

APPENDIX 14



**Meridian Energy Limited
Ruakākā Solar Park Development**

LANDSCAPE, VISUAL AMENITY AND RURAL CHARACTER ASSESSMENT



1 INTRODUCTION

Meridian Energy Limited (Meridian) are proposing to develop a substantial solar energy facility across three sites that it owns in the area between Marsden Point and Ruakākā. This collective land-holding covers approximately 170ha and would contain almost 200,000 solar panels to generate in the order of 130 MW of electricity. Meridian envisages this facility making a significant contribution to Northland's energy needs and it is an integral fit with the Battery Energy Storage System (BESS) that is under construction at the junction of Rama Road.

This report has been commissioned by Meridian Energy Limited to inform a resource consent application to develop the solar energy park. The three sites that it owns include a 105ha block, known as Site 1, that borders State Highway 15A and Rama Road, which is zoned Heavy Industrial by the Whangarei District Plan (WDP). It is on the north eastern margin of this Site is that the BESS is being built. Site 2 has an area of 41ha and has frontages to McCathie Road to its southwest and Port Marsden Highway SH15 to its north west. This land is zoned Light Industrial.

Partially neighbouring to the east of Site 2 is Site 3, which also had a frontage to McCathie Road and is bordered to the east by Marsden Point Road. This block has an area of 55ha and a zoning of Rural Production. The three Sites are highlighted on Figure One opposite. Their legal descriptions are set out in the planning report prepared by Reyburn and Bryant as part of the AEE.



Figure 1: High oblique view over the relic dune field lowlands that the three Sites site within, looking north toward Marsden Point and the elevated terrain of Whangarei Heads in the background and beyond the intervening Whangarei Harbour.

The respective Industrial zonings of Sites 1 and 2 create an “existing environment” that shapes the status of the proposed solar park development of those blocks. In each case, the installation of solar panels and related infrastructure is a restricted discretionary activity, triggered by the intended coverage of panels, platforms and roads exceeding the permitted activity threshold for impermeable surfaces. There are no landscape or visual amenity matters at play in relation to provisions applying to these two Sites, which is unsurprising in light of the Industrial zonings that apply. In response to these circumstances, the balance of this report with focus almost entirely upon Site 3, with passing reference to Site 2. Site 3 will therefore be referred to as “the Site” by this document, with any discussion about Site 2 naming it as such.

Other technical reporting on the application informs this assessment, including an ecological effects assessment prepared by Boffa Miskell¹, a civil design report and accompanying drawings of proposed infrastructure by Beca², and Mr Van der Velden's glint and glare assessment reports³. It is anticipated that *this* assessment will be read in conjunction with those documents and their related drawings to provide a comprehensive understanding of the proposal and its potential effects.

This landscape-related assessment has been undertaken based on the following methodology:

- Review background documents that inform an understanding of the Site and wider setting in terms of both physical characteristics and the regulatory framework.
- Undertake an inspection of the Site/s and visit immediately adjacent, publicly accessible places, primarily road corridors and the peak of Mt Manaia.
- Visit a number of nearby private properties to view towards Sites 2 and 3.
- Photograph the Site – where visible – from these various locations and assemble the resulting images into accompanying attachments. Vantage-points were selected to capture a combination of representativeness and the greatest exposure or “worst case” view from each locale.

¹ *Ruakākā Solar Park Development – Ecological Effects Assessment* (July 2023) Boffa Miskell Limited

² *Civil Design Report - Ruakākā Energy Solar Farm Consent Design* (1 June 2023) Beca Limited

³ *Solar Glare Impact Assessment: Dwellings – Site 3 Consent for Proposed Ruakaka Solar Farm* (28 August 2023) Veldon Aviation Consulting Ltd
Solar Glare Impact Assessment: Road Users – Site 3 Consent for Proposed Ruakaka Solar Farm (4 September 2023) Veldon Aviation Consulting Ltd

- Describe and analyse the biophysical and land use characteristics of the Site.
- Broadly categorise the Site context based upon areas of contiguous character, with these areas being frequently distinguished by land use as the primary determinant.
- Assess the relationship between the Site and the various viewing audience groupings that are potentially affected by the development of the proposed solar park in order to report upon visual amenity effects.
- Assess landscape effects in relation to the form of the solar park and its compatibility or otherwise with established characteristics, patterns and the general structure of both the Site and its wider context.
- Identify and quantify rural character effects that would result from a departure from rural use.
- Provide some summarising conclusions that draw together the main body of findings.

SECTION A: DESCRIPTION OF THE SITE

2 EXTENT

Site 3 has an area of approximately 55ha and is zoned as Rural Production under the Whangarei District Plan. Its narrow southern boundary abuts the eastern segment of McCathie Road and a more expansive eastern boundary spans almost 1.4km along the western edge of Marsden Point Road. This frontage is punctuated by a small, recently formed title opposite the northern edge of Ruakākā Shopping Centre. The northern boundary of the Site is approximately 600m long and bounds a privately-owned, Light Industrial zoned property.

The northern portion of the western boundary wraps along a title that contains a large stormwater management pond serving an area to the north west of Port Marsden Highway. In its southern sector this boundary follows an axial drain that discharges to the Ruakākā River, beyond McCathie Road. On the western side of this segment of boundary are the pair of large-lot rural holdings, one being 109 McCathie Road and its neighbour to the south that has a frontage to McCathie Road.

3 EXISTING PHYSICAL CHARACTERISTICS

3.1 Geology

According to GNS Science's Interactive Geological the Site is entirely founded upon Holocene parabolic dunes of the Kariotahi Group (GNS reference OIS1), a material defined as *loose to poorly consolidated sand in fixed parabolic and local transverse dunes; minor sand, mud and peat in interdune deposits*. This morphology is evident when flying out of Whangarei in early morning light, when the arcing historic dunes underlying the northern part of the Bream Bay hinterland are clearly expressed.

3.2 Soils

Landcare Research's LRIS Portal provides mapping that shows the lower lying portions of the Site as being Ruakākā Loamy Peat (RKD) in its north western portion and Ruakākā Peaty Sandy Loam (RK) over its main body. According to Northland Regional Council's Soil Factsheets, these recent soils are part of the Ruakākā Suite and tend to have very high levels of organic matter (composed largely of peat), have low pH levels and are poorly drained. They are formed from a combination of peat and windblown sand.

The narrow strip of elevated terrain that runs alongside Marsden Point Road traces an old dune crest and is composed of Red Hill Sand (RLa), which is characterised by mature sand from the Pinaki Suite that were deposited by ocean currents. They are a highly variable group that may be peaty and is commonly excessively drained.

3.3 Landform

A large portion of the Site is virtually flat, with extremely limited topographic variation. The uniform grass cover, paddock arrangement, linear drains and equally linear farm races seen in Attachments One and Two are reflective of the plain-like nature of most of the Site.



Photograph 1: The virtually flat, open paddocks extending through the main body, with the even face of a bund that forms a rim to the neighbouring stormwater pond visible in the background.

When compared with areas of relic dune field further north, the uniformity of most of the Site and land on its northern margin suggests that it may have been shaped

at some point by a past meander or lagoon associated with Ruakaka River, rather than by accretion of a sandy, high-energy coast.

A fringe of more elevated terrain associated with Marsden Point Road defines the eastern edge of the Site. For much of the length of the Site this apparent former dune crest rises steeply from the lower body of the land and flattens to a narrow belt of even ground alongside the road corridor. This topography can be seen in Photograph 2 below. It is also evident in Panoramas 07, 08 and 10 of Attachment Three.



Photograph 2: looking up to the elevated relic dune crest that is traversed by Marsden Point Road that runs along the skyline in the image. The predominantly flat land seen in the foreground is typical of most of the Site.

3.4 Hydrology

Arguably the most influential hydrological feature of the Site – particularly in relation to consideration of a solar energy installation – is an extensive area that has been identified as being susceptible to flooding. The extent of that potentially flood-

affected area in the land's current state can be seen on the following Figure 2, which defines the majority of the Site as having heightened risk of flooding. It is understood that inundation occurs only when heavy rainfall coincides with a spring high tide or storm surge, preventing discharge into the nearby Ruakākā River.

A deep drainage channel, referred to as the “unnamed drain” by the Boffa Miskell ecology report, runs along the western margin of Site 3. This drain is approximately 3-4m wide at its crest and in the order of 2m deep as it nears McCathie Road, and carries all of discharge from the land southwards.



Photograph 3: The naturally colonised margins of the unnamed drain along the western edge of the Site, as seen from within the neighbouring property to the west. Note scattered kanuka and totara lining another drain within the Site in the background.

A series of smaller, perpendicular farm drains fall from the east to the unnamed drain. One of these carries stormwater from the Ruakākā shopping centre (see Panorama VP11 in Attachment Three), which is piped under Marsden Point Road.



Figure 2: The extent of the High Risk Flood Hazard Area that applies to the Site, whose southern end is McCathie Road seen centrally on the lower edge of the image, and northern extent relates to the neighbouring stormwater management pond seen upper central.

3.7 Vegetation

The Site is predominantly unrelieved, grazed pasture. The periodic trees and shrubs that exist are typically found alongside drains, and are largely self-seeded

kanuka (*Kunzea ericoides*) and totara (*Podocarpus totara*), the latter likely delivered by birds perching on fences.



Photograph 4: Looking from the north east corner of the Site and showing the typically fragmented nature of the limited vegetation that exists amongst what is largely a grazed sward. Small trees are seen on drain alignment, an isolated deciduous specimen sits centrally and containing planting that shelters the farm house site and agricultural compound to left.

3.6 Structures

In general terms, the Site has a limited number of structures present and is largely open. A farm house and related small farm buildings situated near the north east corner of the Site and opposite the junction of Lakeside Park Road with Marsden Point Road from a small cluster in that part of the Site.

A small telecommunications control building, seen in Panorama VP08, lies immediately alongside the Marsden Point Road corridor. A modest steel-clad industrial building lies on the eastern edge of the Site, opposite the Ruakākā shopping centre. This title was recently subdivided from the Site and the building continues to “read” as part of the Site, as seen in Photograph 5 below.



Photograph 5: The recently constructed small industrial building that sits amidst the eastern margin of the Site. This lies on an allotment that has just been subdivided from the title. Note high tension pylon corridor situated in the midst of the southern part of the Site in the background.

A high-tension electricity transmission corridor that supplies a large substation near Marsden Point traverses the southern portion of the Site. The substantial support pylons and heavy overhead lines are an imposing element in the wider Ruakākā landscape and dominant as they cross the Site, as seen in Panoramas VP 04 - 07 in Attachment Three.

Whilst not physically expressed to view other than through marker signs, a buried gas line corridor runs through the midst of the Site. The presence of this highly

regulated corridor has an influence upon the positioning of panels, accessways, drainage and the positioning of created wetlands.

3.7 Land use

With the exception of the area devoted to the farm house and nearby buildings in its north eastern sector, all of the flat land within the Site is developed as grazed pastoral grassland.

