



Detailed Visual Impact Assessment

Crookwell 3 Wind Farm



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CROOKWELL 3 WIND FARM | DETAILED VISUAL IMPACT ASSESSMENT



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Executive Summary

In May 2019 Moir Landscape Architecture were engaged by Crookwell Development Pty Ltd, a wholly owned subsidiary of Global Power Generation Australia Pty Ltd, to provide an assessment of the recommendations of the Department of Planning and Environment (DP&E) relating to the recommendation for refusal of the proposed Crookwell 3 Wind Farm on the basis of unacceptable levels of visual impact. In the preparation of a report to be submitted to the NSW Independent Planning Commission (IPC) for their assessment of the application I undertook several site visits and reviewed the following documents relating to the proposed Crookwell 3 Wind Farm;

- Crookwell 3 Wind Farm - Landscape and Visual Impact Assessment - Green Bean Design (GBD) 2012 (LVIA)
- Crookwell 3 Wind Farm - Landscape and Visual Impact Assessment Supplementary Report - Green Bean Design 2013 (LVIASR)
- Independent Expert Review - Crookwell 3 Wind Farm Proposal - O'Hanlon Design Pty (OHD) Ltd - July 2018 Revision C (IER)
- Independent Expert Review - Crookwell 3 Wind Farm Proposal - O'Hanlon Design Pty Ltd - August 2013 (IER2013)
- State Significant Development Assessment – Crookwell 3 Wind Farm (SSD 6695) - Assessment Report - NSW Department of Planning and Environment - 2019 (DP&E 2019) April 2019
- State Significant Development Assessment – Crookwell 3 Wind Farm Upper Lachlan Shire (SSD 6695) – Secretary's Environmental Assessment Report - NSW Department of Planning and Environment - (DP&E2015) February 2015

The report for the IPC focused on the recommendations and justifications made in the DP&E Assessment Report April 2019 for the refusal of the Crookwell 3 Wind Farm on the basis of:

- Unacceptable impacts on the broader landscape due to cumulative impacts with other wind farms;
- Impacts on key landscape features in the immediate vicinity of the wind farm;
- Limited capacity of the landscape to absorb further change;
- And, direct and cumulative impact upon nearby residences.

For the purpose of the assessment a desktop review of the methodology and conclusions of the 2012 GBD LVIA was undertaken. Based on this review I considered that the methodology applied by GBD in the preparation of the LVIA was in accordance with the current best practice and provided a fair and impartial assessment of the proposal and its potential impacts. The GBD LVIA clearly detailed the methodology for assessment and how the conclusions of the assessment were reached.

My assessment also commented on the methodology and conclusions presented in the O'Hanlon Report which appears to have informed the recommendations of the DP&E for refusal.

It was my conclusion that there were some significant issues with the conclusions of the O'Hanlon IER in the approach to assessment, lack of clear methodology of assessment and classification of the significance and sensitivity of the landscape.

The assessment undertaken by O'Hanlon appears to only consider potential visibility on the 2D plane utilising a 60 Degree sector tool. The application of this tool ignores the influence of topography and existing vegetation on the potential views to existing and proposed turbines. It is my opinion that this approach to assessment undertaken by O'Hanlon overstated the impacts on nearby receptors.

It is my opinion that the IER also overstates the significance and sensitivity of landscape features including the E3 Zone, St Stephens Church and Pejar Dam within the visual catchment of the development.

It is the objective of this report to undertake a thorough investigation into the identified areas of concern pertaining to visual impacts of the proposed Crookwell 3 development and to clearly demonstrate where, in my opinion, the evidence relied upon by the DP&E and the IPC is flawed and overstates the extent of impact.

Although the proposal was submitted prior to the adoption of the guidelines for the landscape and visual assessment of Wind Farms in New South Wales the Wind Energy Visual Assessment Bulletin 2016 (referred to hereafter as the Bulletin) we have utilised the methodology and tools prescribed in The Bulletin to directly address the issues identified in the assessment process undertaken by the Department of Planning, Industry and Environment (DPIE), the Independent Expert Review prepared by O'Hanlon Design and the Crookwell 3 SSD Statement of Reasons issued by the NSW Independent Planning Commission.

1.0 Introduction

1.1 Introduction

Moir Landscape Architecture has been engaged by Crookwell Development Pty Ltd, a wholly owned subsidiary of Global Power Generation Australia Pty Ltd, to provide a detailed assessment of the issues pertaining to visual impact surrounding the proposed Crookwell 3 Wind Farm. This assessment responds directly to the issues identified in the assessment process undertaken by the Department of Planning, Industry and Environment (DPIE), the Independent Expert Review prepared by O'Hanlon Design and the Crookwell 3 SSD Statement of Reasons issued by the NSW Independent Planning Commission.

A Landscape and Visual Impact Assessment was prepared in 2012 by *Green Bean Landscape Design* (GBLD). Since the preparation of the original report, the Department of Planning and Environment have adopted new guidelines for the landscape and visual assessment of Wind Farms in New South Wales the *Wind Energy Visual Assessment Bulletin 2016* (referred to hereafter as *the Bulletin*).

As a previous LVIA has been undertaken and through the assessment process the specific issues relating to visual impact have been further defined this Detailed Visual Impact Assessment has been prepared to address these specific visual issues identified to justify the refusal of the proposed development. As the IER prepared by O'Hanlon utilised tools incorporated in The Bulletin we have undertaken this detailed assessment utilising the same tools and methodology as outlined in The Bulletin.

1.2 Relevant Experience

Moir Landscape Architecture Pty Ltd is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for wind energy projects. In the context of our experience and with guidance from the Visual Assessment Bulletin we have developed methodologies to ensure a comprehensive and qualitative assessment of the Project.

Relevant experience includes the preparation of Landscape and Visual Impact Assessments for the following Wind Energy Projects:

- *Crudine Ridge Wind Farm (Crudine, New South Wales)*
- *Bodangora Wind Farm (Bodangora, New South Wales)*
- *Capital II Wind Farm (Bungendore, New South Wales)*
- *Ungula Wind Farm (Wellington, New South Wales)*
- *Elysian Wind Farm (Nimmitabel, New South Wales)*
- *Lord Howe Island Wind Turbines (Lord Howe Island, New South Wales)*
- *Cherry Tree Wind Farm (Seymour, Victoria)*
- *Lakeland Wind Farm (Lakeland, Queensland)*

2.0 Study Method

2.1 Wind Energy: Visual Assessment Bulletin

The Wind Energy: Visual Assessment Bulletin for State Significant Wind Energy Development (referred to hereafter as 'the Bulletin') was prepared by the Department of Planning and Environment in December 2016. The Bulletin has been developed to guide the appropriate location of wind energy development in NSW and to establish an assessment framework for the assessment of visual impacts associated with wind energy. Visual impacts are one of a range of issues considered in the assessment and determination of wind energy projects.

The objectives of the Bulletin are to:

- provide the community, industry and decision-makers with a framework for visual impact analysis and assessment that is focused on minimising and managing the most significant impacts;
- facilitate improved wind turbine and ancillary infrastructure siting and design during the pre-lodgement phase of a project, and encourage early consideration of visual impacts to minimise conflicts and delays where possible, and provide for a better planning outcome;
- provide the community and other stakeholders with greater clarity on the process along with an opportunity to integrate community landscape values into the assessment process; and
- provide greater consistency in assessment by outlining appropriate assessment terminology and methodologies.

2.2 Additional Literature

In addition to the Bulletin, the following literature has assisted in the formulation of the study methodology:

- Clean Energy Council, Best Practice Guidelines for Wind Energy Development (June, 2018)
- Scottish Natural Heritage, Visual Representation of Wind Farms - Good Practice Guidance (February, 2017)
- Environment Protection and Heritage Council, Draft National Wind Farm Development Guidelines (July 2010)
- Draft NSW Planning Guidelines Wind Farms (December 2011)

References have been made to the following studies previously undertaken for the Proposed Crookwell 3 Wind Farm:

- Landscape and Visual Impact Assessment undertaken by Green Bean Landscape Design 2012.
- Independent Expert Review: Crookwell 3 Wind Farm Proposal (Rev C July 2018) undertaken by O'Hanlon Design Pty Ltd.

2.3 Overview of the Study Method

In accordance with the Visual Assessment Bulletin, the visual assessment will include:

- a baseline study that includes analysis of the landscape character, scenic quality and visibility from viewpoints of different sensitivity levels;
- establish visual influences zones from viewpoints using data collected in the baseline study;
- assessment of the proposed layout against visual performance objectives; and
- justification for the final proposed layout and identification of mitigation and management measures.

Moir Landscape Architecture have formulated a quantitative study methodology with regards to the Visual Assessment Bulletin and with consideration of previous experience on large scale infrastructure projects and relevant literature and guidelines relating to large scale energy projects.

2.4 Report Structure

Table 1 provides an outline of the report structure, a brief overview of the objectives of the Bulletin and an summary of how these have been addressed in the LVIA. Methodologies for each part of the assessment have been included in the relevant chapters of the report.

2.0 Study Method

Landscape and Visual Impact Assessment Report Structure	
Section 3.0: Project Overview <ul style="list-style-type: none"> Project Overview 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> The VIA is to include a full description of the proposed wind energy project design, the layout, structural elements and scenarios being considered.
Section 4.0: Visual Baseline Study <ul style="list-style-type: none"> Detailed assessment of Landscape Character and Key Features of the Region Landscape Character Unit Classification Application of Scenic Quality Class Ratings 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> A visual baseline study must be undertaken to establish the existing landscape and visual conditions. The baseline study is prepared and evaluated by the proponent prior to undertaking any visual analysis. Describe, assess and map these factors in written and graphic forms supported by photographic representations of the area. Identify Scenic Quality Classes
Section 5.0: Preliminary Assessment Tools <p>Define the Visual Catchment of the Project:</p> <ul style="list-style-type: none"> Preliminary Assessment Tools: <ul style="list-style-type: none"> Visual Magnitude Multiple Wind Turbine Effect Zone of Visual Influence 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> Visual Magnitude Assessment: Mapping the dwellings, key viewpoints and proposed turbines at scale to establish the potential visual magnitude. Map into six sectors of 60° any proposed turbines and any existing or approved turbines within each dwelling or key public viewpoint. Establish the theoretical 'zone of visual influence' of the proposal (the area from which the proposal is theoretically visible or the 'visual catchment').
Section 6.0 Cumulative Visual Impacts <ul style="list-style-type: none"> Assess the potential cumulative effects on the immediate and broader regional context it forms part of. Existing Wind Farms: Crookwell 1 & Crookwell 2, Gullen Range, Gunning and Cullerin Range Wind Farms 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> address potential cumulative impacts of wind energy projects in the region (the wind energy project as well as existing and approved projects).
Section 7.0: Overview of Residences <ul style="list-style-type: none"> Assessment of viewpoints identified through the Preliminary Assessment Tools. Establish Zone of Visual Influence for each viewpoint 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> All key public viewpoints and individual dwellings within the 'visual catchment' should be identified and assessed. The visual performance objectives form the principal framework and guide for assessing the proposed wind energy project when applied to individual viewpoints.
Section 8.0 Mitigation Methods <ul style="list-style-type: none"> Overview of proposed mitigation methods for residences. 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> Outline of any mitigation and management options proposed, including consultation with affected property owners
Section 9.0 Visual Performance Objectives <ul style="list-style-type: none"> Evaluation of Visual Performance Objectives 	Visual Bulletin Requirements Addressed: <ul style="list-style-type: none"> An assessment of the proposed wind energy project against each visual performance objective and demonstration of whether each objective is achieved and how the standard has been achieved.

3.0 Project Overview

3.1 The Project

The proposed Crookwell 3 Wind Farm is located approximately 17km to the southeast of the town of Crookwell in a rural area primarily used for grazing.

Crookwell is the site of the first grid connected windfarm in NSW (Crookwell 1) which was commissioned in 1998 and consisted of 8 turbines. Crookwell 1 consists of 8 wind turbines with a blade tip height of 45 meters and is still in operation. Crookwell 2 was constructed in 2018 and consists of 28 turbines in close proximity to Crookwell 1 with a blade tip height of 160 metres.

The Crookwell 3 project consists of up to 23 turbines (with a maximum height of 157m from ground to tip of blade) and associated infrastructure.

The proposed wind farm is arranged in two distinct precincts (referred to hereafter as the Project Site):

The Crookwell Eastern Cluster (referred to as C3 (South) throughout the report) consists of 17 turbines on an approximately 1100ha site east of Woodhouselee Road and east of Crookwell 2, and;

The Crookwell 3 Southern Cluster (referred to as C3 (North) throughout the report) consists of 6 turbines on an approximately 400ha site located west of Crookwell road and south of Crookwell 2.

Land surrounding the Project Site (including Crookwell 1 and Crookwell 2) is referred to through out this report as the Study Area (as shown in **Figure 1**).

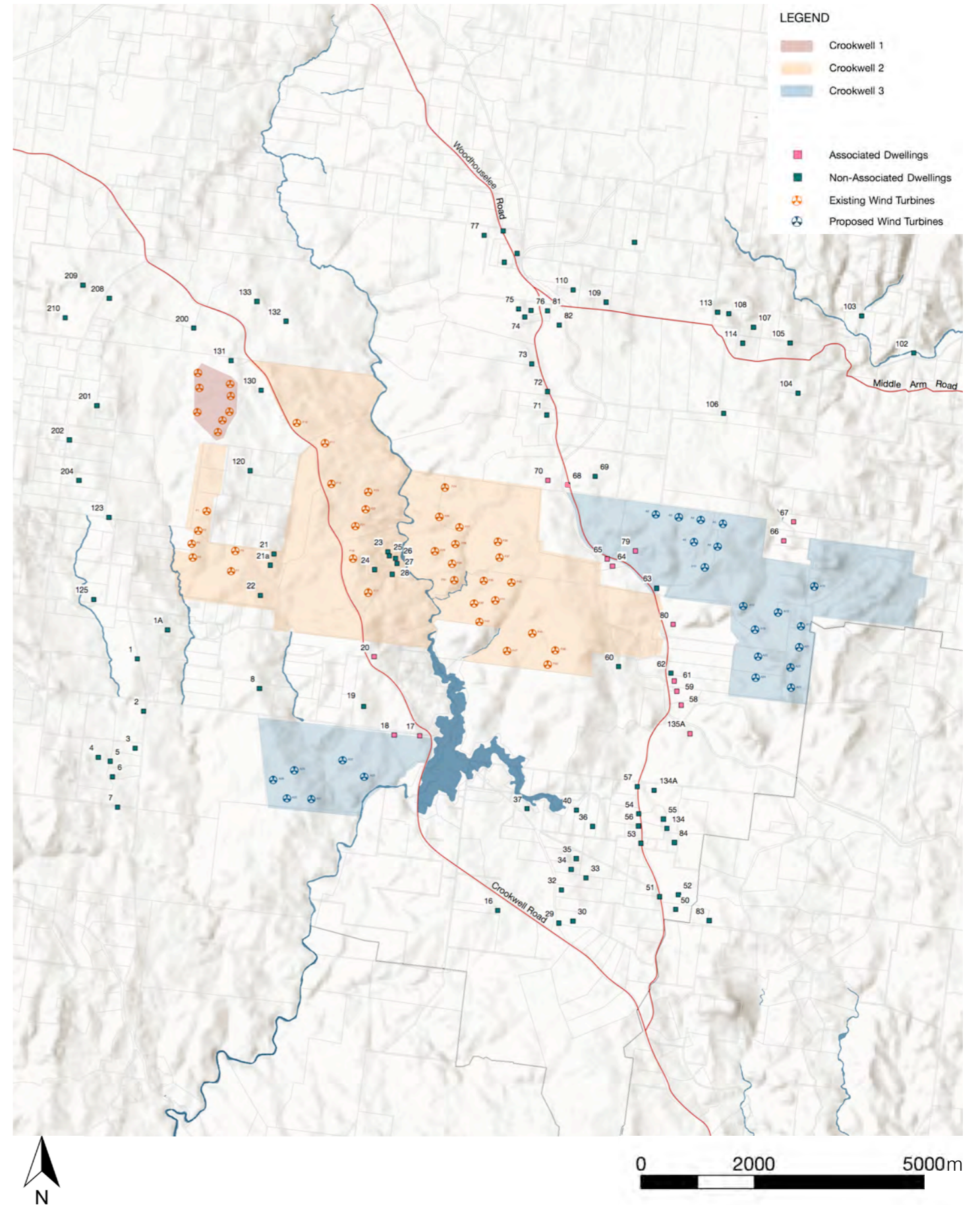


Figure 1 The Proposed Development

4.0 Visual Baseline Study

4.1 Visual Baseline Study

In accordance with the Bulletin, a Visual Baseline Study must be undertaken prior to any visual analysis. The purpose of the Visual Baseline Study is to establish the existing landscape and visual conditions through descriptions, mapping and photographic representations. The study method for undertaking the Visual Baseline Study has been established in accordance with *Appendix 1 of the Bulletin* where relevant and in conjunction with previous experience on large scale wind energy projects.

In accordance with the Bulletin, the baseline study should consider the following inputs in the visual catchment for the project:

- elements of the landscape important to the community, including public and private viewpoints;
- the sensitivity of viewers who use those viewpoints, and the distances at which they may view the landscape and potential wind turbines and other ancillary facilities;
- the character of the landscape involved, its key features and the relative scenic quality of the area; and
- the location of any existing and operational or approved wind energy projects within both a regional and local context, including any nearby surrounding wind energy projects within 8 kilometres which may have the potential to create direct or indirect visual impacts between the proposed and any other operational, approved or proposed wind energy projects.

The following provides an overview of *Table 1 in the Bulletin* and how these are addressed in this LVIA to establish a quantitative approach to defining and assessing the landscape character:

Visual Baseline Study Inputs

Sensitive Land Use Designations

Map Layer identifying National and State Sensitive Land use Designations and LEP Zones. **Refer to Section 4.2**

Landscape Character Type

Describe the broad area of land in which the wind energy project is located. **Refer to Section 4.3**

Key Landscape Features

Identify areas of visual interest or quality that stand out visually in the landscape. **Refer to Section 4.4**

Landscape Character Area Classification

Landscape is categorised into Landscape Character Area's (LCA) and Scenic Quality Ratings are applied to each LCA. **Refer to Section 4.5**

Determine Visual Influence Zones

Determine Visual Influence Zone of each public and private viewpoint using: **Refer to Section 4.6**

- Viewer Sensitivity Levels
- Visibility Distance Zones; and
- Scenic Quality Class

Table 1: Visual Baseline Study Inputs

4.0 Visual Baseline Study

4.2 Sensitive Land Use Designations

The Project Site is located within the Upper Lachlan Shire LEP area. The following provides an overview of the land use zones within the Study Area and its immediate surrounds.

The Bulletin states *'where a wind energy project is proposed to be located in, for example, an environmental management zone, it is important that proponents provide sound justification for the proposed location along with an analysis of the proposal against the objectives of the zone listing'*.

Land within the Study Area is primarily RU1 and RU2 with a large E3: Environmental Management zone which extends from the Goulburn Mulwaree LGA to north of the Project Site.

The objectives of the E3 Zone are as follows:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To facilitate the management of environmentally sensitive land and areas of high environmental value to the local government area.

The E3 Zone is defined by the water catchment feeding into the Wollondilly River and Pejar Dam. It is not a landscape feature as it is not discernable in the view as it is not defined by vegetation or distinct landform.

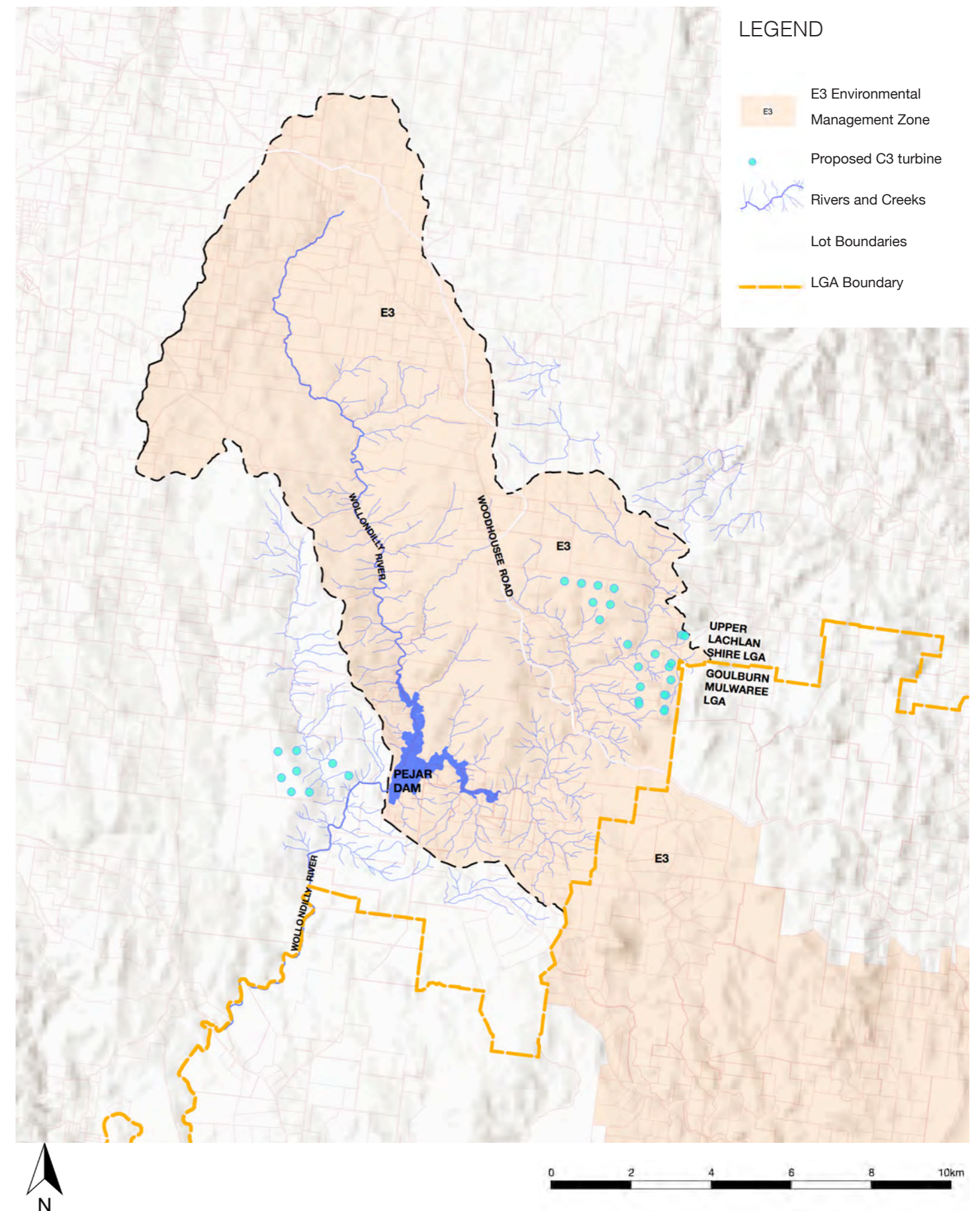


Figure 2 Sensitive Land Use Designations

4.0 Visual Baseline Study

4.3 Existing Landscape Character Type

The proposed Crookwell 3 Wind Farm is located approximately 17km to the South East of the town of Crookwell in a rural area primarily used for grazing. Prior to European settlement the area was inhabited by the Gundungara people.

The Crookwell area was settled by Europeans around 1820's and for the past 200 years the region around Crookwell has been focused on the production of fine Merino wool and potato farming. For these purposes significant clearing of native vegetation has occurred. Today the landscape is typical of the southern tablelands consisting of gently undulating topography covered with open grassland, scattered woodland and more forested areas generally associated with riparian corridors, ridge lines and road corridors.

Settlement surrounding the site is scattered, consisting primarily of isolated homesteads and small clusters of dwellings in close proximity to key roads.

Adjacent roads are a combination of sealed and unsealed single lane carriageways of which only Crookwell Road is identified by the RMS as a road of State or Regional significance.

Two operational wind farms (Crookwell 1 and Crookwell 2) are located within the study area and views to distant wind farms (Gullen Range, Gunning and Cullerin Wind Farms) are available from to the south west of the study area.

The Study Area includes a combination of pastoral and wind energy landscape character. The definitions for these 'landscape options' as per the Bulletin are as follows:

Pastoral:

Landscape character expressing dominant human created paddocks (pastures) or grasslands and associated structures, reflecting valued historic land uses and lifestyles.

It is reasonable to state that, broadly, the landscape character of the Study Area is a pastoral landscape that has been shaped by the dominant land use since European settlement. The landscape is not a natural landscape but generally a highly modified landscape altered through various land management regimes for agriculture as a commercial activity.

Wind Energy:

Landscape character expressing dominant wind energy uses that exert a strong visual influence over the pre-existing character of the landscape primarily in the form of tall wind turbines with mov-

ing blades, access roads, substations and supporting infrastructure.

With the existing Crookwell 1 & 2 situated adjacent to the Crookwell 3 site and the completion of the Gullen Range Wind Farm approximately 10km to the West of Crookwell 1 & 2, the character of the landscape directly surrounding the proposed Crookwell 3 development can be described as Windfarm/Pastoral with wind turbines being a significant and contrasting presence in a predominantly pastoral setting.

4.4 Key Landscape Features

The Bulletin states: *Key landscape features should be identified and shown on a baseline study map for further reference. Key landscape features may include natural features such as a distinctive mountain peak or hill top, a large rock outcrop or cliff, a waterfall, a visually distinctive stand of trees, or even a single tree that stands out visually in the scene.*

Following a consistent and well accepted methodology the GBD LVIA did not identify any significant landscape features of high quality in the region of Crookwell 3.

The Independent Review by OHD identified 'St Stephens Church, The Pejar Creek underbridge and the major recreational sit at Pejar Dam as key landscape features.'

These 'features' have been identified as key viewing locations and an assessment of the potential visual impact from these locations has been undertaken in this report.

4.0 Visual Baseline Study



Image 1. Pejar Dam

Human made water reservoir constructed in 1979. Existing infrastructure including spillway, road bridge and Crookwell 2 wind turbines are visible in this photograph.



Image 2. St Stephens Road

View along St Stephens Road showing the typical landscape character of the area, large areas of cleared grazing land with wind turbines an element in the landscape.



Image 3. Existing Wind Farms

Existing Crookwell 1 and 2 Wind Farms create a wind farm / pastoral landscape character.

4.0 Visual Baseline Study



Image 4. St Stephens Church

View from St Stephens Church over Pejar Dam to distant ranges. Existing turbines associated with Gullen Range are visible in the distance.



Image 5. Pejar Road

View from Pejar Road looking over predominately cleared land to Crookwell 2 turbines.



Image 6. Woodhouselee Road

View along Woodhouselee Road, typical landscape character is cleared land with wind break planting. Turbines associated with Crookwell 2 is an existing element in the landscape.

4.0 Visual Baseline Study

4.5 Landscape Character Area and Scenic Quality Classification

The Bulletin states: *the landscape character type of an area represents the broad scale area of land in which the proposed wind energy project is located. The landscape character type should have common distinguishing visual characteristics primarily based upon landforms and major land cover patterns. These patterns are formed by combinations of vegetation, waterforms, landforms and land use, from which the key landscape features of the baseline study inputs can also be identified.*

A detailed assessment of the landscape character is provided in the LVIA prepared by GBD which on review is an appropriate assessment of the distinct landscape character types surrounding the site. Landscape character areas defined by Green Bean Design were rated as high, medium or low based on accepted criteria formulated to apply a quantitative assessment of the landscape sensitivity. The methodology used by GBD is consistent with the frame of reference provided as an example in the Bulletin.

GBD determined six (6) landscape character areas (LCA's) and assessed each area.

LCA:	Description:	Landscape Sensitivity: (Scenic Quality Rating)
LCA 1	Undulating grasslands;	Medium
LCA 2	River valley and drainage lines;	Medium
LCA 3	Water bodies;	Medium
LCA 4	Simple slope and ridgeline areas;	Medium
LCA 5	Timbered areas (cultural and remnant native)	Medium
LCA 6	Settlements.	Medium

Table 2: Landscape Character Areas and Scenic Quality Ratings as rated by Green Bean Design (2012).

The quantitative methodology applied by GBD to assess Landscape Sensitivity of each LCA is a commonly used approach and is consistent with current best practice.

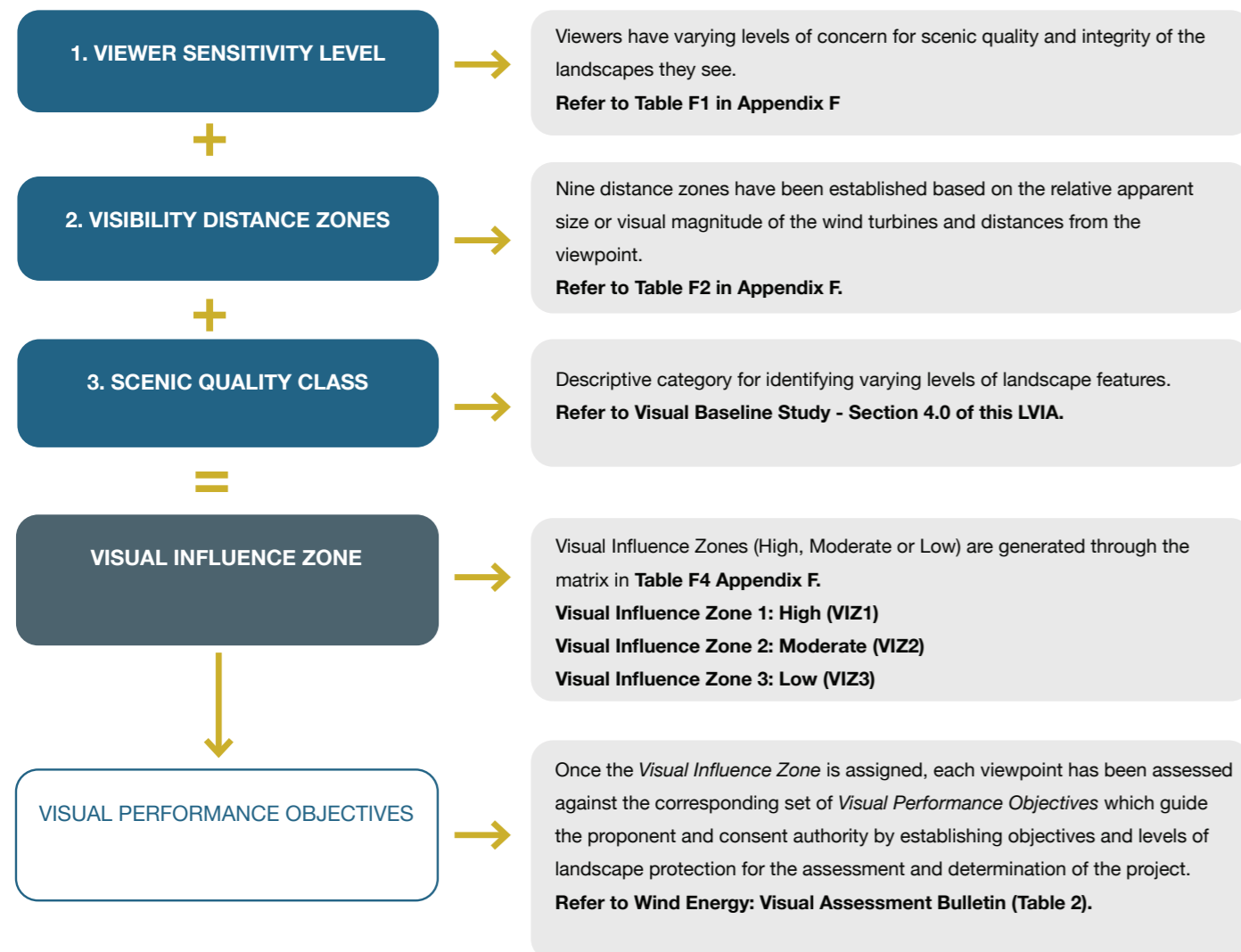
The application of the landscape sensitivity assessment criteria was undertaken prior to the construction of Crookwell 2 and Gullen Range Wind Farms. *GBD noted 'the Gullen Range and Crookwell 2 wind farms have been approved for construction within the Crookwell 3 10km viewshed; however, as these had not been constructed and were not a visible element at the time of this LVIA preparation, they have not been included in the assessment of landscape sensitivity. The presence of existing wind farms would tend to decrease the level of sensitivity of any landscape character area in which it was located subject to an assessment and determination of cumulative impact on landscape sensitivity.'*

4.0 Visual Baseline Study

4.6 Determining Visual Influence Zones

Visual influence zones (VIZ) have been established from the project area from dwellings and key viewpoints. This establishes the relative landscape significance against which the potential impacts of wind turbines may be assessed. The viewpoint assessments provide a description of the existing visual landscape. The *visibility distance zone*, *viewer sensitivity level* and *scenic quality class* of each viewpoint have been assessed which, when combined, result in an overall Visual Influence Zone (see overview below and refer to **Appendix F**). An evaluation using the corresponding visual performance objectives (as per Table 2 of the Visual Assessment Bulletin) has been assessed for each viewpoint.

