	The site is to the north of the Western Tiers, in a gently sloping broad plain.
Geoconservation	The immediate area does not have mapped geoconservation features. The Central Plateau to the southwest has national conservation significance but is more than 4 km from the site.	Views from the Western Tiers may be significant and will be assessed.
Surface Hydrology	Artificial canals as well as a myriad of waterways and small impoundments.	The site sits at approximately 300m above sea level and is bordered by Palmers Rivulet to the north and Woodside Rivulet to the south. There is hydropower infrastructure including a canal and impoundment to the north adjacent to Poatina Road.

Table 4.1 Biophysical factors (Sources: Bureau of Meteorology; Land Information System Tasmania, Natural Values Atlas).

Factor	Comment	Influence on the Visual Setting of the Development
Fire	Various recent planned burns have occurred around Poatina in 2016, 2018 and 2020. All have been highly localised. Larger bushfires are recorded for the forested slopes of the Western Tiers.	Fire can temporarily or permanently change the visual setting by removing vegetation. In this highly managed, agricultural setting with electricity infrastructure, fire management is a priority.
Soils	Dominant soil order is kurosol (60%) and sub-dominant order vertosol (40%). Land capability class 4 – marginal for cropping. Light to dark brown in colour	Low contrast between the soil colour and surrounding vegetation mean bare areas are unlikely to be highly visible from higher elevations in the seen view.
Flora	The site and immediate area are all grazing lands (TASVEG Agricultural land FAG) The western tiers are dominated by *Eucalyptus amygdalina* forest on mudstone with some *E.obliqua* and *E.delegatensis* in higher elevations.	The addition of screening using native vegetation species will add natural values to the existing highly modified farmed land.
Fauna	Some 2022 Tasmanian devil (Sarcophilus harrisii) records are known from Poatina Road and other locations within 2km of the proposed site. Wedge-tailed eagles, grey goshawk, swift parrot, masked owls, and spotted-tail quolls recorded in the area.	The addition of screening using native vegetation will add natural values to the existing highly modified farmed land.

Table 4.1 (continued) Biophysical factors (Sources: Bureau of Meteorology; Land Information System Tasmania, Natural Values Atlas).

In addition to the biophysical factors, the area is influenced by striking ephemeral conditions that add atmosphere to the experience of the landscape including:

occasional snowfalls throughout the year;

changing lighting through the day;

side lighting during parts of the day emphasising the three-dimensional form and mass of the landscape features; and

patterns of cloud and fog.

4.1.2 Social and cultural matters

Aboriginal Heritage

Neoen engaged Cultural Heritage Management Australia (CMHA) to conduct a cultural heritage assessment of the project.

The cultural heritage assessment found no Aboriginal heritage sites were identified or recorded during fieldwork inspections and that there are no other registered Aboriginal sites within the Palmerston Battery Project footprint. It was assessed that there is generally a low to very low potential for additional undetected Aboriginal heritage sites to occur within the Palmerston Battery Project footprint.

Settlement Patterns and Land Use

There is already electricity generation and transmission infrastructure in the landscape with the Palmerston substation immediately adjacent to the proposed development site. There are planning overlays for the substation, overhead powerline corridors and a buffer for the substation.

The nearest settlements to the proposed development are Poatina 2.5km to the west (population 118; 2021 census) and Cressy 16km to the north (population 1150)[4]. A limited number of rural residences are located within the vicinity of the development site. The development site is on the Woodside property.

Neoen has engaged consultants GHD to undertake detailed traffic surveys and analysis for the project. Past traffic counts indicate relatively low average daily traffic volumes on Poatina Road at Poatina village[5].

Map 4.1 shows land tenure and the mostly agricultural and electricity generation setting of the foreground and midground of the proposed development. The reserved land of the Western Tiers provides a strong framing for the flatter parts of the landscape.

[4] https://abs.gov.au/census/find-census-data/quickstats/2021/SAL60151 Accessed 1 May 2023

[5] Geocounts Traffic Counter A16041811P https://geocounts.com/traffic/au/tas/ Accessed 16 May, 2023

Sense of Place Values

Sense of place values are influenced by a variety of factors:

how elements within the landscape become a reference for people's experience of a place and how these make the landscape legible to them[6];

the beauty or scenic quality of a place;

how the landscape tells the story of the history of a place (i.e., cultural landscape values);

the experience of the place as a person moves through it; and

the symbolic and spiritual qualities ascribed to a place.

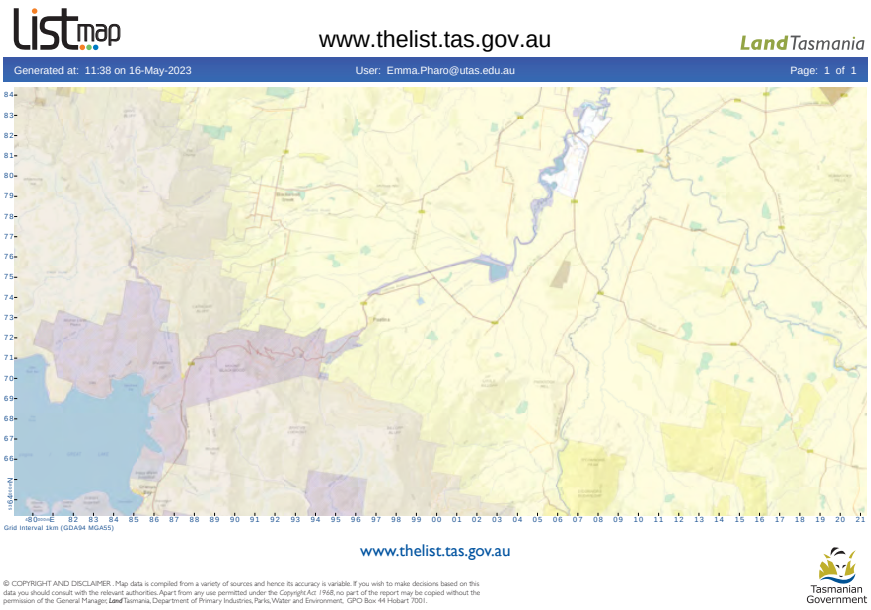
Individuals instinctively ascribe weight to these aspects of the landscape as part of their life world[7]. As a community, the significance of sense of place values intensifies as perceptions are shared and become part of a common bond, that is, how these values become self-defining to a community and their attachment to the uniqueness of living in a place – attachments strengthened through familiarity, access, knowledge of and cultural engagement with a locale.

Anecdotally and without further and in-depth community engagement, it can only be assumed that the sense of place values around the development will vary in depth with individuals. Those with the strongest attachments to the place are likely to be those who live locally or have family who lived locally. Family is used in the widest sense to also mean ongoing attachments to Country by Aboriginal Tasmanians.

The landscape has been dramatically altered over time with the clearing of forest for agricultural use, construction of roads, development of the Poatina power scheme and associated infrastructure including the substation and overhead transmission lines. To this extent, the sense of place values are likely to have changed also.

6 See Lynch, K. 1960. The Image of the City MIT Press, Cambridge, Mass.

7 http://www.tvsanalyser.com.au/ Accessed 27.02.2023.



Map 4.1 shows land tenure as being mostly private freehold in yellow. The purple land is Hydro and blue is 'authority freehold' and is for electricity infrastructure.

4.2 LANDSCAPE CONTEXT

4.2.1 Landscape character type

Landscape character types are physiographic regions with common distinguishing visual characteristics of landform, waterform, vegetation and cultural influences[8]. It is generally agreed there are 11 regional landscape character types in Tasmania (Map 4.2). Poatina falls on the southern edge of the Eastern Hills and Plains Landscape Character Type (LCT) that borders the Central Plateau type. For the purposes of this report, the Eastern Hills and Plains type have been used because the boundaries between these large units were not intended to be interpreted as precise and the proposed development site is on the plains, to the east of the plateau rather than on the plateau.

[8] Op.cit. Forestry Commission Tasmania c1990. p 49.

Map 4.2 Landscape character types (Source: Forestry Commission 1990)

4.2.2 Scenic quality

A frame of reference has been developed for the Eastern Hills and Plains Landscape type that enables the aspects of scenic quality to be assessed into classifications of high, moderate, and low based on the attributes of the landscape character type (Attachment B). High scenic quality in the Eastern Hills and Plains LCT is associated with distinctive isolated hills, incised valley systems that create strong spatial definition, cliffs and rock outcrops of moderate size or colour contrast. In terms of vegetation, high scenic quality has vigorous vegetation that introduces distinctive

patterns and textures, as well as combinations of different sizes and shapes with irregular edges. In terms of waterform, high scenic quality is associated with large water courses and lakes (including lagoons).

Evaluation of the setting of the development against the criteria of the frame of reference for the Eastern Hills and Plains LCT indicates the **moderate to high scenic quality** of its landscape. The development is on the edge of the Plateau LCT that has dramatic cliffs and rock outcrops that frame the relatively flat agricultural land of the plains below. There are many streams in the area that add to the landscape character at a moderate level. Some of the watercourses have been channelled or controlled and lack the irregularity of natural features, which lowers their scenic quality.

The vegetation varies moderately in texture. There are areas of native riparian vegetation, including established eucalypts to the north of the study area, around Blackwood Creek. While varying in texture, the area generally lacks the strongly defined patterns and dramatic displays of form, colour or texture that would give the area high scenic quality.

In other regions of Tasmania, landscape character sub-types have been described to demarcate units that share many of the common landscape features of the landscape character type but have distinctive common environmental and cultural influences that can be readily identified. The identification of a landscape character sub-type was not necessary as the larger landscape character type description was sufficient for evaluation of the development.

4.2.3 Scenic interest

To understand the potential impact of the proposed changes on the existing landscape, the aspects of the development that may lend positive character to the landscape need to be considered. These qualities are considered as scenic interest as distinct from scenic quality. Measuring and ascribing value to scenic interest attempts to account for the fact industrial infrastructure may have value in the visual landscape for the fascination found in its built form or the visible expressions of its workings.

In response to these factors, a scenic frame of reference for rating scenic interest was previously developed[9] and later refined in other Tasmanian studies[10] (Attachment C).

While scenic interest does not necessarily mitigate negative visual impacts, it does potentially add points of interest to the landscape setting that contributes to the acceptability of an impact.

Interrogation of the frame of reference for scenic interest indicates that the existing infrastructure has **low to moderate scenic interest** depending on the viewer's expectations. The proposed development is low in stature and its location on private land means that there is no public access to obtain very close views. Photograph 4.1 shows the view from Poatina Road where the more dominant features of the view are the mid ground (vegetated slopes and penstock) and background (skyline). The foreground is expansive and flat land in agricultural use.

Photograph 4.1 View from Poatina Road west to Western Tiers and penstocks with the red brick of the two-storey building within the substation site visible (Source: Inspiring Place)

9 Jerry de Gryse Pty Ltd 1994. "Bell Bay Major Industry Zone: Visual Values Assessment and Management" unpublished report to the Bell Bay Major Industry Zone Steering Committee

10 Inspiring Place 2001. "North West Industrial Area Visual Aesthetics Assessment" unpublished report to Thompson Brett Engineers and Inspiring Place 2000. 'Musselroe Wind Farm and Associated Transmission Line Visual Values Inventory and Impact Assessment" unpublished report to Hydro Tasmania and Inspiring Place 2002. "Heemskirk Wind Farm and Associated Transmission Line Visual Values Inventory and Impact Assessment" unpublished report to Hydro Tasmania.

4.3 Sensitivity to change

Visual sensitivity is a gauge of the contribution a landscape makes to the sense of place, and the sensitivity of an area to the alteration of its character.

Most landscapes are viewed from multiple locations, some of which are likely to be more sensitive to alterations to the landscape character. Various factors contribute to the rating of sensitivity including:

the viewing distance (foreground, midground, background, far view); and

frequency of viewing from representative viewpoints and viewer expectations (refer to Section 4.3.1).

Sensitivity to change is the combination of these factors and is presented in Section 4.3.2. The subjective nature of the viewer's expectations means that there may be a diversity of reactions to the introduction of infrastructure to the landscape. However, the fixed measures of distance and frequency of view help define the likely scope of the impacts.