SECTION B: CHARACTERISATION OF SETTING

4 DEFINING ELEMENTS / LANDSCAPE CHARACTER AREAS

The wider structure of the Ruakākā hinterland – as it relates to the Site - can be categorised into a series of defining elements and landscape character areas. Many of these areas are undergoing rapid transitions in their use and character, as the One Tree Point / Marsden Point / Ruakākā belt absorbs considerable growth over the past decade.

Zoning is particularly influential in the shifting identity of the area around the Site. As Figure 3 below partially illustrates, Industrial zoning has been extended south down the spine of the Marsden Point form, from the hub of Northland’s port, to a prescribed southern margin created by McCathie Road and the nearby influence of the upper estuarine portion of Ruakākā River. When seen within this context the Site appears as an anomaly, being almost entirely an “island” of rural zoning that is virtually boxed-in on three sides by a predominance of Industrial-zoned land and the commercial pocket occupied by the Ruakākā shopping centre. The pocket of rural lifestyle housing to the west and a rural zone applying to the adjacent stormwater ponds, would be the only zoning separation between Sites 2 and 3.

The recent history of zone changes in the area provides the explanation for this circumstance. A private plan change application to alter the zoning of Site 3 to match the Light Industrial status of Site 2 and other neighbouring land was approved but was subsequently withdrawn due to concerns about the likely increase in rates.

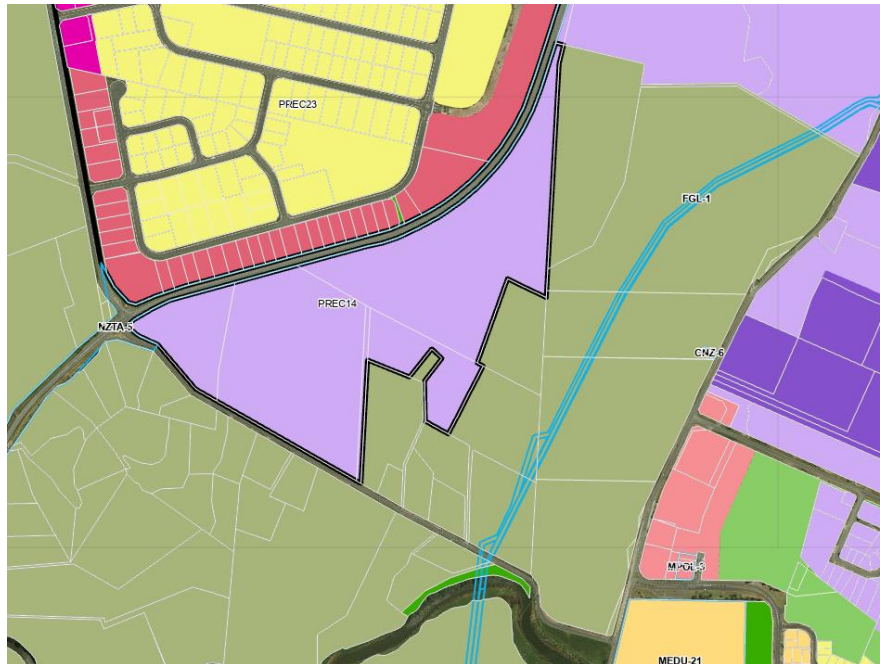


Figure 3: An extract from the Whangarei District Plan zoning maps, with the Site seen to centre right, where it is bisected by the pale blue delineation of a gas pipeline corridor. Note enframement with pale and dark purple industrial zones and red of the Ruakākā shopping centre. The orange to upper right signifies the Marsden Primary Centre zone.

Patuharakeke Te Iwi Trust Board (PTB) has prepared a Draft Cultural Effects Assessment Report (CEA)⁴ in their role as mana whenua of a rohe the incorporates the three properties owned by Meridian that are proposed for development as a solar park. Section 4.1 of the CEA provides an informative overview of Patuharakeke's relationship with the area within and beyond its rohe, to provide an insight into the *cultural landscape* of that area as lived and experienced by tangata whenua. Those dimensions also inform and expand *this* assessment report to create a fuller understanding of the landscape involved.

The CEA emphasises the importance of topographic cultural markers such as the Takahiwai and Kukunui ranges to the west, Manaia, Matariki/Mt Lion and Te Whara/Bream Head beyond the harbour mouth, and Piroa/Brynderwyn range to the south, and Taranga and Marotiri of the Hen and Chickens offshore islands to the east. Viewshafts and the opportunity to relate to those landmarks is therefore an important consideration.

The CEA also references the interwoven network of streams and wetlands that ultimately feed into the Ruakākā River, in its position alongside Site 3. The traditional role of these water elements as mahinga kai and mahinga mātaimai is clearly explained by the CEA, adding layers to the associated cultural values involved. Whilst those water-related elements are now much diminished from their former state, many still exist in a compromised form.

⁴ *Draft Cultural Effects Assessment Report - Ruakākā Solar Park Development* (4 September 2023) Patuharakeke Te Iwi Trust Board

In terms of Site 3, the original watercourse is dramatically altered from its original state to the straightened drainage channel that now exists, whilst former wetlands or damp areas have been drained and are used for grazing cattle.

4.1 industrial areas

As the preceding outline mentions and Figure 3 illustrates, a mix of Light and Heavy Industrial zoning largely determines the “existing environment” setting of the Site. Some of that land is well established in industrial uses, such as the sawmill and adjacent manufacturing businesses found around Lakeside Park Road and Innovate Road a little further north. A large belt of terrain immediately to the north of the Site – seen to top right in Figure 3 - is undergoing major earthworks in readiness for development as a commercial park that will include a large Mitre 10 store.

With its frontage to Port Marsden Highway and virtually flat profile, Site 2 sits poised to receive the Light Industrial forms of development that its zoning provides for. Zone provisions provide for buildings of up to 20m in height and a setback of 5m from a boundary with the Rural Production Zone (and subject to controls over height in relation to boundary). It was this zoning that was approved for Site 3. The zone’s parameters provide for a modern light industrial complex to be developed as a permitted activity, subject to providing screen planting treatment that is 2m wide and a minimum height of 1.8m on the interface with Rural Production land.

A darker purple zoning seen to the right of Point Marsden Road in Figure 3 signifies areas of Heavy Industrial Zone. This zoning applies to almost all of the land to the northeast of the Site, running up to include the port and refinery, but excluding a

belt of Open Space zone connected to the coast. It is generally more permissive than the Light Industrial zone, with provision for buildings up to 35m in height, but requires a greater setback from Rural Production zoned titles.



Photograph 6: Light Industrial zoned development near Lakeside Park Road, as seen from Marsden Point Road.

4.2 Commercial centre

Ruakākā Town Centre occupies a large block of land to the east of the Site, where it lies above the deflated area proposed for wetland development. A belt of parking separates the buildings in the Centre from Marsden Point Road, but it retains a strong presence when travelling along that corridor, as it does for those approaching Marsden Point Road on Peter Snell Drive.

A recent history of progressive expansion of the centre is continuing, with a large supermarket imminently due to be constructed on its northern boundary, accompanied by an extensive area of additional carparking. Completion of this phase of the Centre’s growth leaves a further large block of land on the junction of

Marsden Point and Sime Roads to receive future intensive commercial development. The combined development of this title and the land to be occupied by the new supermarket represents a doubling of the size of the Centre from its current size.



Photograph 7: A view across the southern part of the Site, and area of proposed wetland development, toward the Town Centre from McCathie Road.

Whilst the majority of the Town Centre is devoted to commercial use, it incorporates community facilities and police station. These activities relate a swathe of Open Space land that is devoted to active recreation with its sports fields and gymnasium.

Although the purpose of the Ruakākā Town Centre is self-evidently very different to that of Bream Bay College immediately across Peter Snell Drive, the scale and density of the two areas are very similar, as seen in the aerial view provided by Attachment Two.

4.4 Rural residential and lifestyle properties

Close inspection of Figure 3 reveals a mesh of relatively small titles extending from the south west portion of the Site, including the pocket that bounds immediately to the west and the terrain running south from the southern edge of McCathie Road and across to Port Marsden Highway. This area includes the knoll that rises from the intersection of those two roads.



Photograph 8: A typical view from within the rural lifestyle properties that lie in an enclave to the north of McCathie Road, showing scattered buildings and well-developed amenity plantings.

The smallest of the titles in this area are developed as lifestyle properties, centred around a home and with well-tended amenity planting and extensive areas of mown grass, as seen in Photograph 8 above. Ornamental fencing, like the post and rail structure featuring in Photograph 9, is a common component, alongside dense roadside shrub plantings and hedges.



Photograph 9: The lifestyle properties lining the southern edge of McCathie Road and the more elevated homes on the knoll beyond. The home where Panorama VP 01 was captured from can be seen on the skyline a short distance in from the left-hand edge of the image.

Larger titles include grazed paddocks and a measure of horticultural use. These bring a sense of greater spaciousness to the wider landscape and perpetuate the “production” legacy of this rural area when compared to parts of the District that have become entirely devoted to rural lifestyle development.

4.5 Pastoral farmland

The counterbalance to those more tightly subdivided parts of the Rural Production zoned land just described are those larger titles that remain predominantly devoted to grazing as a financial enterprise. This zoning land use continues on expansively across the southern and western parts of the District from McCathie Road. It also occupies most of the terrain between Port Marsden Highway and Takahiwa settlement to the north west. It is when viewing this broad pattern at the scale of the entire Whangarei District Plan zone map that the “orphan” nature of Site 3 is most evident.

For now, the extent of Site 2 and some other industrially-zoned land in the wider vicinity of the Site are continuing to be grazed, pending a shift to the use that their zoning provides for. This circumstance creates a sense that the pastoral character associated with the Site is more expansive and perpetual than underlying zoning supports.



Photograph 10: Looking north across the current farmland in the centre of Site 2 from McCathie Road. A dying Leyland cypress hedge that fringes no. 79 McCathie Road is seen to centre right.

SECTION C: THE PROPOSAL

Whilst increasingly common internationally, solar parks are a new, novel form of land-use for New Zealand and not a “predictable” form of development in the same way that, say, large rural production structures such as glasshouses or poultry farm buildings are.

They rely on being close to existing substations, large areas of reasonably flat land to satisfy requirements for scale and related economies, along with good solar access and proximity to established transmission corridors. These criteria indicate that large solar generation facilities are likely to occur in settings outside of urban areas, where adequate unimpeded space is more readily available. At Ruakākā, Meridian have secured two large parcels of land within industrial zones, in the form of Sites 1 and 2. It is only Site 3 that has a less compatible Rural Production zoning in place, but the scale required to achieve an efficient solar park has determined that this block is needed to complete the necessary extent.

There are a number of component parts to a solar energy facility and those that have a landscape or visual implication are set out in the following descriptions.

Solar panels

Indicative design drawings for the panels are found in the Beca Consent Drawings referenced earlier. These include details about likely dimensions and arrangement.

There are three possible mounting arrangements for the solar panels. One involves the modules of panels being fixed at a set angle of approximately 25° off of horizontal and is known as a Fixed Tilt (FT). These are mounted in pairs one

above the other, on a rack system that spans approximately 50m. This type would be oriented so that the rows of racks would run east to west and the panels would face north, as seen in the first Beca plan contained in Attachment Six of this report.