For each viewpoint, the potential visual impact was analysed through the use of a combination of the 3D terrain modelling, topographic maps and on site analysis.'



Crookwell 3 Visual Influence Zones:

In accordance with the Bulletin the Visual Influence Zones for the project have been established as follows:

Visual Influence Zone 1 (VIZ1)

The VIZ1 is limited to six (6) dwellings located within 2 kilometres of a turbine (6, 19, 62, 63, 69 and 106) and the Pejar Dam Recreation Area as per the following inputs:

Pejar Dam Recreation Area:

1. Viewer Sensitivity Level: Recreation Site = Level 1: High Sensitivity
2. Distance Zone = (1.2km) Between 1-2kms = Far Foreground (FF)
3. Scenic Quality Class = Moderate

Rural Dwellings (Within 1-2kms)

1. Viewer Sensitivity Level: Rural Dwelling = Level 2: Moderate Sensitivity
2. Distance Zone: Between 1-2kms = Far Foreground (FF)
3. Scenic Quality Class: Moderate

Visual Influence Zone 2 (VIZ2)

All remaining viewpoints are VIZ2 viewpoints as per the following inputs:

St Stephens Church Visual Influence Zone

1. Viewer Sensitivity Level: Level 1: High Sensitivity
2. Distance Zone = Between 2-4kms = Near Middle-ground (NM)
3. Scenic Quality Class: Moderate

Rural Dwellings (Within 2-8kms): Visual Influence Zone

1. Viewer Sensitivity Level: Rural Dwelling = Level 2: Moderate Sensitivity
2. Distance Zone = Between 2 - 4 kms / 4-8 kms= Near Middle-ground (NM)
3. Scenic Quality Class: Moderate

5.0 Preliminary Assessment Tools

5.1 Preliminary Assessment Tools

Preliminary assessment tools have been developed in the Bulletin to provide an early indication of where turbines require careful consideration because of potential visual impacts. The tools apply to both dwellings and key public viewpoints in the study area.

The preliminary assessment tools involve rapid analysis of following two key visual parameters:

- 1. Preliminary Assessment Tool 1: Visual Magnitude (Refer to Section 5.2)
- 2. Preliminary Assessment Tool 2: Multiple Wind Turbine Tool (Refer to Section 5.4)

In addition to the above tools, the Bulletin recommends the use of technology to facilitate the application of the tools. Geographic Information Systems (GIS) has been utilised to establish a 'Zone of Visual Influence' of the proposal (the area from which the proposal is theoretically visible).

3. Zone of Visual Influence (Refer to Section 5.6)

The tools provide an early indication of where placement of turbines will require further assessment and justification, and where consultation with potentially affected landowners needs to be focused – including discussions for landholder agreements.

Dwellings identified through the application of the preliminary assessment tools have been outlined in **Table 3, 4, 5 and 6**. Further detailed assessment of each of these dwellings has been undertaken in **Appendix A - E**.

5.2 Preliminary Assessment Tool 1: Visual Magnitude

The visual magnitude threshold is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints as shown in **Figure 3**. The proposed wind turbines selected for Crookwell 3 are based on a blade tip height of 157 metres. *In accordance with Bulletin the 'black line' intersects at a distance of 2100 metres and the 'blue line' intersects at 3100 metres.*

For the purpose of the Preliminary Assessment, the Visual Magnitude thresholds are based on a 2D assessment of the Project alone (refer to **Figure 4**). Further assessment may indicate factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the project from residences.

The Bulletin states: *'Further assessment and justification for placement of turbines located in these sensitive areas in the EIS will be required, along with a description of mitigation and management measures being employed to reduce impacts. This assessment may identify that factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the project'*.

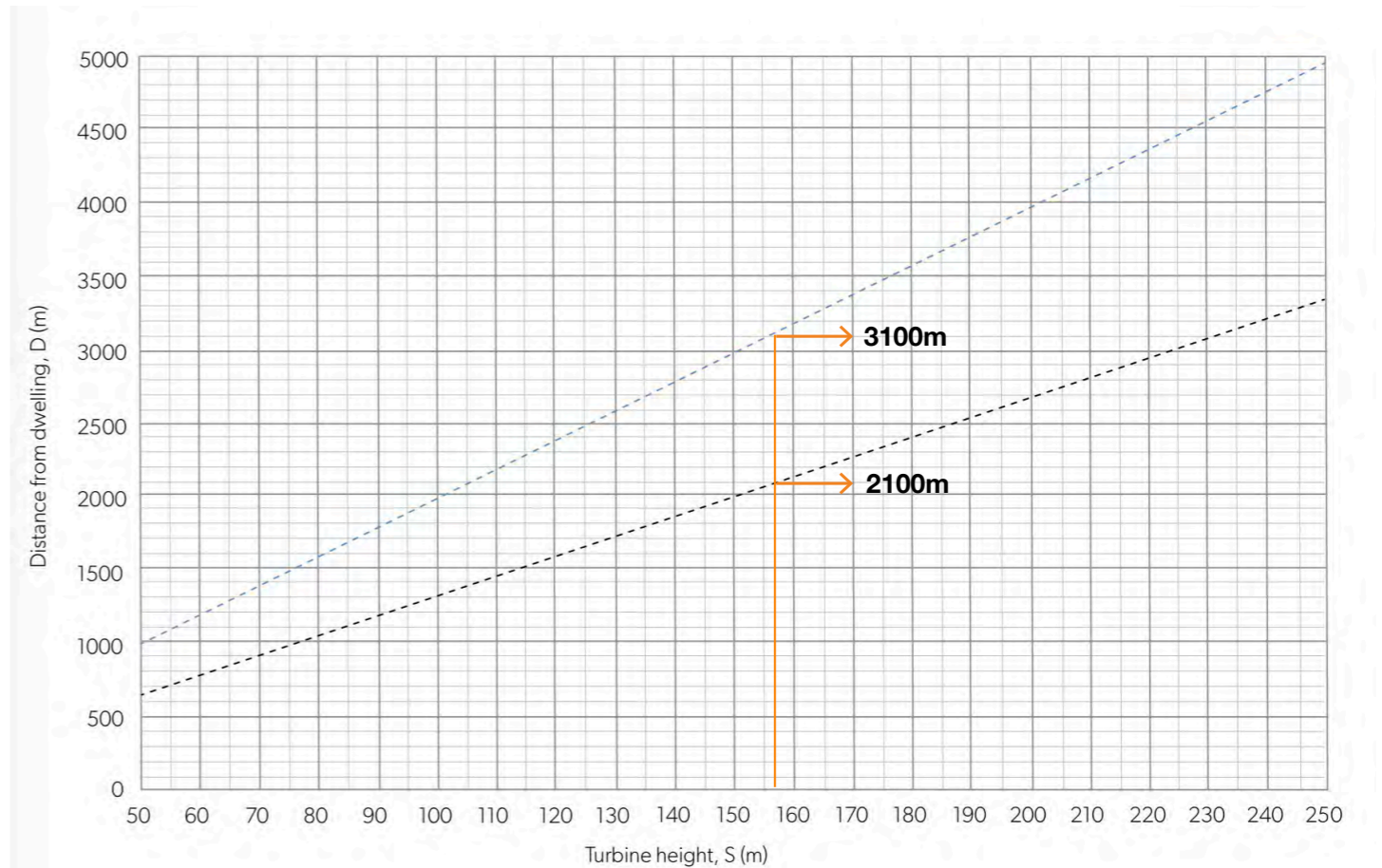
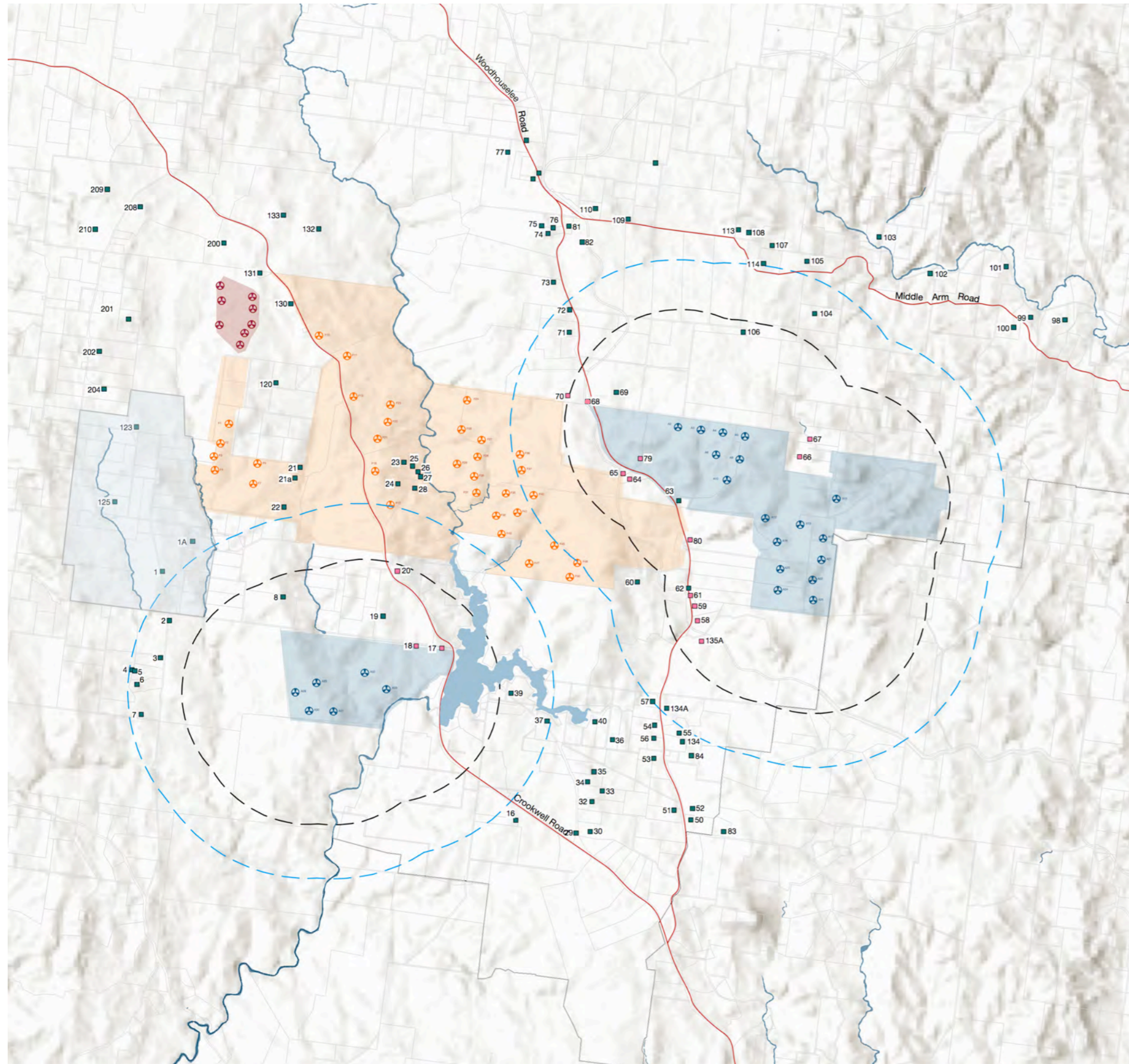


Figure 3 Visual Magnitude thresholds for Project Layouts (Source: Visual Assessment Bulletin)

5.0 Preliminary Assessment Tools



Visual Magnitude Thresholds

Black Line: 2100m

Blue Line: 3100m

LEGEND

- Crookwell 1
- Crookwell 2
- Crookwell 3
- Associated Dwellings
- Non-Associated Dwellings
- Existing Wind Turbines
- Proposed Wind Turbines
- 2100 m
- 3100 m

Note:

Preliminary Assessment Tool 1: Visual Magnitude is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing turbines.

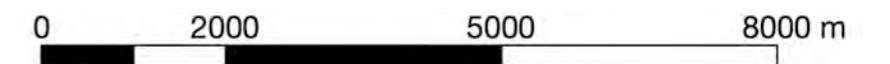


Figure 4 Visual Magnitude thresholds for Crookwell 3 Wind Farm

5.0 Preliminary Assessment Tools

5.3 Preliminary Assessment Tool 1: Visual Magnitude Summary

When applied to the proposed Crookwell 3 Wind Farm, six (6) non-involved landowner dwellings were identified within 2100 metres of a proposed turbine. These residences are shown on **Figure 4** and listed below in **Table 3**.

13 non-involved landowner dwellings (including St Stephens Church) are located between 2100 to 3100 metres of a proposed Crookwell 3 turbine.

The Bulletin states *'The black and blue lines are not determinative of acceptability. Instead, they provide a basis for the assessment to be undertaken. There may be reasons why the proposed turbine will not have the impact as identified by (the visual magnitude thresholds) and detailed justification can be provided for proposed turbines... for example ground truthing may identify that existing vegetation or topography will screen views to a proposed turbine'*.

Detailed assessment has been undertaken for all dwellings identified within the black and blue visual magnitude lines.

Non-involved dwellings within 2100m (black line) of proposed C3 turbine				
ID	Name	Location	Closest C3 WTG (km)	MLA Notes:
South Turbines:				
8	Naranghi	Pejar Road	1.06 km (A32)	Refer to Appendix E.7
19	Wombat Hollow	Crookwell Road	1.73 km (A28)	Refer to Appendix E.8
East Turbines:				
62	Cottonwood	Woodhouselee Road	1.65 km (A24)	Refer to Appendix B.2
63	Rocky Corner	Woodhouselee Road	1.04 km (A10)	Refer to Appendix B.3
69	Atholvale	Woodhouselee Road	1.33 km (A2)	Refer to Appendix A.2
106	Rosedale	3199 Middle Arm Road Roslyn	1.88 km (A4)	Refer to Appendix A.6

Table 3 Dwellings identified within the 'black line' (2100m) of a C3 turbine

Non-involved dwellings within 2100m - 3100m (blue line) of a proposed C3 turbine				
ID	Name	Location	Closest C3 WTG (km)	MLA Notes:
South Turbines:				
2	Bendemere	Dawsons Creek Road	2.68 km (A28)	Refer to Appendix E.1
3	D'Ambrosio	Dawsons Creek Road	2.54 km (A28)	Refer to Appendix E.2
4	-	Dawsons Creek Road		Refer to Appendix E.3
5	-	Dawsons Creek Road	2.95 km (A28)	Refer to Appendix E.4
6	-	Dawsons Creek Road	2.90 km (A28)	Refer to Appendix E.5
7	Emohruo	Dawsons Creek Road	2.85 km (A28)	Refer to Appendix E.6
37	Carinya	St Stephens Road	3.00 km (A33)	Refer to Appendix D.3
39	St Stephens Church	St Stephens Road	2.26 km (A33)	Refer to Appendix D.4
East Turbines:				
57	Kenrick	Woodhouselee Road	3.02 km (A24)	Refer to Appendix D.8
60	Pejar Park	Woodhouselee Road	2.45 km (A10)	Refer to Appendix B.1
71	Lynross	Woodhouselee Road	2.65 km (A2)	Refer to Appendix A.2
72	-	Woodhouselee Road	2.95 km (A2)	Refer to Appendix A.3
104	Highland Park	Middle Arm Road	2.60 km (A5)	Refer to Appendix A.5
134A	-	Woodhouselee Road	3.0km	Refer to Appendix D.10

Table 4 Dwellings identified within the 'blue line' (between 2100 - 3100m) of a C3 turbine

5.0 Preliminary Assessment Tools

5.4 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

The Multiple Wind Turbine Tool provides a preliminary indication of potential cumulative impacts arising from the proposed wind energy project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the proponent must map into six sectors of 60° any proposed turbines, and any existing or approved turbines within eight kilometres of each dwelling or key public viewpoint. **Figure 5** below provides examples of where a dwelling or key public viewpoint may have views to turbines in multiple 60° sectors.

Due to the existing presence of wind farms in the visual catchment associated with Crookwell 1, Crookwell 2 and Gullen Range the Preliminary Assessment Tool: 2 has been applied to the existing wind farm layouts to provide a baseline for the assessment of the proposed Crookwell 3.

Figure 6 provides a preliminary assessment of receptors from which existing wind turbines (associated with Crookwell 1, Crookwell 2 and Gullen Range) are likely to be visible in multiple sectors.

Figure 7 provides an assessment of the proposed develop in conjunction with existing wind turbines.

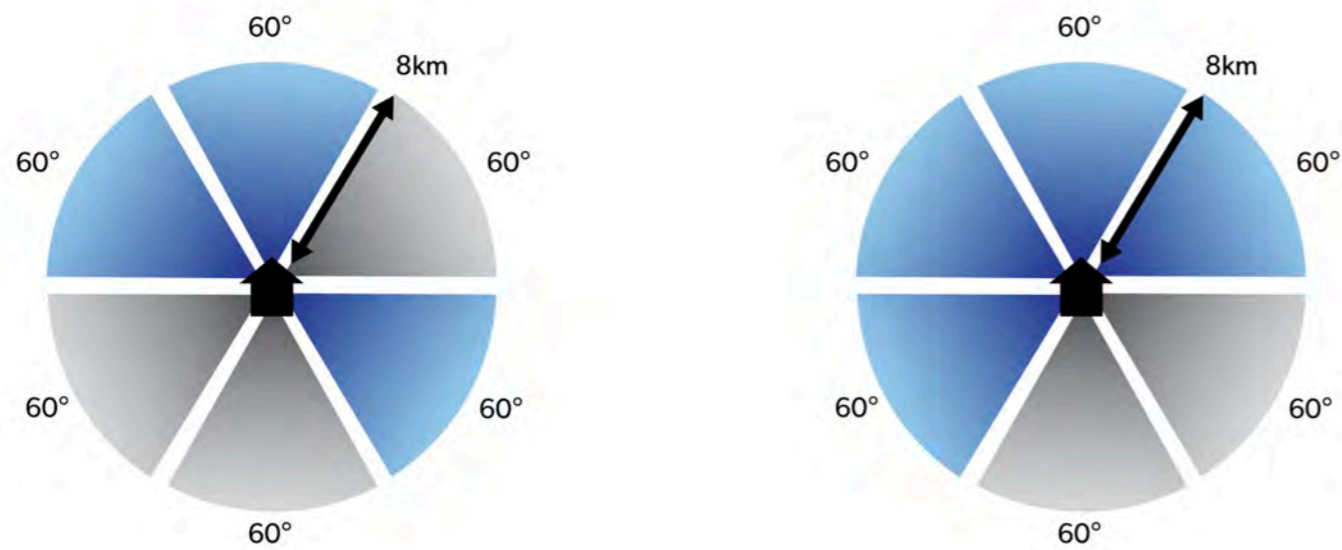
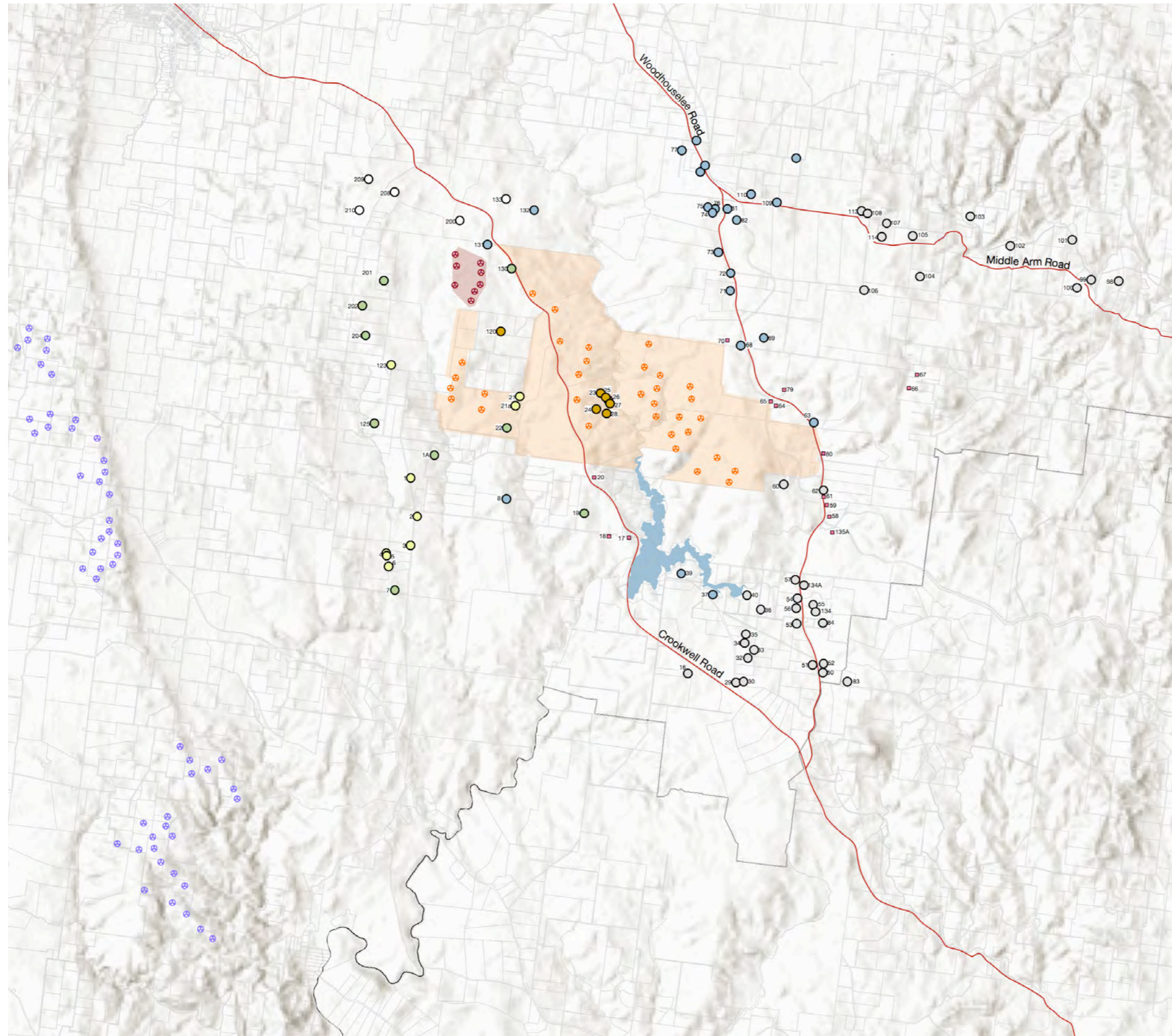


Figure 5 Preliminary Assessment Tool: Multiple Wind Turbines

(Source: Visual Assessment Bulletin)

5.0 Preliminary Assessment Tools



Existing Multiple Wind Turbine Tool Crookwell 1 & 2 and Gullen Range

LEGEND

- Crookwell 1
- Crookwell 2
- Associated Dwellings
- Existing Wind Turbines (Crookwell 1 & 2)
- Existing Wind Turbines (Gullen Range)

Number of 60° Sectors with visible turbines:

(Based on 2D Assessment)

- In excess of 8kms from Crookwell 3
- Up to one sector (60°)
- Up to two sectors (120°)
- Up to three sectors (180°)
- Up to four sectors (240°)
- Up to five sectors (300°)
- Up to six sectors (360°)

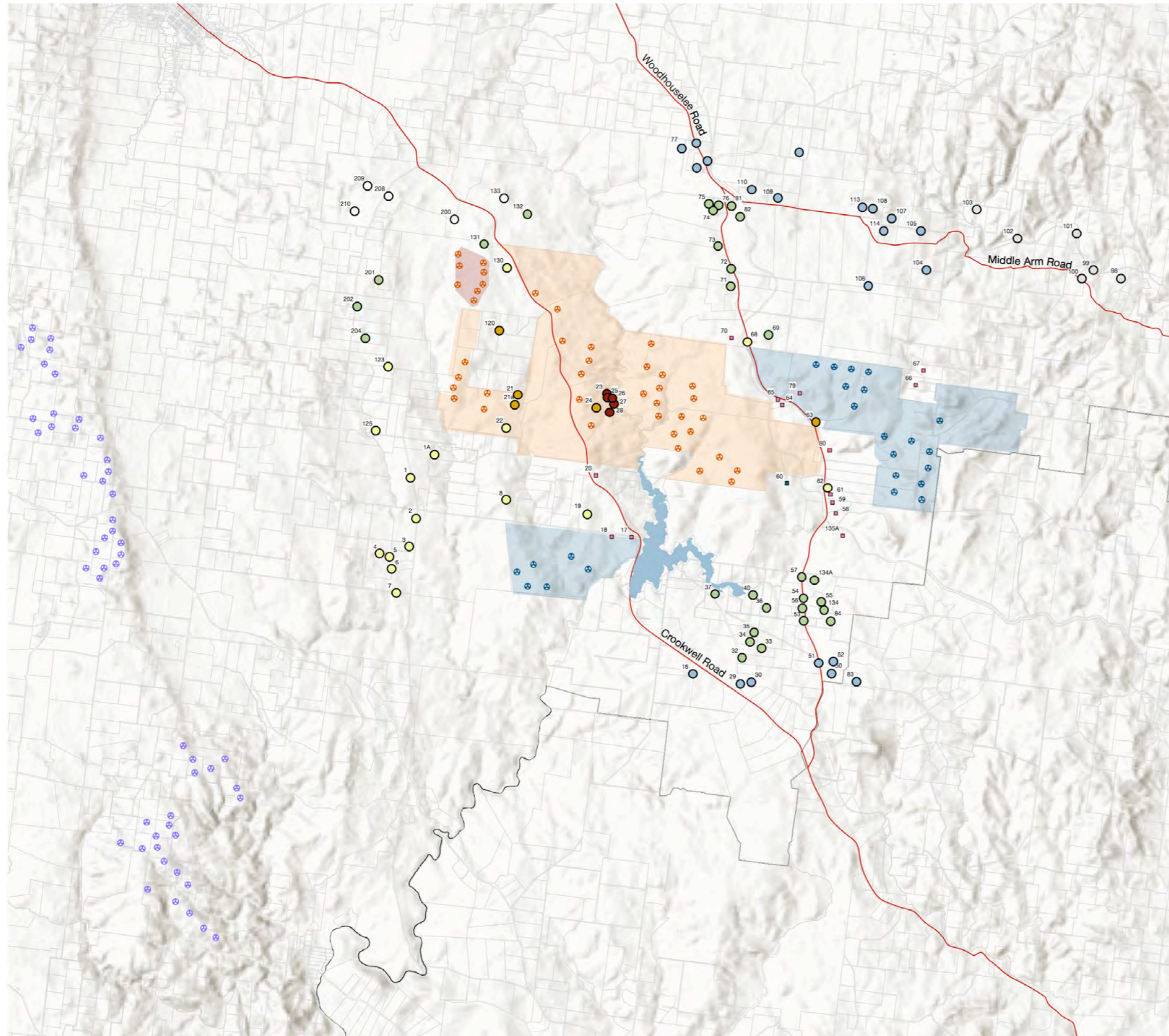
Note:

Preliminary Assessment Tool 2: Multiple Wind Turbine Tool is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing multiple turbines.



Figure 6 Existing Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

5.0 Preliminary Assessment Tools



Proposed Multiple Wind Turbine Tool Crookwell 1 & 2, Gullen Range and Crookwell 3

LEGEND

- Crookwell 1
- Crookwell 2
- Crookwell 3
- Associated Dwellings
- Non-Associated Dwellings
- Existing Wind Turbines (Crookwell 1 & 2)
- Existing Wind Turbines (Gullen Range)
- Proposed Wind Turbines (Crookwell 3)

Number of 60° Sectors with visible turbines: (Based on 2D Assessment)

- In excess of 8kms from Crookwell 3
- Up to one sector (60°)
- Up to two sectors (120°)
- Up to three sectors (180°)
- Up to four sectors (240°)
- Up to five sectors (300°)
- Up to six sectors (360°)

Note:

Preliminary Assessment Tool 2: Multiple Wind Turbine Tool is based on a 2D Assessment alone and does not take into account topography, vegetation or other screening factors which may reduce the potential for viewing multiple turbines.



Figure 7 Proposed Preliminary Assessment Tool 2: Multiple Wind Turbine Tool

5.0 Preliminary Assessment Tools

5.5 Preliminary Assessment Tool 2: Multiple Wind Turbine Tool Summary

The Bulletin states 'depending on the viewer sensitivity level, the location of the proposed turbines should avoid, where possible, views to turbines of one or more wind energy projects, within the effective horizontal views of two or more 60° sectors (from Level 1 viewpoints) or in three or more 60° sectors (from Level 2 viewpoints).