4.3.1 Seen view analysis

'Seen view' or 'viewshed analysis' can be used to predict the theoretical seen view from any point. GIS mapping was used to identify areas from which defined points on the development could be seen[11].

Two modelling techniques have been used to calculate the visibility of the development :

Digital elevation model (DEM) - based on the line of sight available based on the terrain only, that is, it assumes the absence of vegetation[12]; and

Digital surface model (DSM) – which accounts for the presence of vegetation in its interpretation of visibility.

11 Note in the GIS analysis, a point represents a grid cell or pixel of a defined size. In the current study, the terrain without vegetation (DEM) uses 10 by 10m grid cell. Thus, in the visibility analysis on DEM terrain, the 'viewpoint' could be anywhere within the 100 square meter (10 by 10m grid cell).

12 Examination of the view without vegetation is the commonly adopted technique used by visual management professionals as it accounts for the loss of vegetation say from fire, senescence, clearing, disease, etc. For instance, Forestry Commission 1990. op.cit. pg 113 indicates that screening provided by vegetation is potentially temporary. A more realistic understanding of the situation is obtained in the field where vegetation can be accounted for (the DSM model). The frequency of viewing illustrated by the DEM model, therefore is the maximum potential for viewing which is a cautionary analysis of the real situation.

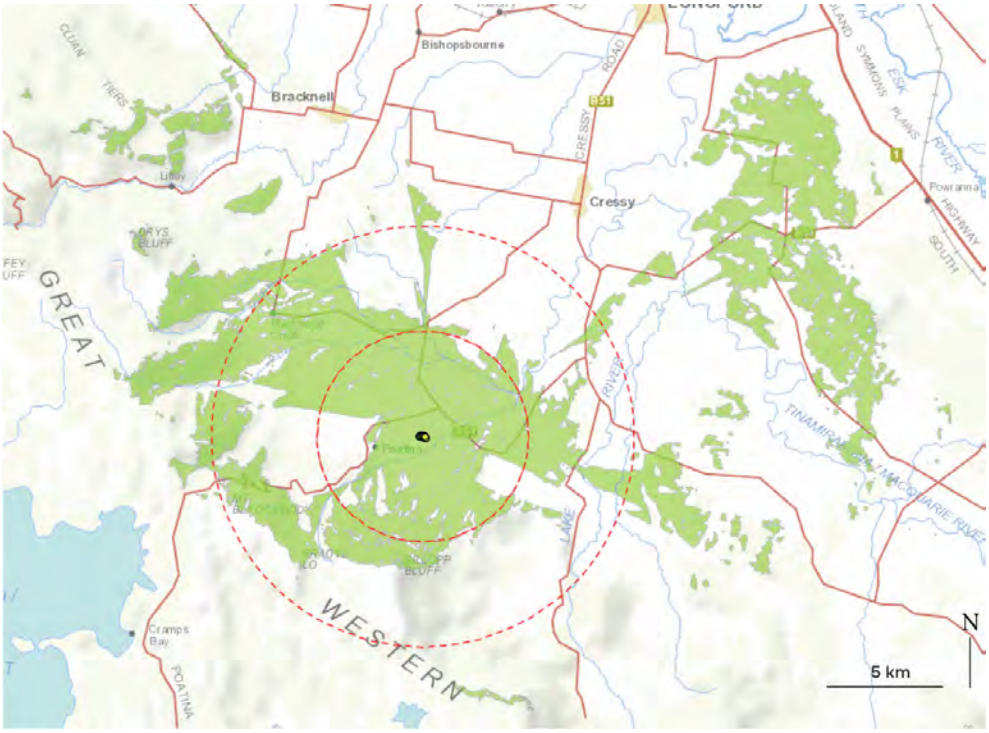
A terrain surface or DEM was used at a 10m resolution and assumes that observer height is 1.65 m. This is used as a standard height of an adult standing on the terrain to where points on the development can be seen from. Single points were located on the proposed infrastructure, including on:

the lightning rod heights at a maximum height of 25 m;

the staging building heights at a maximum height of 6.5 m; and

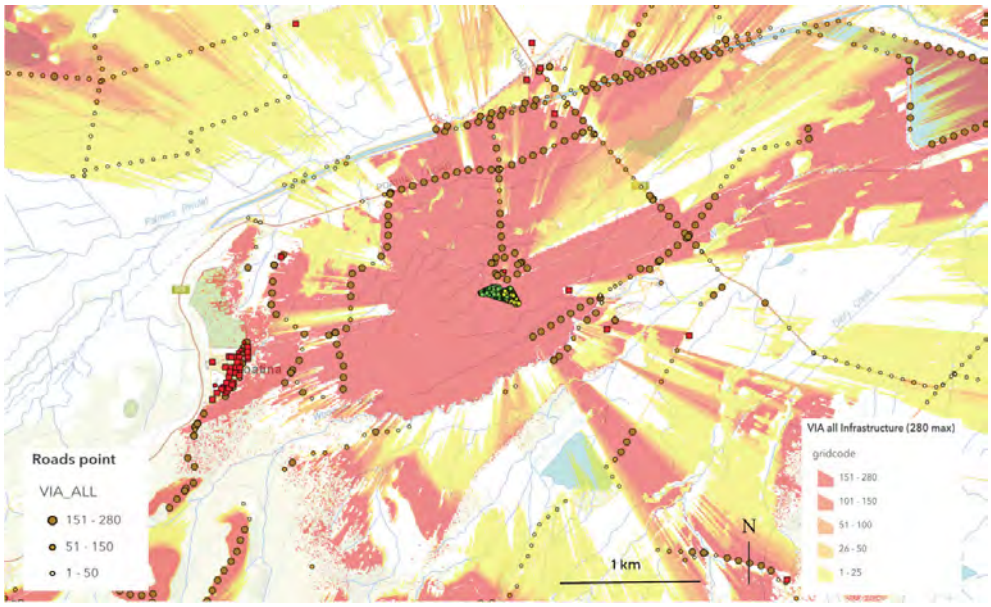
the battery containers at a maximum height of 2.9 m.

The field visit demonstrated that the development will not be seen from many of these locations because of the local topography, viewing distance and existing vegetation within the landscape (Map 4.3). The vegetation included tall hedgerows, some remnant eucalypt vegetation, and roadside plantings. Following the field visit, digital surface modelling was done to locate the actual seen views more clearly.



Map 4.3 Digital Elevation Model of the seen view from the development site (centre circle) with 5km and 10 km circles around the site. The green zone shows locations that have a theoretical view of the development in the absence of vegetation (Source: Entura).

For the digital surface modelling (that accounts for vegetation), 280 points were located on the development. These were divided into stage 1 and stage 2. Each stage has a set of batteries, inverters, buildings, circuit breakers, transformers, firewall, gantry, and lightning rod. For analysis, these points were grouped into categories of 1-25 points (pale yellow), 26-50 points (pale orange), 51-100 points (mid orange), 101-150 points (pink) and 151-280 points (deep pink) points. This helps make the seen view clearer for the purposes of analysis in Map 4.4. The seen view map is shown in full in Attachment D.



Map 4.4 Seen view of the 280 modelled points on the battery and associated infrastructure. The development is in the centre of the map with the cluster of 280 points in green and yellow. Road views are modelled every 100m (Source: Entura)

The location of the viewpoint or 'seen view' is discussed in this section and results for the DEM and DSM mapping for this project are shown in Table 4.2 and Attachment D. Table 4.2 is organised into foreground views and midground views. There are no public views closer than 1km for this development at this location.

Viewing locations	Km	Type	Total points DSM	Total batteries stage 1	Total batteries stage 2	Lightning rod Seen/not seen	Gantry Seen/not seen
Foreground (less than 5km)							
Woodside main	< 1	Residence	0	0	0	Not Seen	Not Seen
Poatina Road north	1	Road	174	99	31	Seen	Seen
Poatina Road east	1.5	Road	280	120	102	Seen	Seen
Saundridge Road south	1.7	Road	186	100	34	Seen	Seen
Poatina Road west	1.7	Residence	267	120	91	Seen	Seen
Poatina village	2	Residence	280	120	102	Seen	Seen
Poatina Road east	5	Road	226	116	59	Seen	Seen
Saundridge Road north	5	Road	5	0	0	Not Seen	Not Seen
Mid ground (5-10km)							
Blackwood Creek	7.5	Residence	29	20	0	Seen	Seen
Hop Valley Road	7.5	Road	2	0	0	Seen	Seen
Lake River	7.5	Residence	10	0	0	Seen	Seen
Mount Blackwood lookout	8	Scenic lookout	280	120	102	Seen	Seen
Cressy Road	9	Road	4	0	0	Seen	Seen
McRaes Hills	10	Residence	147	43	68	Seen	Seen
Cressy Road	10	Residence	185	53	90	Seen	Seen
Blackwood Creek	10	Residence	11	1	2	Seen	Seen

Table 4.2 Theoretical visibility of the components of the development from key locations in the presence of vegetation (Source: Entura and Inspiring Place).

The assessment included a review of residences that may have views to the infrastructure and facilities. The clearest view of the proposed development is from Poatina village.

The only places with **foreground** views (less than 1km) are on private property. These are on the Woodside property where the development is proposed. The views from the two residences are screened by existing vegetation (as noted in Table 4.1).

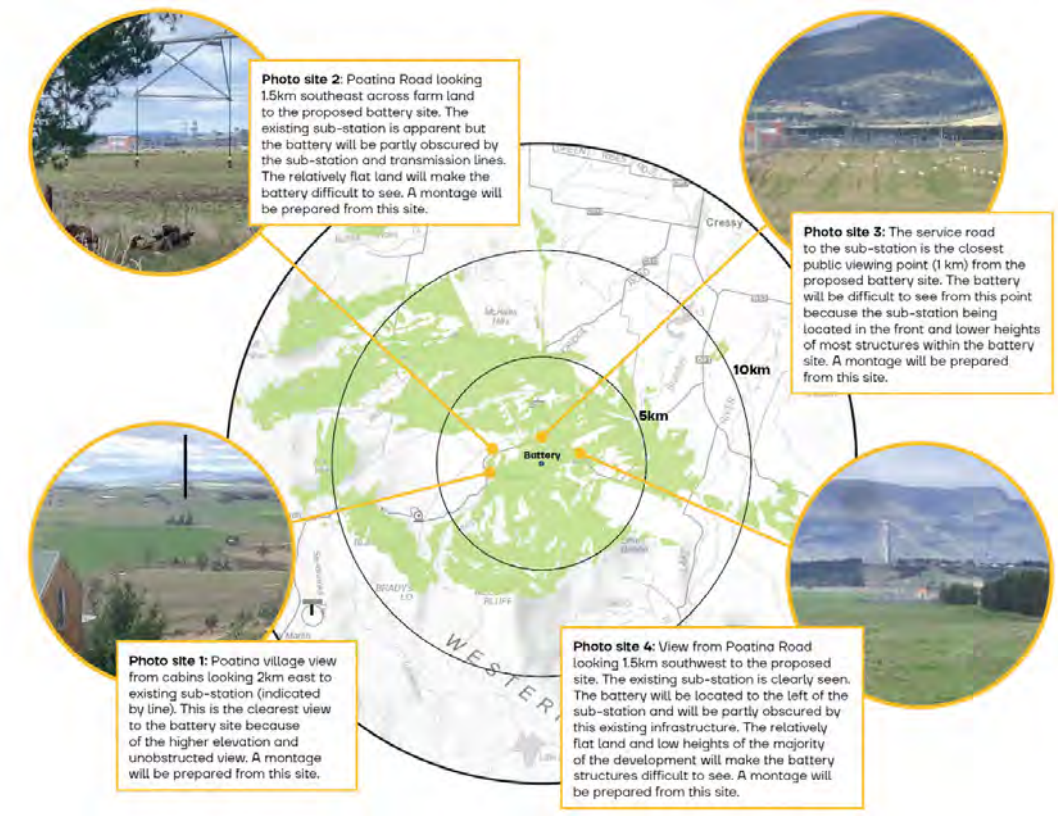


Figure 4.1 Digital elevation mapping (DEM) and the four photomontage sites within 1 – 1.5km of the proposed development site (Source: Entura and Inspiring Place)

In the **midground** (1-5km), the following views are likely:

Poatina village, particularly the eastern edge that has unobstructed views down to the substation and proposed development (refer to Photomontage site 1 in Attachment E);

from a residence on Poatina Road west (refer to Photomontage site 2 in Attachment E);

the intersection of the road leading to the substation and Poatina Road (refer to Photomontage site 3 in Attachment E);

Poatina Road near the entrance to Woodside property looking eastwards to the proposed development site and the Western Tiers, and

glimpses from Saundridge Road not far from Photomontage site 3 (Table 4.1).