The alternative mounting type provides for the solar panels to mechanically track the path of the sun through the day, revolving around a single axis, defined as Single Axis Tracking (SAT). A third option is more sophisticated and provides for the panels to track the sun by adjustments in both axes, known as Contour Tracking (CT). The racks for tracking systems would typically form modules of a little over 100m in length.

Tracking options would be mounted so that the racks are oriented north to south, and therefore perpendicular to the line of an FT system. That different “texture” can be seen on the second Beca plan in Attachment Six. Meridian does not currently favour any one of these three options and wishes to maintain flexibility to adopt one based upon further detailed design and feasibility.

The Beca Consent Drawings set out two mounting heights for the FT option. In areas prone to flooding the apex of the panels would be 5.6m above ground level, and the lower edge 2.9m. In drier locations the peak of the panels would be just under 4.5m and the lower edge a little over 1.8m.

For an SAT installation, the flood prone area would see panels with a peak height of approximately 4.3m and a horizontal level of approximately 3.1m. In areas where flooding doesn’t occur, the panels’ apex would be a little under 2.4m and a horizontal level of just over 1.2m.

Clearly the tallest of the panel options would be more challenging to screen, although its application in flood-prone situations means that these would be placed in areas of depressed terrain, lessening their general prominence. At a broader level, in terms of a broader landscape identity, the various panel mounting types would all result in a uniform, structured appearance, albeit at varying elevations depending upon type. For the purposes of this assessment, the FT option has been adopted as the model, since its greater scale results in nominally heightened effects in relation to the Site and therefore serves as a “worst case” scenario.



Photograph 11: A typical fixed axis solar array installation. The panels proposed by the application would be mounted higher than this example, particularly in areas that are prone to inundation. Image source: Meridian

In terms of scale, CT panels would have a lesser presence than FT and SAT options, due to their lesser height, but that modest difference is not considered to be of particular significance in the level of impact created by the overall solar park.

All mounting options come with a reasonably uniform and coherent visual signature when compared to most other structured broadscale land uses. An industrial estate, for example, typically contains a range of building sizes, forms and finishes, interspersed by broad accessways, service and storage yards, equipment, parking etc.

Power inverter stations and control rooms

Six stations that contain invertors and control are proposed to be spaced along the midst of the Site, where they would be in the order of 250m from Marsden Point Road. They receive the power generated by the panels and condition it to be conveyed to the substation near Rama Road.

These containerised structures are proposed to sit atop a plinth that is in the order of 3m in height. This plinth provides for access around the container, which is just under 3.8m high, approximately 3.2m wider and approaching 8m in length.

Control sheds follow a similar format, but are positioned on a larger plinth that is approximately 15m square. The control room building would be 6m x 6m, with a height of 2.4m. A pair of much smaller Ring Main Units would be installed on the plinth, somewhat separated from the Control Room structure.

The Control Room for Sites 2 and 3 is shown as being where the homestead for the farm on Site 3 is currently located, where it would lie within 50m of Marsden Point Road.

All buildings would be finished in a moderately dark, recessive colour.



Photograph 12: An example of a typical inverter power station assembly. This is set closer to the ground than those proposed for the Ruakākā installations. Image source: Meridian

Reticulation to the substation

All cabling within the Site would be underground. A high-tension cable/s would convey the power generated by the panels from the invertors to an existing substation near Site 1. This cabling is proposed to be relatively low level as it heads north to the substation, comparable to the single poles that exist alongside Marsden Point Road. It would lie within the legal road corridor and therefore comply with the permitted activities that can occur within the road's designation, where there is a maximum height standard of 15m in Rural zones and 18.5m in Industrial zones.

Access corridors

Beca's solar farm layout drawing indicates a perimeter track, supplemented by a pair of central tracks that flank the buried gas pipeline corridor. Access to the Site

is anticipated to be approximately along the same line as the driveway into the farm buildings on the Site.

Security fencing

In light of the potential personal safety hazards involved in a development generating electricity, a wire mesh security fence is required to prevent access by unauthorised visitors. The fence would be in the order of 2m high and designed to prevent easy scaling, but it is not envisaged that it would incorporate barbed wire or electrification, being closer in design to a deer fence than, say, an airport security fence

In those parts of the Site's perimeter that are assigned to screen planting (as seen in Attachment Five and described shortly) it is intended that the fence would sit inside that vegetation and therefore be almost entirely screened from exterior view once planting is established, along with the solar panel arrays. Those parts of the boundary that would be fenced but not planted are isolated from exposure to road corridors and neighbouring domestic properties.

Ground treatment

The proposal involves some remodelling of the ground surface profile, as described in the Beca Civil Report. Contrary to the impression created by Photographs 11 and 12 above, most of the ground surface that is not devoted to vehicle access and any provisions for wet areas, would be maintained as a grass sward. This will be grazed by light animals such as sheep.

Wetland development

An area of approximately 11.73ha at the southern end of the Site is proposed to be developed as a wetland habitat, in part to offset the loss of wetland that is proposed on Site 1. An indicative plan of the proposed wetland is contained in Attachment Five.

Key features – at a conceptual level and subject to detailed design post consent – of this wetland creation include:

- Generally maximising the extent of damp and wet terrain.
- Creation of 2 large areas of open water in the order of 1m deep to provide habitat for waterfowl such as dabchick. These are set apart from the high-tension power corridor to minimise conflict with large aquatic birds such as shags.
- A dominance of indigenous terrestrial and aquatic plant species to create a rich, diverse habitat and a “wild” landscape identity.
- Vegetation generally of modest scale to limit any impact on the high-tension infrastructure and restrict the potential for roosting birds utilising the pylons and lines.
- Consider the potential for walkways, interpretation and other measures to provide information and amenity. Such concepts to be balanced with the ecological impacts of encouraging human use and subject to the outcomes of continuing engagement.
- Putting into effect the partnership with Patuhareke to formulate, implement and care for the wetland area.
- A recognition of the importance of fully understanding soil morphology and hydrological factors when designing the wetland.

In addition to an offsetting function and ecological contributions, the wetland is envisaged as an important landscape mitigation and enhancement measure. It would occupy the most visually exposed and accessible portion of the Site and transform the current featureless pasture to a complex and visually appealing highlight in the core of Ruakākā. It would also provide a thematic linkage to the nearby Ruakākā River corridor.

Those who live closest to the Site in the rural lifestyle enclave on the northern side of McCathie Road would be exposed more to the margin of the wetland area than to the solar farm itself, which would be set further north.

Boundary planting

As outlined earlier, the Whangarei District Plan requires a modest planted screen on the interface between Rural Production zoned properties and Light Industrial zoning. The proposal responds to this requirement with a series of indicative planting plans that provide for a minimum width of 2.5m and heights in excess of the 1.8m threshold stipulated by the Light Industrial provisions. Planting heights are configured to effectively screen or buffer solar panels that may have a height in the order of 5m.

The planting plans also allow to create a vegetative belt along the Marsden Point Road margin in order to screen views into the northern part of the Site from that corridor.

Species selections are shaped by an effort to employ locally common species, with a majority being indigenous and tolerant of the soil and wind conditions found on the Site. Periodic accents in the form of flowering exotic species are intended to

offer a subtle accent and provide seasonal nectar sources for birds and lizards. The species have also been chosen in the knowledge that the screens will need to be trimmed periodically to maintain the vegetation within a height and width limit that is compatible with the functional requirements of the solar park, the need to maintain a dense canopy as a screen, and to maintain adequate height to block views to the tops of the solar panels.

It is expected that screen planting would reach a height of 3m approximately 3 years after planting, and continue on to achieve 5m in 5-6 years.

There is a possibility that future detailed earthworks design will yield adequate surplus topsoil to create a bund or linear mound in the areas proposed for screen planting. If that situation arises, the bunds would be mulched and planted using similar species mixes to those indicated in Attachment Five. Installing planting on a bund would reduce the screen height timing mentioned above by 1-1.5 years.

SECTION D: EFFECTS ASSESMENT

Preceding sections describe the characteristics of the Site and its setting. These are followed by a description of the proposed structure plan as an entity and its component parts. The purpose of *this* section of the report is to define the effects of the proposed solar park upon the Site and its setting, to consider how that new use is likely to impact upon the experience of people viewing that development from outside of the site, and to comment upon the resulting level of effect upon landscape values, visual amenity and the rural character of the site and its context

at Ruakākā. The following assessments have been based upon a worst-case scenario where the panels are of the FT type and therefore most elevated.

Adverse effects impact negatively on the landscape and result in landscape or visual amenity values being diminished. **Benign or neutral effects** are those in which a proposed change neither degrades nor enhances the landscape setting when considered in the whole. In circumstances where **positive effects** arise from a development, the changes that have been brought are deemed to be beneficial relative to the landscape state of the site prior to that change.

Effect ratings that will be used:

Very high: resulting in a dramatic or total loss of the defining landscape characteristics of the site/context, or visual amenity associated with that setting.

High: leading to a major change in the characteristics site or setting, or significantly diminishing key attributes, and/or comparable impacts upon visual amenity.

Moderate – high: an interim measure of effect in which impact of the development results in a change of some significance to the qualities or perception subject landscape.

Moderate: a self-explanatory magnitude in which effects sit midway between the extremes this spectrum of magnitude. Can also be considered as an “average” level.

Moderate – low: impacts on landscape characteristics and attributes are relatively contained.

Low: effects are generally very limited and do not result in compromising the characteristics of a landscape or perceptions of it in a more than subtle way.

Very low: negligible or imperceptible effects result upon the landscape and/ or perceptions of it.

7 VISUAL AMENITY EFFECTS

Viewing audiences / affected parties

To assist with predicting the level of visual and landscape effect that the proposal would generate, publicly accessible vantage points in the area were selected to be broadly representative of each of the following identified audience groups, selecting worst-case views wherever possible. Their location is marked in the aerial photograph comprising Attachment Two. Photographs for each vantage point are found in Attachment Three. These will be referred to in the following commentary.

The degree of adverse visual / landscape effect generated by a proposed change or development depends upon the character of the surrounding landscape (the context), existing levels of development on the application site, the contour of the land, the presence or absence of screening and/or backdrop vegetation, and the characteristics of the proposed development.

By way of preface, the topography of the Site and its context are particularly influential in the relative prominence of the proposal for Site 3. The fact that the Site is largely flat and slightly deflated relative to surrounding, similarly flat land means that the proposal would be largely seen at a very low angle of view. This circumstance means that the depth and extent of the solar park is less perceptible

from these low vantage points. It also means screening tends to be effective in entirely blocking views across the Site in a way that is much more difficult to achieve if, for example, the panel-clad terrain was to rise up from the external property boundary.

Also pivotal is the positioning and scale of the proposed wetland, since this would occupy a part of the Site that is surrounded by similarly low-lying ground and is a focal part of the local in its position on the McCathie/Marsden Point Road junction. Planting on the northern margin of the wetland area would achieve the same screening role to that intended by vegetation proposed for parts of the Site perimeter.