In accordance with the Bulletin, all dwellings are defined as rural dwellings and have therefore been assessed as Level 2 viewpoints (with the exception of St Stephens Church which is Level 1 Sensitivity).

Table 5 and **Table 6** provide an overview of dwellings which may experience an increase in the potential number of sectors. This is based on a 2D Assessment alone. Further detailed 3D assessment of these dwellings has been included in this report.


The 2D assessment of the Multiple Wind Turbine tool identified the following:


- 13 dwellings within 3100m of a C3 turbine with three or more 60° sectors (See **Table 5**)
- 27 residences in excess of 3100m from a turbine had turbines within three or more 60° sectors. (See **Table 6**)

Non-involved dwellings within 2100m - 3100m (blue line) of a proposed C3 turbine				
ID	Name	Existing number of 60° Sectors (Based on 2D Assessment)	Proposed number of 60° Sectors (Based on 2D Assessment)	MLA Notes:
Within 2100 metres of a C3 Turbine				
8	Naranghi	2	4	Refer to Appendix E.7
19	Wombat Hollow	3	4	Refer to Appendix E.8
62	Cottonwood	1	4	Refer to Appendix B.2
63	Rocky Corner	1	5	Refer to Appendix B.3
69	Atholvale	2	3	Refer to Appendix A.2
Within 2100 - 3100 metres of a C3 Turbine				
7	Emohruo	3	4	Refer to Appendix E.6
37	Carinya	2	3	Refer to Appendix D.3
39	St Stephens Church	2	3	Refer to Appendix D.4
57	Kenrick	1	3	Refer to Appendix D.8
60	Pejar Park	1	4	Refer to Appendix B.1
71	Lynross	2	3	Refer to Appendix A.2
72	-	2	3	Refer to Appendix A.3
134A	-	1	3	Refer to Appendix D.10

Table 5 Dwellings within the 'blue line' (3100m) with multiple 60° sectors

KEY:

 Identifies dwelling with existing 'unacceptable' 60° sectors - Refer to Figure 6 (Based on 2D Assessment of C1, C2 and Gullen Range)


 Identifies dwelling with proposed increase in 60° sectors - Refer to Figure 7 (Based on 2D Assessment of C1, C2, C3 and Gullen Range)


5.0 Preliminary Assessment Tools

Non-Involved dwellings in excess of 3100m from Crookwell 3 with turbines in multiple sectors							
ID	Name	Location	Involved	Closest C3 WTG (km)	Existing number of 60° Sectors (Based on 2D Assessment)	Proposed number of 60° Sectors (Based on 2D Assessment)	Assessment Notes
1A	-	Pejar Road	No	3.39 (A28)	2	3	Increased from an acceptable limit of 2 sectors to 3.
21	Ahgunyah	Crookwell Road	Crookwell 2 Host	3.98 (A29)	4	5	Increased from 4 to 5. Already unacceptable limits.
21A	Ahgunyah	Crookwell Road	Crookwell 2 Host	3.81 (A29)	4	5	Increased from 4 to 5. Already unacceptable limits.
22	Minnamurra	Crookwell Road	Crookwell 2 Host	3.29 (A29)	3	4	Increased from 3 to 4. Already unacceptable limits.
23	Gundowringa	Crookwell Road	Crookwell 2 Host	3.94 (A32)	5	6	Increased from 5 to 6. Already unacceptable limits.
25	Gundowringa	Crookwell Road	Crookwell 2 Host	3.90 (A32)	5	6	Increased from 5 to 6. Already unacceptable limits.
26	Gundowringa	Crookwell Road	Crookwell 2 Host	3.85 (A32)	5	6	Increased from 5 to 6. Already unacceptable limits.
27	Gundowringa	Crookwell Road	Crookwell 2 Host	3.75 (A32)	5	6	Increased from 5 to 6. Already unacceptable limits.
32	-	St Stephens Road	No	4.19 (A33)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
33	Whispering Pines	St Stephens Road	No	4.51 (A33)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
34	Kooloona	St Stephens Road	No	4.12 (A33)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
35	Clydesdale	St Stephens Road	No	4.20 (A33)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
36	Tyrendarra	St Stephens Road	No	4.07 (A24)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
40	Tyrendarra	St Stephens Road	No	3.96 (A33)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
53	-	Woodhouselee Road	No	3.80 (A24)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
54	Ginmara	Woodhouselee Road	No	3.37 (A24)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.

Table 6 Dwellings in excess of the 'blue line' (3100m) with multiple 60° sectors (table continued on following page)

KEY:

 Identifies dwelling with existing 'unacceptable' 60° sectors - Refer to Figure 6 (Based on 2D Assessment of C1, C2 and Gullen Range)


 Identifies dwelling with proposed increase in 60° sectors - Refer to Figure 7 (Based on 2D Assessment of C1, C2, C3 and Gullen Range)


5.0 Preliminary Assessment Tools

Non-Involved dwellings in excess of 3100m from Crookwell 3							
ID	Name	Location	Involved	Closest C3 WTG (km)	Existing number of 60° Sectors (Based on 2D Assessment)	Proposed number of 60° Sectors (Based on 3D Assessment)	Assessment Notes
55	-	Woodhouselee Road	No	3.20 (A24)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
56	Mathlie	Woodhouselee Road	No	3.52 (A24)	1	3	Increased from an acceptable limit of 1 sector to 3 sectors.
73	Highlands	Woodhouselee Road	No	3.59 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.
74	-	Woodhouselee Road	No	4.36 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.
75	Roslyn	Woodhouselee Road	No	4.56 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.
76	-	Woodhouselee Road	No	4.34 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.
81	Roslyn	Woodhouselee Road	No	4.25 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.
82	-	Woodhouselee Road	No	3.93 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.
125		Third Creek Road	No	4.6 km	3	4	Increased from an un-acceptable limit of 3 sectors to 4.
131	Wharekarori (2)	Crookwell Road	No	7.65 (A32)	2	3	Increased from an acceptable limit of 2 sectors to 3.
132	Lake Edward Cottage	Crookwell Road	No	7.68 (A2)	2	3	Increased from an acceptable limit of 2 sectors to 3.

Table 6 (continued) Dwellings in excess of the 'blue line' (3100m) with multiple 60° sectors

KEY:

 Identifies dwelling with existing 'unacceptable' 60° sectors - Refer to Figure 6 (Based on 2D Assessment of C1, C2 and Gullen Range)

 Identifies dwelling with proposed increase in 60° sectors - Refer to Figure 7 (Based on 2D Assessment of C1, C2, C3 and Gullen Range)

5.0 Preliminary Assessment Tools

5.6 Zone of Visual Influence

The Zone of Visual Influence (ZVI) represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI usually presents a bare ground scenario - ie. A landscape without screening, structures or vegetation, and is usually presented on a base map. It is also referred to as a zone of theoretical visibility (The Landscape Institute and the Institute of Environmental Management and Assessment, 2002).

The ZVI is a desktop tool intended to make the fieldwork more efficient by clearly excluding areas that are screened by topography. Considerable field assessment is then undertaken predominantly within the areas where potential for impact exists. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario. In reality the zone of visibility of the Crookwell 3 Wind Farm is far less than that shown in the following ZVI figures.

The ZVI has been determined through the use of digital topographic information and 3D modelling software *WindPro*. The ZVI has been assessed to approximately 10km from the project. Although it is possible for the development to be visible from further than 10km away, it is generally accepted that beyond 10km visibility is greatly diminished.

Two ZVI figures have been prepared Moir LA to assess the Crookwell 3 Wind Farm. **Figure 8** depicts the areas of land from which the proposed development may be visible and provides an indicative number of wind turbines. **Figure 10** (refer to Section 6.0) provides a cumulative ZVI which illustrates areas from which multiple Crookwell wind farms will be visible.

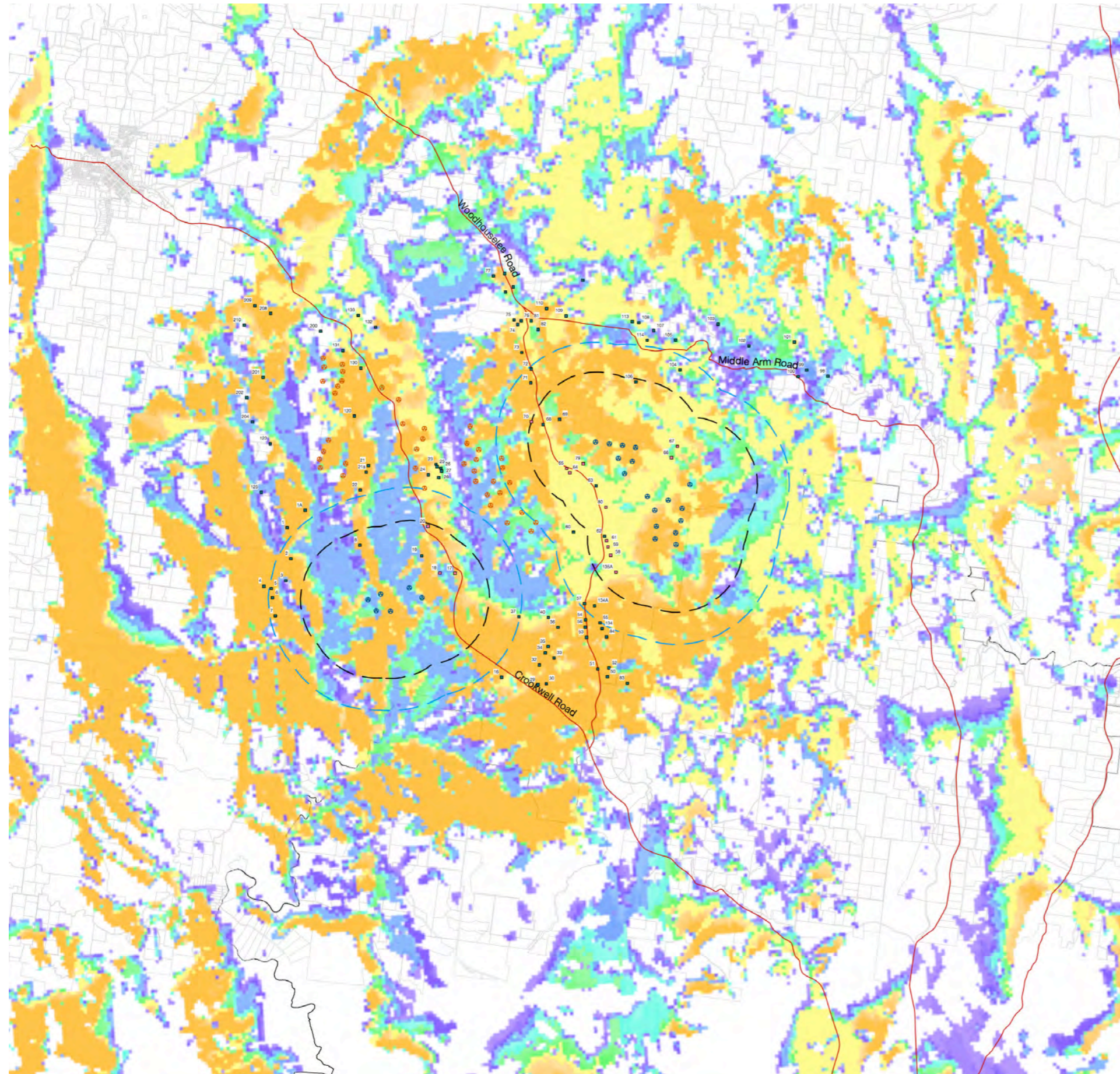
The following parameters were used for the development of the ZVI figures:

Crookwell 1: 45m blade tip

Crookwell 2: 160m blade tip

Crookwell 3: 157m blade tip.

5.0 Preliminary Assessment Tools

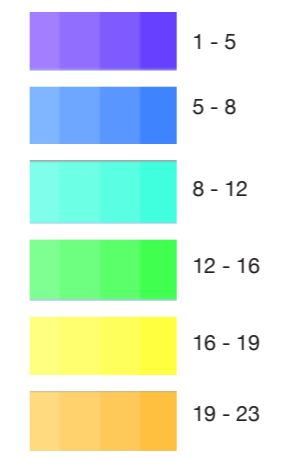


Zone of Visual Influence Proposed Crookwell 3 Wind Farm

LEGEND

- Associated Dwellings
- Non-associated Dwellings
- ⊗ Existing Wind Turbines
- ⊗ Proposed Wind Turbines

Number of visible Crookwell 3 WTGs:



Note:

The ZVI is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

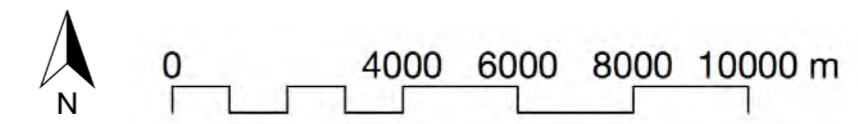


Figure 8 Zone of Visual Influence - Proposed Crookwell 3 Wind Turbines

6.0 Cumulative Visual Impact Assessment

6.1 Cumulative Visual Impacts

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future (Landscape Institute et al, 2008). Cumulative effects may also affect the way a landscape is experienced and can be positive or negative. Where they comprise benefits, they may be considered to form part of the mitigation measures.

The Draft Planning NSW Guidelines state that *“Cumulative impacts may result from a number of activities with similar impacts interacting with the environment in a region. They may also be caused by the synergistic and antagonistic effects of different individual impacts interacting with each other and may be due to temporal or spatial characteristics of the activities’ impacts.”*

It is important the proposed Crookwell 3 Wind Farm considers the potential cumulative effects on the immediate and broader regional context it forms part of.

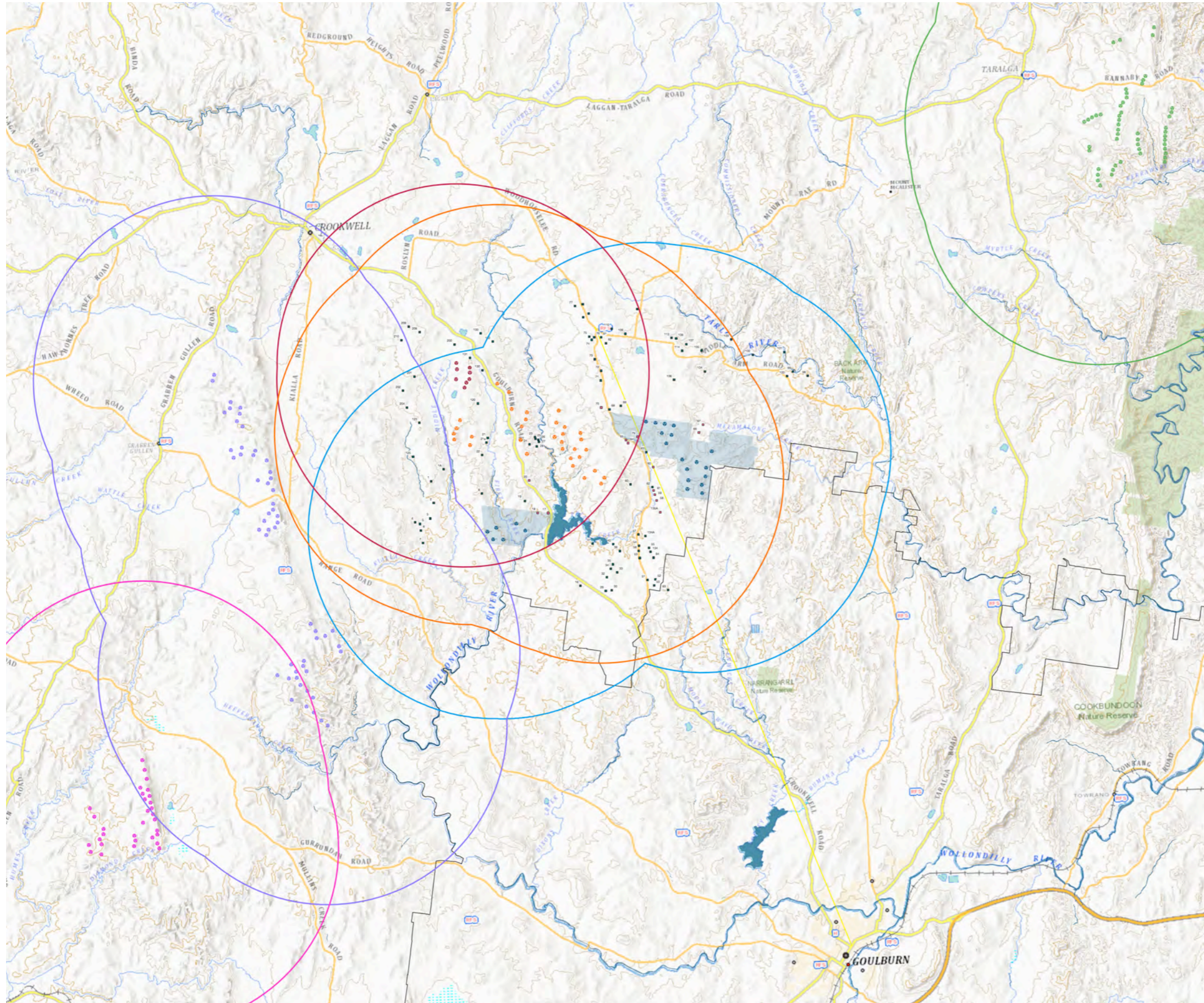
A cumulative impact assessment has several dimensions:

- The impact of the wind farm, when added to the combined impacts of all other existing developments and environmental characteristics of the area.
- The impact of this development in the context of the potential for development of wind energy developments in the local, regional and national context.
- The impact of developments which are ancillary to or otherwise associated with the proposed wind farm eg. the development of transmission lines.
- The potential for future development of wind farms in the region.

Wind Farm:	Distance to nearest proposed C3 turbine:	Number of Turbines:
Crookwell 1	6.3 km	8
Crookwell 2	3 km	28
Gullen Range	8.3 km	73
Gunning	18.4 km	31
Cullerin Range	27.3 km	15
Taralga	20.8 km	51

Table 7 Wind Farms nearby Crookwell 3

6.0 Cumulative Visual Impact Assessment



Nearby Wind Farms

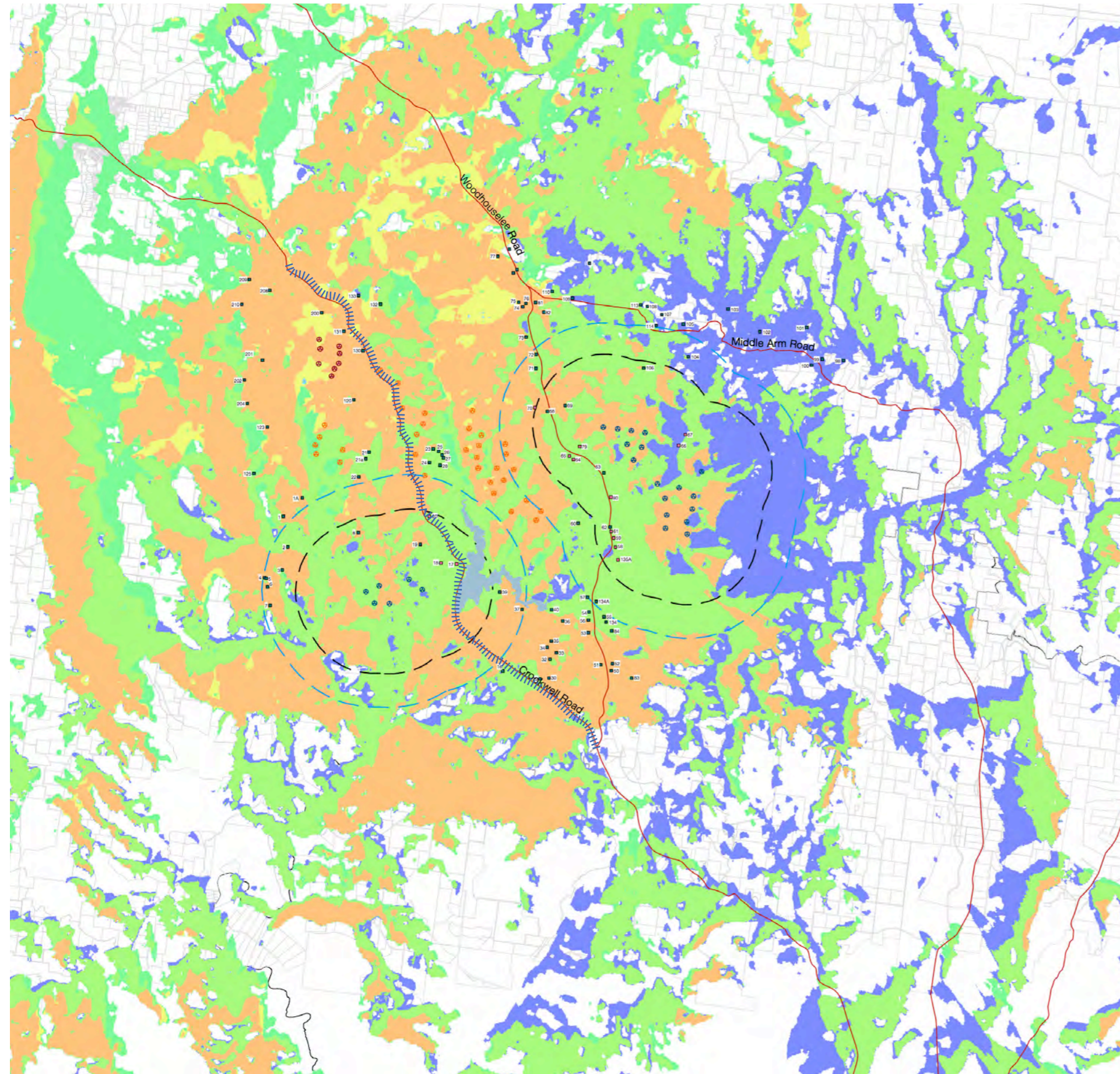
LEGEND

- Crookwell 3 Wind Farm:**
 - Existing Wind Turbines
 - 8km radius
- Crookwell 1 Wind Farm:**
 - Existing Wind Turbines
 - 8km radius
- Crookwell 2 Wind Farm:**
 - Existing Wind Turbines
 - 8km radius
- Gullen Range Wind Farm:**
 - Existing Wind Turbines
 - 8km radius
- Gunning Range Wind Farm:**
 - Existing Wind Turbines
 - 8km radius
- Taralga Wind Farm:**
 - Existing Wind Turbines
 - 8km radius



Figure 9 Local Wind Farm Map (Base Map Source: Six Maps)

6.0 Cumulative Visual Impact Assessment



Cumulative Zone of Visual Influence Existing Crookwell 1 & 2 and Proposed Crookwell 3 Wind Farms

LEGEND

- Associated Dwellings
- Non-associated Dwellings
- ⊗ Existing Wind Turbines
- ⊗ Proposed Wind Turbines

LEGEND

- Crookwell 1 WTGs
- Crookwell 2 WTGs
- Crookwell 3 WTGs
- Crookwell 1 / Crookwell 2 WTGs
- Crookwell 3 / Crookwell 1 WTGs
- Crookwell 3 / Crookwell 2 WTGs
- Crookwell 1 / Crookwell 2 / Crookwell 3 WTGs
- Existing extent of visible turbines (Associated with C1, C2 and Gullen Range) along Crookwell Road

Note:

The ZVI is a preliminary assessment tool that represents a bare ground scenario - ie. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst case scenario.

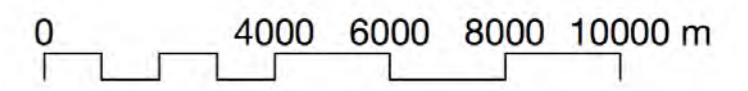


Figure 10 Cumulative Zone of Visual Influence - Proposed Crookwell 3 Wind Turbines

6.0 Cumulative Visual Impact Assessment

6.2 Summary of Cumulative Visual Impacts

The Scottish Natural Heritage (2005) identifies a range of potential cumulative landscape impacts of wind farms on landscapes which include:

- Combined visibility (where two or more wind farms will be visible from one location).
- Sequential visibility (e.g. The effect of seeing two or more wind farms along a single journey eg. road or walking trail).
- The visual compatibility of different wind farms in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. Viewing type or feature) across a character type caused by developments across that character type.

Crookwell 1 and 2:

The project will undoubtedly impact upon residences to the east of Woodhouselee Road, and primarily those in close proximity to the turbines (within 2km). It is likely, from most of these residences, that the impacts will be direct as opposed to cumulative due to the varying topography and extensive wind break plantings that surround most dwellings and line many of the fields. Certainly, some of these residences will experience cumulative impacts of being able to view multiple wind farms. However these views will not be enclosing and will primarily be either to the east and west or east and south. The cumulative effects will be the result of the combined viewing of elements of Crookwell 1, 2 and 3 and Gullen Range. Other wind farms exist in the region, however most are more than 20km away from Crookwell 3 (Refer local wind farm map **Figure 7**) and unlikely to be sufficiently discernable, through a combination of distance, topography and vegetation, to influence the character of the view.

Gullen Range:

The Bulletin states: *The application of the cumulative tool to a distance of eight kilometres from a dwelling or public viewpoint is based on visibility research conducted by Sullivan et. al (2012), Bishop (2002), Shang and Bishop (1999) and others. At eight kilometres, turbines and object recede into the background in terms of visibility.*

14 dwellings are located within 8 kilometres of the proposed C3 wind turbines and Gullen Range (see **Figure 7**). Of these 14 dwellings, only three (3) are identified through the desktop assessment using the multiple wind turbine tool as having an increased number of sectors of potentially visible wind turbines due to the C3 turbines. These dwellings are:

- Dwelling 1A
- Dwelling 7
- Dwelling 125

Detailed assessment of these dwelling indicates topography or vegetation screens view to Gullen Range and the cumulative impacts between C3 and Gullen Range are negligible.

Sequential Viewing:

Public viewpoints and the surrounding landscape have been adequately addressed in the LVIA undertaken by GBD. The most significant public viewing opportunities occur along the corridor of Crookwell Rd where the Windfarm Pastoral landscape character is already established over an approximate 15km stretch of the 40km journey between Crookwell and Goulburn (refer to **Figure 8**). It is unlikely that character of this landscape will change significantly with the development of the Crookwell 3. In accordance with Green Bean Design's Report, *sequential views from local roads would be mitigated to some extent by undulating landform and tree cover alongside road corridors.*

7.0 Overview of Residences

7.1 Desktop Assessment Methodology

The following section of the report provides an overview of the potential visual impacts on residences. The preliminary assessment tools (Section 5.0) identified non-involved residences within the study area which require detailed assessment. The residences have been grouped into five clusters in keeping with the assessment by OHD Report (see **Figure 9**).

For each dwelling assessment the following was undertaken:

Step 1. Application of Preliminary Assessment Tools (2D Assessment)

Preliminary Assessment Tools were applied to each dwelling to assess the following two parameters:

- Visual magnitude (identify the number of turbines within blue and black lines)
- Multiple 60° sector assessment (identify the number of sectors based on a 2D assessment).

Step 2. Preparation of a Wire frame (3D Assessment based on topography alone)

A wireframe image is prepared to identify the extent of visible turbines in the based on topography alone. A wire frame is a computed generated image based on a digital terrain model, that indicate the 3D shape of the landscape in combination with additional elements. They are a valuable tool in the wind farm LVIA process as they allow the assessor to compare the position and scale of the turbines to the existing view of a landscape (*Scottish Natural Heritage, 2017*).

Once the wire frame image has been prepared, this eliminates turbines which will not be visible due to topography and as a result the extent of visibility is generally decreased when compared to the 2D assessment.

Step 3. Assessment of Visual and Cumulative Impacts:

Information on the extent of visibility extracted from the wire frame diagrams is then overlaid onto a recent aerial image of the dwelling and its surrounds. This provides a detailed assessment of the direction and extent of potentially visible turbines and identifies any intervening elements (such as structures, wind break planting or vegetation) which may reduce the potential visibility.

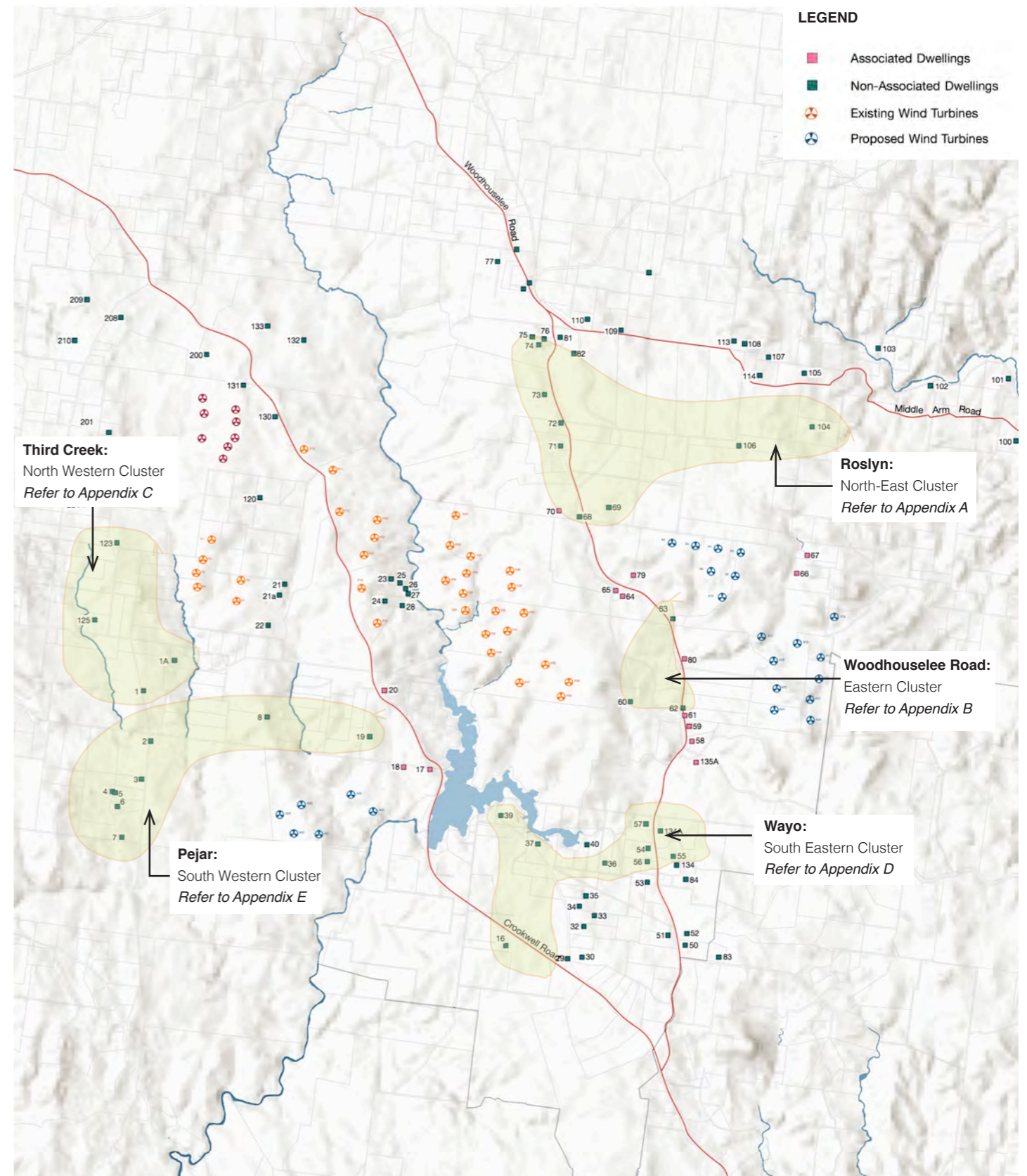


Figure 11 Residence Clusters

7.0 Overview of Residences

7.2 Roslyn: North East Cluster (Refer to Appendix A)

OHD Assessment:

This cluster of residences is located north of turbines A1-A25 along and in the vicinity of the northern end of Woodhouselee Road. They are elevated and may have significant views to the turbines south, to the west over Crookwell 2 and in the background, the string of Gullen Range Turbines.