In the **background** (5-10km), the following views can be seen:

some of the taller infrastructure such as the lightning rod can in theory (the rod is a thin pole structure and unlikely to be seen from residences at Blackwood Creek and McRaes Hills),

glimpses of taller infrastructure from Hop Valley Road and Cressy Road, and

views down from Mount Blackwood lookout (Photograph 4.2).

The development will not be framed against the sky from Mount Blackwood but seen against the darker forms of the surrounding landscape.

Photograph 4.2 View to the development site from the Mount Blackwood hydropower interpretation site and scenic lookout (Source: Inspiring Place)

It will be very difficult to see the proposed development from **locations more than 10km** from the site. Between the screening from the local topography and substantial hedgerows (Photograph 4.3), it will be very difficult to see the battery containers that form the bulk of the development given the low height of the containers. The taller components such as the gantry and lightning rod do not have the bulk that will make them noticeable from a distance. It will be difficult to make out the infrastructure from this distance, particularly on grey days with reduced visibility and some capacity for the taller elements to blend with the background landscape.

Photograph 4.3 Tall, thick macrocarpa (Cupressus macrocarpa) hedges are a prominent feature of the Poatina rural landscape (Source: Inspiring Place)

4.3.2 Overall Sensitivity to Change

Table 4.2 sets out a hierarchy of sensitivity ranging from high to low for several factors. Intermediate or moderate sensitivity is possible but not represented in the table. For example, the composition of the view is high if the view is from a fixed point and low if the viewer is on the move. Moderate sensitivity could occur if the viewer is stationary, but the alteration is seen as part of a wider view (e.g., the view from Poatina village towards the project site).

Factor	High sensitivity	Low sensitivity
Composition of the view	Uniform, apparently natural landscape High scenic quality setting	Patterned landscape of mixed land use and/or vegetation Degraded/Low scenic quality setting
	Alteration is the focus of a panoramic view	Alteration seen as fractional part of a wider landscape
	View is from a fixed point (i.e., residences)	Viewer is on the move
Number of viewers	Alteration seen by large numbers of viewers[13].	Alteration unseen or seen by limited numbers of viewers
Visibility	Multiple views from a location to the alteration	Limited or no view from a location to the alteration
Distance	Alteration seen in the foreground (near)	Alteration seen in the background (far)
Duration	Alteration permanently in the view (i.e., residences)	Alteration only seen in glimpses (views from the road)
Location	Promoted public viewing area with high visitation views the alteration	Isolated viewing area, low visitation with views to the alteration
	Residential living areas, permanent living with views to the alteration	Isolated homes, temporary living with views to the alteration
Viewer Expectation	Alteration located in a natural, apparently natural, or largely undisturbed landscape	Alteration located in a highly modified landscape

Table 4.2 Hierarchy of Sensitivity

Table 4.3 summarises the overall sensitivity of the development by providing an examination of the variables in Table 4.2 for each of the critical viewing locations. These are analysed in terms of distance as well as duration, view composition and viewer expectations. Each of these locations is given a sensitivity rating of either low, moderate, or high.

[13] Scenic Spectrums Pty Ltd adapted from Williamson, D. and Calder, S. 1979. "Visual Resource Management of Victoria's Forests: A new concept for Australia." **Landscape Planning** 6(3-4), 313-341.

Viewing opportunities	Viewing composition: Disposition, Scenic quality, Condition	Distance (km)	Likely number of views with veg (DSM)	Duration	Viewer expectation	Resulting Sensitivity
Foreground (less than 5km)						
Woodside main residence	Residence heavily screened by vegetation and sheds	< 1	None	Sustained	Landowners have agreed to development to be located on the property. Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** screening by the existing mature trees near the residence and the involvement of views in the development result in low sensitivity. Screening immediately around the development required to reduce visual and auditory impact.
Poatina Road north	Relatively open road with some screening from hedgerows and farm infrastructure	1	High	Fleeting	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – there is significant capacity to screen proposed development. Views are not in focus and will be difficult to see from vehicle.
Poatina Road east	Relatively open road with some screening from hedgerows and farm infrastructure	1.5	High	Fleeting	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – there is significant capacity to screen proposed development.

Table 4.3 Evaluation of sensitivity by viewing opportunity (location) using DSM. Note that high, medium, and low are used rather than the number of viewing points because the actual number of modelled points is highly variable depending on the location. A sense of the extent of the impact is the goal.

Viewing opportunities	Viewing composition: Disposition, Scenic quality, Condition	Distance (km)	Likely number of views with veg (DSM)	Duration	Viewer expectation	Resulting Sensitivity
Foreground (less than 5km)						
Saundridge Road south	Rural landscape with some heritage hawthorn hedges	5	High	None	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to the development but not likely to be dominant when viewed from moving vehicle and being located to the side.
Poatina Road west residence	Residence and garden with near views across a mix of industry and rural uses.	1.7	High	Sustained	Residence already has clear views to the substation set in rural landscape. Expectation is of a mix of industry and rural uses.	**Moderate** – there is significant capacity to screen proposed development for this residence by planting immediately around the development. Landscape already highly altered by existing hydropower and rural uses.
Poatina village	Views across a mix of industry and rural uses.	2	High	Sustained	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Moderate** - there is less capacity to screen proposed development because the village is higher in the landscape and looks down to the substation and proposed development. However, viewer expectations are for landscape already highly altered by existing hydropower and rural uses.

Table 4.3 (continued) Evaluation of sensitivity by viewing opportunity (location) using DSM. Note that high, medium, and low are used rather than the number of viewing points because the actual number of modelled points is highly variable depending on the location. A sense of the extent of the impact is the goal.

Viewing opportunities	Viewing composition: Disposition, Scenic quality, Condition	Distance (km)	Likely number of views with veg (DSM)	Duration	Viewer expectation	Resulting Sensitivity
Foreground (less than 5km)						
Poatina Road east	Relatively open road with some screening from hedgerows and farm infrastructure	5	High	Fleeting	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – there is significant capacity to screen proposed development.
Saundridge Road north	Rural landscape with some heritage hawthorn hedges	5	Low	None	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to the development but not likely to be dominant when viewed from moving vehicle
Mid ground (5-10km)						
Blackwood Creek	Rural landscape with some remnant riparian vegetation and hawthorn hedges	7.5	Low	Sustained	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to small part of the development but will be difficult to see from this distance and in the wider landscape.
Hop Valley Road	Rural landscape with some heritage hawthorn hedges	7.5	Low	None	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to the development but not likely to be dominant when viewed from moving vehicle

Table 4.3 (continued) Evaluation of sensitivity by viewing opportunity (location) using DSM. Note that high, medium, and low are used rather than the number of viewing points because the actual number of modelled points is highly variable depending on the location. A sense of the extent of the impact is the goal.

Viewing opportunities	Viewing composition: Disposition, Scenic quality, Condition	Distance (km)	Likely number of views with veg (DSM)	Duration	Viewer expectation	Resulting Sensitivity
Mid ground (5-10km)						
Lake River	Rural landscape with some heritage hawthorn hedges	7.5	Low	Sustained	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to small part of the development but will be difficult to see from this distance and in the wider landscape.
Mount Blackwood lookout	Escarpment landscape with intact native vegetation and far views to across plains to the northeast	8	High	20 minutes	Expansive views across Western Tiers, plains, and distant hills. Expectation of a mix of native landscapes, existing hydropower infrastructure and rural activities.	**Low** – theoretical view to small part of the development but will be difficult to see from this distance and in the wider landscape.
Cressy Road	Rural landscape with some heritage hawthorn hedges and native windbreaks	9	Low	Fleeting	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to the development but not likely to be dominant when viewed from moving vehicle
McRaes Hills	Rural landscape with some heritage hawthorn hedges	10	High	Sustained	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to small part of the development but will be difficult to see from this distance and in the wider landscape.

Table 4.3 (continued) Evaluation of sensitivity by viewing opportunity (location) using DSM. Note that high, medium, and low are used rather than the number of viewing points because the actual number of modelled points is highly variable depending on the location. A sense of the extent of the impact is the goal.

Viewing opportunities	Viewing composition: Disposition, Scenic quality, Condition	Distance (km)	Likely number of views with veg (DSM)	Duration	Viewer expectation	Resulting Sensitivity
Mid ground (5-10km)						
Cressy Road	Rural landscape with some native windbreaks	10	High	Fleeting	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – t theoretical view to the development but not likely to be dominant when viewed from moving vehicle
Blackwood Creek	Rural landscape with some heritage hawthorn hedges	10	Low	Sustained	Expectation of a mix of existing hydropower infrastructure and rural activities.	**Low** – theoretical view to small part of the development but will be difficult to see from this distance and in the wider landscape.

Table 4.3 (continued) Evaluation of sensitivity by viewing opportunity (location) using DSM. Note that high, medium, and low are used rather than the number of viewing points because the actual number of modelled points is highly variable depending on the location. A sense of the extent of the impact is the goal.

Review of Tables 4.2 and 4.3 suggests that the development site has **low** sensitivity to change with only a couple of locations that have a **moderate** sensitivity. The following factors contribute to this rating:

that most of the near and midground views are screened or partially screened by local topography and vegetation (**low** sensitivity);

the view from Poatina village is already altered by the presence of the existing substation and transmission lines (**low**);

the landscape is relatively flat and of **moderate** scenic quality, lacking features such as the iconic dolerite peaks and dramatic forms of landscapes found further west;

the landscape is highly variable in terms of a patchwork of natural and built forms (**low**);

views from the local road network are fleeting, rarely in a focal view, with roadside screening and topography reducing the duration of viewing and that the impact of the prominence of the development will not be seen against the skyline (**low**); and

one of the foreground views is from a nearby residence on Poatina Road looking towards the west that already has views to the substation and some views to the new infrastructure are expected or unavoidable (**moderate**).

4.4 Visual Absorption Capability

Visual absorption capability is a measure of the inherent ability of a landscape to accommodate visual change. Visual absorption capability is considered an offset in the evaluation of the magnitude of impact expected in its absence.

Absorption capability is affected by:

physical factors (topography, prominence, vegetation, soils);

perceptual factors (distance, aspect to the viewer, number of viewing points, number of viewers and duration of viewing); and

visual characteristics of the alteration (form, scale, colour, and contrast to surrounds and the permanency of the alteration).

Table 4.4 outlines the physical factors affecting visual absorption capability and how they range from high to low across each factor with boundaries between ranges strongly influenced by local conditions. As with sensitivity, an intermediate or moderate condition is possible.

Factor	High visual absorption capacity	Low visual absorption capacity
Slope	Flat	Steep
Prominence	Lightning rod and gantry seen against the skyline	Lightning rod and gantry seen against a backdrop
Vegetation	Tall	Low height
	Open, patterned	Uniformly dense vegetation
Soils	Dark	Light

Table 4.4 High and low visual absorption capacity for various factors.

Table 4.4 suggests that the visual absorption capability of the site is **moderate to high**. Several factors contribute to this including that:

the development is generally well screened by vegetation and local topography from many locations except for side views from Poatina Road and a clear view from Poatina village;

the tallest parts of the development (e.g., lightning tower at 25 m height) may be visible from roads and some residences, but the view will not be prominent because of the limited bulk and backdrop of the Great Western Tiers within the wider landscape topography;

much of the development will be fleeting and difficult to see as it will mainly be outside the focal view when viewed from vehicles travelling on Poatina Road; and

the varied colours of the landscape and the dominance of features such as the dark macrocarpa hedges mean a high visual absorption capability.

Scenic interest can be seen as an offset to visual impact that ameliorates environmental impacts by adding positively to the landscape setting. The proposed development has **low** scenic interest and there is little offsetting value ascribed to it.

4.5 MAGNITUDE OF IMPACT

Visual impact refers to the lack of contextual fit and coherence in a landscape. Visual impacts occur where change to the scenic attributes of the landscape is brought about by the introduction of visual contrasts that alter the viewing experience. Visual impacts can be positive or negative, and those that detract from the viewers appreciation of the scene are considered negative.