Higher ground that allows for views down over the Site, and consequently witness the extent of the solar farm, is limited to the knoll and related Takahiwai hills to the north west, along with higher ground associated with Whangarei Heads, both of which are not immediately adjacent to the Site.

An added dimension of consideration in relation to solar farms is that of solar glare or reflectance from the surfaces of the panels. Meridian have commissioned Velden Aviation Consulting Ltd to prepare assessments in relation to dwellings and road corridors (the Solar Glare Impact Assessments [SGIA]) to address this form of potential effect. Their findings will be referred to in the following commentary.

Travellers and pedestrians on Marsden Point Road and intersecting roads to the east

Marsden Point Road carries a reasonably large number of vehicles between Ruakākā and Marsden Point / One Tree Point, with the supermarket and shops at

Ruakākā being the closest comprehensive retail area to the rapidly expanding One Tree Point settlement. The experience of travelling this road is shaped by industrial uses established to the east of the road, whilst earthworks to the eastern side (and north of the Site) have shifted the character of that area from being rural in readiness for industrial development that caters for a range of uses, including a large Mitre 10 hardware store.

Most of the Site lies below the road, but registers as a large, grazed area regardless. The substantial steel pylons and heavy high-tension lines are an imposing feature of the southern part of the Site and as they cross Marsden Point Road. Panoramas VP7, 8 and 9 represent the views of those in south-bound traffic, whilst Visualisation 03 in Attachment Four illustrates the role of proposed planting in screening views to the part of the Site that is proposed as solar park. Informed by this evolving context, adverse visual amenity effects upon this audience are assessed as being *moderate-low* initially and reducing to *low* as planting gains stature to create an effective screen.

Perpendicular views from intersections of Sime Road and Innovate Road to the east are comparable those from the northern part of Marsden Point Road – albeit perpendicular – and visual amenity effects are closely related.

Sime Road and Peter Snell Road travellers would witness the proposed wetland development as they near the intersections with Marsden Point Road, so would benefit from the positive effects of that initiative. That effect would be to a *moderate* level. A similar level of positive effect would be experienced by users of the western face of the shopping centre, although views towards the wetland area are substantially obstructed by parked cars for much of the time.

The proposed wetland would bring its highest visual amenity benefits to those travelling north past the McCathie Road junction, where Marsden Point Road is largely directed towards the Site and the proposed wetland on its southern portion. Here the positive effect of the proposal is assessed as being *high*, as indicated by Visualisation 05.

Modelling reported by the SGIA establishes that there is potential for a measure of solar glare to impact upon users of Marsden Point Road, based upon limited provision for topographic screening and no allowance for existing vegetation. When allowance is made for the screen planting described by this report and its attachments, the SGIA determines that glare would be avoided, as documented by its Tables 5.1 and 5.2.

Motorists on McCathie Road

McCathie Road's brief brush with the Site is represented by a combination of VP05 and VP04, a little further to the west. Here the beneficial shift in the character of the Site is similar to that just described and would therefore bring a high level of positive effect.

The SGIA analysis identifies that those travelling in tall vehicles – such as trucks and buses – may be subject to a small measure of low-order Annual Green Glare under an SAT panel arrangement, but not if fixed tilt panels of 20° were to be installed.

Residents on McCathie Road

McCathie Road traverses flat land to the south west of Sites 2 and 3. A pocket of large lot rural housing is situated on the western side of this road, opposite the

edge of Site 2. Panorama VP03 provides a sense of the view across Site 2 to be had by those leaving these properties as they reach the edge of McCathie Road.

The homes on these properties tend to be set back into their titles and most feature a belt of planting along their frontage to buffer the effects of traffic on this moderately busy road.

The Light Industrial zoning of Site 2 means that these properties are conditioned by the prospect of large buildings being developed as-of-right across Site 2. The more uniform and almost certainly lower profile of the proposed solar park development is considered to be a less impactful scenario than that permitted outcome.

A second enclave of modestly-sized rural lots lies to the northern side of McCathie Road, where they are effectively encapsulated by Site 2 to the north and west, and by Site 3 to the east. 79 McCathie Road (No 79) is the largest of these properties and adjoins Site 2 to its west and north. It is closely proximate to the small projection of Site 2 to its east, separated only by the drive corridor to 89 McCathie (No 89). Preceding comments about the Light Industrial status of Site 2, and the development that is provided for by that zone, apply equally to this property and its neighbours to the north and east.

No 79 is largely shielded from Site 2 by a mature Leyland cypress hedge. That belt of trees is in decline as a result of cypress canker disease, and is unlikely to survive more than a few years. Proposed planting Screen Mix A would progressively replace that shielding function, bringing a more diverse and interesting margin to the property in the process. That planting would create an entire screen over a period of 5-7 years, with a progressive reduction of views to Site 2 as it does so.

This property has a view to Site 3 amongst the vegetation of intervening properties on the eastern margin of views to the north from its entry drive and related parts of the land. This outlook is represented by Panorama VP15. Almost all of that exposed portion of Site 3 falls within the proposed wetland development area.

No. 89 is a relatively small property situated on slightly elevated terrain relative to ground to its east. Panorama VP14 is taken from within this property, looking east towards Site 3. It is closely contained on all but its narrow southern frontage (onto no 79) by Site 2. As such, it is subject to the permitted development outcomes provided for by the Light Industrial zoning of that land, as has been described earlier. Proposed planting around the related segments of the Site 2 boundary would progressively screen the proposed solar installation over 5-7 years. Whilst impactful upon this property, the solar park would have lesser effects than buildings provided for by the Site 2 zoning and Meridian's commitment to planting would be considerably more effective than the minimum standard set by the Zone provisions. Development of the proposed solar park within the pocket of Site 2 that lies to the east of no.89 would block views to Site 3, with proposed planting further reinforcing that blockage over time. Visualisation 04 provides a comparison of that planting by way of a comparison with the existing outlook.

No. 189 has a portion of frontage to Site 2 (being the pocket just described in relation to no.89) and another to Site 3 to the west. The houses on this property are concentrated in its south western corner and largely encapsulated in mature amenity plantings that create an introspective atmosphere and limit outlooks from this most inhabited part of the title.

Open pasture to the northern part of the property is open to views to the west (Site 2) and east (Site 3). To the north it addresses the bund associated with the large stormwater pond that lies just beyond. The eastern part of the title is currently devoted to use by the neighbouring turf farm and it is from this area that Panorama VP13 was captured from. Approximately half of the eastern boundary of no. 109 would abut the intended solar park portion of Site 3 and the balance would relate to the wetland development proposed for the southern portion of that Site. Visualisation 02 shows the role of proposed planting in screening views to the part of Site 3 that is assigned to the solar park, and its interface with the planned wetland.

An unnumbered property in the south eastern corner of the enclave is occupied by the turf farm just mentioned in relation to no. 109. This is partially screened from Site 3 by a fragmented belt of vegetation associated with the drain that charts the western edge of Site 3, as seen in Photograph 3. This property only bounds that portion of Site 3 that is proposed for wetland development. Planting on the western margin of the wetland is intended to be of modest height to minimise potential for shading of the turf crop.

For the majority of those living within this defined area, the visual amenity effects of a solar park on much of Site 3 are assessed as being *very low*, due to either a lack of visibility to Site 3 or very limited glimpse to the part of it that would be north of the wetland development.

For numbers 79 and 89, which look across part of the Industrial zoned Site 2 in limited views to that part of Site 3 that would be developed as solar park, those affects are predicted to be *low* initially, reducing to *very low* once plantings are fully established.

This same assessment of level of effect applies also to the portion of no. 109 that contains the houses and living area. The south eastern paddock of that title is more exposed and in closer proximity to the solar farm, so effects experienced in that part of the property would be more pronounced. There, the initial visual amenity effects are predicted to be *moderate-low*, diminishing to *very low* after screen planting has achieved its full height.

The SGIA (Dwellings) Assessment establishes that solar glare from a fixed tilt type of array will potentially result in adverse effects upon 6 of the 18 adjacent homes that were assessed by that report. Four of these (being 24, 28, 34 and 79 McCathie Road) may experience minor glare effects and the Solar Glare Assessment states that no mitigation is required in relation to these properties. The modelling does not allow for existing vegetation or topographic buffering of potential glare.

In most cases, the properties in question feature extensive planting that may serve to reduce the limited levels of glare predicted. It should be noted that the SGIA modelling is based upon an assumption that 79 McCathie Road contains a two storied home, when it is actually a single level residence.

The remain 2 of the 6 identified dwellings are predicted by the SGIA as being subject to solar glare in the absence of mitigating elements. Specific planting measures along the boundaries of these properties are proposed, and it is predicted that such vegetation will progressively address glare effects as it gains stature. The SGIA suggests that interim measures to contain glare may be desirable.

People living on the knoll that lies between McCathie Road and Port Marsden Highway

Almost all of the terrain surrounding the proposed solar park Sites is part of a low lying coastal plain, being of a similar level to the park itself. Elevated land is restricted to the Takahiwai hills (part of which is an ONL) some distance to the north west and a small peaked landform that sits just beyond their south eastern end. The Port Marsden Highway / SH15 cuts through the narrow gap between these hill forms and McCathie Road skirts beyond the northern toe of the knoll.

Approximately 6 homes are strung along the north eastern rim of this knoll, where they enjoy varying views towards Whangarei Heads and northern Bream Bay across the lowlands stretching back from Marsden Point. Panorama VP01 is representative of those views, having been taken from the house nearest the eastern end of the knoll.

From its position near the south western corner of Site 2, the foreground to midground of views from the apex of the knoll is largely occupied by Site 2. This situation is highlighted by Visualisation 01, where the Industrial zoning of that land has been highlighted and a number of key aspects noted. In these views, the northern part of Site 3 that is proposed for solar farm development lies beyond Site 2 and the central stormwater ponds on its eastern edge. Solar panels and control buildings on Site 3 would therefore be witnessed as a subservient extension of solar development on Site 2, rather than standing in contrasting isolation. In a similar vein, the wetland development would form a small fragment of the wider view and so would not have the same strong positive impact that it would bring to closer views.

After allowing for the beneficial contribution of the proposed wetland, the industrial status of Site 2 and the shifting character of much of the terrain inland of northern Bream Bay, the adverse visual amenity effect of the portion of Site 3 that would carry solar panels is assessed as being *moderate-low*.

Homes at 28, 34 and 40 McCathie Road, which are positioned on the northern face or apex of the knoll, were modelled by the SGIA. Based upon the results for a worst-case-scenario 25° fixed tilt panel, it is only no 28 McCathie that would potentially be subject to solar glare from the proposal, with this being at a minor level and not requiring mitigation.

Whilst the modelling did not extend as far as the property where the photograph for Visualisation 01 was captured from, the results for 38 McCathie Road provide a useful proxy, with that house being closer to the Site and approximately 10m more elevated. On this basis, the “no solar glare” finding that applies to 38 Mcathie is expected to also apply to this property.

Residents of the Takahiwai area

All of the lowest-lying portions of Takahiwai are screened from the Sites by numerous layers of established shelter tree plantings that lie within the 2-3km wide belt of rural land spanning between Port Marsden Highway and the settlement. This screening applies equally to homes on the low terrace that sits to the west of Takahiwai Road and houses the Takahiwai Marae.