Moderate to High levels of dominance at residences 68, 69 with some screening, and with open views at 106 indicate that consideration should be given to removal or amelioration of turbines A2, A3, A4 and A5.

Moir LA Assessment:

Eight (8) non-involved residences have been identified within the Roslyn: North East Cluster, as identified by OHD. Note: Since the assessment by OHD Dwelling 68 'Meadowvale' has signed a neighbourhood agreement.

Turbines associated with C3 (South) are screened by topography from all residences associated with the 'Roslyn North East Cluster'. Views to C3 (East) are available from all dwellings (based on an assessment of topography alone). Existing vegetation is likely to reduce the potential visibility of the C3 (East) turbines to varying degrees from most residences.

Two dwellings are located within the 'black line of visual magnitude' *Dwelling 69* and *Dwelling 106*. Dwelling 69 is likely to have views to all turbines associated with the C3 (East) in up to 35° of the view to the south east. Views to the turbines from *Dwelling 106* are likely to be obstructed to a degree by wind break planting to the south of the dwelling.

Three dwellings (71, 72 and 104) identified within the black and blue line assessed as views to the eastern cluster of turbines and have been assessed as having a low visual impact.

A desktop assessment undertaken by Moir LA identified lower visual impacts than those identified in the cumulative assessment by OHD in 2018. It appears that OHD assessed the cumulative visual impact on each dwelling using the multiple wind turbine tool only. That is, OHDs assessment appears to be purely based on a 2D assessment.

7.3 Woodhouselee Road: Eastern Cluster (Refer to Appendix B)

OHD Assessment:

This cluster of residences is located around the middle section of Woodhouselee Road. Most residences are of inferior viewing locations with some screening provided by the ridge running parallel and east of Woodhouselee Road and individual curtilage vegetation.

High levels of dominance and overall impact on the remaining non-associated residences in this cluster suggest that careful justification is required for most turbines to remain as all turbines except A15 are elevated above the viewing points and mostly within 2km of the remaining residences resulting in high levels of dominance.

Moir LA Assessment:

Three residences Pejar Park (60), Cottonwood (62) and Rocky Corner (63) were assessed within this cluster of residences. Dwelling 62 and 63 are located within 2100m of a proposed turbines (within the black line) and Dwelling 60 is between the blue and black lines of visual magnitude. The C3 (South) turbines would be screened by topography from all of these residences. Existing C2 turbines are also screened by topography and vegetation with the exception of a few blade tips.

When undertaking a 3D assessment (before any consideration of the intervening vegetation on each property in particular Pejar Park and Rocky Corner), the proposed C3 (East) turbines are likely to result in moderate to high visual impacts on these three residences. Potential mitigation methods which could be incorporated in keeping with the existing landscape character of the area would further reduce these impacts.

7.0 Overview of Residences

7.4 Third Creek: North Western Cluster (Refer to Appendix C)

OHD Assessment:

This group of residences to the north and north-west of turbines have substantial views south and east towards the Crookwell Road ridge.

No specific individual turbine effects above moderate. Cumulative effects could be reduced by the removal of the southern turbine group, however the overall cumulative effect of C3 south is relatively low as Gullen Range and C2 are major components.

Moir LA Assessment:

Four (4) residences are located within the 'Third Creek Cluster' (1, 1A, 123 and 125). Each of these residences are in excess of 3100m from the nearest C3 turbine (the blue line of visual magnitude).

The existing wind turbines associated with C1 and C2 are major components in the existing landscape and as a result, three of these residences already have unacceptable levels of multiple sectors with up turbines associated with C1, C2 and Gullen Range within 3 or 4 sectors. Although there would be a slight increase to the views to proposed C3 turbines, the increase in potential visual impacts would be negligible to low in the context of the existing wind farms.

7.5 Wayo: South Eastern Cluster (Refer to Appendix D)

OHD Assessment:

This cluster of residences is located to the South East and have potential views of all turbines in the Crookwell 3 development. They look over an area of high scenic value around Pejar Dam. St Stephens Church (State Heritage Item) and some residences will have views of the C3 turbines with Pejar Dam in the foreground and turbines located behind. Most residences, with the exception of St Stephens Church and 37 'Carinya', are desktop reviews. Residences between Woodhouselee Road and St Stephen's Road generally face north between C2 and C3.

The combination of Crookwell 2 and 3 would create high cumulative impacts at many locations in the Wayo cluster and this appears to be reflected in the VIA assessments. The cumulative change to the landscape character is also significant as Crookwell 3 east is highly visible from this area. The ratings are further elevated by the high scenic quality of the landscape within which they are located.

Moir LA Assessment:

The Wayo: South Eastern Cluster of residences are located within an area rated as having a medium scenic quality. Existing Crookwell 2 turbines are an existing visible element in the landscape from this cluster of residences.

Ten dwellings were assessed by OHD as part of the Wayo: South Eastern Cluster. Since then dwelling 135A has signed a neighbour agreement and was not assessed by Moir LA.

Of the remaining nine (9) residences assessed by desktop analysis, Moir LA identified the Project was likely to have nil - low visual impacts resulting from the proposed C3 (South) turbines. This is due to a combination of distance, topography or intervening vegetation.

The C3 (East) turbines are screened by topography from Dwelling 37 (Carinya) and Dwelling 39 (St Stephens Church). They were assessed as having a nil - low and low impact on Dwelling 16 and 36 respectively.

The C3 (East) turbines are likely to have a moderate visual impact from dwellings 54, 55 and 57, and a moderate - high impact on Dwelling 84, 134 and 134A.

A 3D assessment of the dwellings within this cluster found that eight (8) of the nine residences would experience up to 3 sectors of turbines. These include the existing Crookwell 2 turbines. OHD rated this cumulative impact as high, however it is unclear what methodology was applied to determine this rating. Intervening vegetation would reduce the number of turbines visible from Dwelling 37 (Carinya) 39 (St Stephens Church) and 84 (Nierrina Heights) reducing the cumulative impact.

7.0 Overview of Residences

7.6 Pejar: South Western Cluster (Refer to Appendix E)

OHD Assessment:

This cluster has a wide variety of locations and most viewpoints are relatively elevated. Those residences in the east may have extensive views of most of the Crookwell 3 as well as Gullen Range and Crookwell 2.

Residences 8 and 19 have significant impacts from individual turbines at reduced distances. These eastern residences also have high cumulative impacts due to the combination of Crookwell 1, 2 and 3 and Gullen Range to the west

Consider removal of C3 South turbine cluster to ameliorate both cumulative and individual impacts. Removal of the southern group of turbines would reduce individual impacts at all residences and reduce the cumulative effects significantly.

Moir LA Assessment:

Eight dwellings were assessed as apart of Pejar: South Western Cluster. Residences within this cluster are associated with Dawsons Creek Road and Pejar Road. Existing wind break planting along roadsides and property boundaries is an common landscape element in this area, particularly along Dawsons Creek Road.

A desktop assessment by Moir LA found the C3 (East) turbines are likely to have nil - low and low impact from all residences within this cluster as they will be viewed at a distance and behind the existing C2 turbines.

The proposed C3 (South) turbines will be visible from most dwellings within this cluster, and are likely to appear as an extension of the existing C2 turbines.

Based on a desktop assessment alone, a high visual impact is likely to exist for Dwellings 8 and 19. Further assessment should be undertaken at these properties to groundtruth potential impacts and if appropriate, identify opportunities for mitigation.

8.0 Mitigation Methods

8.1 Overview of Mitigation Methods

In circumstances where residences are subject to a high level of visual impact, screen planting is an option proposed to assist in mitigating views of turbines from residential properties. As the viewing location of the proposal would be generally fixed there is opportunity to significantly reduce potential visual impact from the proposal.

In order to achieve visual screening planting between the intrusive element and the homestead, tree planting should be undertaken in consultation with the relevant landowners to ensure that desirable views are not inadvertently eroded or lost in the effort to mitigate views of the turbines.

8.2 Landscaping Principles

Visual screen planting is a beneficial mitigation method used to assist in reducing the visual impact of the wind farm and associated infrastructure. Landscaping and screen planting can also be utilised to significantly reduce the effect of shadow flicker on both roads and residences. The existing character of the landscape allows for a variety of methods of landscaping and visual screening which will remain in keeping with the landscape character. General guidelines to adhere to when planning for landscaping and visual screening include:

- Planting should remain in keeping with existing landscape character.
- Species selection is to be typical of the area.
- Planting layout should avoid screening views of the broader landscape.
- Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.
- Allow natural vegetation to regrow over any areas of disturbance.

Locally native plant species are preferred, as they will help assist and maintain the connectivity of the area and therefore. They help preserve the landscape character and scenic quality of the area as well as building habitat for local fauna. Native species are also well-suited to local conditions (ie. soil, climate, etc.) and will build on the existing vegetation assemblages in the area

Due to the climatic conditions of the Study Area, wind break planting is a common feature in the landscape, particularly surrounding residences and along site boundaries. When planted close to a dwelling, wind break planting can significantly reduce potential visual impacts. Where it is deemed appropriate, screen planting is to be considered to reduce the potential visual impacts from residences.



Image 4. Existing wind break planting along Woodhouselee Road which is typical of the area.



Image 5. Example of vegetation surrounding dwelling 68 on Woodhouselee Road



Detailed Dwelling Assessments

Without Prejudice issue for the purpose of Section 34 Conference

Appendix A

Assessment of Roslyn: North-east Cluster

Appendix B

Assessment of Woodhouselee Road: Eastern Cluster

Appendix C

Third Creek: North Western Cluster

Appendix D

Wayo: South Eastern Cluster

Appendix E

Pejar: South Western Cluster

Appendix F

Visual Influence Zone Methodology



Appendix A

Assessment of Roslyn: North-east Cluster

A. Roslyn: North-east Cluster Assessment

Table A: Roslyn: North-east Cluster												
ID	Name	Location	Closest C3 WTG (km)	VIA Assessment		OHD Comments			MLA Desktop Assessment			MLA Assessment Notes:
				South	East	South	East	Cumulative	South	East	Cumulative	
68	Meadowvale	Woodhouselee Road		Nil	High	Nil - Low	Mod-High A2, A3, A4 and A5 all less than 3km some vegetation screening.	High >3 sectors with some curtilage screening.	Residence is now in a Neighbour Agreement. No further assessment required.			
69	Athol Vale	Woodhouselee Road	1.33 km (A2)	Nil	Mod - High	Nil - intervening veg.	Mod - High A2 at 1.4km A3, A4 <2.0km	Mod > 2 Sectors	Nil - Topography	Mod - High	*Up to 2 Sectors	Cumulative visual impact is less than assessed by OHD. <i>Refer to A1.</i>
71	Lynross	Woodhouselee Road	2.65 km (A2)	Nil	Low	Nil - Low	Mod	Mod > 2 Sectors	Nil - Topography	Low	*Up to 3 Sectors	Impact assessment is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility. <i>Refer to A2.</i>
72	Highlands	Woodhouselee Road	2.9km	Nil	Low	Nil - Low	Mod	Mod > 2 Sectors	Nil - Topography	Low	*Up to 2 Sectors	Impact assessment and cumulative visual impact is less than assessed by OHD. <i>Refer to A3.</i>
74	Roslyn	Woodhouselee Road	4.5km	Nil	Nil	Nil - Low	Low - Mod	Mod - High > 2 Sectors	Nil - Topography	Nil - Low	*Up to 2 Sectors	Impact assessment and cumulative visual impact is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility. <i>Refer to A4.</i>
104	Highland Park	Woodhouselee Road	2.6km	Nil	Low	Nil - Intervening vegetation	Nil - Low Intervening veg	Mod - High > 2 Sectors	Nil - Topography	Nil - Low - Intervening Vegetation	*Up to 1 Sector	Cumulative visual impact is less than assessed by OHD. <i>Refer to A5.</i>
106	Rosedale	Woodhouselee Road	1.7km	Nil	Low	Low - Intervening Vegetation	High A2, A3, & A4 all less than 2km full views of A2-A9 to the south	Mod - High > 2 Sectors	Nil - Topography	Low - Intervening Vegetation	*Up to 2 Sectors	Impact assessment and cumulative visual impact is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility. <i>Refer to A6.</i>

KEY:

- Identifies conflicting ratings (C3 South Assessment)
- Identifies conflicting ratings (C3 East Assessment)
- Identifies conflicting ratings (Cumulative Assessment)

* = Likely to be reduced by intervening vegetation

A1. Dwelling 69 Athol Vale Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	1.3km	Nearest proposed <i>visible</i> C3 turbine (km):	1.3km	Views to the existing C2 turbines are limited to approximately 45° to the SSW and no views are available to C3 (South) turbines due to topography. Intervening vegetation is likely to screen views to the existing C2 turbines.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	2	
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Total degrees of <i>visible</i> turbines (Based on 3D Assessment)	2 Sectors (Total = 80°)	The GBLD and O’Hanlon assessments rated the visual impact as moderate to high, due to three (3) proposed C3 (east) turbines being located within 2100m and four (4) within 3100m of dwelling 69.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	11	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	28	The O’Hanlon VIA gave a cumulative visual impact of moderate based on a 2D assessment of > 2 sectors. Desktop assessment undertaken by Moir LA established the cumulative impact is likely to be less than assessed by O’Hanlon due to intervening vegetation limiting views to C2 turbines.

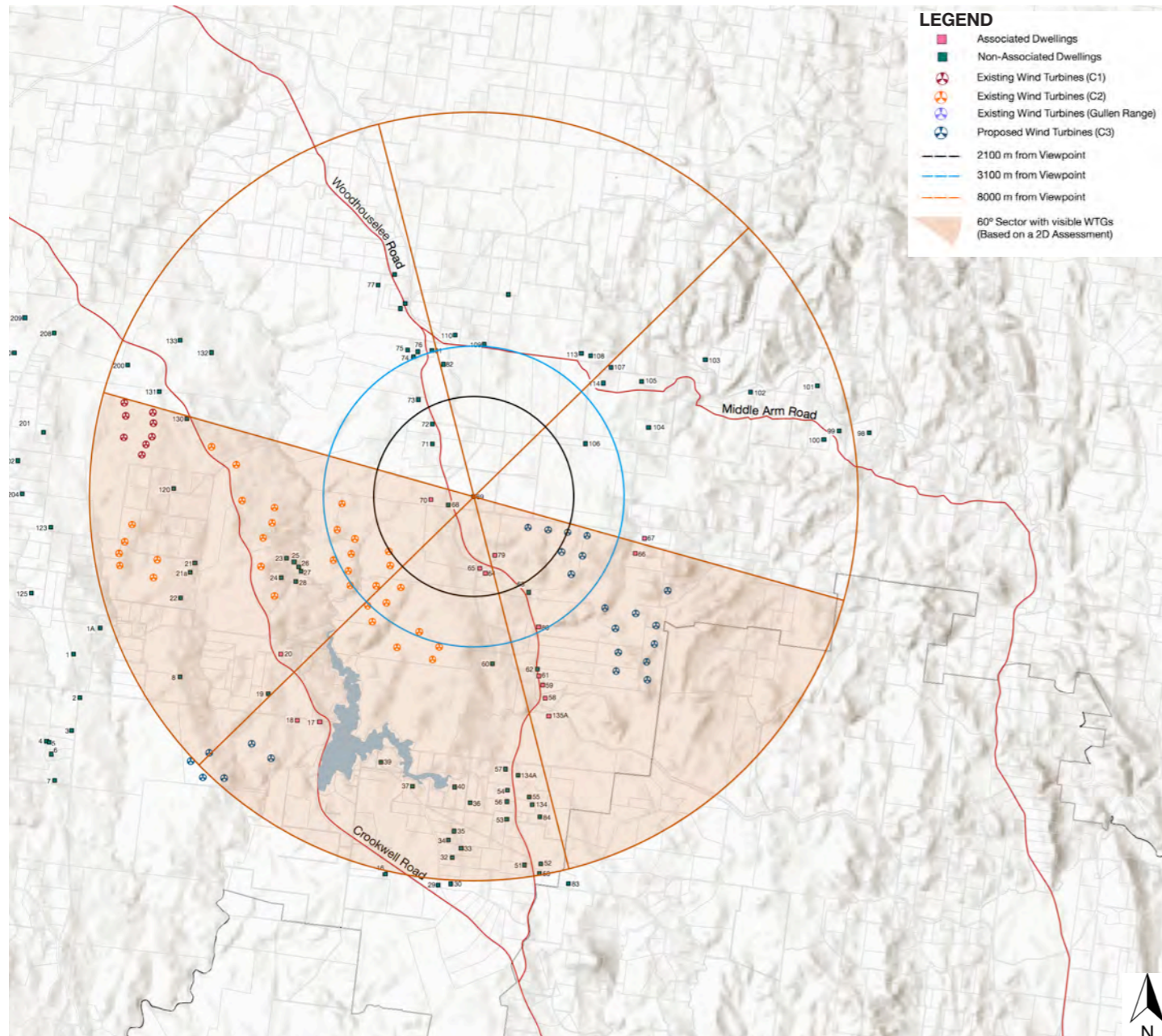


Figure X Preliminary Assessment Tools: Dwelling 69

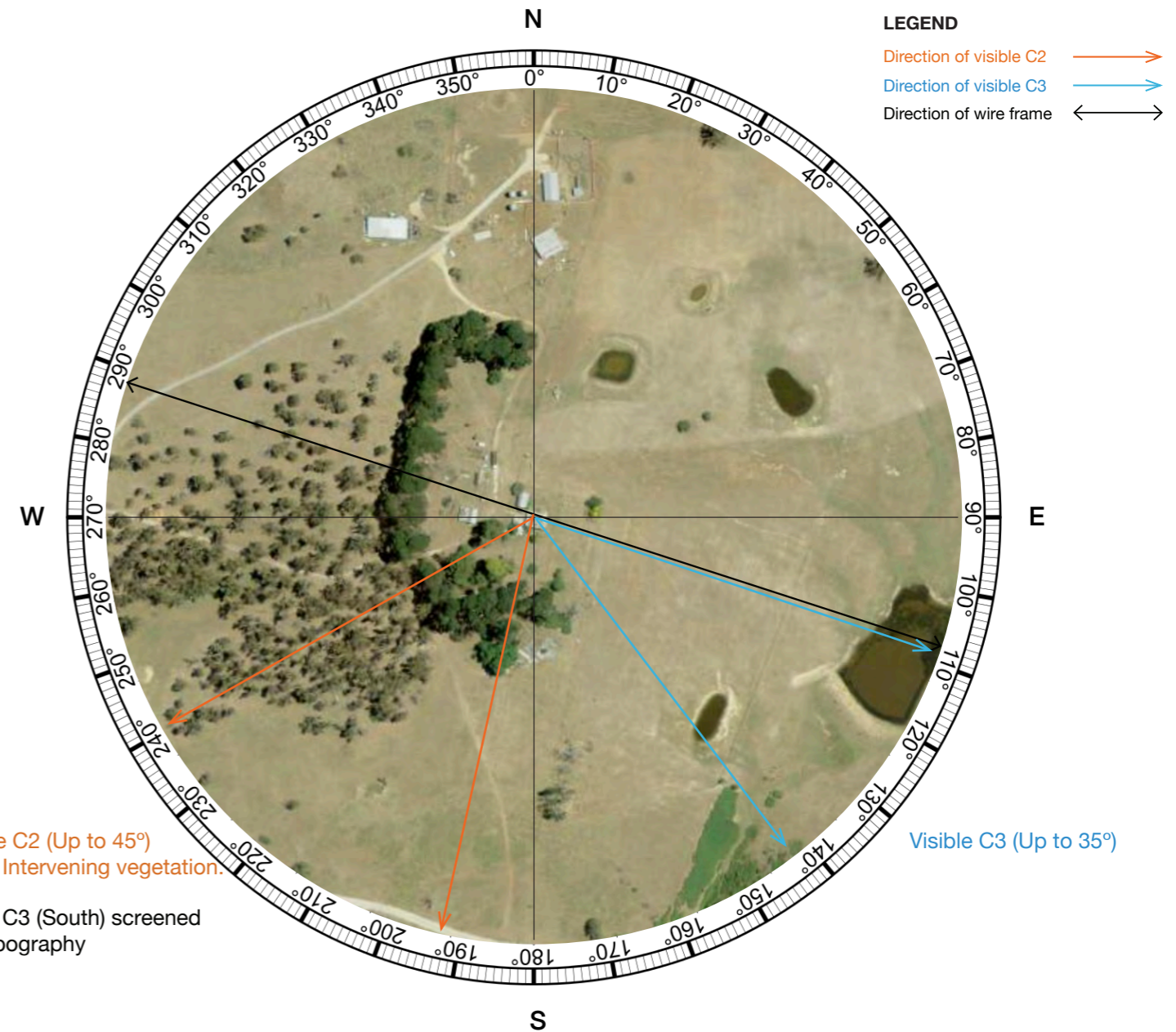
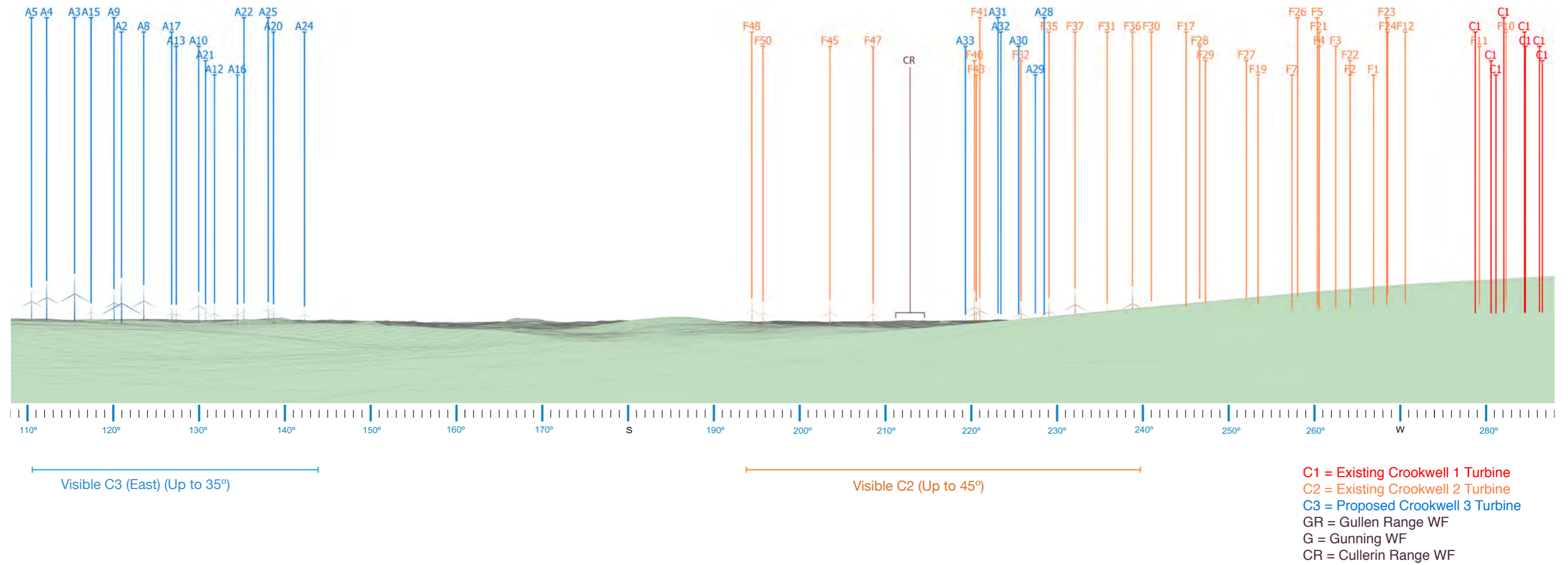


Figure X Aerial Assessment - Dwelling 69 (Source: Google Earth Imagery Date 20.08.2020)

A1. Dwelling 69 Athol Vale Wire frame



A2. Dwelling 71 Lynross Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed turbine (km):	2.7 km	Nearest proposed <i>visible</i> turbine (km):	2.7 km	Views to the existing C2 turbines are limited to approximately 85° to the SW and no views are available to proposed C3 (South) turbines due to topography. Intervening vegetation is likely to fragment views to the existing C2 turbines.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Total degrees of <i>visible</i> turbines (Based on 3D Assessment)	3 (Total = 105°)	Views to up to 17 proposed C3 (East) turbines would occupy approximately 20° of the view to the south east. Intervening vegetation is likely to reduce the potential visibility.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	20	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	37	The GBLD and O'Hanlon assessments rated the visual impact as low and moderate, respectively. Two (2) proposed C3 turbines are located within the blue line (3100m) of visual magnitude. The O'Hanlon VIA gave a cumulative visual impact rating of moderate based on a 2D assessment of > 2 sectors. 3D Assessment identified views to proposed and existing turbines would be in up to 3 sectors of the view however intervening vegetation is likely to reduce the potential to view all of these turbines.