The development will be conspicuous in the landscape from the eastern side of Poatina village, but generally well hidden from most other locations, particularly once the proposed vegetation screening around the site matures on the northern and southern site boundaries. The alteration type does not deviate significantly from the existing landscape character and there is considerable ability to absorb the alteration within the broad flat landscape to limit the magnitude of the visual impact.

Table 4.5 sets out the criteria for evaluating magnitude of impact as high, moderate, or low. The assessment is an overall one using information from the previous sections to determine the overarching influence on the viewing opportunity.

Magnitude of Impact	Rationale
High	Changes contrast strongly with the landscape character and viewing experience where the alteration will be viewed as a permanently dominant change
Moderate	Changes that are permanently visible but of a scale that is sub-ordinate to the setting or of an alteration type consistent with the landscape character and viewing experience
Low	Changes that are permanently visible but of a scale or alteration type that is subsumed in the setting and consistent with the landscape character and viewing experience

Table 4.5 Definitions of magnitude of impacts from high to low

Overall, the proposed development will have a **low** magnitude of impact because:

- most elements of the proposed development will be hidden and screened by vegetation or topography and only a couple of locations have **moderate** magnitude of impact (one residence, Poatina village);

the development is consistent with the existing mix of industrial and rural uses (**low**);

the works will occupy disturbed ground and low heights of most of the infrastructure that will mostly be screened by native vegetation planted around the three sides facing away from the existing substation (**low**); and

road users will have views to the development, but views will mostly be to the side, be fleeting and be consistent with expectations of the type of landscape use (**low**).

4.6 Significance of visual impact and mitigation

The significance of impact is an amalgam of the magnitude of impact and the sensitivity of the landscape to change. The significance of impact suggests what mitigation measures might be needed to reduce the level of impact.

Table 4.6 illustrates the risk matrix with the interactions of how sensitivity and magnitude of impact can be evaluated to determine the significance of an impact.

	Magnitude of Impact			
Sensitivity		**Low**	**Moderate**	**High**
	Low	Low	Low	Moderate
	Moderate	Low	Moderate	High
	High	Moderate	High	High

Table 4.6 Significance of Impact

An impact of very high significance is one that threatens to permanently alter the landscape character of a location, affecting many viewers sensitive to change. Such an impact requires a review of the design to reduce the significance of the impact.

An impact of high significance is one where the landscape character is at risk of change, and likely requires planning and design considerations, in addition to the inherent controls and proposed construction methods, to reduce the significance of the impact.

Impacts rated moderate are those where the magnitude of impact is either moderate to high and the sensitivity is low to moderate, or where sensitivity is high, but the magnitude of impact is low. In these situations, construction method mitigation measures are required in addition to the Inherent controls. Treatments may vary in selected areas where either the magnitude of impact or sensitivity varies to that for the larger viewing opportunity.

Impacts that are rated a low significance include those where the magnitude of impact is low to moderate and occurs in areas where the sensitivity to change is low to moderate. In these situations, inherent mitigation measures are generally relied upon, but construction method mitigation measures may be required in selected areas where the magnitude of impact or sensitivity is greater than for the larger viewing opportunity.

Applying the findings from previous sections and using the hierarchy set out in Table 4.6, the development is of **low** significance prior to mitigation measures being applied**.**

In the situation where there is a moderate significance of impact, inherent and additional mitigation measures are relied on.

4.6.1 Mitigation Measures

Visual impact mitigation are the actions taken (in order of preference) to:

minimise impacts to limit the significance of an impact;

rectify an impact by repairing, rehabilitating, or restoring the affected landscape; and/or

reduce the significance of an impact over time.

The foregoing sections have identified the potential significance of the impact as being **low**. The significance of the impact in some areas underlines the importance of the planting around the development to help screen views.

In general, the **low** significance of the impact suggests the principal opportunities to mitigate the visual impacts lies in the design of the elements to better match the character of their surrounds, than it is to make major changes to the design or location of the proposed elements of the development.

Inherent Mitigation

Activities by Neoen to date have already had significant benefits in limiting potential visual impacts. These actions are considered 'inherent mitigation' and include:

use of GIS data to understand the seen views;

the siting and integration of the development with existing infrastructure of the Palmerston substation;

eliminating vegetation clearing by using a disturbed location;

general low scale and height of infrastructure elements; and

the preparation of a landscape plan for the site.

Planning and Design Considerations

Planning and design considerations should be given to those areas where the potential significance of the visual impact caused by the development is moderate. These include consideration to:

locate works and storage areas in the existing cleared areas,

minimising the impacts of repeated access of construction vehicles and the equipment itself to avoid the loss of vegetative cover and erosion, and

use of materials of an appropriate finish to blend with the landscape and minimise potential for glint and glare;

4.6.2 Additional Mitigation Measures

The montages (refer to Attachment E) from Poatina Village and Poatina Road indicate that the proposed development will be more evident if white or light colours are used on the exterior surface of buildings and the battery containers. The montages show that the grey tones of the existing Palmerston substation are far less evident within the landscape.

The following additional mitigation measures should be considered for the potential to further reduce visual impacts:

use dark (grey tones) on the exterior surface of buildings and the battery containers to help reduce the visual impact, particularly from locations within 2km of the site14; and

use exterior materials and matt finishes that will reduce the potential for glint and glare15.

14 The final product will be dependent on the technology supplier and technical of safety issues for reflecting heat to help keep the batteries cool.

15 This should include consideration to reduce, where possible given safety standards and requirements, the potential glint and glare resulting from signs used at the site.

SECTION 5
CONCLUSION

This report has considered the character, extent, and significance of the visual values of the development site and its surrounds.

The visibility of the development was shown to be largely restrained topographically to near and midground views from Poatina village and on Poatina Road (Section 4). The **sensitivity** of these views was rated **low** given that views are mostly obscured by infrastructure or large hedgerows. Also, views from the road are fleeting and often not within the focal view as viewed from a vehicle.

The landscape was found to have a **moderate to high visual absorption capacity** which helped to minimise the potential visual impacts that might have arisen in a more natural setting and without the existing substation and overhead transmission lines dominating the site.

Together, these factors suggested that the **magnitude of impact** of the development was **low**. Magnitude in conjunction with estimated sensitivity and visual absorption capability meant the conclusion was reached that development would have a **low significance of visual impact**.

Neoen has achieved significant benefits in limiting potential visual impacts by the proposed siting and integration of the development with the existing infrastructure of the Palmerston substation. The proposed landscape plan shows planting of vegetation around the border of the site, which will help to reduce the visibility of the proposed development from many locations.

The following additional mitigation measures should be considered for the potential to further reduce visual impacts:

- use dark (grey tones) on the exterior surface of buildings and the battery containers to help reduce the visual impact, particularly from locations within 2km of the site[16]; and

[16] The final product will be dependent on the technology supplier and technical of safety issues for reflecting heat to help keep the batteries cool.

use exterior materials and matt finishes that will reduce the potential for glint and glare[17].

There are no substantive visual impacts that should preclude the development from proceeding.

17 This should include consideration to reduce, where possible given safety standards and requirements, the potential glint and glare resulting from signs used at the site.

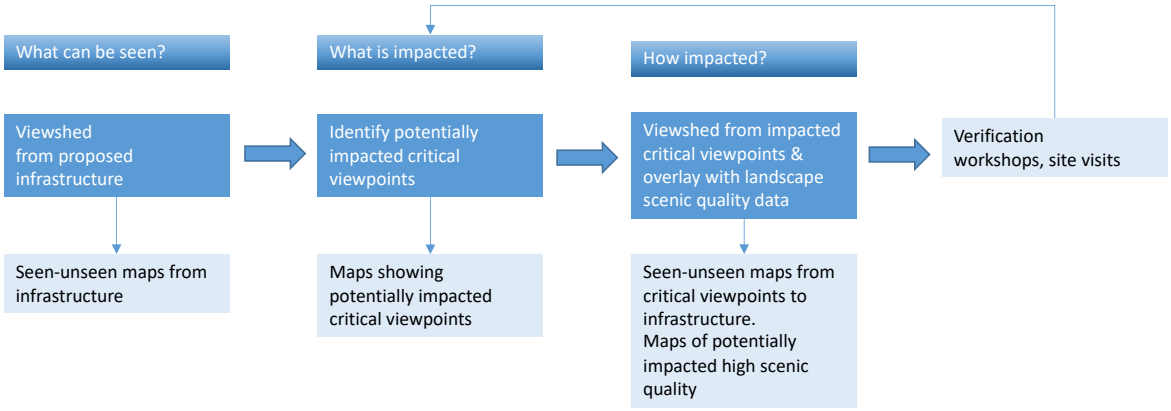
ATTACHMENT A
GIS SPECIFICATIONS

Source: Entura

A.1 Approach

Entura have developed a desktop analysis approach to identify total seen views for proposed infrastructure and critical viewpoints. The approach utilises viewshed (ZVT) analysis to investigate visibility of proposed infrastructure as shown in Figure B.1.

FIGURE A.1 Total Seen View desktop methodology approach



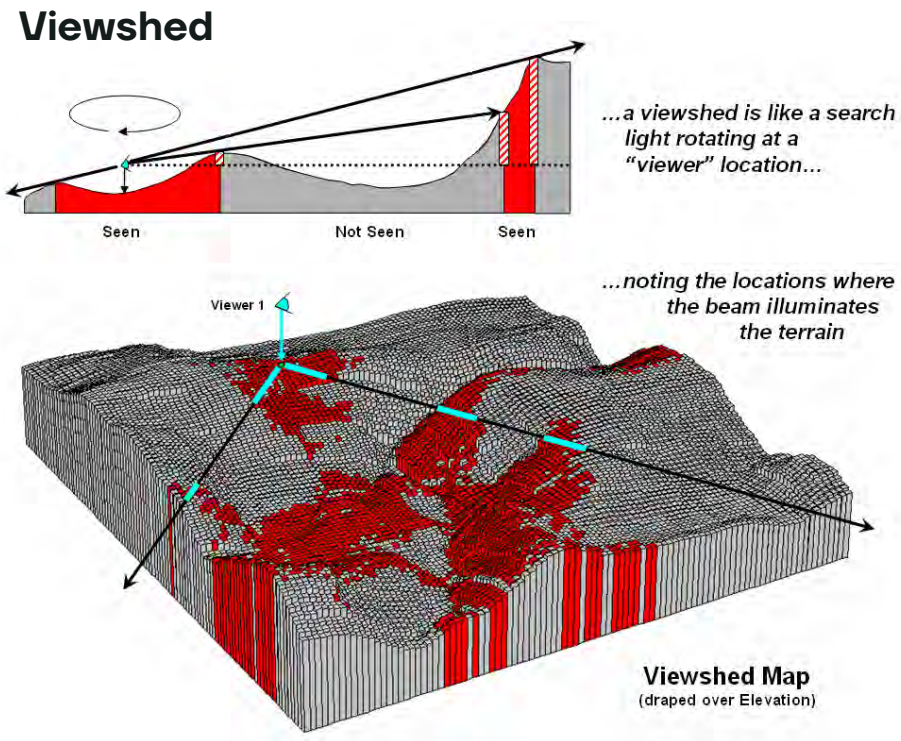
The outputs from this analysis is data and a series of maps showing visibility from proposed infrastructure and identified critical viewpoints.

A.2 Methodology

A.2.1 Viewsheds

Entura used the *Viewshed toolbox* on ArcMap from ESRI was implemented to do the main task of viewshed analysis (Figure B.2. The toolbox allows the creation of a raster layer that records sighted/unsighted cells from the observer location (i.e. observation points). It produces a realistic representation of visibility level by taking into account the earth curvature and refractivity, whilst keeping a relatively reasonable processing time. It also allows for observer and surface offsets to take into account average eye height and infrastructure heights.

FIGURE A.2 A viewshed definition



The locations that are visible from a viewer location. Line of sight analysis. Useful for cell coverage and visual exposure analysis.

From: http://www.innovativegis.com/basis/mapanalysis/Topic15/Topic15.htm

The *viewshed* analysis generates a raster image of the investigated area with integer count of observation points that can be seen from each raster cell creating a heat map of seen and unseen.