More elevated land associated with the north western end of Takahiwai Road is blocked from views to the Sites by its orientation and intervening spurs descending

the slope to the east. The settled parts of similarly elevated terrain to the south and south west of Takahiwai settlement are also blocked from views to Sites 2 and 3 and have very limited, if any, view to Site 1.

In light of the spatial separation and lack of visual connection with the Site, the proposal would result in no visual amenity effects upon those living in or visiting Takahiwai.

Residents and visitors to the eastern face and peaks of Whangarei Heads

Many parts of the south or west-facing peaks, flanks and shoreline of Whangarei Heads are oriented towards Marsden Point and beyond. Low-lying areas have views in the direction of the Site dominated by a midground occupied by One Tree Point's residential fringe, Northport and the neighbouring oil refinery, but not of the Site itself.

Moderately elevated locations, such as at Norfolk Avenue, provide an outlook over the port and refinery but at such a shallow tangent that clearly discerning elements of land use over the approximately 6km distance to Site 3 is difficult, and it is not evident that the Site is an expanse of grazed pasture in its current state. Intervening vegetation adds to this lack of clarity.

It is not until viewers reach elevated ground as found at the public lookout on the crest of Manaia, the ridge track on Mt Aubrey or glimpsed views from amongst the forest of Mt Lion, that they have potential to see the Site more clearly as a small component of a broad, sweeping view. Even then, Site 3 lies at a distance and is not readily distinguished, as representative Panorama VP16 taken from Manaia's summit illustrates, with the need to insert an arrow in order to identify the Site

reinforcing this situation. It is predicted that a solar farm on Site 3 would lie largely the "lee" of extensive areas of existing or zoned industrial activity to its north. Ref to Manaia panorama.

In the context of the constrained area from which the Site would be available, the visible extent of the Site within views from where it can be seen, and the industrial shift that is occurring in much of the surroundings to the Site, adverse visual amenity effects upon this audience are assessed as being *low*.

The SGIA (Dwellings) considers potential glare effects upon Mt Manaia at its section 4.3. The report notes that the maunga is approximately 7km from Site 3 and comments that it is "well outside any area where there is potential impact from associated reflections".

8 LANDSCAPE EFFECTS

Landscape effects are those impacts upon the structure, pattern and character of landscape that result from a development or change in land use.

Earlier descriptions and photos, along with the images contained in the Attachments, demonstrate that whilst the Site has a well-defined identity through its simple, grazed land use, it is unremarkable in landscape terms. They also illustrate that the combined forces of surrounding zoning, existing adjacent industrial and commercial land use, and the imposition of elements like the high-tension power corridor that traverses part of the Site as it marches up the peninsula, serve to considerably deflate the potential landscape values and sensitivity of both the Site and its immediate context.

Predictably, the Site is not identified as having elevated landscape values. The nearest Outstanding Natural Landscapes (ONL) are the Takahiwai Hills, which lie 3km to the west at their closest, and the Bream Bay Ocean Beach with its narrow active dune field, 1km to the east. Neither of these identified ONLs has a direct relationship with the Site or faces any potential for a negative impact upon their identity or values as a result of the proposal.

When considered in the context of the very limited landscape values and sensitivity carried by the Site and land that immediately relates to it, the adverse effects of the proposal are assessed as being *low*. It should be noted that this predicted level does not underplay the significant *change* to the Site's landscape that would arise from the proposal, but focusses upon the magnitude of *effect* involved.

9 RURAL CHARACTER EFFECTS

Earlier description of the context of the Site identified how rural, pastoral land-use and related identity is rapidly being "rolled back" from the north towards McCathie Road under District Plan zonings that favour industrial and commercial activities in this setting that is closely related to both the port and rapidly growing residential areas.

Amongst this zoning pattern, the Site and a large-lot residential enclave hard alongside are something of any orphan from the body of rural-zoned land clearly demarcated to the south of the line prescribed by McCathie Road, being surrounded on three sides by industrial and commercial zones. The expression of those underlying zones is being swiftly realised on the ground, with the identity of the area shifting as land to the north is developed from its former farming heritage.

As those contrasting land uses press in upon the Site, its inconsistency will become increasingly marked and its character as a block of farmed, pastoral ground will also diminish accordingly.

When compared with likely development outcomes of provided for by surrounding industrial zones, with their provision for a wide diversity of large buildings and variable spatial patterns, a solar park goes some way towards perpetuating several of the characteristics of farmed use. It brings a high degree of uniformity, a sense of openness when seen from a distance, a ground cover of grass and attendant animals and screening perimeter vegetation that is not dissimilar to informal shelterbelts and rural roadside margins that commonly colonise with native shrubs and trees as a natural process.

Although the conversion of pastoral farmland to a solar park inevitably results in a loss of rural character, when put in the context of these dimensions that level of loss is not dramatic. Accordingly, the adverse effect of the proposal upon rural the rural character of the Site itself is assessed as *moderate-low* and when considered in the context of the rural character of the wider setting, as *low*.

SECTION E: CONCLUSIONS

By their nature, solar parks tend to be relatively low-lying and visually cohesive as a land-use, particularly when compared to alternative, non-rural activities such as residential development or industrial use. Whilst a departure from a traditional, pastoral rural use of the land, they may be seen as being less of a departure from that simple, extensive cover than much more disparate alternative urban-type usage.

Of the three sites owned by Meridian that are proposed for development as a solar park, it is only Site 3 that requires consideration of landscape, rural character and visual amenity effects, due to its Rural Production zoning. The fact that it retains that zoning is due to an approval to rezone the land as Light Industrial was not pursued by the Site's previous owner (and applicant for that rezone).

The Site has limited landscape value and sensitivity. It is located some distance from the nearest identified outstanding natural landscapes on the ocean coast and Takahiwai hills to the northwest, being spatially and visually disconnected from both of those ONLs. As a result, the proposal would not compromise their status.

The modest rural character values of the Site are compromised by the high-tension corridor that affects part of it and the wider zoning context that sees it and an adjacent pocket of lifestyle-type residential land use as a Rural Production zoned pocket that is disconnected from the main body of rural land that extends more coherently to the south and west.

A shifting land use pattern that reflects the industrial zoning that extends from Marsden Point to McCathie Road is advancing swiftly, as seen in the development of the former farmland to the north of the Site. A continued momentum of that change across remaining undeveloped farmland with an industrial zoning, including Site 2, will see the expectations of the District Plan realised and the isolated rural pocket occupied by the Site become more discordant with that surrounding character over time. Continuing expansion of the Ruakākā Town Centre, immediately to the east of the Site, further reinforces the consolidation of rural activities surrounding the Site and at odds with its current pastoral nature.

The low-lying nature of the Site and most surrounding terrain is influential in the level of prominence of the proposal and its potential visual effects. Almost all potential viewing audiences are set at a similar level to the solar park on the lowlands of the Marsden Point landform and continuing low land continuing south towards Waipu. Intended plantings to the "public" frontages of the Site are therefore destined to be highly effective in screening the solar park. Similar proposed plantings to the private, "residential" frontages to Site 2 will considerably exceed the requirements of the District Plan for that interface and are expected to be equally effective, as they grow, in mitigating the effects of the solar park on those properties.

A more elevated viewing position for the small number of properties occupying the knoll to the west of the Site means that those residents look down to the Site, rather across it. As a result, their occupants are the most potential affected audience. The extensive views from these properties results in them being a grandstand from which to observe the significant changes occurring more widely across the Ruakākā hinterland as a reflection of zoning and considerable growth pressures, including the most adjacent Site 2 and Marsden Primary Centre Zone. Amongst that shifting outlook, the portion of the Site forms part of the midground and is sandwiched between Site 2 and industrial land to the east of Marsden Point Road. This context informs an assessment that the adverse visual amenity effects of the solar park portion of the proposal for Site 3 would be of a minor level, countered in part by wetland component of the proposal.

The extensive wetland intended for the southern portion of the Site represents a significant commitment to ecological enhancement that equally carries considerable benefits for landscape character and visual amenity values. Its

position close to the adjacent Ruakākā River heightens its spatial relatedness, whilst its proximity to the Ruakākā Town Centre, open space area and Bream Bay College is also opportune.

Mike Farrow **Principal landscape architect**

ATTACHMENTS

RUAKĀKĀ ENERGY PARK
MARSDEN POINT | WHANGĀREI

ATTACHMENT ONE OBLIQUE VIEW

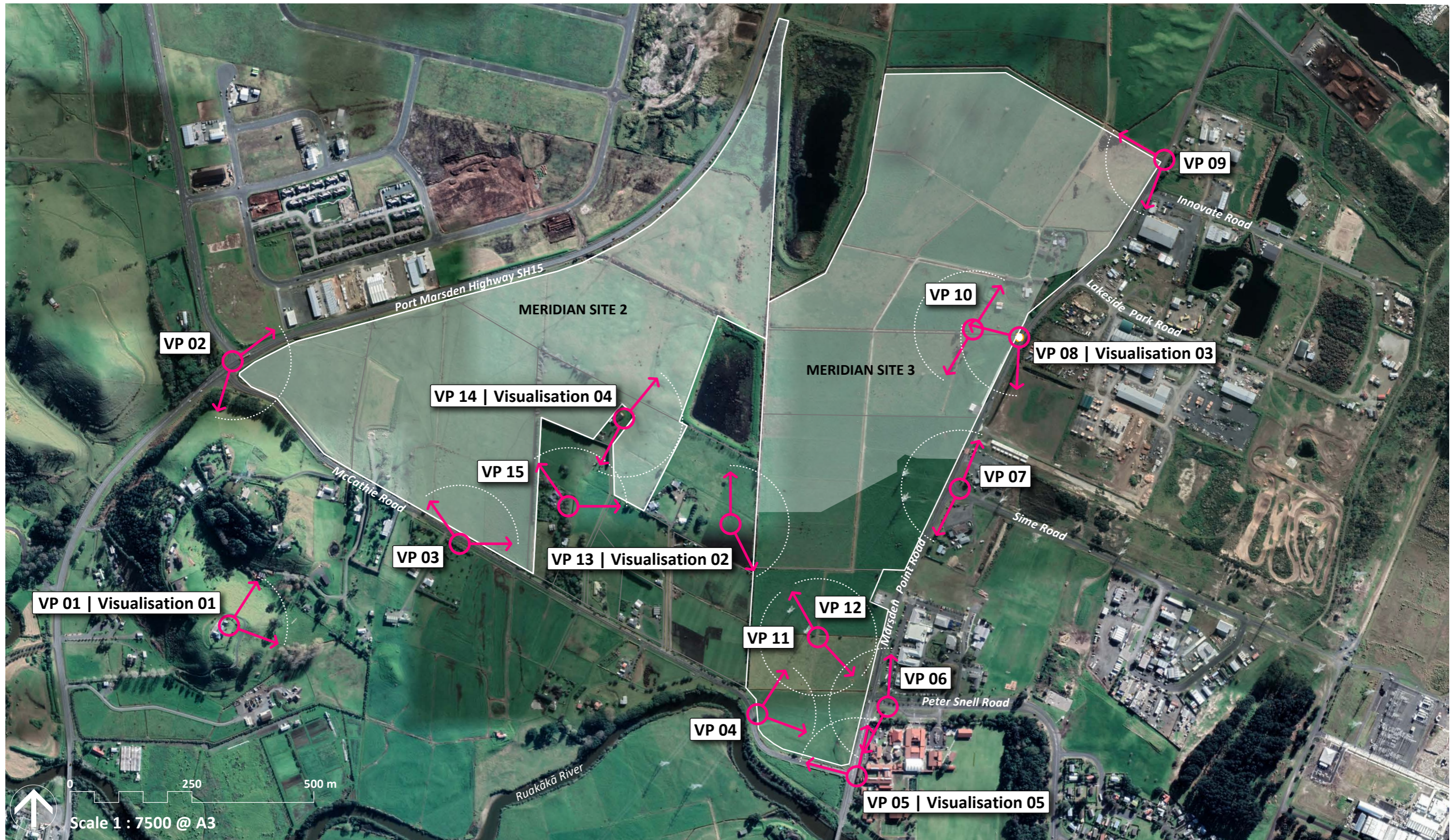
IMAGE SOURCE: Google Earth Pro 21/06/2023. Please note site boundaries shown are indicative only.