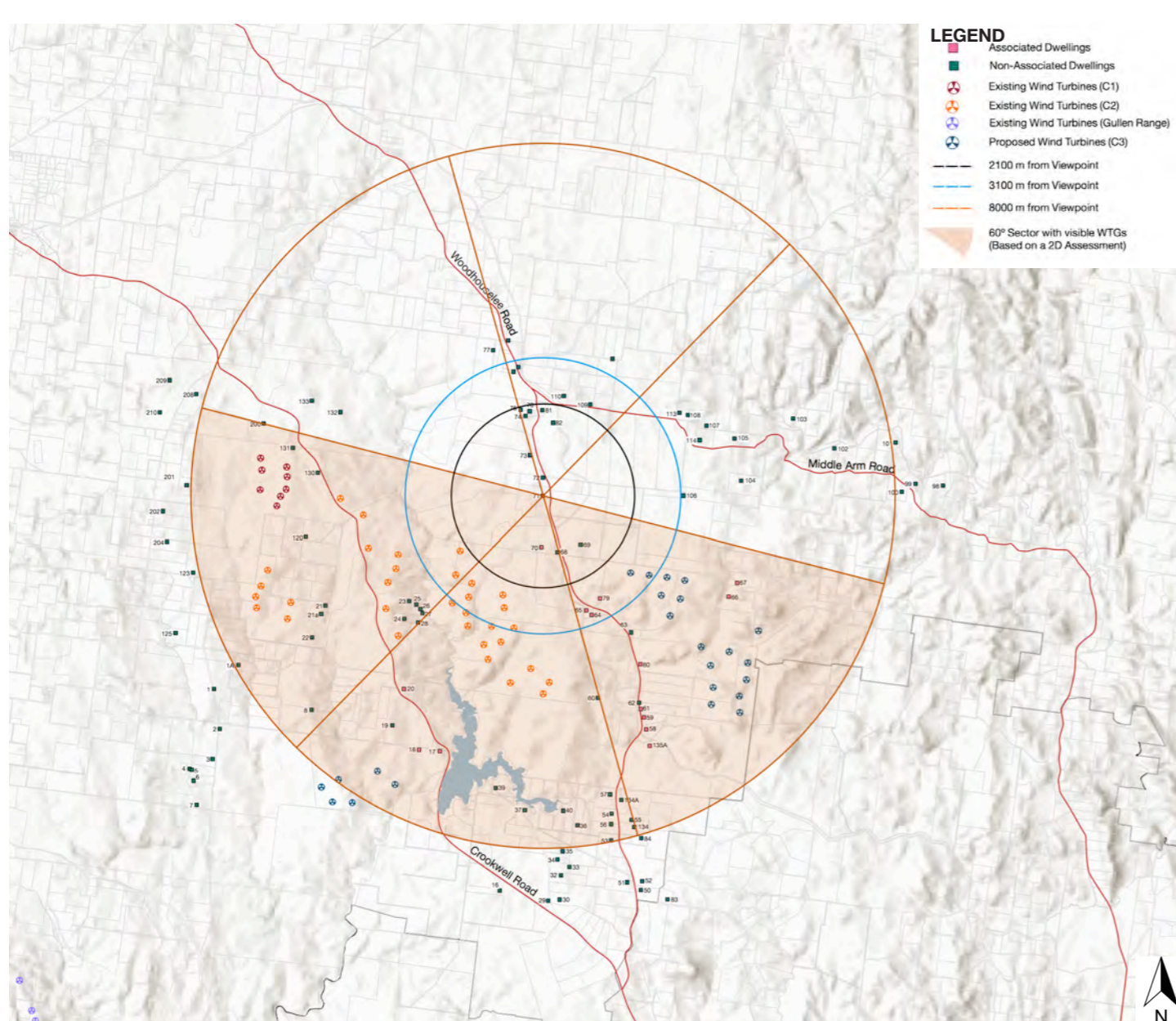


Figure A.2.A Preliminary Assessment Tool: Dwelling 71

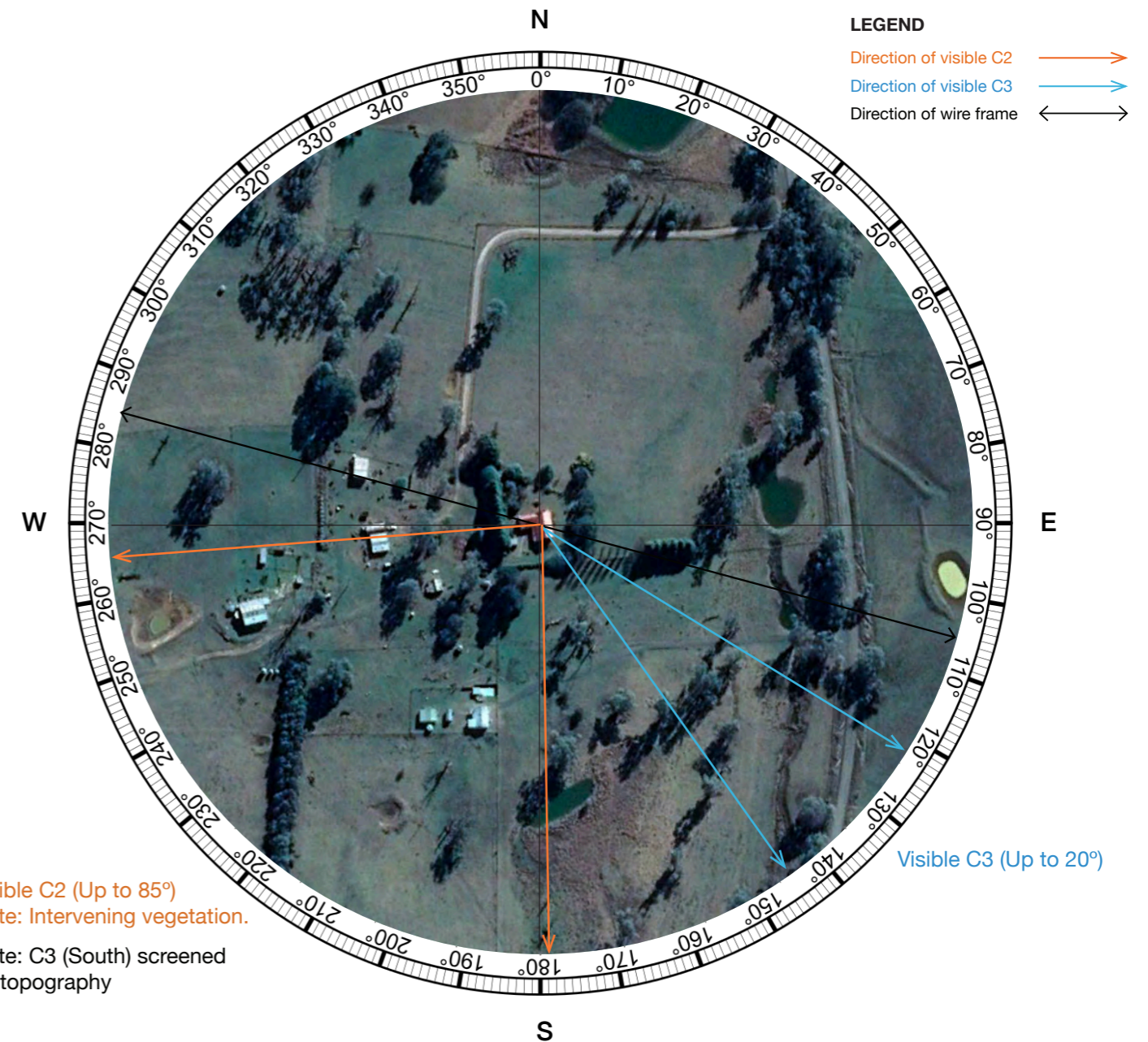
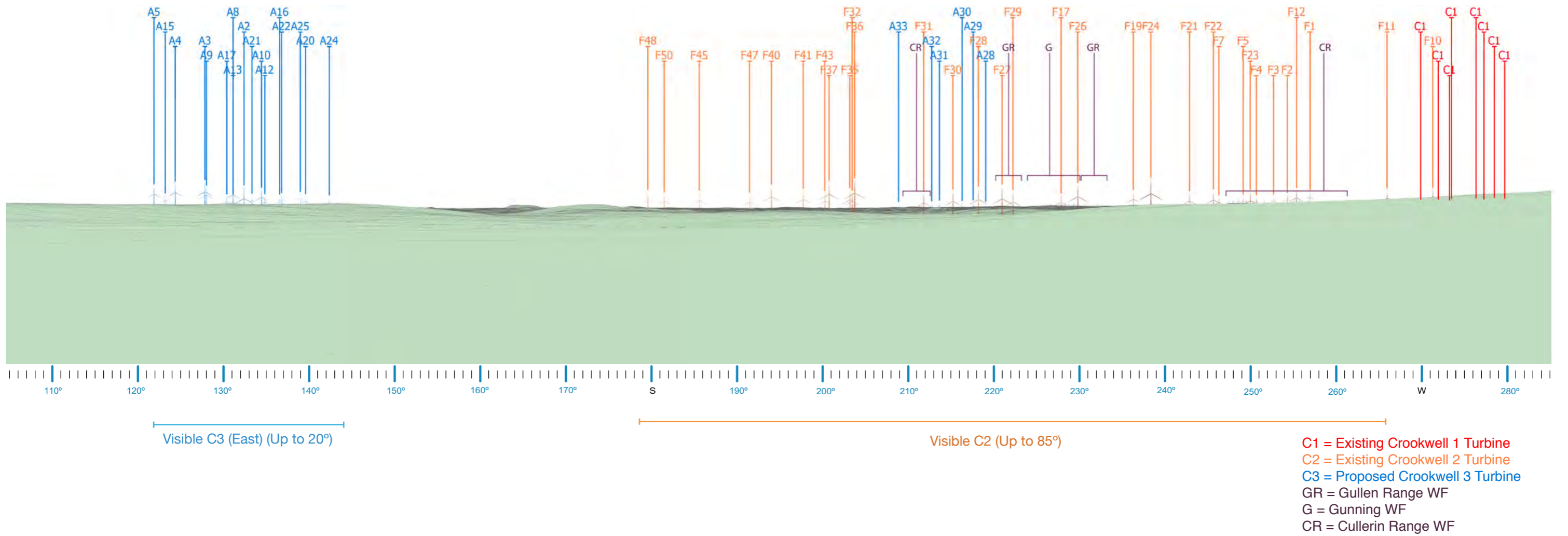


Figure A.2.B Aerial Assessment - Dwelling 71 (Source: Google Earth Imagery Date 20.08.2020)

A2. Dwelling 71 Lynross Wire frame



A3. Dwelling 72 Highlands Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.9 (A2)	Nearest proposed <i>visible</i> C3 turbine (km):	2.9 (A2)	Views to the existing C2 turbines are limited to approximately 35° to the SSW. No views are available to proposed C3 (South) turbines due to topography. Views to up to 17 proposed C3 (East) turbines would occupy approximately 20° of the view to the south east. Intervening roadside vegetation has the potential to reduce the number of visible C3 (East) turbines.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	
Number of theoretical 60° Sectors (Based on 2D Assessment)	3 Sectors	Number of theoretical 60° Sectors (Based on 3D Assessment)	2 Sectors (Total = 55°)	The GBLD and OHD assessments rated the visual impact as low and moderate, respectively. One (1) proposed C3 turbines is located within the blue line of visual magnitude. The OHD assessment gave a cumulative visual impact rating of moderate based on a 2D assessment of > 2 sectors. Desktop assessment undertaken by Moir LA found the cumulative impact is likely to be lower as there is an acceptable 2 sectors (combined total of 55°). Cumulative views to proposed and existing turbines would be in up to 45° of the view.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	9	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	26	

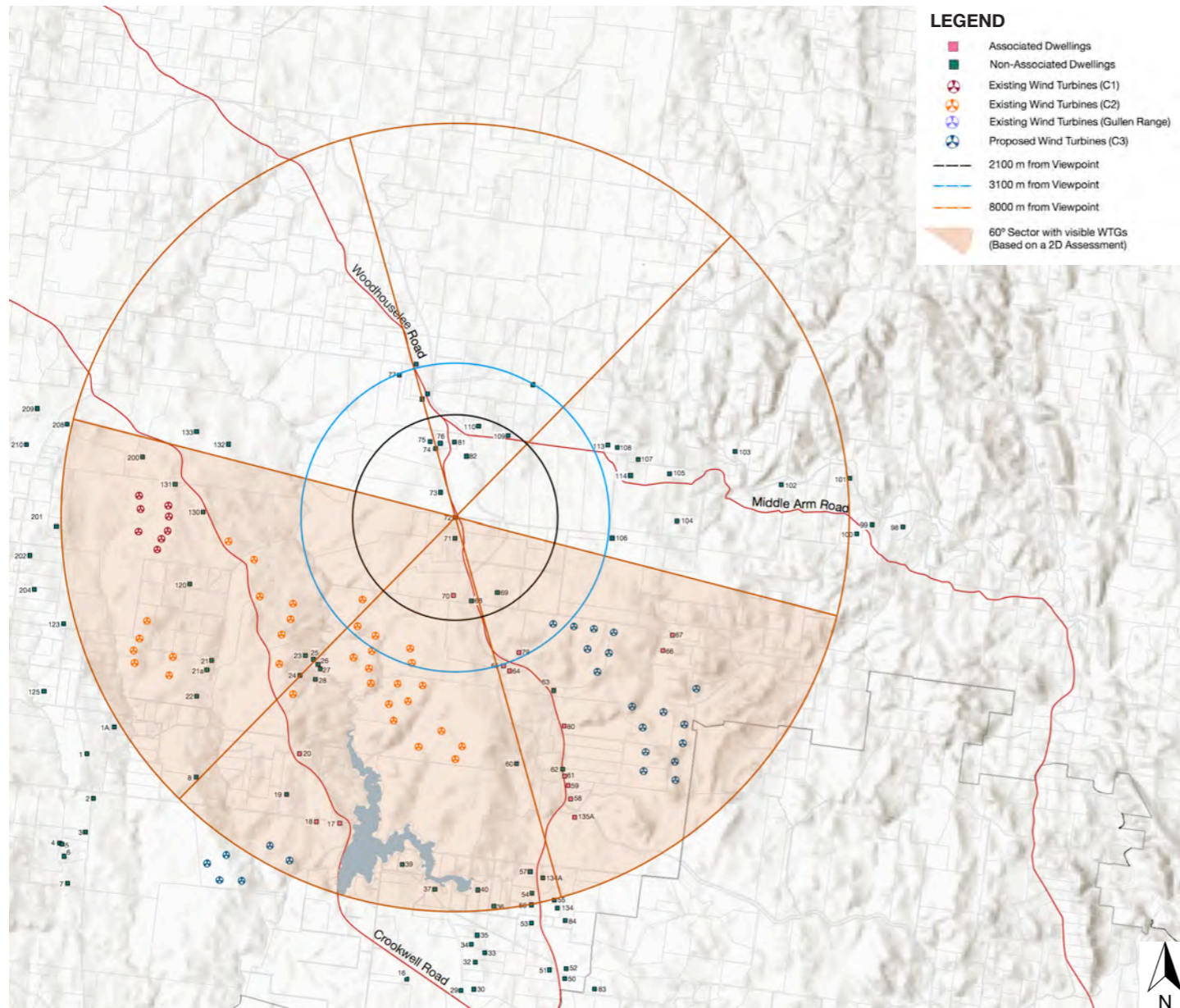


Figure A.3.A Preliminary Assessment Tool: Dwelling 72

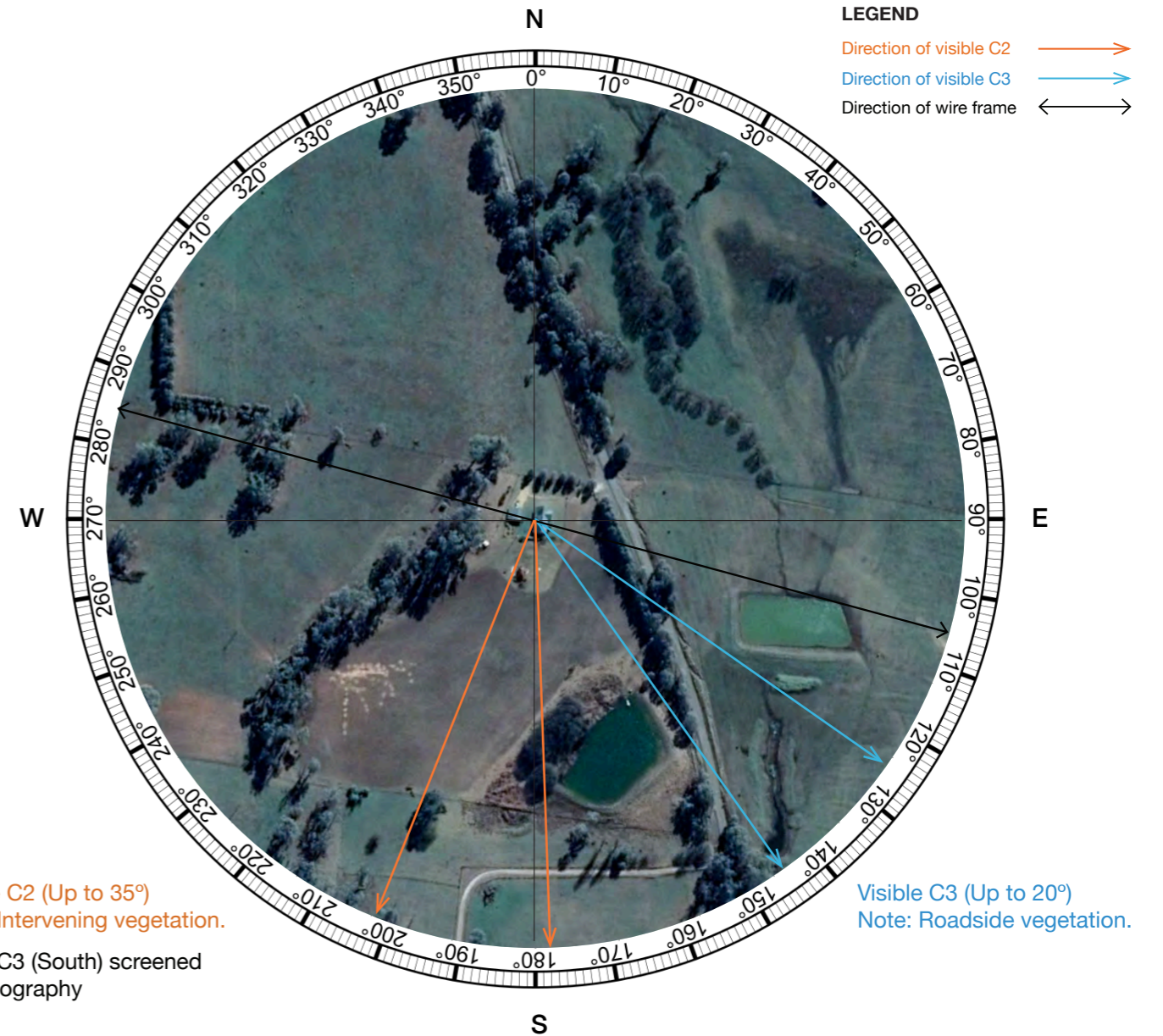
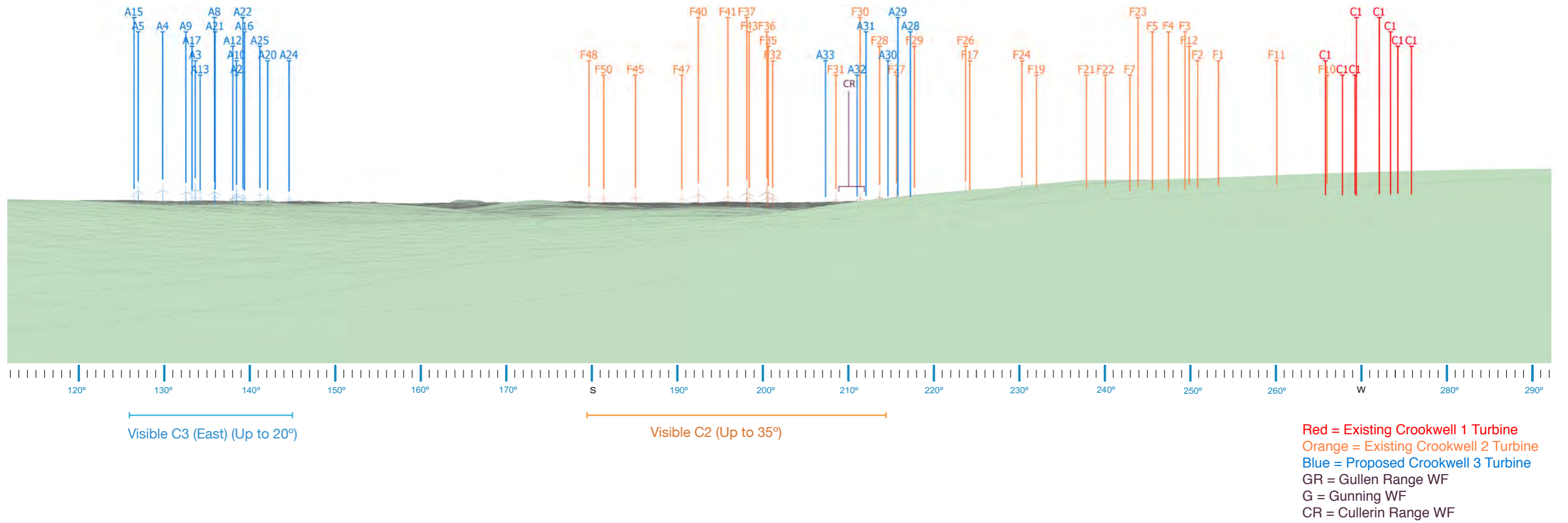


Figure A.3.B Aerial Assessment - Dwelling 72 (Source: Google Earth Imagery Date 20.08.2018)

A3. Dwelling 72 Highlands Wire frame



A4. Dwelling 74 Rosslyn Assessment

Preliminary Assessment Tools:		Assessment Notes:	
Nearest proposed C3 turbine (km):	4.2km	Nearest proposed <i>visible</i> C3 turbine (km):	
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of theoretical 60° Sectors (Based on 3D Assessment)	2 (Total = 80°)
Number of existing visible turbines (C1 & C2) (Based on topography alone)	13	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	30

Views to the existing C2 turbines are limited to up to 65° to the SSW.

No views are available to proposed C3 (South) turbines due to topography. Views to up to 17 proposed C3 (East) turbines would occupy approximately 15° of the view in excess of 4.2km to the south east. Intervening wind break planting has the potential to reduce the number of visible C3 (East) turbines.

The GBLD and OHD assessments rated the visual impact as nil and low-moderate, respectively.

The OHD assessment gave a cumulative visual impact rating of moderate-high based on a 2D assessment of > 2 sectors. Desktop assessment undertaken by Moir LA found the cumulative impact is likely to significantly lower as there is an acceptable 2 sectors (combined total of 80°). Additionally, dense wind break planting surrounding the dwelling is likely to screen views to the majority of wind turbines.

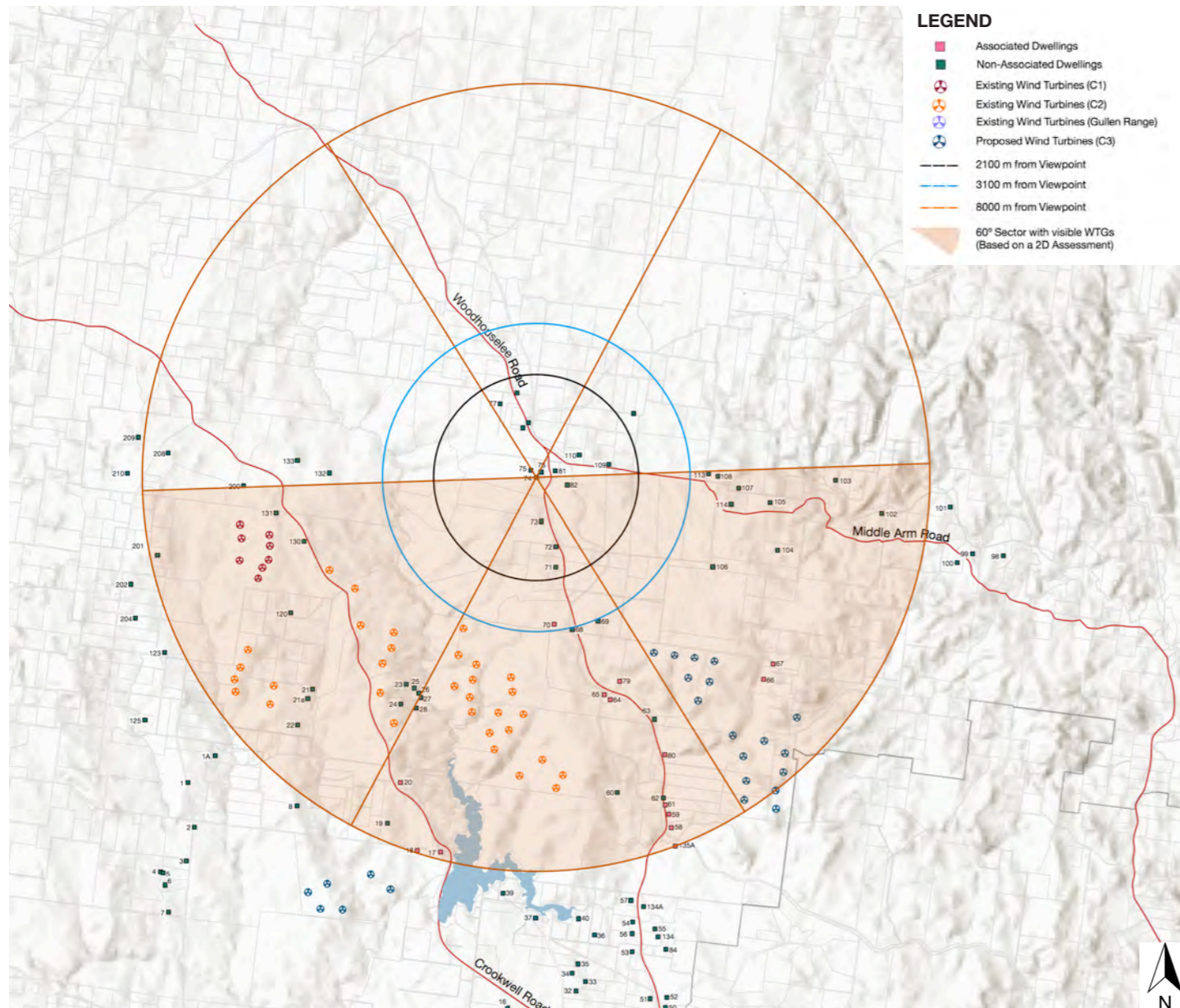


Figure A.4.A Preliminary Assessment Tool: Dwelling 74

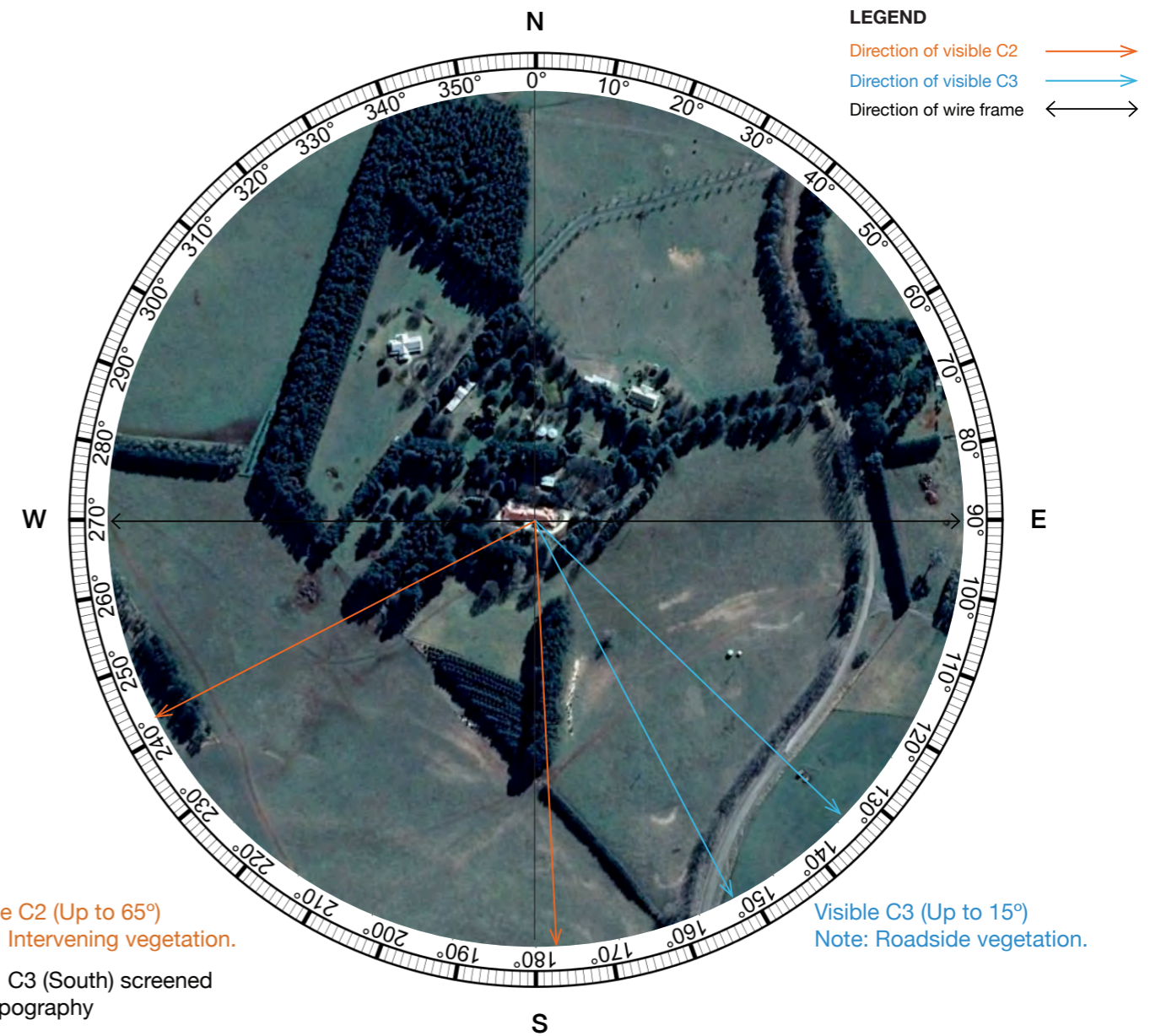
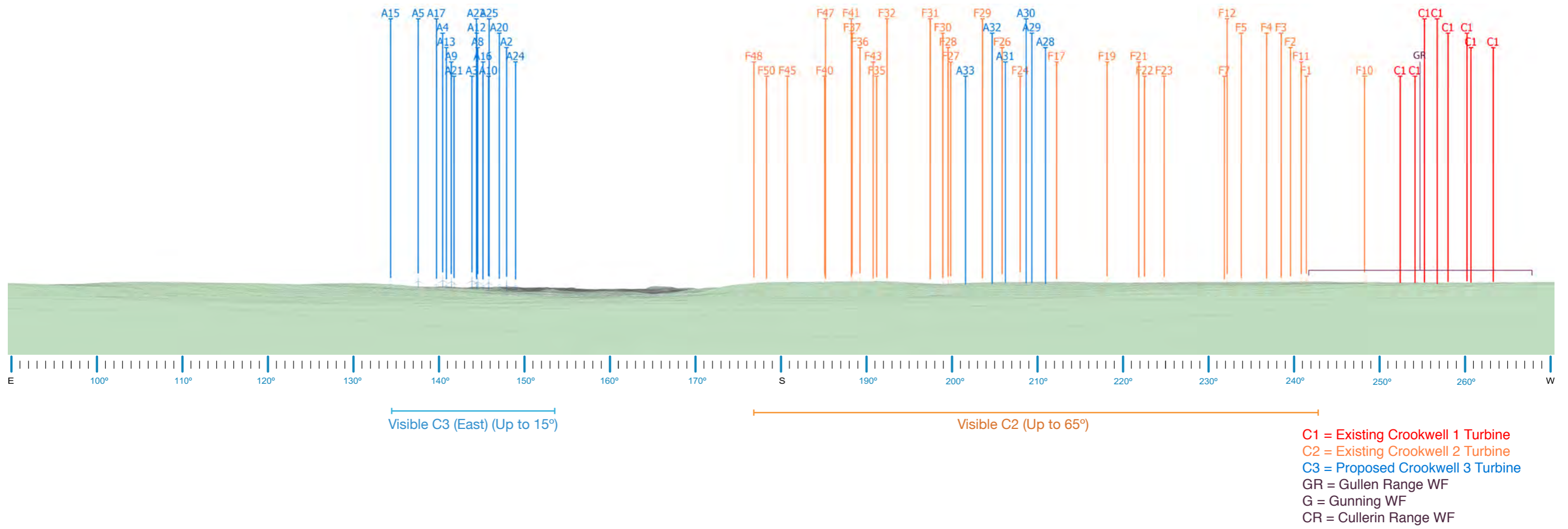


Figure A.4.B Aerial Assessment - Dwelling 74 (Source: Google Earth Imagery Date 20.08.2018)

A4. Dwelling 74 Rosslyn Wire frame



A5. Dwelling 104 Highland Park Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.6km (A5)	Nearest proposed <i>visible</i> C3 turbine (km):	2.6km (A5)	No views to the existing C2 turbines due to topography.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	No views are available to proposed C3 (South) turbines due to topography. Views to up to 16 proposed C3 (East) turbines would occupy up to 50° of the view to the south east. Intervening vegetation is likely to reduce the number of visible C3 (East) turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	2	Number of theoretical 60° Sectors (Based on 3D Assessment)	1 (Total = 58°)	The GBLD and OHD assessments rated the visual impact of C3 (East) as low and nil - low, respectively. One (1) proposed C3 turbines is located within the blue line of visual magnitude.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	0	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	17	The OHD assessment gave a cumulative visual impact rating of moderate - high based on a 2D assessment of > 2 sectors. Desktop assessment undertaken by Moir LA found the cumulative impact is likely to be lower as there is only one sector (total of 58°) potentially visible. This is based on a 3D Assessment and intervening vegetation is likely to further reduce the extent of visible C3 (East) turbines.