There are two datasets required for input viewshed analysis: the terrain data (digital elevation model) and observation points (proposed infrastructure or critical viewpoints).

A.2.2 Viewshed Observation Points

Viewshed observation points are points representing what can be seen, these can either be from proposed infrastructure or from critical viewpoints. Viewshed observation points need to have elevations assigned to them based on designs or specifications for proposed infrastructure or average eye height for critical observation points.

The number of observation points is determined by the size of the infrastructure or critical viewpoints and the scale of the viewshed. Larger infrastructure and larger viewshed areas require more viewpoints however, this can result in very long processing time. Viewshed observation points for proposed infrastructure and critical observation points need to be representative of the area they represent, for example:

- a proposed dam, the points need to be placed on dam walls, top of dam crest and on the surface of the dam;
- transmission lines need to take into account the width of the easement, placement and height of towers; and
- roads and walking tracks observation points need to be at regular intervals along the distance of the road or track.

To take into account average eye height the following offsets are applied to the viewshed observation points:

- proposed infrastructure observation points from have a surface offset of 1.5 meters; and
- critical viewpoints observation points have an observer offset of 1.5m.

A.2.3 Terrain Data

Two types of elevation surfaces are used in the viewshed analysis:

- ground terrain or Digital Elevation Model (DEM); and
- above ground features or Digital Surface Model (DSM), this includes surface features such as vegetation and buildings.

The DEM viewshed represents the worst-case scenario for what can be seen and is used to assess what is seen and unseen for proposed infrastructure. Viewsheds using DSM can be run in addition to the DEM to understand the impact of existing vegetation. However, DSM viewsheds need to be used with caution as they only represent a single point in time and surfaces can change dramatically in a short period of time (fires, logging, development).

The quality of the output of the viewshed is largely determined by the quality of the terrain data. The higher quality and resolution of the DEM & DSM the more reliable the output will be.

For viewshed from critical observation points the DEM and DSM need to be modified to include the proposed infrastructure:

- DEM – the proposed infrastructure is added to the DEM based on 3D design models and specifications; and
- DSM – vegetation is removed from around the proposed infrastructure and the infrastructure is added to the DSM based on 3D design models and specification. Vegetation removal includes clearance around the infrastructure, for example within easement for transmission lines and roads.

During the creation of the DSM vegetation points within 50m of the proposed dam infrastructure construction zone were removed as well as all vegetation points within a cleared easement along the new proposed transmission line path.

A.2.4 Critical Viewpoints

Critical viewpoints are identified from available datasets and where possible local knowledge. The *Viewer Sensitivity Levels for Ravel Routes and Use Areas* as cited in the Guidelines for Scenic Values Assessment – Southern Tasmanian Council[21] is used as a guideline for determining what is considered critical (Sensitivity Level 1). These critical viewpoints include but are not limited to state highways, main sealed roads, tourist routes, walking tracks, urban areas, tourism-based businesses, recreation, cultural or scenic viewpoints.

This desktop processes may miss critical viewpoints that are not documented in publicly available data or information. As such, critical viewpoints need to be verified through site visits and stakeholder engagement sessions.

A.2.5 The investigated area

The investigation area is broken up into foreground, middle ground and background, represented by 1km, 5km and 25km buffers around the proposed infrastructure. Viewshed analysis and critical viewpoints are only identified within this area.

As a general rule viewshed analysis is performed at high resolution (1m cell size) within the fore and middle ground and a lower resolution (10m cell size) within the background. This is largely determined by the size of the investigation area, available data and location of critical viewpoints.

A.3 Application and limitations

The viewshed analysis relies on the quality of the terrain data, high resolution LiDAR data will produce a more accurate results for what is seen and unseen. LiDAR can be used for both DEM and DSM analysis. Lower resolution terrain data derived from contour data needs to be used with caution and only for background analysis and can only be used for DEM analysis.

Critical viewpoints are identified through publicly available data and information, it is highly likely that some critical viewpoints will be missed. There for this data needs to be used with caution

It is intended that the viewshed analysis and critical viewpoints are used in conjunction with other visual impact assessment tools including scenic quality, stake holder engagement and site verifications.

21 Guidelines for Scenic Values Assessment – Southern Tasmanian Council

ATTACHMENT B
FRAME OF REFERENCE EASTERN HILLS AND PLAINS LANDSCAPE CHARACTER TYPE

Source: Forestry Commission 1990. **A Manual for Forest Landscape Management**

5 Eastern Hills and Plains Landscape Character Type

	HIGH SCENIC QUALITY	MODERATE	LOW
LANDFORM	• Distinctive isolated hills or small peaks. • Steep, complex hill systems. • Incised valley systems creating strong spatial definition. • Cliffs and rock outcrops of moderate size and/or colour contrast.	• Rolling hills to undulating plains. • Moderate to gently dissected open valleys with subtle spatial definition.	• Extensive flat plains without dissection or spatial definition (0% to 10% slope).
VEGETATION	• Rainforest and vigorous stands of wet sclerophyll forest that introduce distinctive patterns and textures. • In forest areas, combinations of openings of different sizes and shapes with irregular edges.	• Vegetative patterns and textures, usually in dry sclerophyll forests. • Large forest opening with straight or regular edges.	• Extensive areas of similar vegetation with infrequent patterns or forest openings.
WATERFORM	• Large streams and rivers with permanent flow. • All lakes, including small lagoons.	• Intermittent streams.	• No waterforms.

ATTACHMENT C
SCENIC INTEREST FRAME OF REFERENCE

Source: Inspiring Place

Frame of reference Scenic Interest

High Scenic Interest	Moderate Scenic Interest	Low Scenic Interest
Industrial estates which appear highly ordered, with strong unity of purpose and which are well maintained particularly in contrast to a powerful landscape setting (e.g **Woolnorth wind farm, Middelgrunden offshore windfarm, Denmark**) High technology industries where the activity is expressed in its architecture or surrounds (**solar furnace, Laguardia Airport TWA terminal**) Strong contrasting industrial forms of an immense scale expressed through colour or linking elements (conveyors, piping, night lighting, etc.) (e.g. Pasminco EZ zinc works, **River Rouge Ford Plant, large scale oil refinery**) Large scale industrial elements with a strong 'industrial' design expressing function (**Telstra tower, Canberra**) Large scale utilitarian features exhibiting a modernist design aesthetic of simple geometry, clean lines and raw material finishes, with the form expressive of its function (e.g. Gordon River Dam, **power station cooling towers**) (particularly where the utilitarian, human created element is in stark contrast to a natural setting (e.g. **Hoover Dam**, Gordon River Dam).	Large scale industrial elements with a strong utilitarian design (e.g. **groupings of penstocks, wind turbine(s), container port or other** large scale lifting cranes, **spillways**) Moderate scale industrial buildings with strong unified forms and a readily apparent design ethos (e.g. **Tarraleah Generator Building, Pump Station at Pump House Point, heritage sub-stations, some power stations**) Complex clusters of industrial elements of multiple forms but lacking in legibility (i.e. the uninformed viewer does not have the capacity to understand the workings of the activity but responds to the complexity) (e.g. **large electrical substation, Tarraleah Power Station**)	Scattered buildings of limited architectural character and/or scale (e.g. light industrial buildings, aluminum **and tilt up concrete sheds**) Disturbed open storage areas lacking apparent organization or scale (e.g. temporary construction materials set down areas) Large monolithic stockpiles of industrial materials or wastes (e.g. wood chip piles, **fuel or water storage tanks**, excavation spoils) Common industrial elements (e.g. **common electricity transmission towers, small switchyards, steel or plastic electrical turrets/ transformers**) Linear features without topographic or alignment relief and/or with multiple repetitive, low scenic interest elements (e.g. **electrical transmission corridors, some canals**)

Examples of High Scenic Interest Infrastructure

1 Telstra Tower, Canberra – strong industrial design form that expresses its function

2 Middelgrunden Windfarm, Denmark – highly ordered, with a strong unity of purpose in contrast to its powerful landscape setting

3 Laguardia TWA Terminal, New York – air flight, a high technology industry as expressed in the architecture of the TWA terminal

4 Gordon River Dam - a modernist design aesthetic of simple geometry, clean lines and raw material finishes, with the form expressive of its function

5 Oil refinery, Alberta, Canada - strong contrasting industrial forms of an immense scale expressed through inking elements such as pipework and lighting


1


2

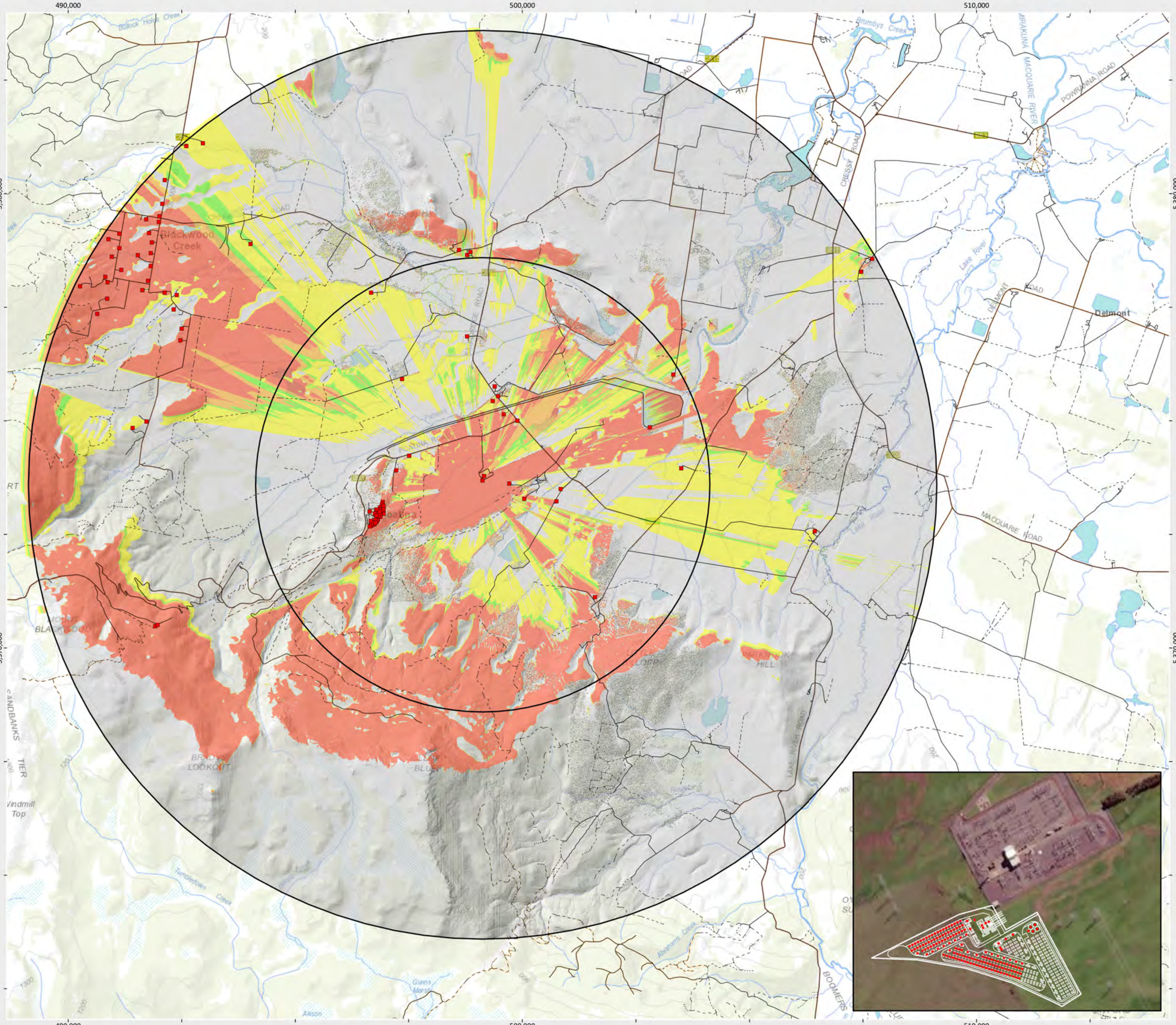

3


4


5

ATTACHMENT D
SEEN VIEW ANALYSIS

Source: Entura



Great Lakes Battery

Viewshed Analysis
Stage 1 - 140 MW

Surface : 2m DEM & DSM
Observer height : 1.65m

LIST - Buildings

Visible BESS infrastructure items

- 1 - 25
- 25 - 50
- 50 - 100
- 100 - 161

Client: NEOEN

Map no:	P519427_GIS01
Date:	Thursday, 8 June 2023
Drawn:	Steve Thomas
Reviewed:	Agung Wahyudi
Approved:	Callum Finney