Google Earth

© 2023 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2023 CNES/ Airbus

ATTACHMENT TWO VANTAGE POINT LOCATIONS 1



ATTACHMENT THREE SITE PHOTOGRAPHS

NOTE:

Dates of photography:

26/05/2023 03:00pm to 05:00pm

31/03/2023 12:00pm to 05:20pm

The panoramic photographs were digitally merged. Original photographs with Nikon Z5 with approx. 33mm focal length lens setting, making the image magnification equivalent to a 50mm focal length lens on a full frame 35mm camera.

The field of view for each panorama varies in response to the relevant field of view for each of the vantage points.



Panorama VP01 :

The sweeping view from a home at 194 Port Marsden Highway which is situated on the crest of the knoll to the south of McCathie Road. See also the Visualisation of this image, overlaid with District Plan Zones, relative to Site 2 (in the midground to the left of this image) and Site 3 (seen in the middle distance and to either side of the steel tube in the foreground, and relative to the Ruakaka shopping centre).



Panorama VP02 :

Site 2's north west corner, as experienced from the junction of Port Marsden Highway and One Tree Point Road.

**ATTACHMENT THREE
SITE PHOTOGRAPHS**



Panorama VP03 :
Another view of Site 2, this time from mid McCathie Road



Panorama VP04 :
Looking over the southern portion of Site 3 – proposed as a wetland development – from eastern McCathie Road.

**ATTACHMENT THREE
SITE PHOTOGRAPHS**



Panorama VP05 :
The prominent view into southern Site 3 from the intersection of Marsden Point Road and McCathie Road. This is the most exposed part of Site 3. See also Visualisation 05



Panorama VP06 :
A westerly outlook across the proposed wetland development area from the well-used Peter Snell Road.

ATTACHMENT THREE SITE PHOTOGRAPHS



Panorama VP07 :
Another image from the western end of an intersecting road, this time Sime Road, which would focus towards the northern extent of the intended wetland development.



Panorama VP08 :
Looking south from the slight kink in Marsden Point Road, a short distance to the south of Lakeside Park Road. See also Visualisation 03.

**ATTACHMENT THREE
SITE PHOTOGRAPHS**



Panorama VP09 :
A sweeping view across the north east corner of the Site.



Panorama VP10 :
A panorama across the consistent flats that characterise the majority of the Site.

**ATTACHMENT THREE
SITE PHOTOGRAPHS**



Panorama VP11 :
A panorama across the consistent flats that characterise the majority of the Site.



Panorama VP12 :
Another view from within the body of the Site, here being the southern sector near the pylons and in the midst of the proposed wetland area.

ATTACHMENT THREE SITE PHOTOGRAPHS



Panorama VP13 :
Looking to the western boundary of the Site from within the property at 109 McCathie Road. See also Visualisation 02, which illustrates a scenario containing boundary screening and the wetland development.



Panorama VP14 :
An eastern view across Site 2 in the foreground towards the proposed wetland on Site 3 further beyond (marked by the pair of pylons to the right of the image). See also Visualisation 04.

ATTACHMENT THREE SITE PHOTOGRAPHS



Panorama VP15 :
A view from 79 McCathie Road, looking across towards Site 2 (which would become screened by planting associated with the drive corridor to no. 79) and the proposed wetland portion of the Site in the distance to the right.



Panorama VP16 :
The southern view from the apex of Mount Manaia, to the north of Whangarei Harbour. In the view Site 3 lies in the distance and beyond intervening layers of industrial land uses, dominated by the former refinery and port developments on the southern margin of the harbour mouth.

ATTACHMENT FOUR

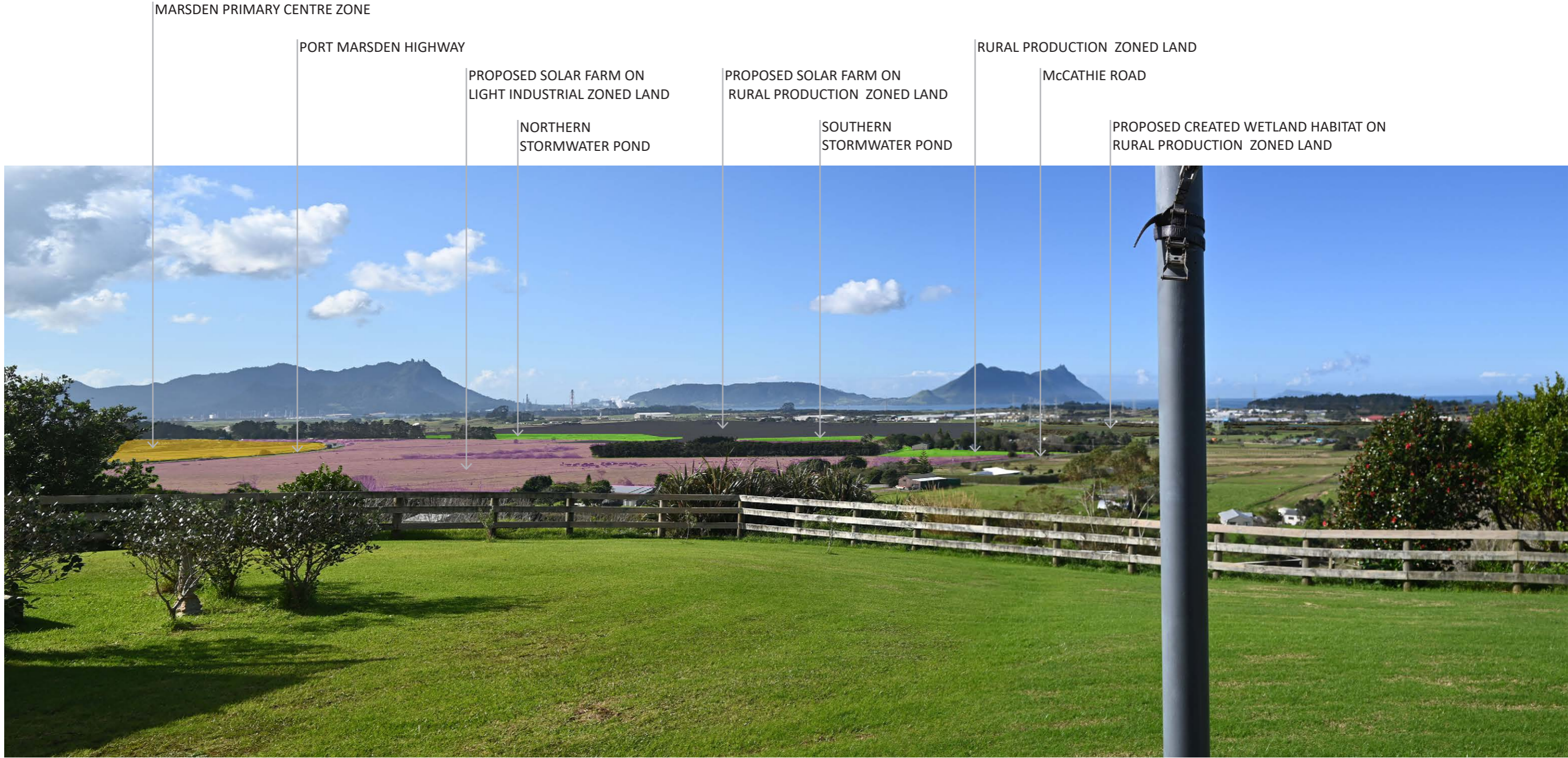
VISUALISATIONS

ATTACHMENT FOUR VISUALISATION 01



CURRENT SITUATION VP01 | 194 PORT MARSDEN HIGHWAY

ATTACHMENT FOUR OVERLAY DISTRICT PLAN ZONES | VISUALISATION 01



VISUALISATION 01 VP01 | 194 PORT MARSDEN HIGHWAY

ATTACHMENT FOUR VISUALISATION 02



PANORAMIC PHOTOGRAPH OF CURRENT SITUATION
VP13 | 109 McCATHIE ROAD



VISUALISATION OF PROPOSED PLANTING 4 - 5 YEARS AFTER INSTALLATION
VP13 | 109 McCATHIE ROAD

ATTACHMENT FOUR VISUALISATION 03



PANORAMIC PHOTOGRAPH OF CURRENT SITUATION
VP08 | MARSDEN POINT ROAD



VISUALISATION OF PROPOSED PLANTING 4 - 5 YEARS AFTER INSTALLATION
VP08 | MARSDEN POINT ROAD

ATTACHMENT FOUR VISUALISATION 04



PANORAMIC PHOTOGRAPH OF CURRENT SITUATION
VP14 | 89 McCATHIE ROAD



VISUALISATION OF PROPOSED PLANTING 4 - 5 YEARS AFTER INSTALLATION
VP14 | 89 McCATHIE ROAD

ATTACHMENT FOUR VISUALISATION 05



PANORAMIC PHOTOGRAPH OF CURRENT SITUATION
VP05 | McCATHIE ROAD AND MARSDEN POINT ROAD INTERSECTION



VISUALISATION OF PROPOSED PLANTING 4 - 5 YEARS AFTER INSTALLATION
VP05 | McCATHIE ROAD AND MARSDEN POINT ROAD INTERSECTION

ATTACHMENT FIVE

PLANTING CONCEPT



0 250 500 m

scale 1 : 7500 @ A3

Ref: 1338_PlantingConcept_20230904



**PLANTING CONCEPT OVERVIEW
 RUAKĀKĀ ENERGY PARK**

SCREEN MIX A & B



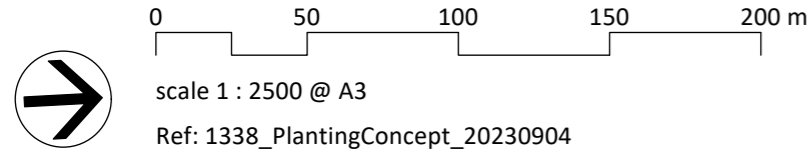
Plant centres 1m off-set from boundaries