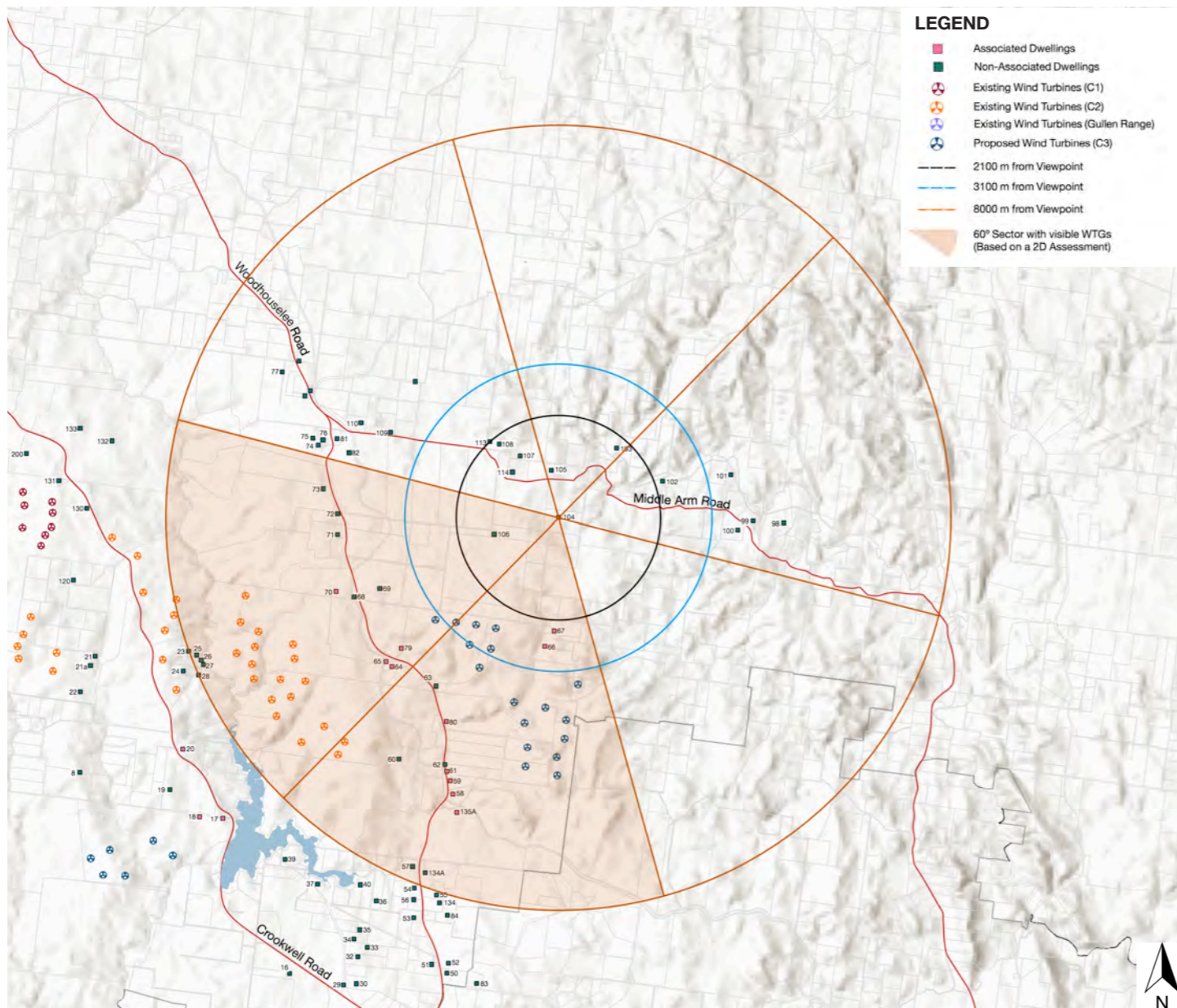


Figure A.5.A Preliminary Assessment Tool: Dwelling 104

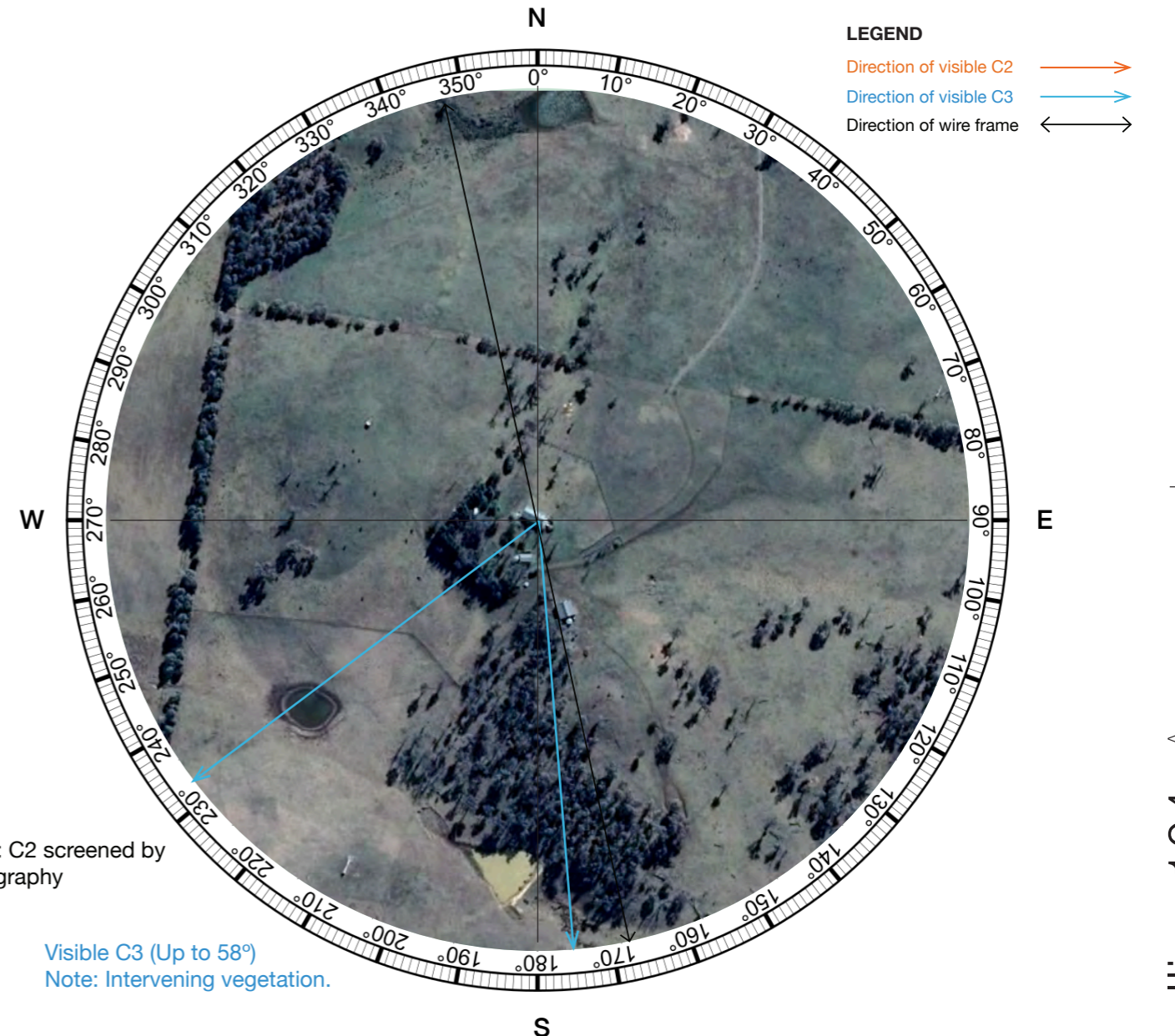
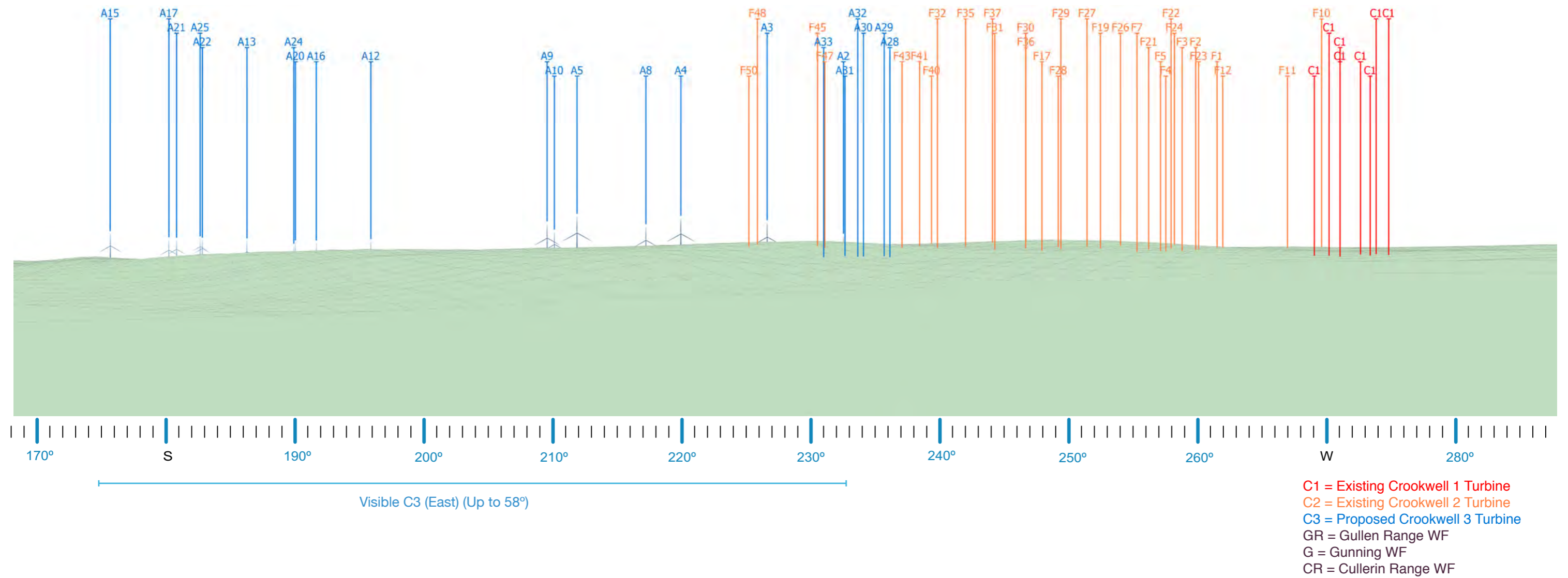


Figure A.5.B Aerial Assessment - Dwelling 104 (Source: Google Earth Imagery Date 20.08.2018)

A5. Dwelling 104 Highland Park Wire frame



A6. Dwelling 106 Rosedale Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	1.8km (A4)	Nearest proposed <i>visible</i> C3 turbine (km):	1.8km (A4)	Views to up to 22 of the existing C2 turbines are visible to the WSW.
Number of proposed C3 turbines within 2100m:	3	Number of <i>visible</i> C3 turbines within 2100m:	3	No views are available to proposed C3 (South) turbines due to topography. Views to up to 17 proposed C3 (East) turbines would occupy up to 65° of the view to the south east. Intervening vegetation is likely to reduce the number of visible C3 (East) turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	2	Number of theoretical 60° Sectors (Based on 3D Assessment)	2	The GBLD and OHD assessments rated the visual impact of C3 (East) as low and nil - low, respectively. Three (3) proposed C3 turbines are located within the blue line of visual magnitude.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	22	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	39	The OHD assessment gave a cumulative visual impact rating of moderate - high based on a 2D assessment of > 2 sectors. Desktop assessment undertaken by Moir LA found the cumulative impact is likely to be lower as there is two sectors (total of 65°) potentially visible. This is based on a 3D Assessment and intervening vegetation is likely to further reduce the extent of visible C3 (East) turbines.

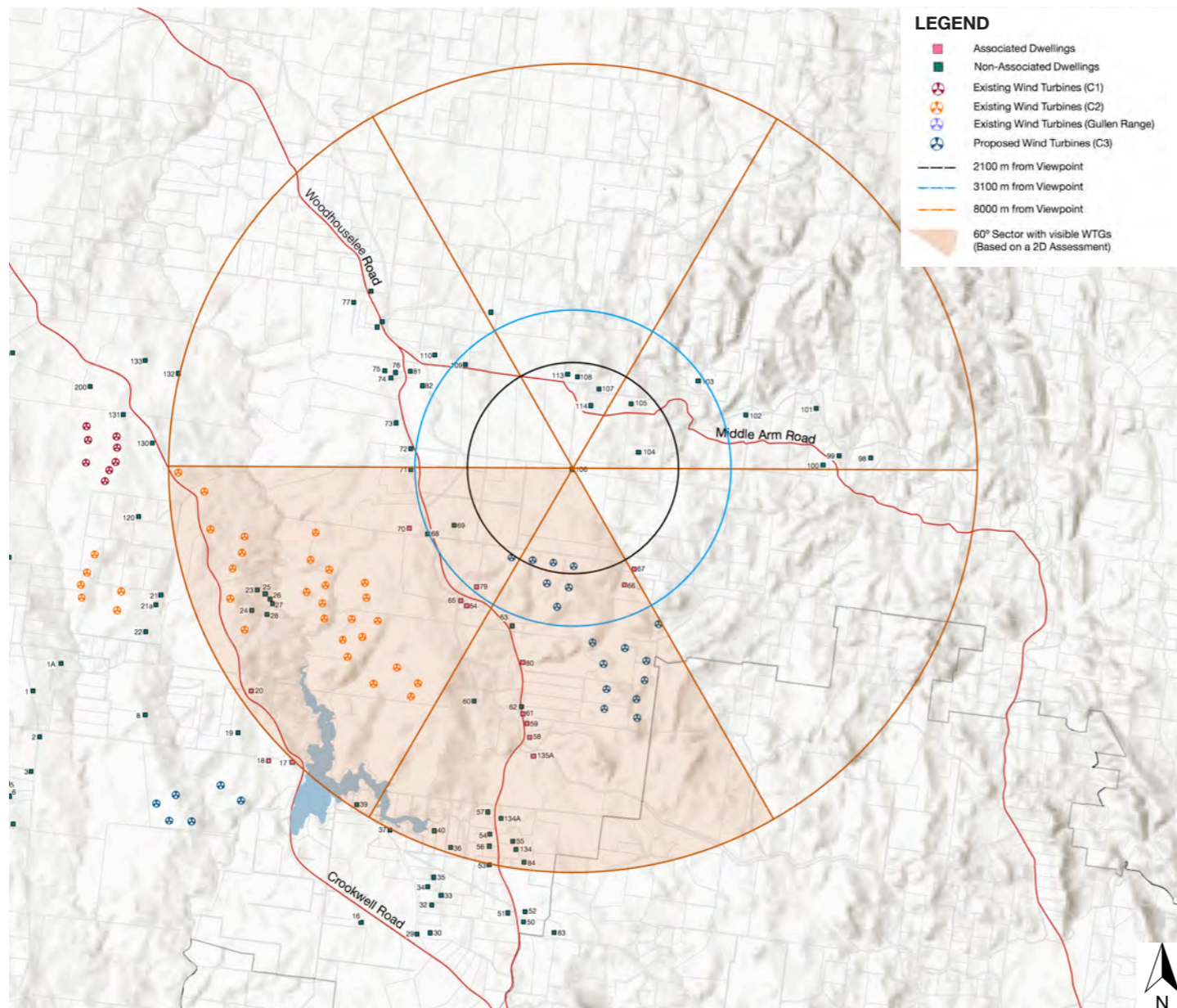


Figure A.6.A Preliminary Assessment Tool: Dwelling 106

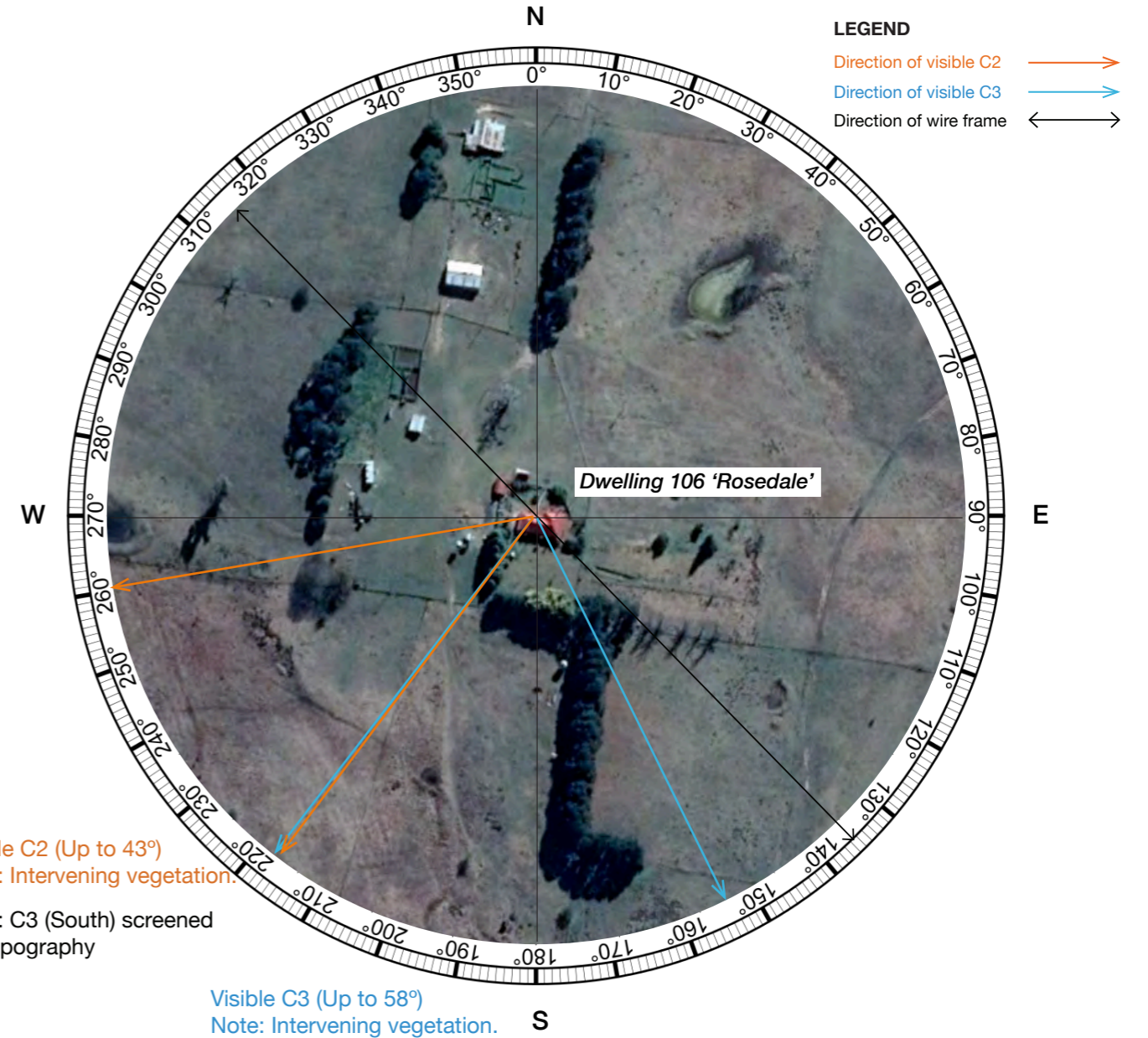
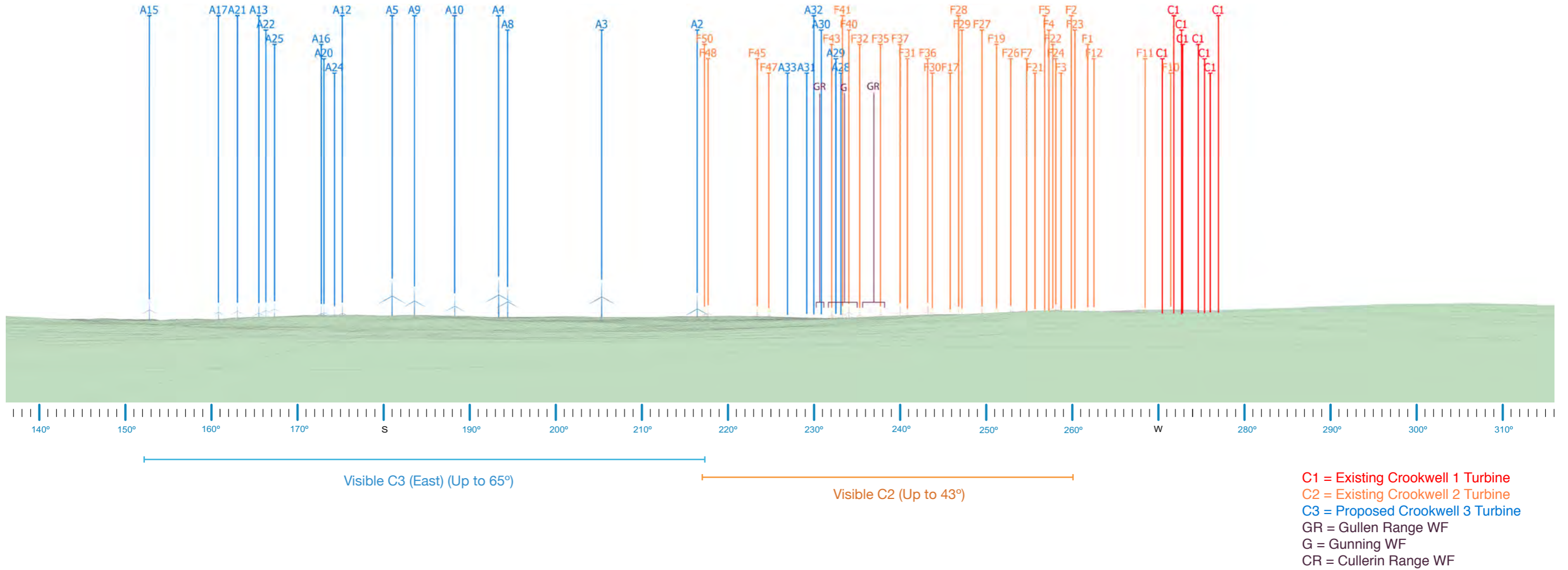


Figure A.6.B Aerial Assessment - Dwelling 106 (Source: Google Earth Imagery Date 20.08.2018)

A6. Dwelling 106 Rosedale Wire frame








Appendix B

Assessment of Woodhouselee Road: Eastern Cluster

B. Woodhouselee Road: Eastern Cluster Assessment

Table B. Woodhouselee Road: Eastern Cluster													
ID	Name	Location	Involved	Closest C3 WTG (km)	VIA Assessment		OHD Comments			MLA Desktop Assessment			MLA Assessment Notes:
					South	East	South	East	Cumulative	South	East	Cumulative	
60	Pejar Park	Woodhouselee Road	No	2.6km	Nil	Moderate	Nil	Mod - High All east turbines are visible at between 2.2 - 3.5km, in 2 sectors, light screening.	Mod - High > 3 Sectors	Nil - Topography	Moderate	*Up to 3 Sectors	Cumulative visual impact is less than assessed by OHD. Likely to be further reduced by intervening vegetation. Refer to B1.
62	Cottonwood	Woodhouselee Road	No	1.6km	Nil	Mod - High	Nil	Mod - High A12, A16, A20 and A24 all visible at less than 2000m, some curtilage screening.	High > 3 Sectors	Nil - Topography	Mod - High	Up to 3 Sectors	Cumulative visual impact is less than assessed by OHD. Refer to Appendix B2.
63	Rocky Corner	Woodhouselee Road	No	1.1km	Nil	High	Nil	High A2, A3, A4, A5, A8, A9, A10, A12, A13, A16, A17, A20, A21, A22 and A24 all highly visible.	High over 5 sectors	Nil - Topography	High	*Up to 4 Sectors	Cumulative visual impact is less than assessed by OHD. Likely to be further reduced by intervening vegetation. Refer to Appendix B3.

KEY:

-  Identifies conflicting ratings (C3 South Assessment)
-  Identifies conflicting ratings (C3 East Assessment)
-  Identifies conflicting ratings (Cumulative Assessment)

* = Likely to be reduced by intervening vegetation

B1. Dwelling 60 Pejar Park Assessment

Preliminary Assessment Tools:		Assessment Notes:	
Nearest proposed C3 turbine (km):	2.6 km (A24)	Nearest proposed <i>visible</i> C3 turbine (km):	2.6 km (A24)
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of theoretical 60° Sectors (Based on 3D Assessment)	3 (Total = 100°)
Number of existing visible turbines (C1 & C2) (Based on topography alone)	2	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	19

Views to the blades of two (2) turbines associated with existing C2 wind farm. Intervening vegetation likely to limit visibility.

No views are available to proposed C3 (South) turbines due to topography. Views to up to 17 proposed C3 (East) turbines would occupy up to 85° of the view to the north east. Intervening vegetation is likely to reduce the number of visible C3 (East) turbines.

The GBLD and OHD assessments rated the visual impact of C3 (East) as moderate and moderate - high, respectively.

The OHD assessment gave a cumulative visual impact rating of moderate - high based on a 2D assessment of > 3 sectors. Desktop assessment undertaken by Moir LA found the cumulative impact is likely to be lower as there is *up to three (3) 60° sectors* which is including the two blade tips to the west associated with C2. This is based on a 3D Assessment and intervening vegetation is likely to further reduce the extent of visible C3 (East) turbines.

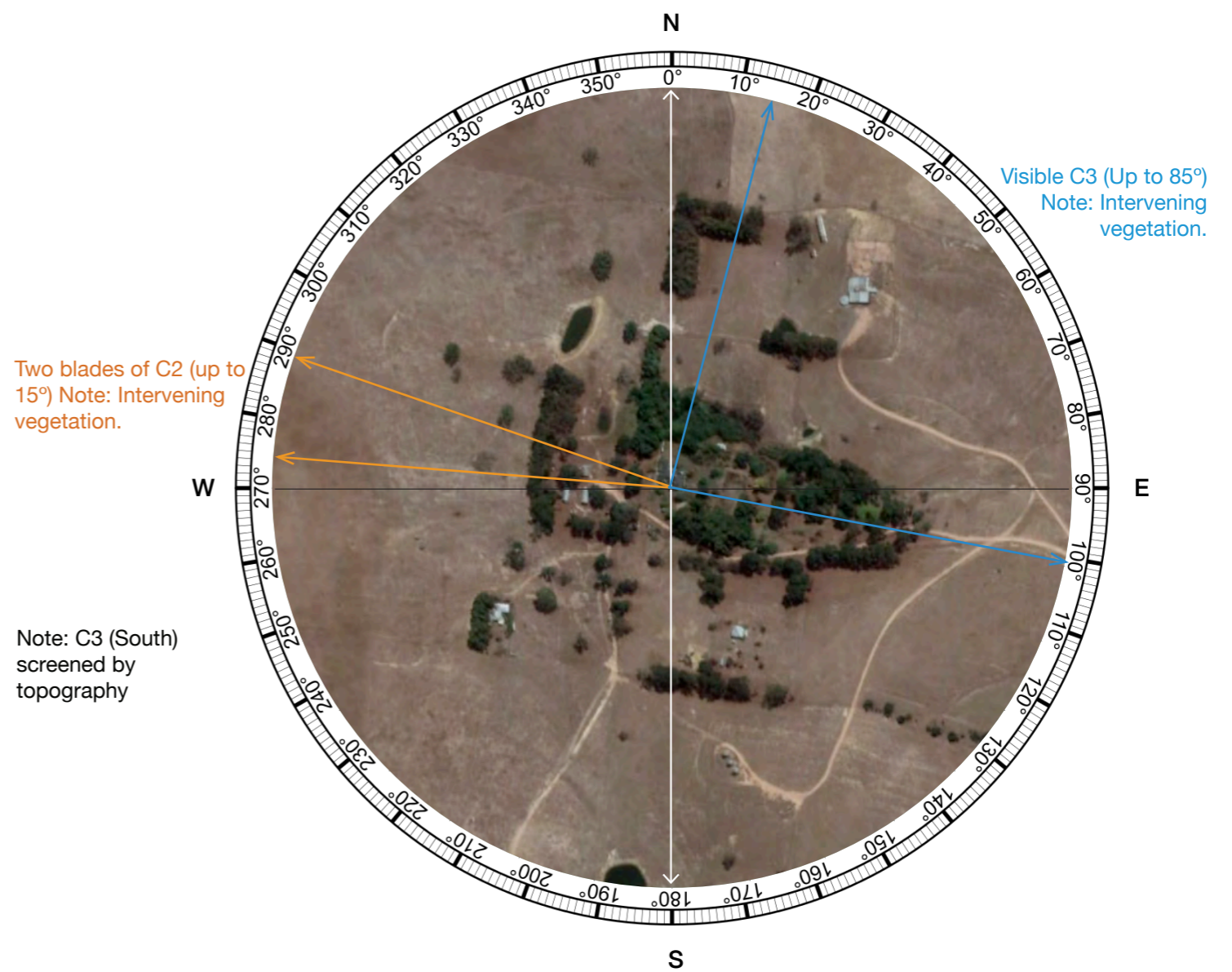
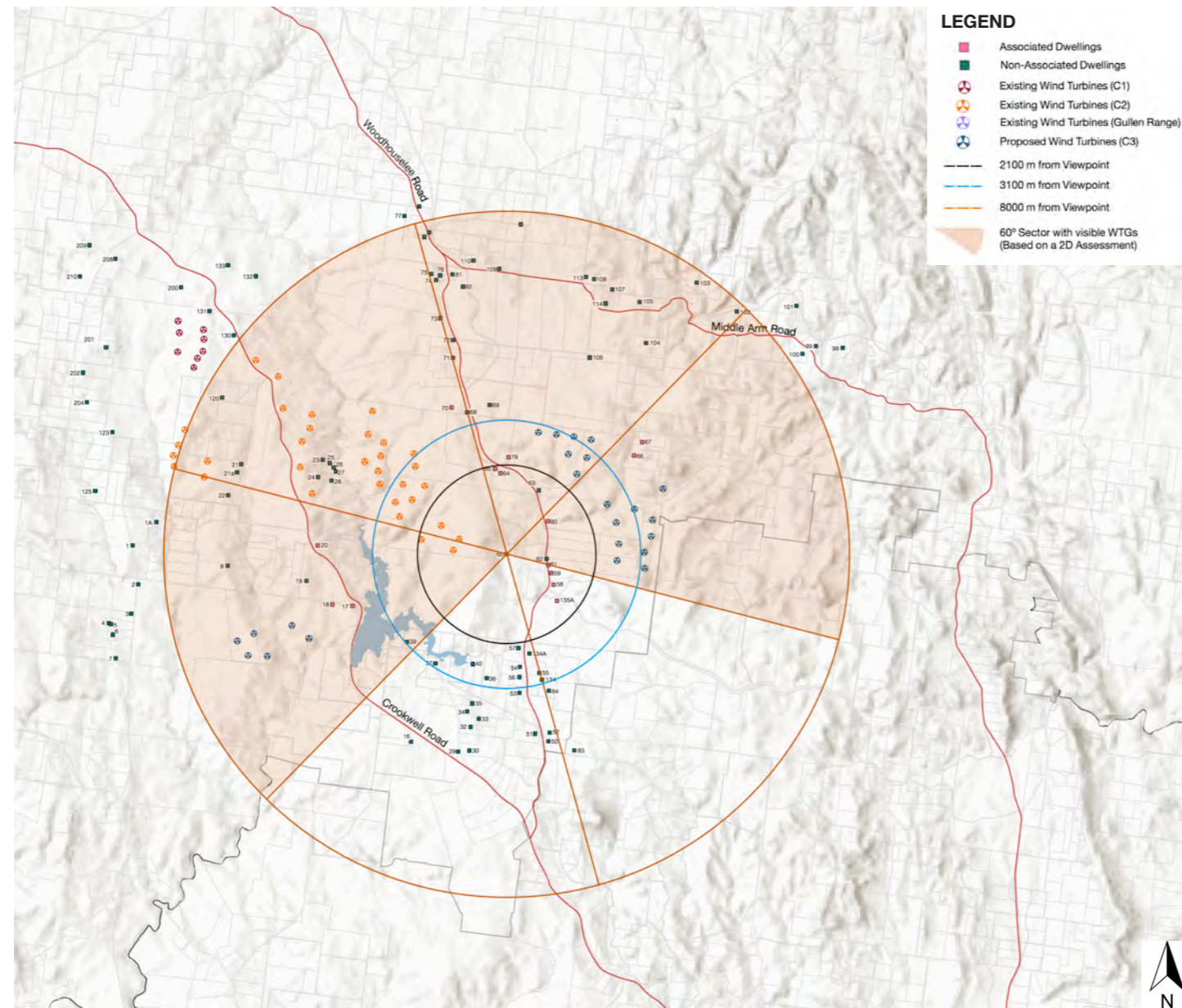
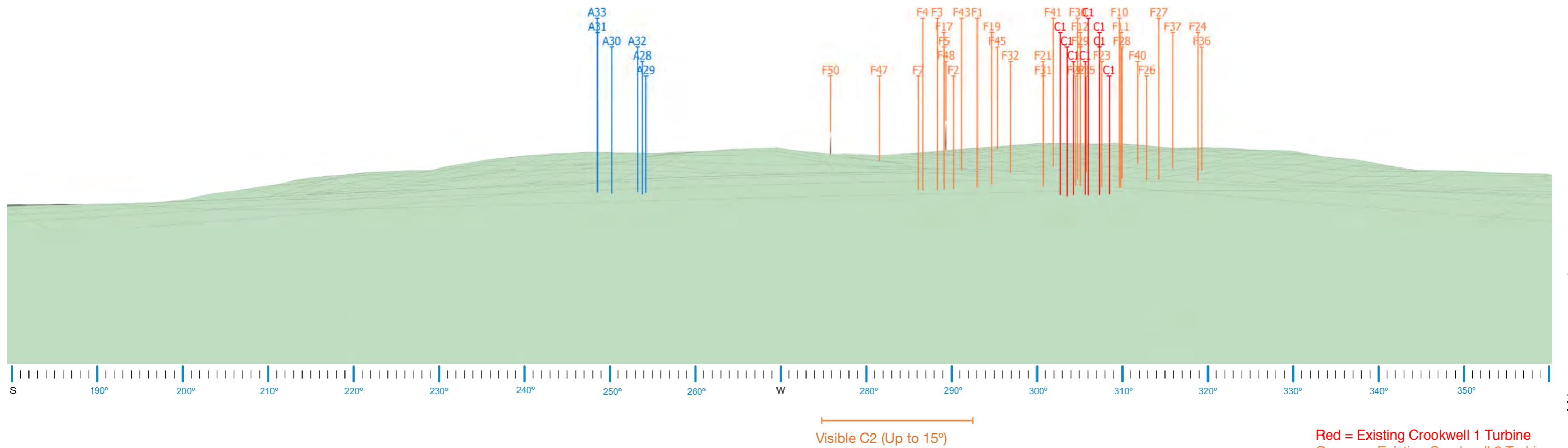
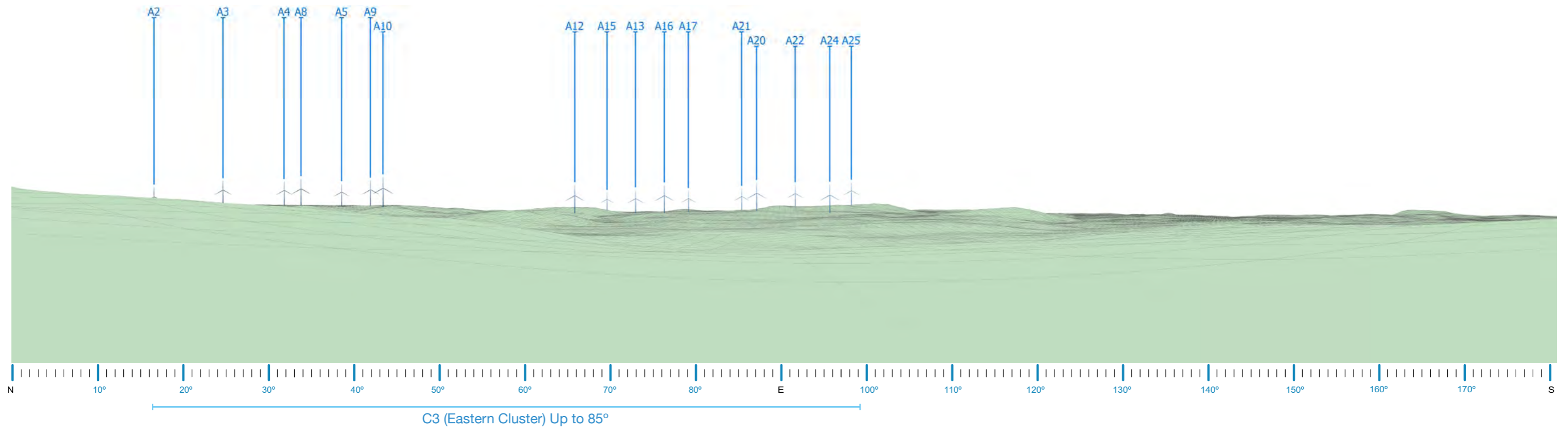