Locality:

N

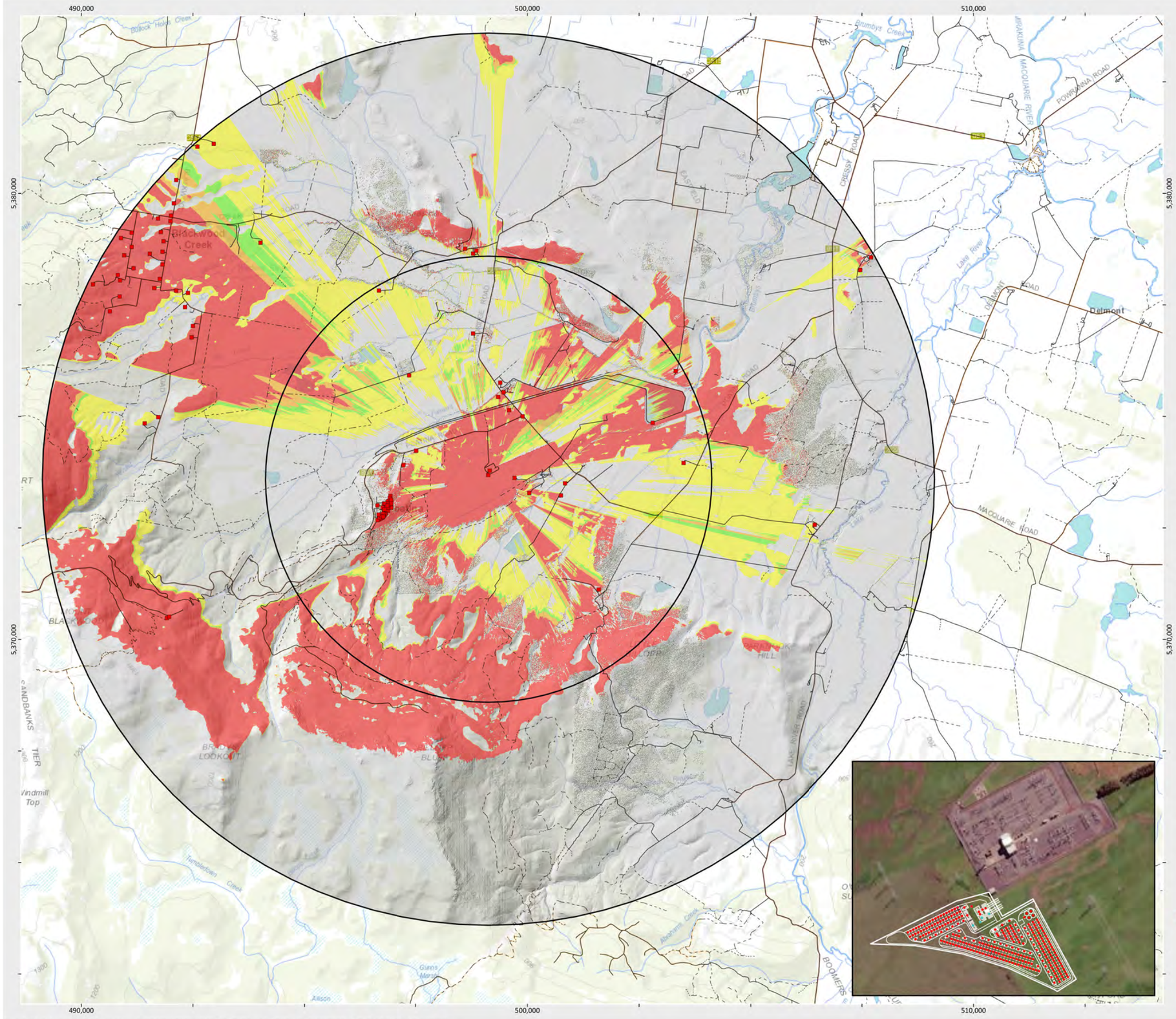
0 1 2 3 4 km

1:80,000 @ A3 paper size
Coordinate System: GDA2020 MGA Zone 55

Source:
1. State of Tasmania, Information and Land Services.
2. Esri, Maxar, Earthstar Geographics, and the GIS User Community.

entura

Doc path: \\hydrotasmania\consult$\Project\ConsultDM\E310xxx\E3104xx\E310468\P519427\Survey\P519427_SUR01\VIA\E310468_P519427 - GIS 01 VIA_v4 Mapping.aprx



Great Lakes Battery

Viewshed Analysis
Stage 2 - 280 MW

Surface : 2m DEM & DSM
Observer height : 1.65m

- LIST - Buildings

Visible BESS infrastructure items

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 280

Client: NEOEN

Map no:	P519427_GIS01
Date:	Thursday, 8 June 2023
Drawn:	Steve Thomas
Reviewed:	Agung Wahyudi
Approved:	Callum Finney

Locality:

N

0 1 2 3 4 km

1:80,000 @ A3 paper size
Coordinate System: GDA2020 MGA Zone 55

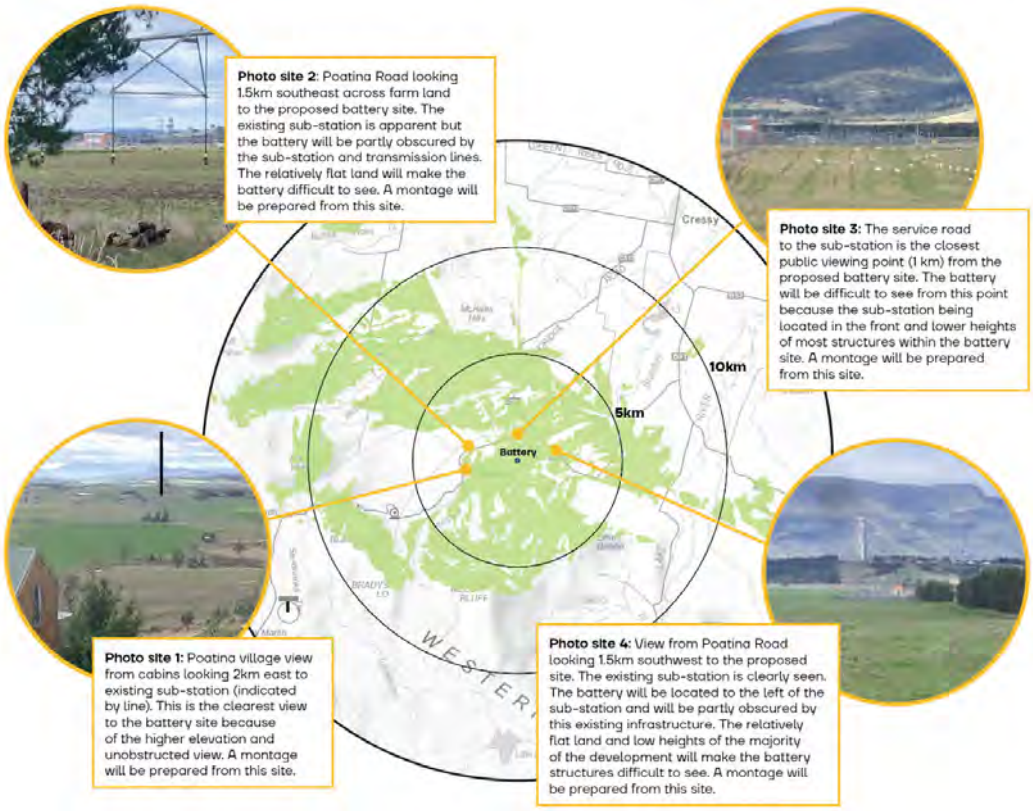
Source:
1. State of Tasmania, Information and Land Services.
2. Esri, Maxar, Earthstar Geographics, and the GIS User Community.

entura

Doc path: \\hydrotasmania\consult$\Project\ConsultDM\E310xxx\E3104xx\E310468\P519427\Survey\P519427_SUR01\VIA\E310468_P519427 - GIS 01 VIA_v4 Mapping.aprx

ATTACHMENT E
MONTAGES FROM KEY VIEWPOINTS

Source : Entura



The above map show the locations chosen for the montages. The montages are then presented in order of Photo site 1-4 and provide a montage for both Stage 1 and Stage 2 of the proposed development.

Palmerston Utility Scale

Battery Project

Ecological Assessment

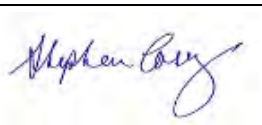
Stephen Casey Ecology

Document information

Title	Palmerston Utility Scale Battery Project.
	Ecological Assessment
Client organisation	Joule Logic
Client contact	Sue Marsh
Project manager	Stephen Casey

Revision history

Revision 1

Revision description	Final		
Authored by	Stephen Casey		
	(name)	(signature)	15/06/2022
Distributed to	Sue Marsh	Joule Logic	
	(name)	(organisation)	(date) 15/06/2022

1 CONTENTS

Figures

2 EXECUTIVE SUMMARY

Joule Logic is investigating a site for a large battery project on private property in the Northern Midlands. As part of the Development Application a natural values survey is required to identify potential flora and fauna issues at the site, particularly in relation to State and Commonwealth listed species. The aim of this study is to undertake a flora and fauna habitat assessment at the site and to identify any potential impacts of the proposal on species and vegetation communities listed on State and Federal legislation and provide advice with regard to mitigation of impacts on natural values.

Vegetation communities

Native vegetation has largely been cleared from the site and the land cropped and grazed for many years. The vegetation present is best categorised as agricultural land. No vegetation communities listed on either the *Nature Conservation Act 2002* or the *Environment Protection and Biodiversity Conservation Act 1999* were recorded from the site.

Threatened species

Fauna habitat at the site is of very low quality due to the agricultural nature of the area. Some mammal species may occasionally utilise the site and some bird species may overfly the area but due to lack of habitat, no threatened fauna are likely to reside on the site. Due to the highly modified nature of the study area and small scale of the works there is little chance that there will be an impact on any significant fauna values.

No significant fauna or habitat is likely to be impacted by the proposed works.

Weeds and Disease

There are statutory management plans for the two declared weed species present (*Rubus fruticosus*-blackberry, *Ulex europaeus*-gorse). These plans outline management measures for these weed species in the Northern Midlands municipality. The management plans for all these species, focus on containment and their spread from the municipality must be prevented. No sign of disease was recorded from the site.

Recommendations

The following recommendations are made with regard to the proposal.

- In order to prevent the spread of declared weeds within and from the municipality, construction machinery should be cleaned prior to first entry to the site as well as when leaving. Any weed material and soil should be removed and disposed of appropriately to prevent the spread of weeds and diseases. Construction machinery should be cleaned as described in DPIWE 2004 Washdown Guidelines for Weed and Disease Control Edition 1.

3 INTRODUCTION AND BACKGROUND

Joule Logic is investigating the site for a large battery project on private property in the Northern Midlands. As part of the Development Application a natural values survey is required to identify potential flora and fauna issues at the site, particularly in relation to State and Commonwealth listed species.

The aim of this study is to undertake a flora and fauna habitat assessment at the site and to identify any potential impacts of the proposal on species and vegetation communities listed on State and Federal legislation and provide advice with regard to mitigation of impacts on natural values. The location of the study area can be seen in Figure 1.