Plant spacing 1.5m crs in off-set rows

1.5m
1.5m
Site boundary

SPECIES SCREEN MIX A
Trimmed to maintain height of 5m
Kunzea robusta kānuka 30%
Myrsine australis māpou 15%
Pseudopanax lessonii houpara 15%
Pittosporum crassifolium karo 15%
Pittosporum tenuifolium kohukohu 15%
Coprosma lucida taupata 10%

SPECIES SCREEN MIX B
Trimmed to maintain height of 2.5m
Pittosporum crassifolium karo



**PLANTING CONCEPT SOUTH EAST SITE 2
RUAKĀKĀ ENERGY PARK**

INDICATIVE WETLAND CONCEPT



MERIDIAN SITE 3

Marsden Point Road

McCathie Road



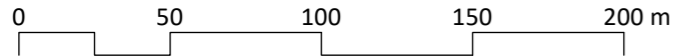
scale 1 : 2500 @ A3

Ref: 1338_PlantingConcept_20230904



PLANTING CONCEPT SOUTH EAST SITE 3
RUAKĀKĀ ENERGY PARK

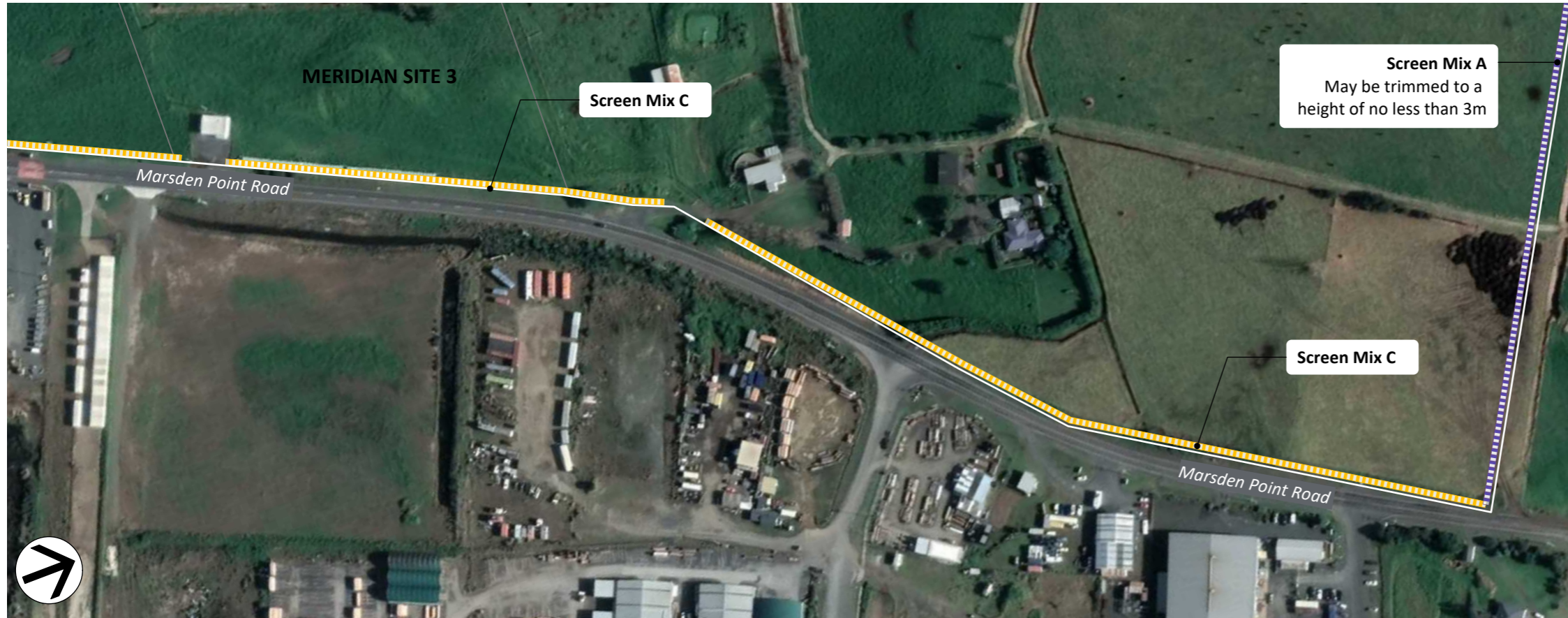
INDICATIVE WETLAND CONCEPT WITH POWER PYLON OFF-SETS



scale 1 : 2500 @ A3
Ref: 1338_PlantingConcept_20230904



PLANTING CONCEPT SOUTH EAST SITE 3
RUAKĀKĀ ENERGY PARK



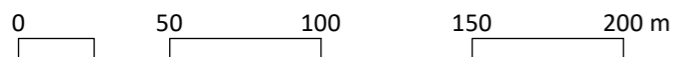
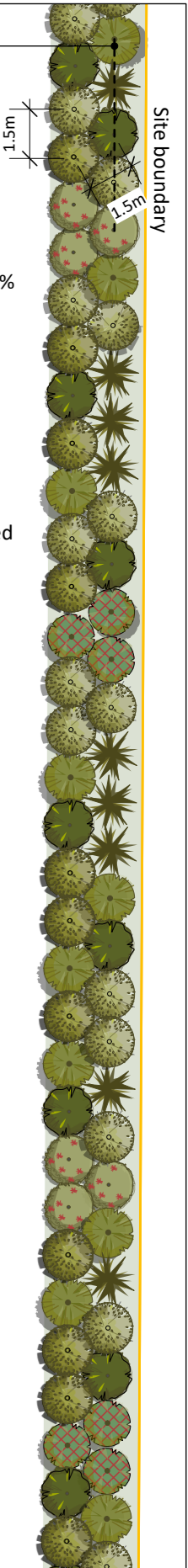
SCREEN MIX C

Plant centres 1m off-set from boundaries

Plant spacing 1.5m crs in off-set rows

SPECIES SCREEN MIX C

- Leptospermum scoparium* mānuka 40%
- Phormium tenax* harakeke/flax (on outer, road side of mix) 20%
- Pseudopanax lessonii* houpara 15%
- Pittosporum crassifolium* karo 10%
- Callistemon citrinus* "Endeavour" 10%
 - in periodic clumps of 3
- Leucadendron* 'Safari Sunset' 5%
 - in periodic clumps of 3, but separated from *Callistemon*

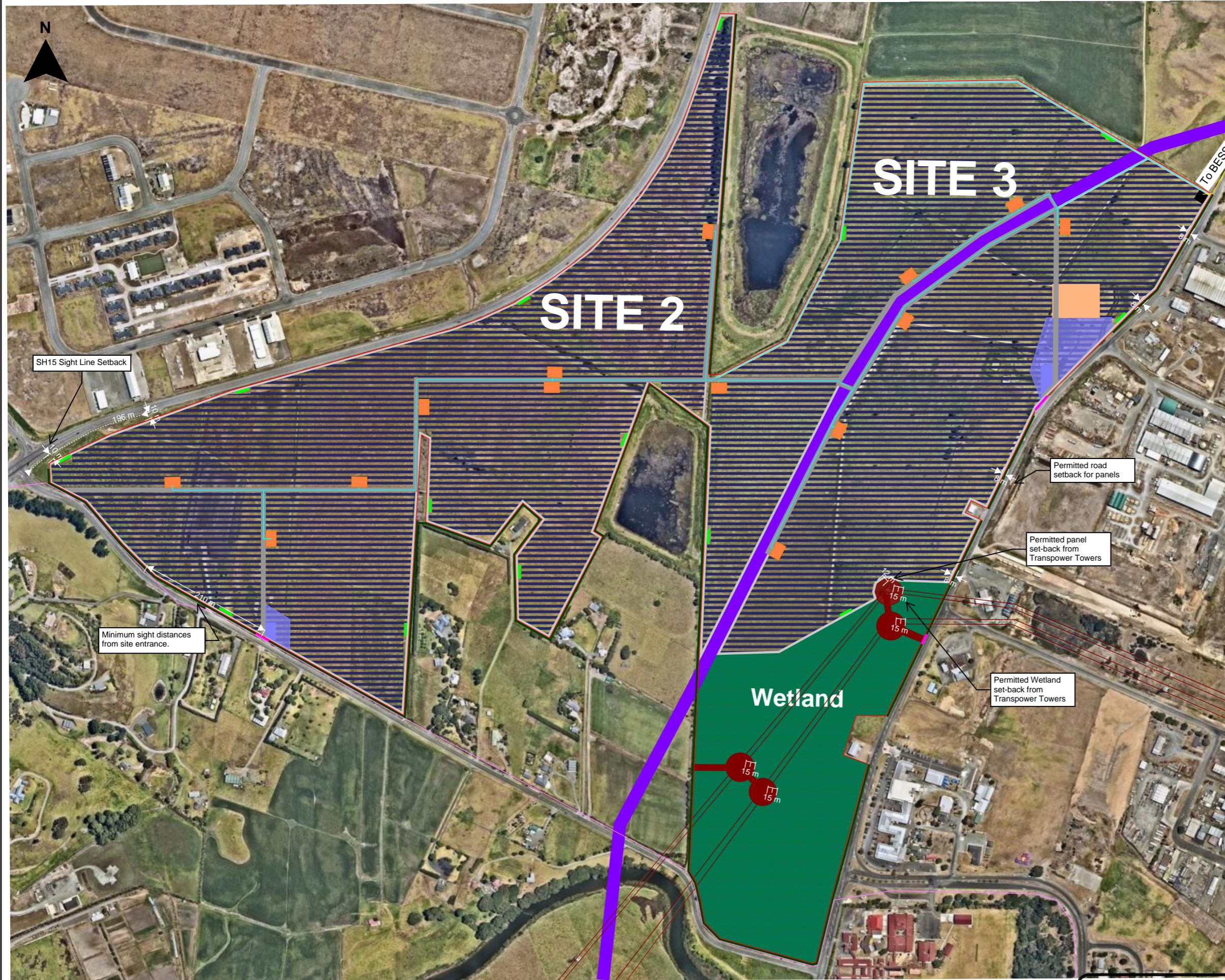


scale 1 : 2500 @ A3

Ref: 1338_PlantingConcept_20230904

ATTACHMENT SIX

SOLAR PARK DESIGN LAYOUTS



LEGEND:	
Existing:	
	Transpower Assets (notes 5 & 20.)
	First Gas pipeline easement
	Satellite control room & O&M Facility
	Existing 11 kV Northpower line (note 18)
Proposed:	
	Temporary construction lay-down areas
	Permanent parking & lay-down area
	33 kV underground cable & F.O cable
	Perimeter planting (1.8m x 2m)
	Medium Inverter Power Station
	PV modules
	Main access roads (8m)
	Perimeter road (4m)
	Over-taking lane (4m)
	Perimeter fencing
	Proposed site access points
	33 kV OH Transmission line & OPGW
	Constructed wetland
	Switching Station (15m x 15m)