Figure B.1.A Preliminary Assessment Tool: Dwelling 60

Figure B.1.B Aerial Assessment - Dwelling 60 (Source: Google Earth Imagery Date 23.01.2020)

B1. Dwelling 60 Pejar Park Wire frame



Red = Existing Crookwell 1 Turbine
Orange = Existing Crookwell 2 Turbine
Blue = Proposed Crookwell 3 Turbine

B2. Dwelling 62 Cottonwood Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed turbine (km):	1.6km (A24)	Nearest proposed <i>visible</i> turbine (km):	1.6km (A24)	Views to the existing C2 turbines are limited to approximately 35° to the WNW and no views are available to proposed C3 (South) turbines due to topography.
Number of proposed C3 turbines within 2100m:	5	Number of <i>visible</i> C3 turbines within 2100m:	5	Views to up to 17 proposed C3 (East) turbines would occupy approximately 105° of the view to the north east.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	Up to 3 (Total = 140°)	The GBLD and O'Hanlon assessments consistently rated the visual impact as moderate - high. Five (5) proposed C3 turbines are located within the black line (2100m) of visual magnitude.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	5	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	22	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of > 3 sectors. Desktop assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed. Cumulative views to proposed and existing turbines would be in up to three sectors.

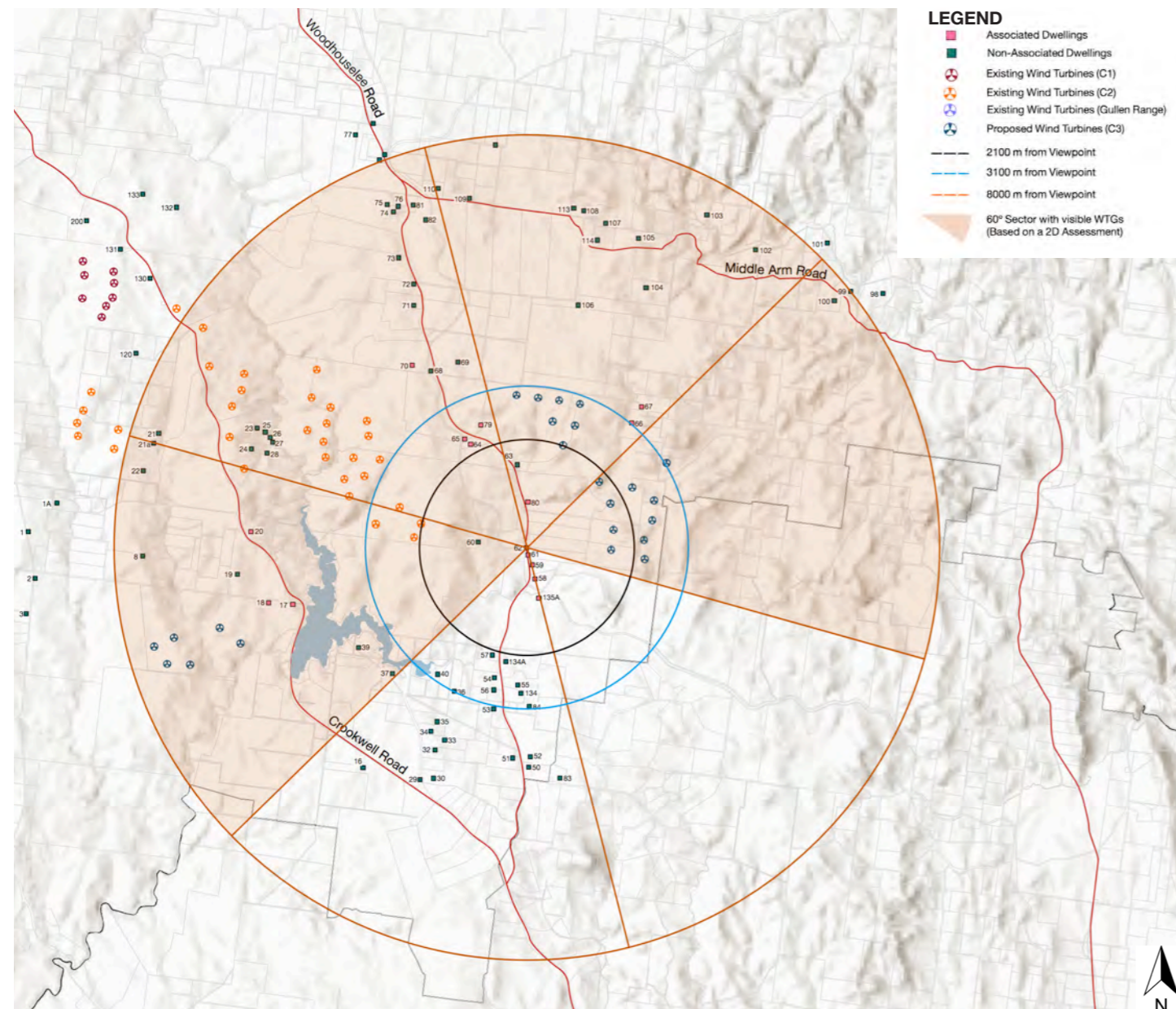


Figure B.2.A Preliminary Assessment Tool: Dwelling 62

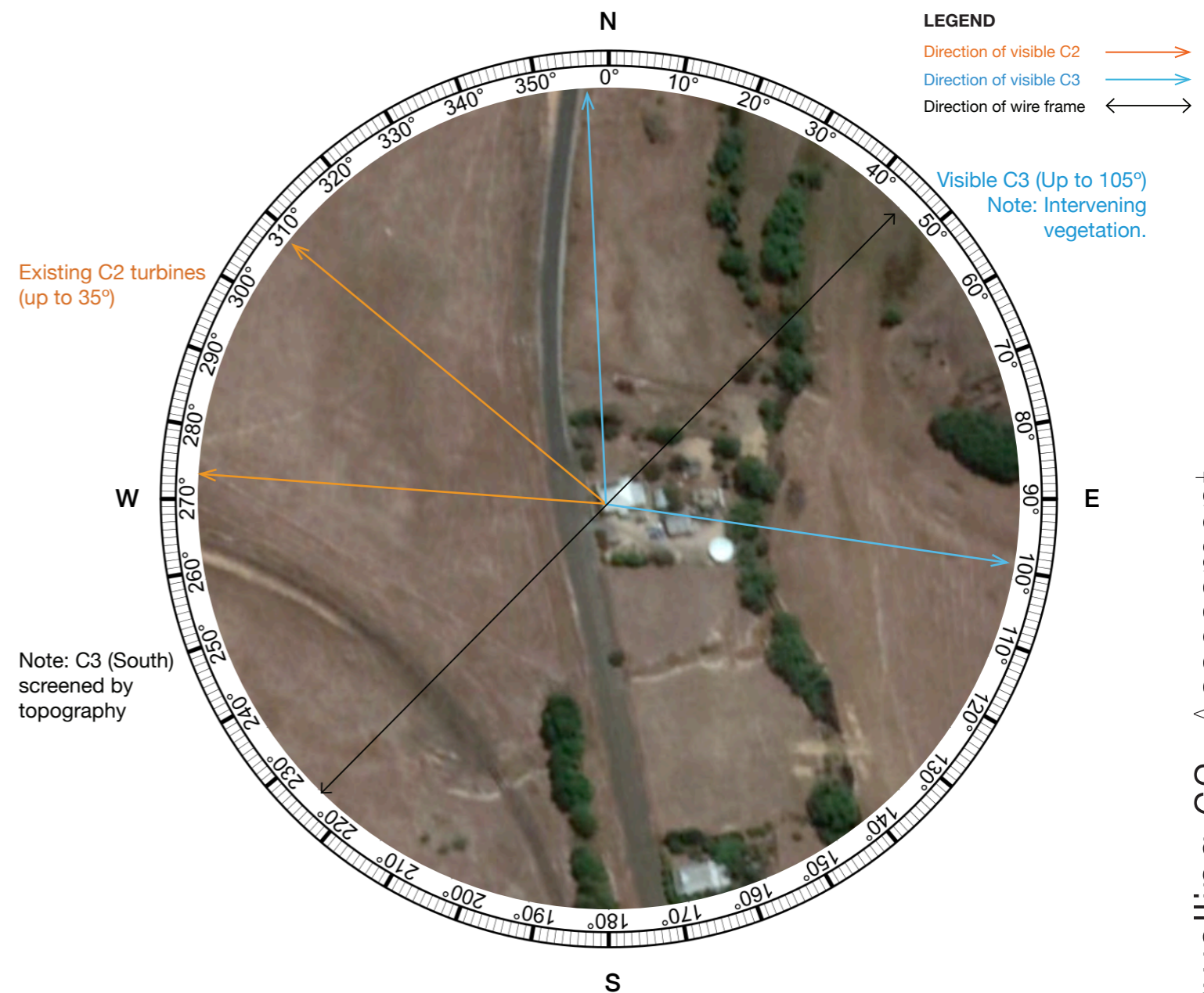
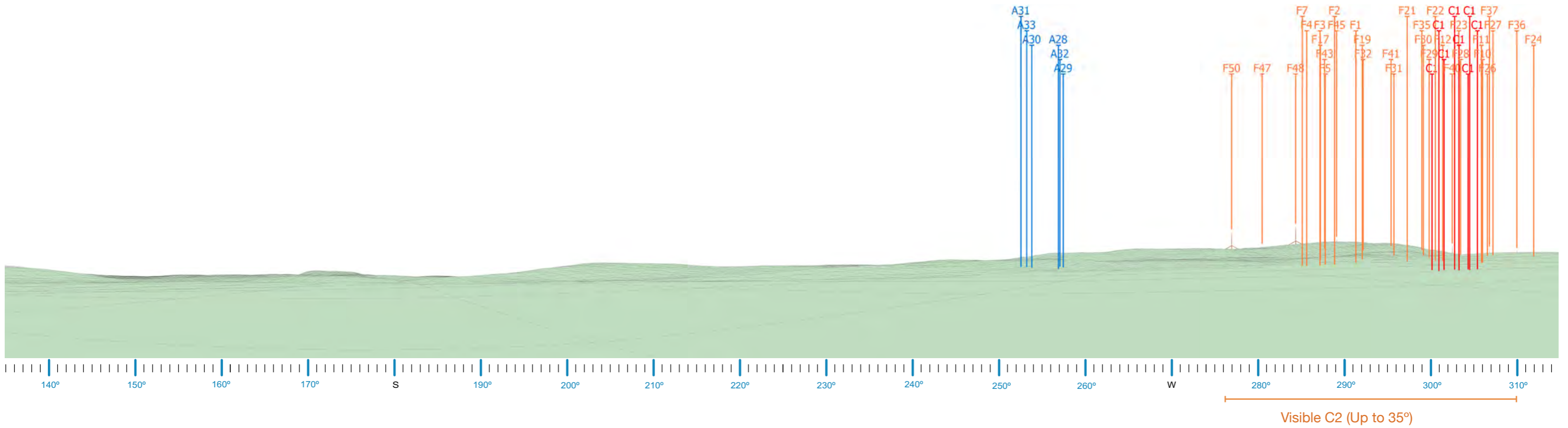
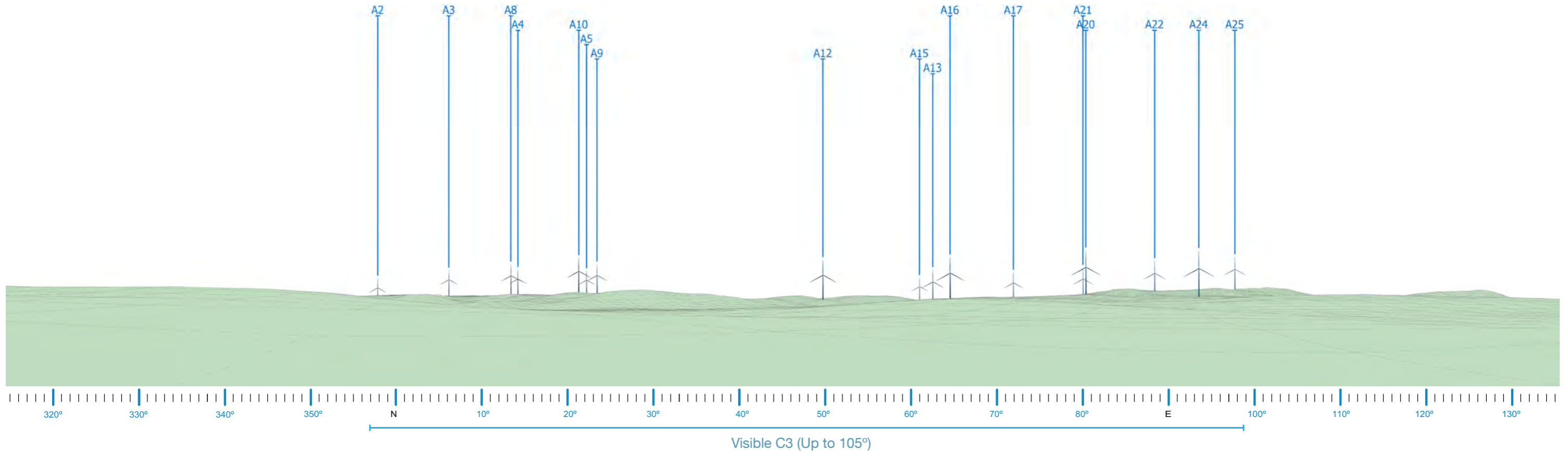


Figure B.2.B Aerial Assessment - Dwelling 62 (Source: Google Earth Imagery Date 23.01.2020)

B2. Dwelling 62 Cottonwood Wire frame



Red = Existing Crookwell 1 Turbine
 Orange = Existing Crookwell 2 Turbine
 Blue = Proposed Crookwell 3 Turbine

Dwelling 62 Assessment

B3. Dwelling 63 Rocky Corner Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed turbine (km):	1.1km	Nearest proposed <i>visible</i> turbine (km):	1.1km	Views to the existing C2 turbines are limited to approximately 55° to the west.
Number of proposed C3 turbines within 2100m:	9	Number of <i>visible</i> C3 turbines within 2100m:	9	No views are available to proposed C3 (South) turbines due to topography. Views to up to 17 proposed C3 (East) turbines would occupy approximately 105° of the view to the north east.
Number of theoretical 60° Sectors (Based on 2D Assessment)	5	Number of visible 60° Sectors (Based on 3D Assessment)	4 (Total 190°)	The GBLD and O'Hanlon assessments consistently rated the visual impact as high.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	5	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	22	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of > 5 sectors. 3D desktop assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed. Cumulative views to proposed and existing turbines would be in up to four sectors with intervening vegetation likely to limit visibility.

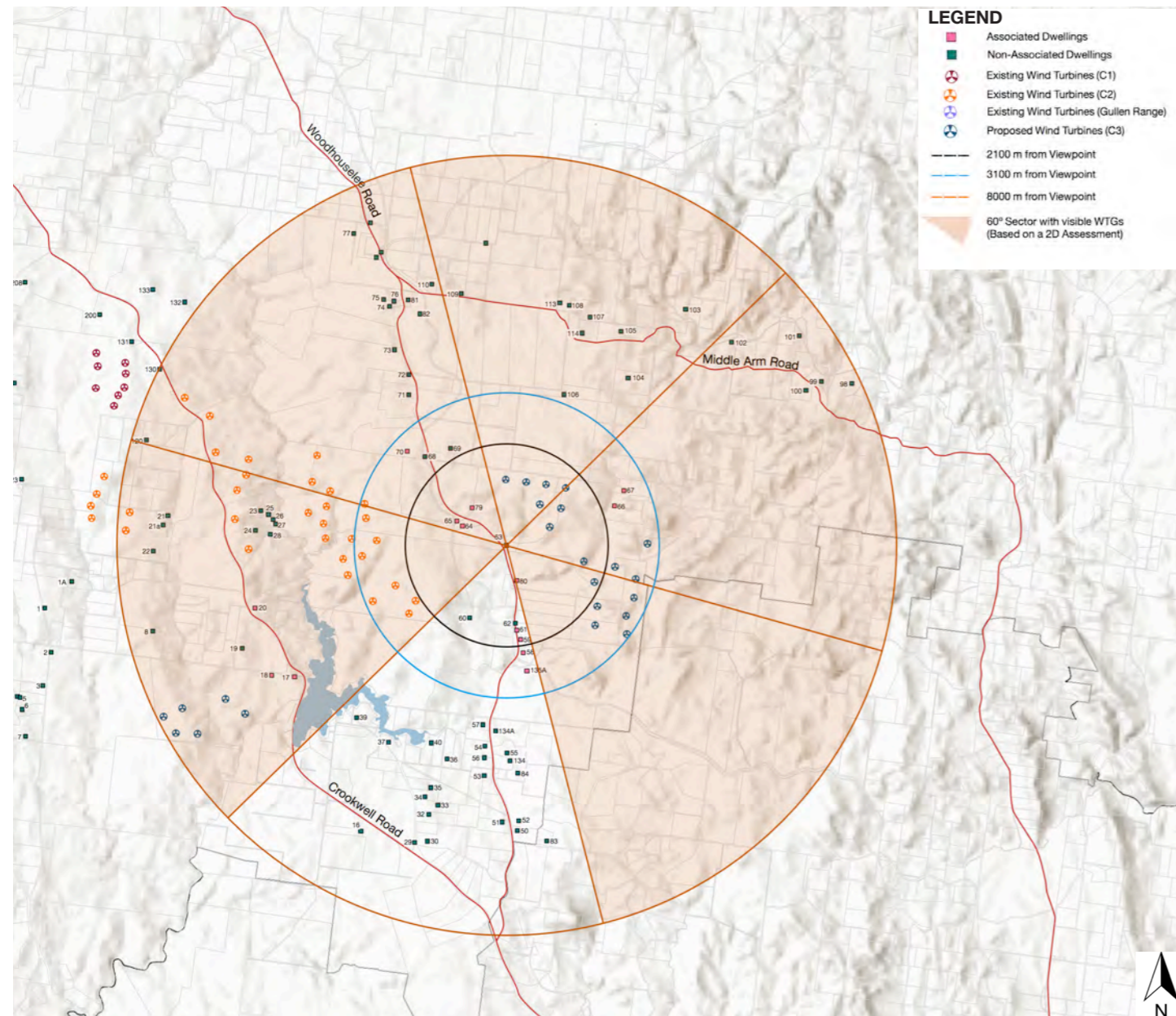


Figure B.3.A Preliminary Assessment Tool: Dwelling 63

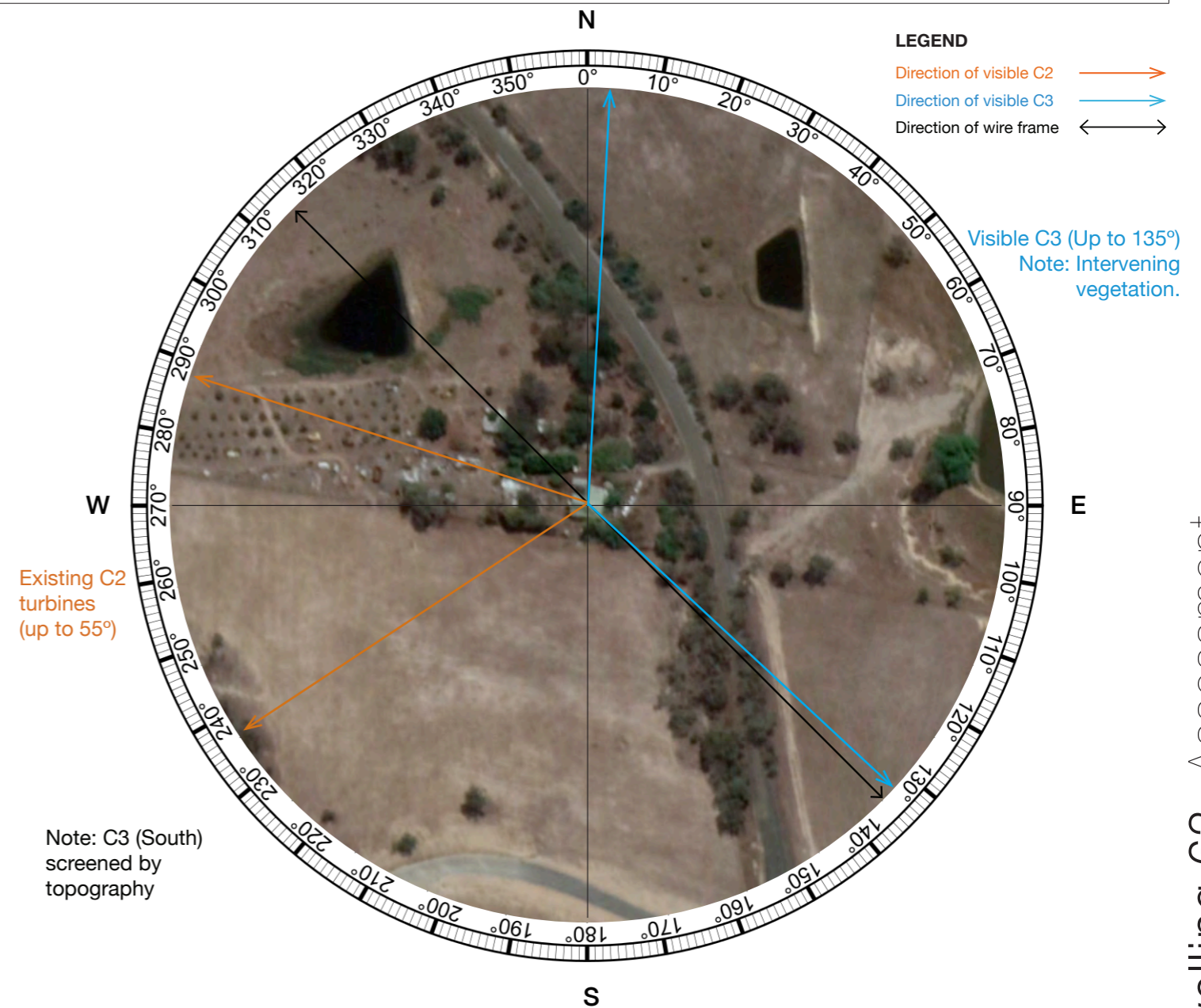
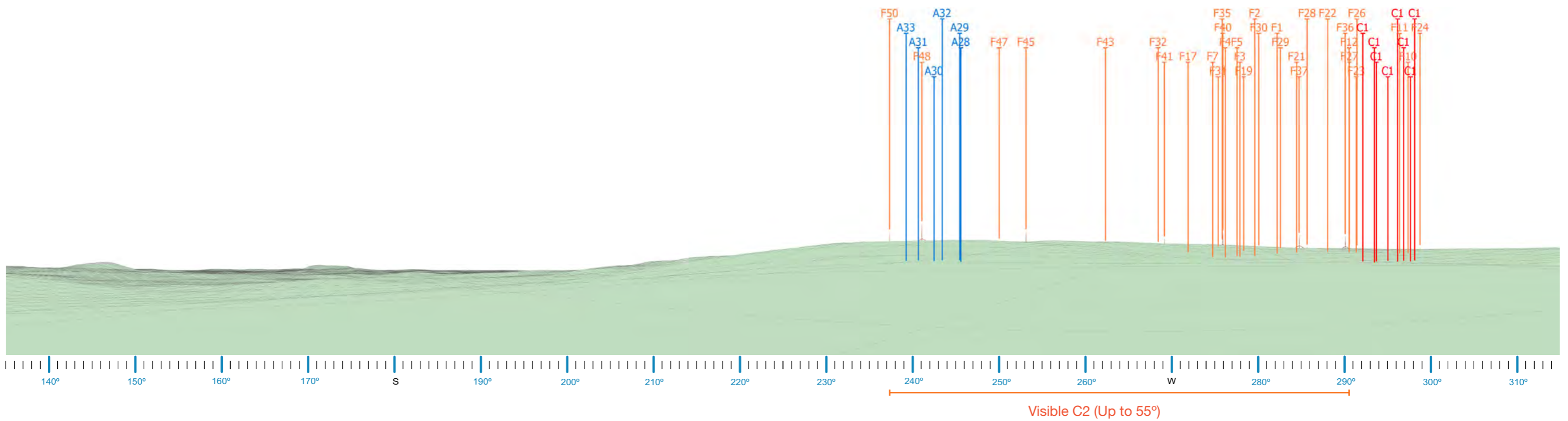
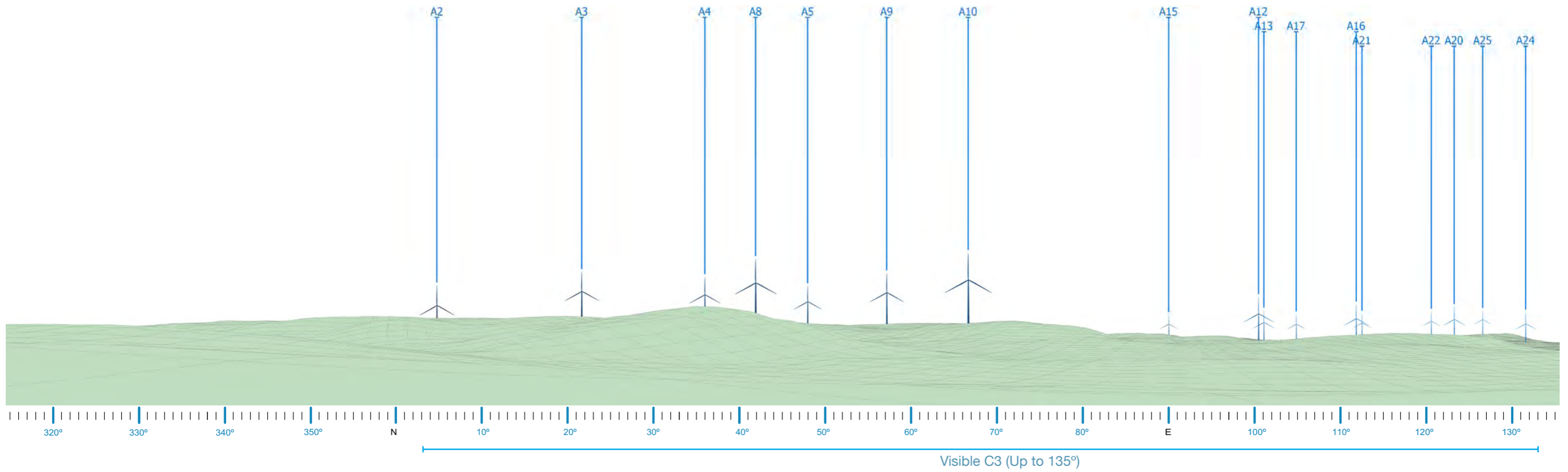


Figure B.3.B Aerial Assessment - Dwelling 62 (Source: Google Earth Imagery Date 23.01.2020)

B3. Dwelling 63 Rocky Corner Wire frame



Red = Existing Crookwell 1 Turbine
 Orange = Existing Crookwell 2 Turbine
 Blue = Proposed Crookwell 3 Turbine

Dwelling 63 Assessment



Appendix C

Third Creek: North Western Cluster

C. Third Creek: North Western Cluster Assessment

Table C: Third Creek: North Western Cluster												
ID	Name	Location	Closest C3 WTG (km)	VIA Assessment		OHD Comments			MLA Desktop Assessment			MLA Assessment Notes:
				South	East	South	East	Cumulative	South	East	Cumulative	
1	Evermore	Dawsons Creek Road	3.5km	Mod-High	Low	Mod Approx. 40% visible some veg. screening.	Nil - Low	Mod - High 4 Sectors incl. C2 and Gullen Range. 1 additional sector.	Mod	Nil - Low	*Up to 5 sectors majority screened by vegetation.	Existing C2 turbines and Gullen Range are the major components. C3 would only slightly increase the number of visible turbines in the view. Refer to C1.
1A	-	Pejar Road	3.8km	Nil	Low	Low - Mod approx 30% visible	Negligible	Low 2 sectors with C2	Low - Mod	Negligible	Up to 3 sectors.	Existing C2 turbines are the major components. C3 would only slightly increase the number of visible turbines in the view. Refer to C2.
123	-	Third Creek Road	5.6km	Nil	Low	Low	Negligible	Moderate 4 sectors with C2 and Gullen Range	Negligible	Negligible	*Up to 3 sectors.	Vegetation is likely to screen views to C3 (south) reducing the potential extent of visible turbines to one sector. Refer to C3.
125	-	Third Creek Road	4.6km	Nil	Low	Negligible	Negligible	Negligible	Negligible	Negligible	*Negligible	Limited opportunities to view existing and proposed turbines due to topography and roadside vegetation. Refer to C4.