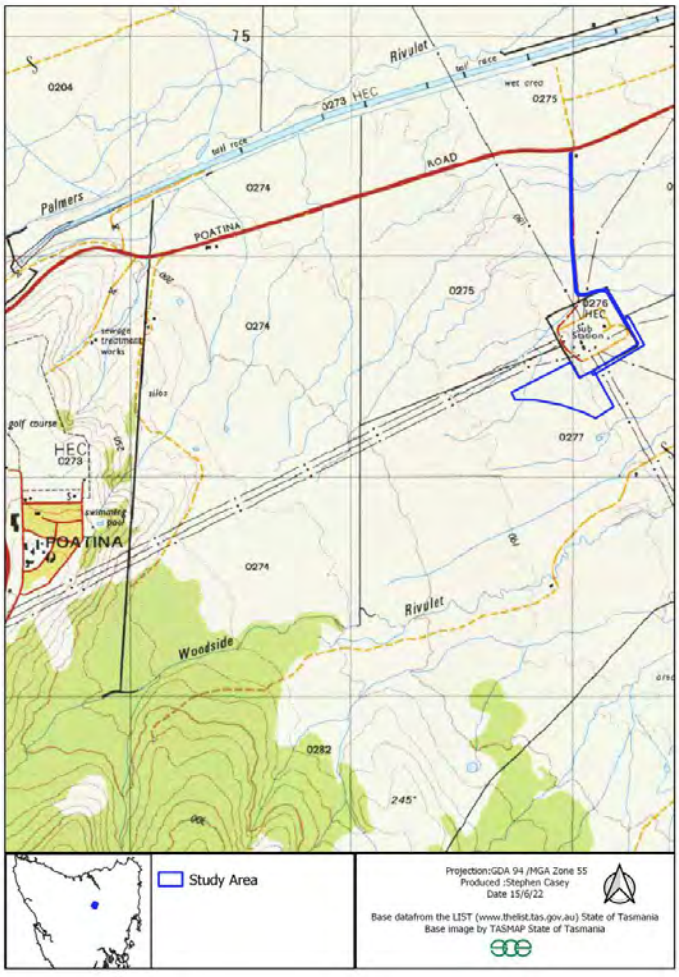


Figure 1. Location of potential works east of Poatina just off the Poatina Road in the Northern Midlands.

4 METHOD

4.1 FLORA AND FAUNA

The area of the proposed project including the access road was assessed during a vegetation and fauna habitat assessment undertaken on the 14th June 2022. The field investigation involved a meandering survey of the study area. Information recorded included community structure and condition. Vegetation communities were identified and attributed to Tasmanian Vegetation Mapping Units (Harris and Kitchener 2013). All native species of flora and fauna encountered during the survey were recorded. Nomenclature for flora follows the current census of Tasmanian Vascular Plants
https://www.tmag.tas.gov.au/__data/assets/pdf_file/0005/195800/2019_Census_of_Tasmanian_Vascular_Plants_-_PDF.PDF

4.2 LIMITATIONS

Due to varying flowering times and seasonality of occurrence it is possible that not all flora species that occur at the site were identified in the survey. Some threatened species, particularly short lived annuals, orchids and lilies that may be present at the site may have been missed because they were not able to be identified (they were not flowering) or they were not evident at this time of year (they were annual plants that had died back or not emerged at the time of survey).

The fauna assessment was limited to a habitat assessment for fauna species, including the ground truthing of potential habitats for significant fauna species that were identified in database searches. Any indirect evidence of fauna presence was also recorded (e.g. scats, diggings, burrows, shelters etc.). No systematic fauna surveys were undertaken.

Mapping was undertaking using a handheld GPS with an accuracy of +/- 5-10m.

4.3 CRITERIA FOR DETERMINING FLORA AND FAUNA SPECIES OF CONSERVATION SIGNIFICANCE

The conservation significance of the flora and fauna at the site was assessed using the following criteria.

- They were listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- They were listed on the Tasmanian *Threatened Species Protection Act 1995*

The requirements of the Tasmanian *Threatened Species Protection Act 1995* (TSPA), and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are summarised below. The requirements of the *Tasmanian Forest Practices Act 1985* are also summarised below. This Act and the associated Forest Practices Code are included because they prescribe the manner in which the clearing of native vegetation can be undertaken and afford protection to Threatened Native Vegetation Communities listed on Schedule 3A of the *Nature Conservation Act 2002.*

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) provides for the protection of matters of national environmental significance and the conservation of Australia's biodiversity. Whilst the States are primarily responsible for environmental impact assessment there are a number of triggers that may initiate Commonwealth involvement in a project. These are:

- listed threatened species and communities
- listed migratory species

- Ramsar wetlands of international importance
- Commonwealth marine environment
- world heritage properties
- national heritage places
- the Great Barrier Reef Marine Park
- nuclear actions
- a water resource, in relation to coal seam gas development and large coal mining development.

4.3.2 Threatened Species Protection Act 1995

Generally, the following obligations under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) are relevant to proposed works. In the absence of a permit:

- no listed species may be killed, injured or collected
- listed species on land subject to an interim protection order must not be disturbed
- there must be no disturbance to listed species contrary to a land management agreement
- any interim protection order made to conserve the critical habitat of a listed taxon of flora or fauna must be complied with. In the absence of a permit, no activity may be undertaken on land subject to an interim protection order.

4.3.3 Forest Practices Act 1985

The *Forest Practices Act 1985* provides that the Forest Practices Code (FPC) prescribes the manner in which forest practices or clearance and conversion of native vegetation is to be conducted and provides for the protection of the natural and cultural values. Forest Practices Plans are required when clearing trees or clearance and conversion of Threatened Native Vegetation Communities listed on Schedule 3A of the *Nature Conservation Act 2002.*

A Forest Practices Plan (FPP) will not be required for the proposed works as a FPP is unnecessary

where

> (j) the harvesting of timber or the clearing of trees on any land, or the clearance and conversion of a threatened native vegetation community on any land, for the purpose of enabling –
>
> > (i) the construction of a building within the meaning of the Land Use Planning and Approvals Act 1993 or of a group of such buildings; or
> >
> > ii) the carrying out of any associated development – if the construction of the buildings or carrying out of the associated development is authorised by a permit issued under that Act.

5 RESULTS

5.1 FLORA

5.1.1 Vegetation Communities

Vegetation across the study area is highly modified and is comprised of predominantly introduced vegetation associated with agricultural activities and includes crop and pasture land, a shelterbelt planting and the highly modified roadside vegetation occurring along the access road from Poatina Road to the Substation. This vegetation is best described by the TASVEG mapping unit **Agricultural Land (FAG)** (Figure 2 and Figure 3). Only a few native species were recorded from the whole site and these were confined to the roadside vegetation on the substation access road and included very common and widespread species such as L*omandra longifolia* (sagg), *Acaena novaezealandiae* (common buzzy), and *Juncus australis* (southern rush) and *Juncus filicaulis* (thread rush). Typical pasture species present on the roadside and in paddocks include *Lolium spp*. (rye grass), *Paspalum dilatatum* (paspalum), *Hordeum murinum* (barley grass), *Agrostis capillaris* (brown top bent), *Trifolium spp*. (clover) and *Dactylis glomeratus* (cock's foot). A small shelterbelt planting of *Eucalyptus nitens* (shining gum) also occurs on the access route to the construction site (Figure 2). A total of 31 species were recorded from the site of which only seven are native species. A full list of species recorded can be seen in Appendix 1.

5.2 THREATENED SPECIES

5.2.1 Flora

Background searches of the Natural Values Atlas revealed a number of threatened flora species which have been previously recorded from within 5km of the site (Appendix 2). No threatened flora species were recorded from the site or were considered likely to occur there due to the very long history of agricultural development.

5.2.2 Fauna

Available data sources, including the Natural Values Atlas (NVA) and the EPBC Protected Matters Search (PMS) revealed a number of fauna species recorded from within 5 km or based on range boundaries that have the potential to occur in the area. These species are detailed in Appendix 2. No suitable habitat is present on site for any of the species and none of these species are considered likely to be impacted in any significant way by the works.

5.3 WEEDS AND DISEASES

Two weed species listed on the Tasmanian Weed Management Act 1999 were recorded from the site. *Rubus fruticosus* (blackberry) and *Ulex europaeus* (gorse) were recorded from the substation access road and around the end of the shelterbelt planting on the eastern side of the substation (Figure 2 and Figure 4). No sign of disease was recorded.

There are statutory management plans for these species which outline management measures in the Northern Midlands municipality. These measures have been considered in developing the recommendations in the following section.

Figure 2. Declared weeds found in the agricultural land of the access and construction areas.

Figure 3. Top-The substation access road. Middle-Access across paddocks north and east of the substation. Bottom-The construction area for the battery project.

Rubus fruticosus (blackberry)	*Ulex europaeus* (gorse)

Figure 4. Declared weed species found within the study area

5.4 WATERWAYS

The nearest water way to the construction area is Woodside Rivulet which is over 450m to the south of the construction area. The land around the construction site is flat and has been cropped and grazed for many years and there are a number of man-made drains in the paddocks south of the construction area, so there is little chance of any construction activities impacting this waterway.

6 DISCUSSION AND RECOMMENDATIONS

6.1 THREATENED VEGETATION COMMUNITIES

Native vegetation has largely been cleared from the site and the land cropped and grazed for many years. The vegetation present is best categorised as agricultural land. No vegetation communities listed on either the *Nature Conservation Act 2002* or the *Environment Protection and Biodiversity Conservation Act 1999* were recorded from the site.

6.2 THREATENED FLORA

No species of flora listed on either the Tasmanian *Threatened Species Protection Act 1995* or the *Environment Protection and Biodiversity Protection Act 1999* were recorded from the site.

6.3 THREATENED FAUNA

Fauna habitat at the site is of very low quality due to the agricultural nature of the area. Some mammal species may occasionally utilise the site and some bird species may overfly the area but due to lack of habitat, no threatened fauna are likely to reside on the site. Due to the highly modified nature of the study area and small scale of the works there is little chance that there will be an impact on any significant fauna values.

No significant fauna or habitat is likely to be impacted by the proposed works.

6.4 WEEDS AND DISEASES

There are statutory management plans for the two declared weed species present (*Rubus fruticosus*-blackberry, *Ulex europaeus*-gorse). These plans outline management measures for these weed species in the Northern Midlands municipality. The management plans for both species focus on containment and their spread from the municipality must be prevented. No sign of disease was recorded from the site.

6.5 RECOMMENDATIONS

The following recommendations are made with regard to the proposal.

- In order to prevent the spread of declared weeds within and from the municipality, construction machinery should be cleaned prior to first entry to the site as well as when leaving. Any weed material and soil should be removed and disposed of appropriately to prevent the spread of weeds and diseases. Construction machinery should be cleaned as described in DPIWE 2004 Washdown Guidelines for Weed and Disease Control Edition 1.

7 REFERENCES

Baker ML, & MF de Salas (2017) *A Census of the Vascular Plants of Tasmania \ Index to The Student's Flora of Tasmania and Flora of Tasmania Online.* Web Edition (http://www.tmag.tas.gov.au/__data/assets/pdf_file/0009/77607/2017_Census_of_Tasmanian_Vascular_Plants.pdf).

Harris, S. & Kitchener (2005). *From Forest to Fjaeldmark. Descriptions of Tasmania's Vegetation*. Department of Primary Industries, Water and Environment, Printing Authority of Tasmania. Hobart.