NOTES:

Site 2 Information

Fixed Tilt Solution	(Indicative only)
4.8m Row spacing	(Indicative only)
25 Degree tilt	(Indicative only)
69,240 x 500 Wp PV modules	(Indicative only)
7x Medium Inverter Power Stations	(Indicative only)
Total DC Capacity 34.7 MWp	(Indicative only)
Total AC Capacity 29.4 MVA	(Indicative only)

Site 3 Information

Fixed Tilt Solution	(Indicative only)
4.8m Row spacing	(Indicative only)
25 Degree tilt	(Indicative only)
66,482 x 500 Wp PV modules	(Indicative only)
7 x Medium Inverter Power Stations	(Indicative only)
Total DC Capacity 33.2 MWp	(Indicative only)
Total AC Capacity 29.4 MVA	(Indicative only)

- Placement of Inverter Power Stations and PV Modules are indicative only. Exact inverter, racking and PV modules for design are yet to be selected.
- Road to run parallel to pipelines, will encroach on easement but aligned to avoid surcharge load on pipes. Subject to agreement with Firstgas.
- Refer to Ruakaka Solar Farm - Design Basis Report for constraints information.
- Road design assumes that large access vehicles will only use main access road. Recommended route would be to access from Site 2 and leave through Site 3.
- Panels set-back is 12m from Transpower towers as per WDC District Plan. Refer to 'Ruakaka Solar Farm - Design Basis Report'.
- Internal 33 kV reticulation yet to be confirmed.
- Do not scale from this drawing.
- All dimensions are in meters and levels in meters unless noted otherwise. All dimensions to be verified and are estimates only.
- Exact locations of all parts of the installation to be determined by contractor.
- Print in Colour.
- PV array quantities are indicative only and to be confirmed during detailed design.
- Row spacing to be confirmed during detailed design.
- Setback is 10m from the SH15 Sight Line Setback.
- Temporary lay-down areas will be set-up at the beginning of construction. These areas will reduce to the permanent lay-down areas following completion of construction.
- Access to Transpower assets will be agreed with Transpower ahead of construction and current access points & routes are indicative only.
- Site 2 minimum sight distances from site access: 210m
- Site 3 Permitted road setback for panels: 8m
- Existing Northpower 11kV line goes through the site. Line to be relocated as per consultation with Northpower.
- Refer to Ruakaka Solar Farm Wetland analysis and Optimisation Report for wetland information.
- No wetland excavation within 20m of Transpower tower legs, planting can encroach within 15m of tower legs, as per consultation with Transpower.

**FOR CLIENT REVIEW
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	Draft Concept Drawing	TH	HP	HP	28/4/23
B	Satellite Control Room added, OH lines changed & minor visual changes	TH	HP	HP	01/05/23
C	Kanuka Block re-mapped & inverter placement moved on Site 2	TH	HP	HP	03/05/23
D	Consent Drawing update	TH	HP	HP	1/06/23

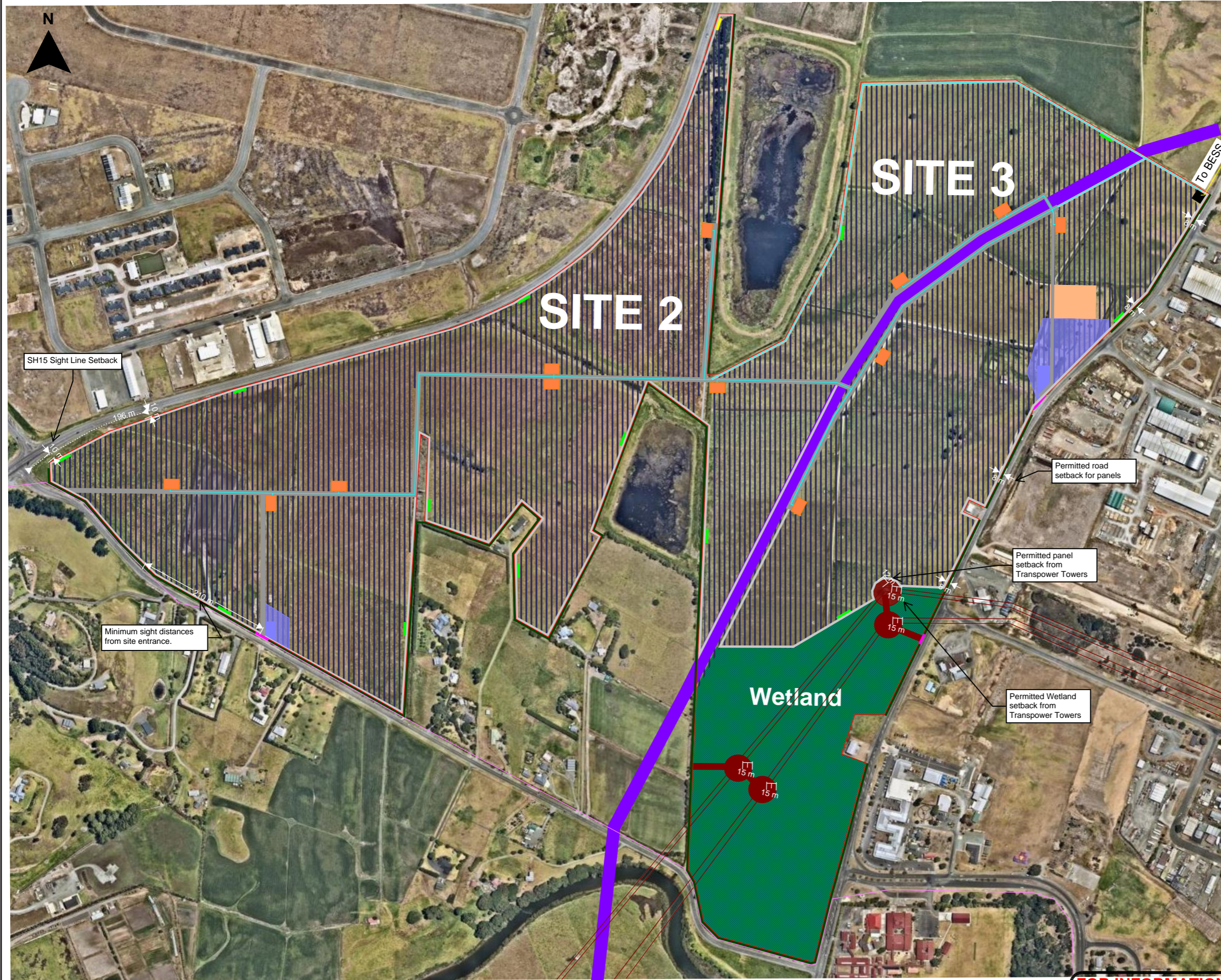
Original Scale (A1)	Design	TH	Approved For Construction*
Drawn	TH		
Reduction Scale (A3)	Dwg Verifier	HP	
	Dwg Check	HP	



Client: RUAKAKA ENERGY PARK SOLAR FARM

Project: SOLAR FARM LAYOUT FIXED TILT SYSTEM ARRANGEMENT (2 of 2)

Discipline	SOLAR
Drawing No.	2318415-EL-001-2
Rev.	D



LEGEND:

Existing

- Transpower Assets (notes 5 & 20)
- First Gas pipeline easement
- Satellite control room & O&M Facility
- Existing 11 kV Northpower line (note 18)

Proposed

- Temporary construction lay-down areas
- Permanent parking & lay-down area
- 33 kV underground cable & F.O cable
- Perimeter planting (1.8m x 2m)
- Medium Voltage Inverter Power Station
- PV modules
- Main access roads (8m)
- Perimeter road (4m)
- Over-taking lane (20m x 4m)
- Perimeter fencing
- Proposed site access points
- 33 kV OH Transmission line & OPGW
- Constructed wetland
- Switching Station (15m x 15m)

NOTES:

Site 2 Information

Single Axis Tracking Solution	(Indicative only)
3m Row spacing	(Indicative only)
50,224 x 600 Wp PV modules	(Indicative only)
6 x Medium Inverter Power Stations	(Indicative only)
Total DC Capacity 30.1 MWp	(Indicative only)
Total AC Capacity 25.2 MVA	(Indicative only)

Site 3 Information

Single Axis Tracking Solution	(Indicative only)
3m Row spacing	(Indicative only)
48,976 x 600 Wp PV modules	(Indicative only)
6 x Medium Inverter Power Stations	(Indicative only)
Total DC Capacity 29.4 MWp	(Indicative only)
Total AC Capacity 25.2 MVA	(Indicative only)

- Placement of Inverter Power Stations and PV Modules are indicative only. Exact inverter, racking and PV modules for design are yet to be selected.
- Road to run parallel to pipelines, will encroach on easement but aligned to avoid surcharge load on pipes. Subject to agreement with Firstgas.
- Refer to Ruakaka Solar Farm - Design Basis Report for constraints information.
- Road design assumes that large access vehicles will only use main access road. Recommended route would be to access from Site 2 and leave through Site 3.
- Panels setback is 12m from Transpower towers as per WDC District Plan. Refer to 'Ruakaka Solar Farm - Design Basis Report'.
- Internal 33 kV reticulation yet to be confirmed.
- Do not scale from this drawing.
- All dimensions are in meters and levels in meters unless noted otherwise. All dimensions to be verified and are estimates only.
- Exact locations of all parts of the installation to be determined by contractor.
- Print in Colour.
- PV array quantities are indicative only and to be confirmed during detailed design.
- Row spacing to be confirmed during detailed design.
- Setback is 10m from the SH15 Sight Line Setback.
- Temporary lay-down areas will be set-up at the beginning of construction. These areas will reduce to the permanent lay-down areas following completion of construction.
- Access to Transpower assets will be agreed with Transpower ahead of construction and current access points & routes are indicative only.
- Site 2 minimum sight distances from site access: 210m
- Site 3 Permitted road setback for panels: 8m
- Existing Northpower 11kV line goes through the site. Line to be relocated as per consultation with Northpower.
- Refer to Ruakaka Solar Farm Wetland analysis and Optimisation Report for wetland information.
- No wetland excavation within 20m of Transpower tower legs, planting can encroach within 15m of tower legs, as per consultation with Transpower.

**FOR INFORMATION
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	Draft Concept Drawing	TH	HP	HP	28/4/23
B	Satellite Control Room added, OH lines changed & minor visual changes	TH	HP	HP	01/05/23
C	Kanuka Block re-mapped & inverter placement moved on Site 2	TH	HP	HP	03/05/23
D	Consent Drawing	TH	HP	HP	01/06/23

Original Scale (A1)	Design Drawn	TH	Approved For Construction*
Reduced Scale (A3)	Dwg Verifier	HP	Date
	Dwg Check	HP	

* Refer to Revision 1 for Original Signature



Client: **RUAKAKA ENERGY PARK SOLAR FARM**

Title: **SOLAR FARM LAYOUT SINGLE AXIS TRACKING SYSTEM ARRANGEMENT (2 of 2)**

Discipline: SOLAR	Rev: D
Drawing No: 2318415-EL-002-2	