Natural and Cultural Heritage Division (2015) Guidelines for Natural Values Surveys - Terrestrial Development Proposals. Department of Primary Industries, Parks, Water and Environment

8 APPENDIX 1-FLORA SPECIES RECORDED FROM THE STUDY AREA

Status Codes

i – introduced,
D - declared weed- *Weed Management Act 1999*

Name	Common name	Status
DICOTYLEDONAE		
ASTERACEAE		
Arctotheca calendula	capeweed	i
Cirsium vulgare	spear thistle	i
Hypochoeris radicata	rough catsear	i
Leontodon taraxacoides subsp. taraxacoides	hairy hawkbit	i
Senecio quadridentatus	cotton fireweed	
Taraxacum officinale	common dandelion	i
CARYOPHYLLACEAE		
Cerastium glomeratum	sticky mouse-ear	i
FABACEAE		
Trifolium spp.	clover	i
Vicia hirsuta	hairy vetch	i
Ulex europaeus	gorse	D
GERANIACEAE		
Erodium cicutarium	common heronsbill	i
GENTIANACEAE		
Centaurium erythraea	common centaury	i
MIMOSACEAE		
Acacia dealbata	silver wattle	
MYRTACEAE		
Eucalyptus nitens	shining gum	i
OXALIDACEAE		
Oxalis corniculata	largeleaf woodsorrel	i
PLANTAGINACEAE		
*Plantago coronopus subsp. coron*opus	slender buckshorn plantain	i
Plantago lanceolata	**ribwort plantain**	**i**
POLYGONACEAE		
Acetosella vulgaris	sheep sorrel	
Rumex crispus	curled dock	
PRIMULACEAE		
Anagallis arvensis var. *arvensis*	scarlet pimpernel	i
ROSACEAE		

Rubus fruticosus	blackberry	D
MONOCOTYLEDONAE		
JUNCACEAE		
Juncus australis	southern rush	
Juncus filicaulis	thread rush	
POACEAE		
Agrostis capillaris	brown top bent grass	i
Dactylis glomerata	cocksfoot	i
Holcus lanatus	Yorkshire fog	i
Lolium spp.	ryegrass	i
Poa labillardierei	silver tussockgrass	
Rytidosperma sp.	wallaby grass	
TYPHACEAE		
Typha latifolia	great reedmace	i
XANTHORRHOEACEAE		
Lomandra longifolia	sagg	

9 APPENDIX 2- THREATENED FLORA AND FAUNA SPECIES RECORDED WITHIN 5KM OF STUDY AREA.

Threatened Flora Species recorded within 5km

Species	Common Name	SS	NS	Bio	Observation Count	Last Recorded
Brunonia australis	blue pincushion	r		n	2	08-Nov-2002
Carex longebrachiata	drooping sedge	r		n	1	08-Nov-2002
Glycine latrobeana	clover glycine	v	VU	n	1	01-Nov-1984
Juncus prismatocarpus	branching rush	r		n	1	05-Mar-1975
Muehlenbeckia axillaris	matted lignum	r		n	1	29-Feb-1972

Threatened Fauna Species recorded within 5km

Species	Common Name	SS	NS	Bio	Observation Count	Last Recorded
Accipiter novaehollandiae	grey goshawk	e		n	1	29-Mar-1999
Aquila audax	wedge-tailed eagle	pe	PEN	n	2	12-Aug-2018
Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	e	EN	e	7	08-Apr-2022
Botaurus poiciloptilus	australasian bittern		EN	n	1	08-Jan-1965
Dasyurus maculatus subsp. maculatus	spotted-tail quoll	r	VU	n	2	01-Dec-1992
Dasyurus viverrinus	eastern quoll		EN	n	2	01-Jan-1996
Galaxias fontanus	swan galaxias	e	EN	e	7	09-Jan-2021
Haliaeetus leucogaster	white-bellied sea-eagle	v		n	6	08-Apr-2022
Paragalaxias dissimilis	shannon galaxias	v	VU	eH	2	10-Sep-2004
Sarcophilus harrisii	tasmanian devil	e	EN	e	9	26-Nov-2020

Palmerston Battery Project
4554 Poatina Road, Cressy

Aboriginal Heritage Assessment Report
Final Draft Version 1

AUTHOR: Shay Hannah and Vernon Graham
27 Apsley St South Hobart, TAS 7004

CLIENT:
Joule Logic

20.11.2022

CULTURAL
HERITAGE
MANAGEMENT
AUSTRALIA

Report Version Control

Report version	Report distribution	Date of Distribution
Draft Report V1	Zoe Smith (CHMA) for editing	19.11.2022
Draft Report V1	Joule Logic for review	20.11.2022
Final Draft Report V1	Aboriginal Heritage Tasmania	
Final Report version	Aboriginal Heritage Tasmania	

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Executive Summary

Introduction

Joule Logic is working on the Environmental Impact Assessment and Development Application for a utility scale battery which will be constructed on land adjacent to the Palmerston substation near Poatina, in the Northern Region of Tasmania (see Figures 1–3). The Palmerston Battery Project will be developed by Neoen Australia (the Proponent). The proposed site for the project is situated on an approximately 3ha area of private pastureland. The site will be accessed via an existing access road linking the Palmerston TasNetworks Substation to Poatina Road.

CHMA Pty Ltd and Vernon Graham (SAHO) have been engaged by Joule Logic (on behalf of Neoen Australia) to undertake an Aboriginal heritage assessment for the proposed Palmerston Battery Project (the study area), to identify any potential Aboriginal heritage constraints. This report presents the findings of the Aboriginal heritage assessment.

Registered Aboriginal Sites in the Vicinity of the Study Area

As part of Stage 1 of the present assessment, a search was carried out of the Aboriginal Heritage Register (AHR) to determine the extent of registered Aboriginal heritage sites within and in the general vicinity of the Palmerston Battery Project study area.

The search shows that there are a total of 11 registered Aboriginal sites that are situated within a 5km radius of the study area (search results provided by Paul Parker from AHT on 6-06-2022). Eight of these sites are classified as artefact scatters and the remaining three sites are classified as isolated artefacts. None of these registered sites is situated within the bounds of the study area. The detailed AHR search results are presented in section 4.2 of this report.

Summary of Survey Results

No Aboriginal heritage sites were identified and recorded during the field survey inspection of the proposed Palmerston Battery Project footprint. As noted previously, a search of the AHR shows that there are no other registered Aboriginal sites within the Palmerston Battery Project footprint.

The field survey was able to confirm that there are no stone resources identified within the study area that would be suitable for stone artefact manufacturing. Nor are there any sizeable rock outcrops occurring within the study area, and therefore there is no potential for Aboriginal rock shelters to be present.

As discussed in section 6, surface visibility across the study area was variable, ranging between <10% to 90%, averaging at 25%. Given these constraints, it cannot be stated with certainty that there are no undetected Aboriginal heritage sites present in the proposed Palmerston Battery Project footprint. With this acknowledged, the survey assessment still did achieve effective coverage of an estimate 2515m². This level of effective coverage is certainly sufficient to provide a reasonable indication as to the potential extent, nature and distribution of Aboriginal cultural heritage sites in the study area.

The survey results strongly indicate that site and artefact densities across the study area are likely to be low to very low. If undetected sites are present, they are most likely to be isolated artefacts or small artefact scatters, representing sporadic Aboriginal activity. Given that soil

deposits across much of the study area were generally shallow to skeletal, there is a very limited potential for sub-surface artefact deposits to be present.

It should be noted that there are no specific landscape features present within the study area, where it would be likely that an elevated site or artefact densities may be present, such as elevated and well-drained alluvial terraces, or small knolls or spurs fringing watercourses.

The detailed survey results and discussions are presented in section 7.

Management Recommendations

Heritage management options and recommendations provided in this report are made based on the following criteria.

- Consultation with Vernon Graham (Aboriginal Heritage Officer).
- The legal and procedural requirements as specified in the *Aboriginal Heritage Act 1975* (The Act).
- The results of the investigation as documented in this report; and
- Background research into the extant archaeological and ethnohistoric record for the study area and the surrounding region.

Recommendation 1

No Aboriginal heritage sites, suspected features, or areas of elevated archaeological sensitivity were identified within the proposed development footprint for the Palmerston Battery Project. It is assessed that there is a very low potential for undetected Aboriginal heritage sites to be present. On this basis it is advised that there are no Aboriginal heritage constraints or requirements to the development proceeding.

Recommendation 2

It is assessed that there is generally a low to very low potential for additional undetected Aboriginal heritage sites to occur within the Palmerston Battery Project footprint. However, if, during the course of the proposed works, previously undetected archaeological sites or objects are located, the processes outlined in the Unanticipated Discovery Plan should be followed (see Appendix 1). A copy of the Unanticipated Discovery Plan should be kept on-site during all ground disturbance and construction work. All construction personnel should be made aware of the Unanticipated Discovery Plan and their obligations under the Aboriginal Heritage Act 1975 (the Act).

Recommendation 3

Copies of this report should be submitted to Aboriginal Heritage Tasmania (AHT) for review and comment.

1.0 Project Outline

1.1 Project Details

Joule Logic is working on the Environmental Impact Assessment and Development Application for a utility scale battery which will be constructed on land adjacent to the Palmerston substation near Poatina, in the Northern Region of Tasmania (see Figures 1–3). The Palmerston Battery Project will be developed by Neoen Australia (the Proponent). The proposed site for the project is situated on an approximately 3ha area of private pastureland. The site will be accessed via an existing access road linking the Palmerston TasNetworks Substation to Poatina Road.

CHMA Pty Ltd and Vernon Graham (SAHO) have been engaged by Joule Logic (on behalf of Neoen Australia) to undertake an Aboriginal heritage assessment for the proposed Palmerston Battery Project (the study area), to identify any potential Aboriginal heritage constraints. This report presents the findings of the Aboriginal heritage assessment.

1.2 Aims of the Investigation

The principal aims of the current Aboriginal Heritage assessment are as follows.

- To undertake an Aboriginal cultural heritage assessment for the proposed Palmerston Battery Project footprint (the study area, as shown in Figures 1-3). The assessment is to be compliant with both State and Commonwealth legislative regimes, in particular the intent of the *Aboriginal Heritage Act 1975* and the associated *Aboriginal Heritage Standards and Procedures (June 2018).*
- Search the Aboriginal Heritage Register (AHR) to identify previously registered Aboriginal heritage sites within and in the general vicinity of the study area.
- Undertake relevant archaeological, environmental and ethnohistorical background research to develop an understanding of site patterning within the study area.
- To locate, document and assess any Aboriginal heritage sites located within the study area.
- To assess the archaeological and cultural sensitivity of the study area.
- To assess the scientific and Aboriginal cultural values of any identified Aboriginal cultural heritage sites located within the study area.
- Consult with (or ensure the Aboriginal community representative consults with) Aboriginal organisation(s) and/or people(s) with an interest in the study area in order to obtain their views regarding the cultural heritage of the area.
- To develop a set of management recommendations aimed at minimising the impact of the proposed Palmerston Battery Project on any identified Aboriginal heritage values.
- Prepare a report which documents the findings of the Aboriginal heritage assessment and meets the standards and requirements of the current standards and procedures of *Aboriginal Heritage Standards and Procedures* prepared by AHT.

1.3 Project Methodology

A three-stage project methodology was implemented for this assessment.

Stage 1 (Pre-Fieldwork Background Work)

Before fieldwork was undertaken, the following tasks were completed by CHMA staff.

Consultation with Aboriginal Heritage Tasmania

Aboriginal Heritage Tasmania (AHT) was contacted and informed that CHMA had been engaged to undertake an Aboriginal heritage assessment for the Palmerston Battery Project. As part of this initial contact, a search request of the Aboriginal Heritage Register (AHR) was submitted to AHT in order to ascertain the presence of any previously registered sites in the vicinity of the study area (search request submitted on 6-06-2022).

The collation of relevant documentation for the project

As part of Stage 1, the following research was carried out and background information was collated for this project:

- The collation of information pertaining to any registered heritage sites located within the general vicinity of the study area.
- Mapping information showing the proposed footprint of the Palmerston Battery Project.
- Relevant reports documenting the outcomes of previous Aboriginal heritage studies in the vicinity of the study area.
- Ethno-historic literature for the region.
- References to the land-use history of the study area.
- GIS Information relating to landscape units present in the study area;
- Geotechnical information for the study area, including soil and geology data.

Consultation with Aboriginal Heritage Officer

Vernon Graham is the Senior Aboriginal Heritage Officer for this project. As part of Stage 1 works, Stuart Huys and Shay Hannah (CHMA archaeologists) were in regular contact with Vernon Graham. The main purpose of this contact was to discuss the scope of the present investigations, ratify the proposed methodology for the investigations and coordinate the timeframes for implementing fieldwork.

Stage 2 (Field Work)

Stage 2 entailed the fieldwork component of the assessment. The field survey was undertaken by Shay Hannah (CHMA archaeologist) and Vernon Graham (Senior Aboriginal Heritage Officer), over a period of 1 day (19-10-2022).

The field team walked a total of 2.15km of survey transects across the proposed Palmerston Battery Project footprint, with the average width of each transect being 5m. As part of the field survey program, additional transects were walked in areas where there was improved surface visibility, in order to gain a better insight as to the potential presence or absence of Aboriginal sites across the study area. Section 6 provides further details as to the survey coverage achieved within the study area.

The results of the field investigation were discussed between Vernon Graham and Shay Hannah (CHMA Archaeologist). This included the potential cultural and archaeological sensitivity of the study area, and possible management options.