KEY:

- Identifies conflicting ratings (C3 South Assessment)
- Identifies conflicting ratings (C3 East Assessment)
- Identifies conflicting ratings (Cumulative Assessment)

* = Likely to be reduced by intervening vegetation

C1. Dwelling 1 Evermore Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.3km	Nearest proposed <i>visible</i> C3 turbine (km):	3.3km	Views to the existing C1 and C2 turbines occupy approximately 80° to the north east. Gullen Range is visible to the west. Vegetation surrounding the dwelling is likely to reduce visibility of these existing turbines.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views of up to 20° to the proposed C3 turbines (to the south east). The GBLD and O'Hanlon assessments rated the visual impact of the south C3 turbines as mod and mod - high respectively. Intervening vegetation would reduce potential visibility.
Number of theoretical 60° Sectors (Based on 2D Assessment)	5	Number of visible 60° Sectors (Based on 3D Assessment)	5	Views to up to 17 proposed C3 (East) turbines would occupy approximately 20° within the background of the view currently occupied by the existing Crookwell 2 turbines. Intervening vegetation would reduce potential visibility.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	38	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	61	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of 4 sectors. 3D desktop assessment undertaken by Moir LA found the cumulative impact is likely to be similar to that assessed and agrees with statement made by OHD that <i>the overall cumulative effect of C3 (south) is relatively low as C2 and Gullen Range are the major components.</i>

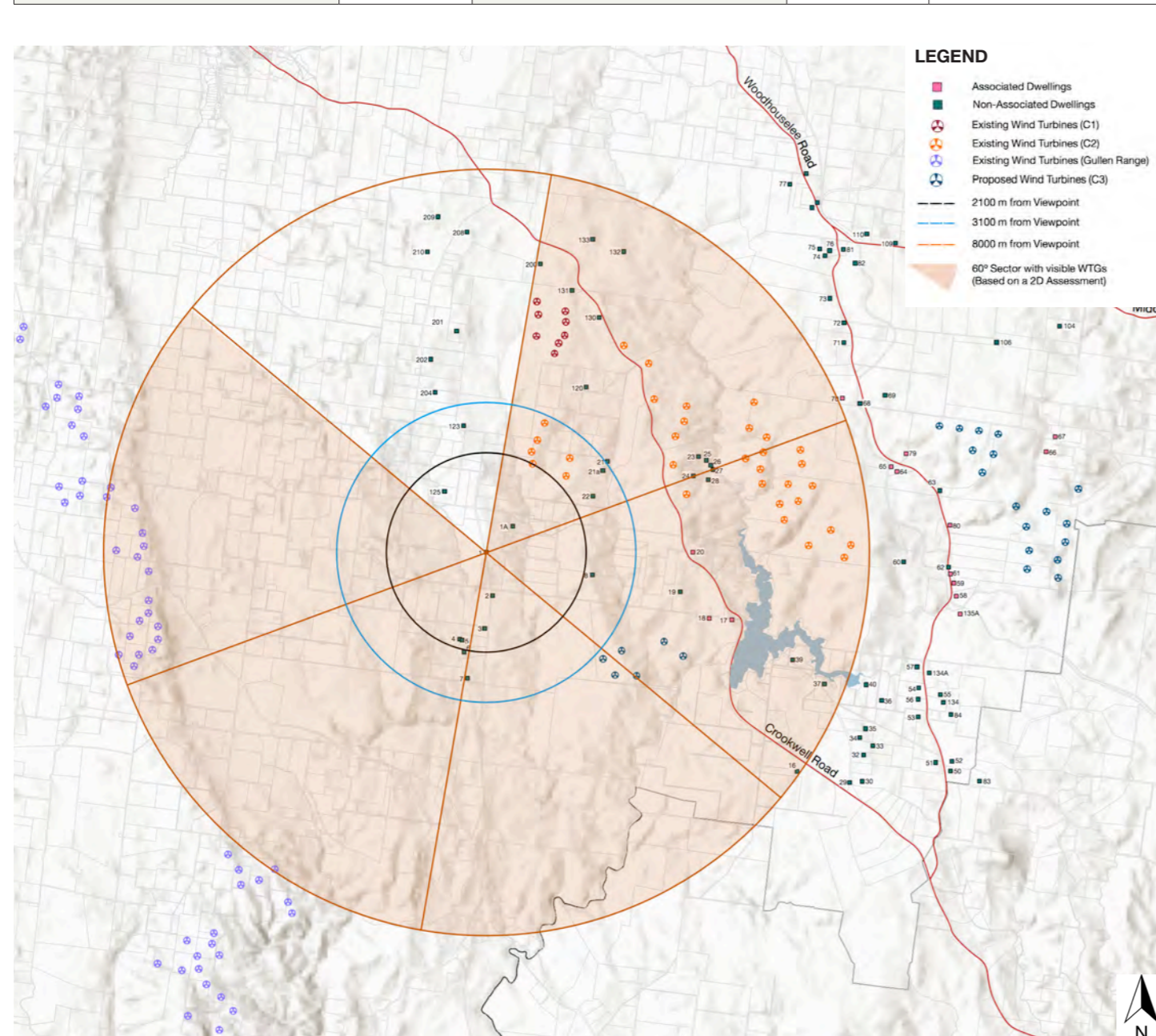


Figure C.1.A Preliminary Assessment Tool: Dwelling 1

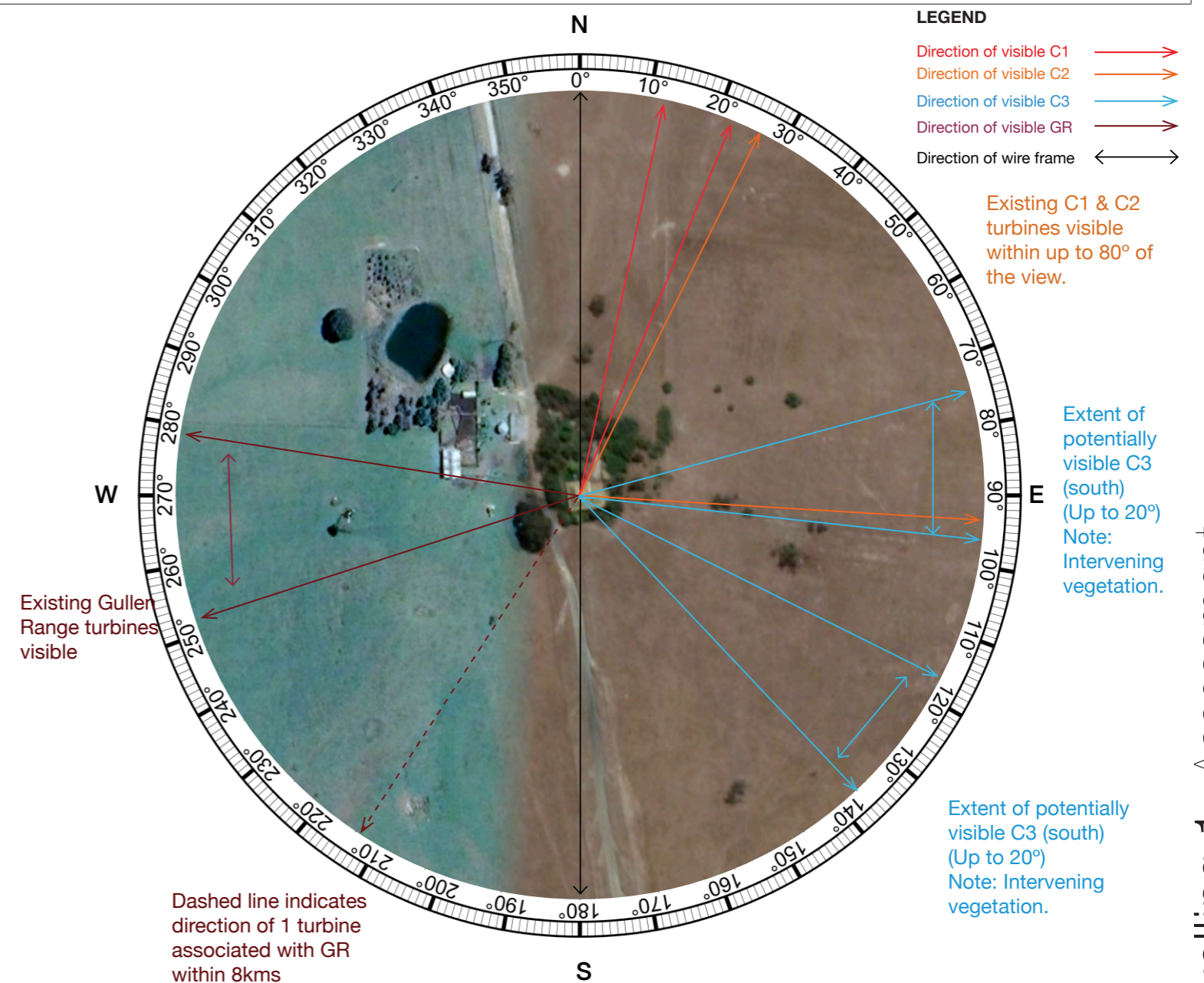
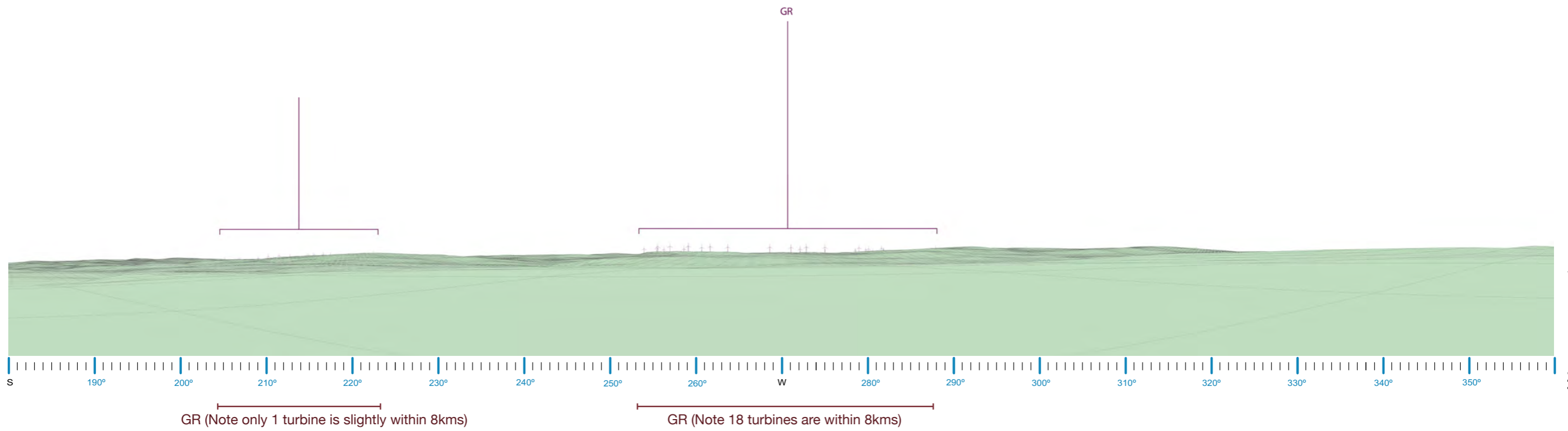
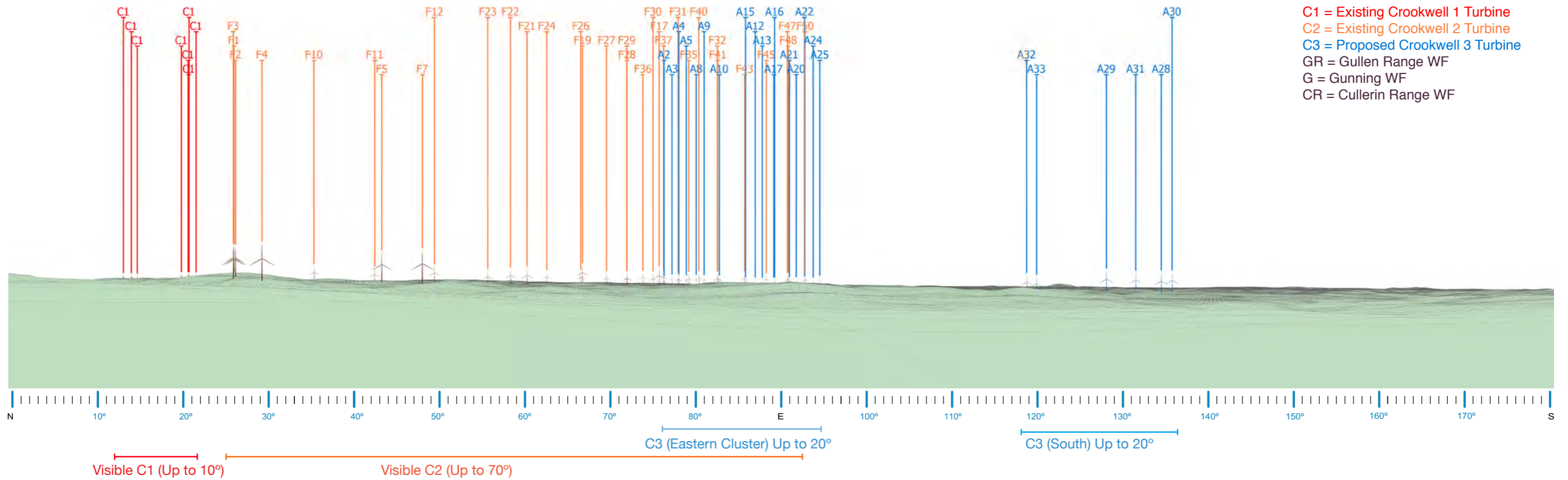


Figure C.1.B Aerial Assessment - Dwelling 1 (Source: Google Earth Imagery Date 23.01.2020)

C1. Dwelling 1 Evermore Wire frames



C2. Dwelling 1A Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.8km	Nearest proposed <i>visible</i> C3 turbine (km):	3.8km	Views to the existing C2 turbines occupy approximately 80° to the north east. C1 turbines and Gullen Range are not visible due to topography. C3 (east) would be in the distance beyond existing C2 turbines are visual impact would be negligible. Views of up to 20° to the proposed C3 turbines available (to the south east).
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	3 (Total = 100°)	The O'Hanlon VIA gave a cumulative visual impact rating of low based on visibility within 2 sectors. Moir LA found the cumulative impact is likely to be slightly more than to that assessed however, agrees with the statement made by OHD that <i>the overall cumulative effect of C3 (south) is relatively low as C2 is a major component.</i>
Number of existing visible turbines (C1 & C2) (Based on topography alone)	31	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	37	

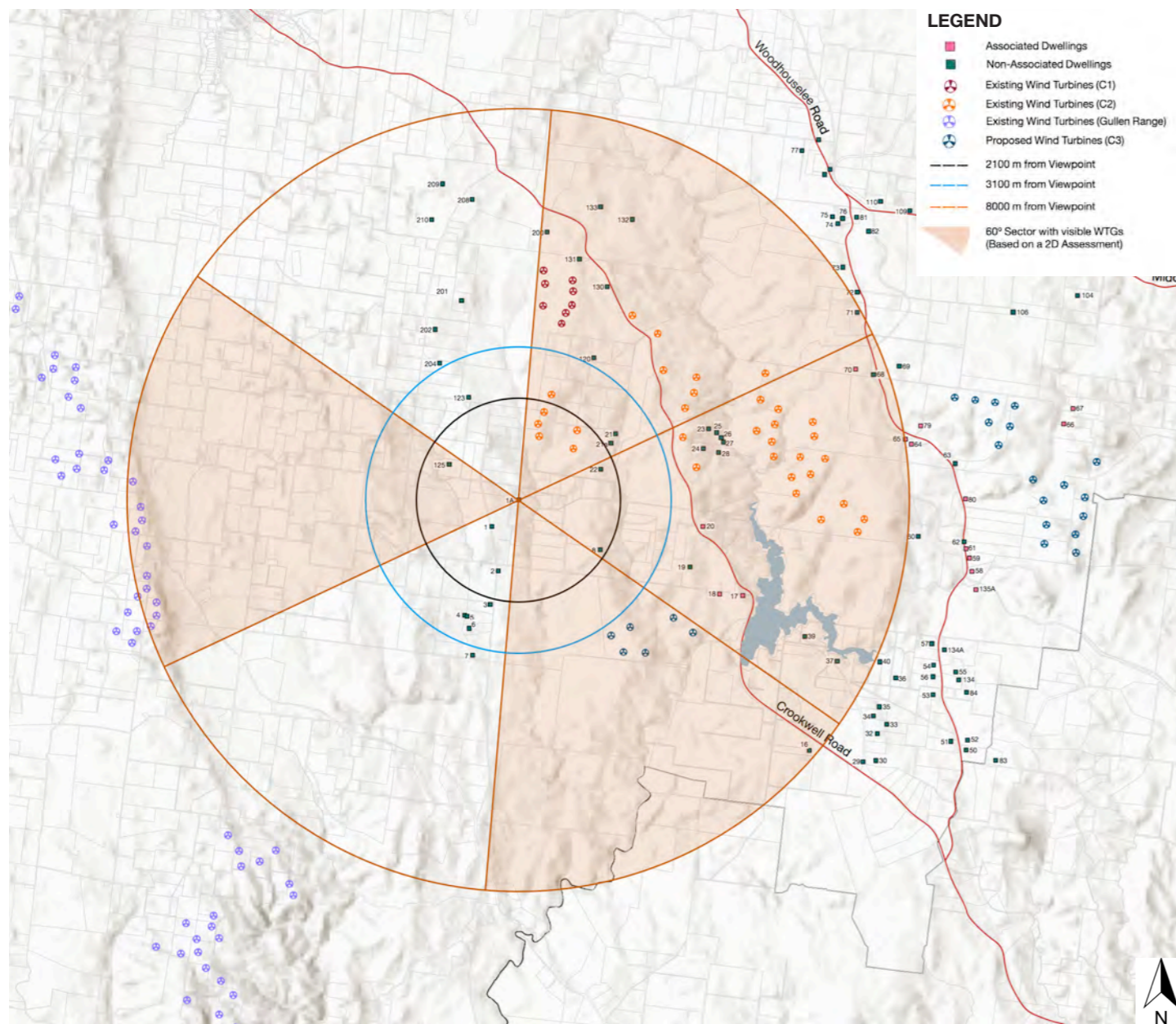


Figure C.2.A Preliminary Assessment Tool: Dwelling 1A

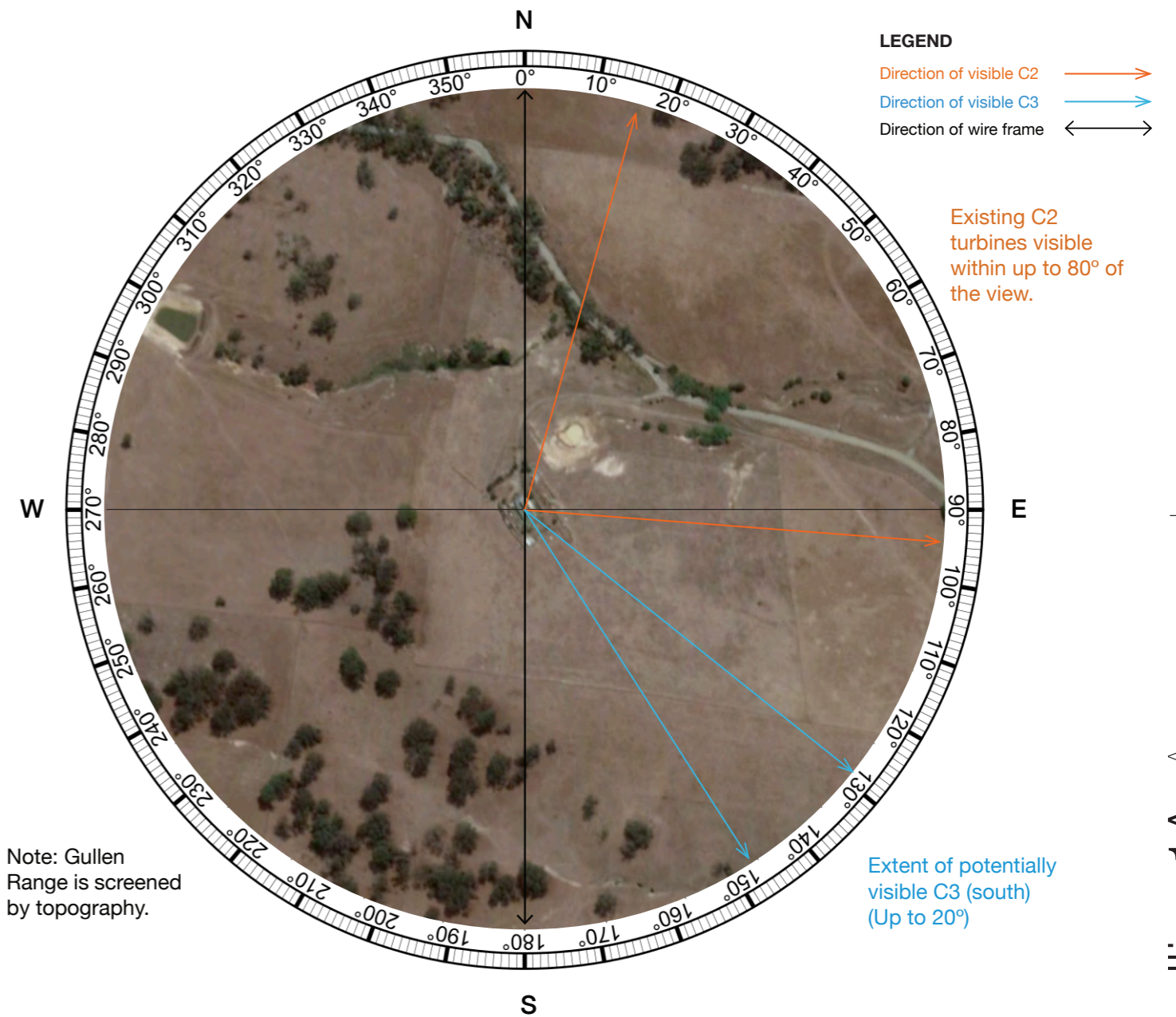
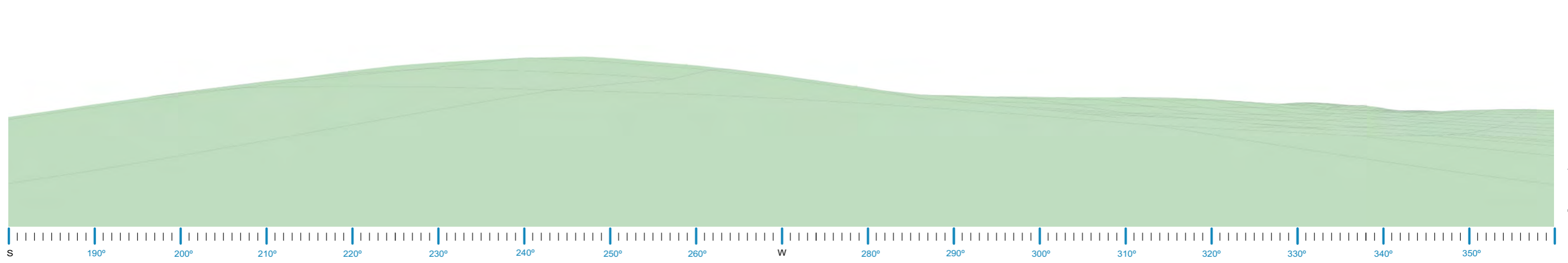
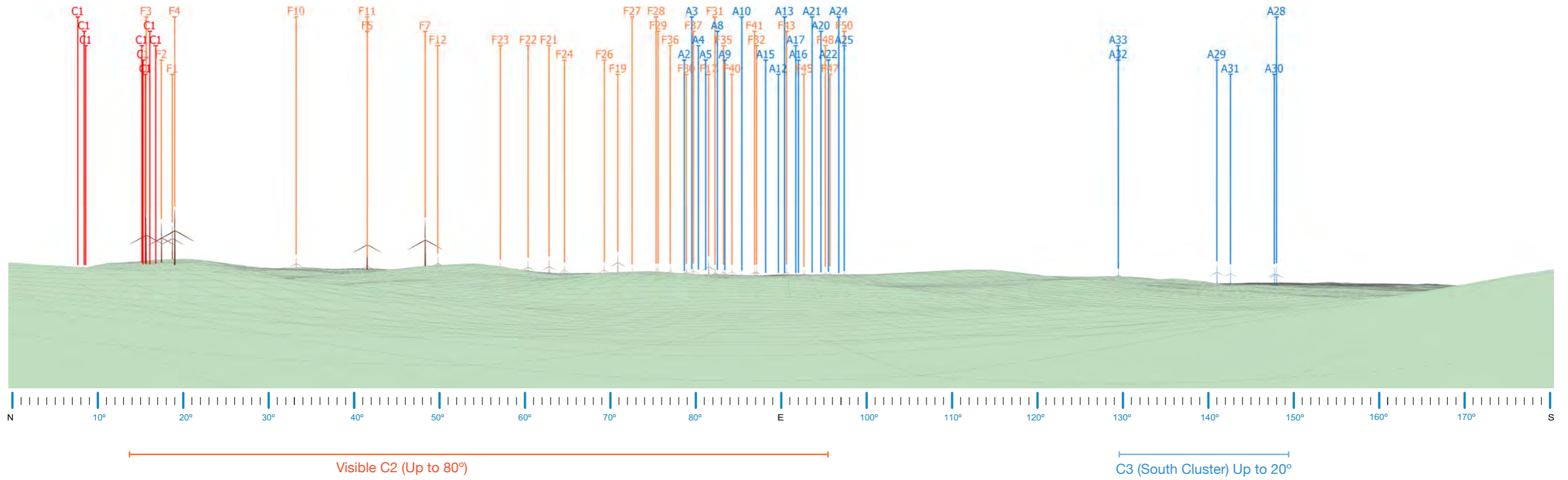


Figure C.2.B Aerial Assessment - Dwelling 1A (Source: Google Earth Imagery Date 23.01.2020)

C2. Dwelling 1A Wire frames



- C1 = Existing Crookwell 1 Turbine
- C2 = Existing Crookwell 2 Turbine
- C3 = Proposed Crookwell 3 Turbine
- GR = Gullen Range WF
- G = Gunning WF
- CR = Cullerin Range WF

C3. Dwelling 123 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	5.6km	Nearest proposed <i>visible</i> C3 turbine (km):	5.6km	Views to the existing C1 and C2 turbines occupy approximately 80°. Gullen Range is visible to the west. Vegetation surrounding the dwelling is likely to significantly reduce visibility of these existing turbines (particularly C1 and Gullen Range).
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views of up to 15° to the proposed C3 turbines (to the south east). The GBLD and O’Hanlon assessments rated the visual impact of the south C3 turbines as nil and low respectively. Intervening vegetation is likely to screen views to C3 (south).
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	Up to 3	Views to up to 9 proposed C3 (East) turbines within the background of the view currently occupied by the existing Crookwell 2 turbines and the visual impact would be negligible.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	32	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	47	The O’Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of moderate - high. 3D desktop assessment undertaken by Moir LA found the cumulative impact is likely to be much lower than assessed. The 3D assessment identified turbines within 3 sectors, however aerial assessment indicates intervening vegetation would reduce this to one sector .

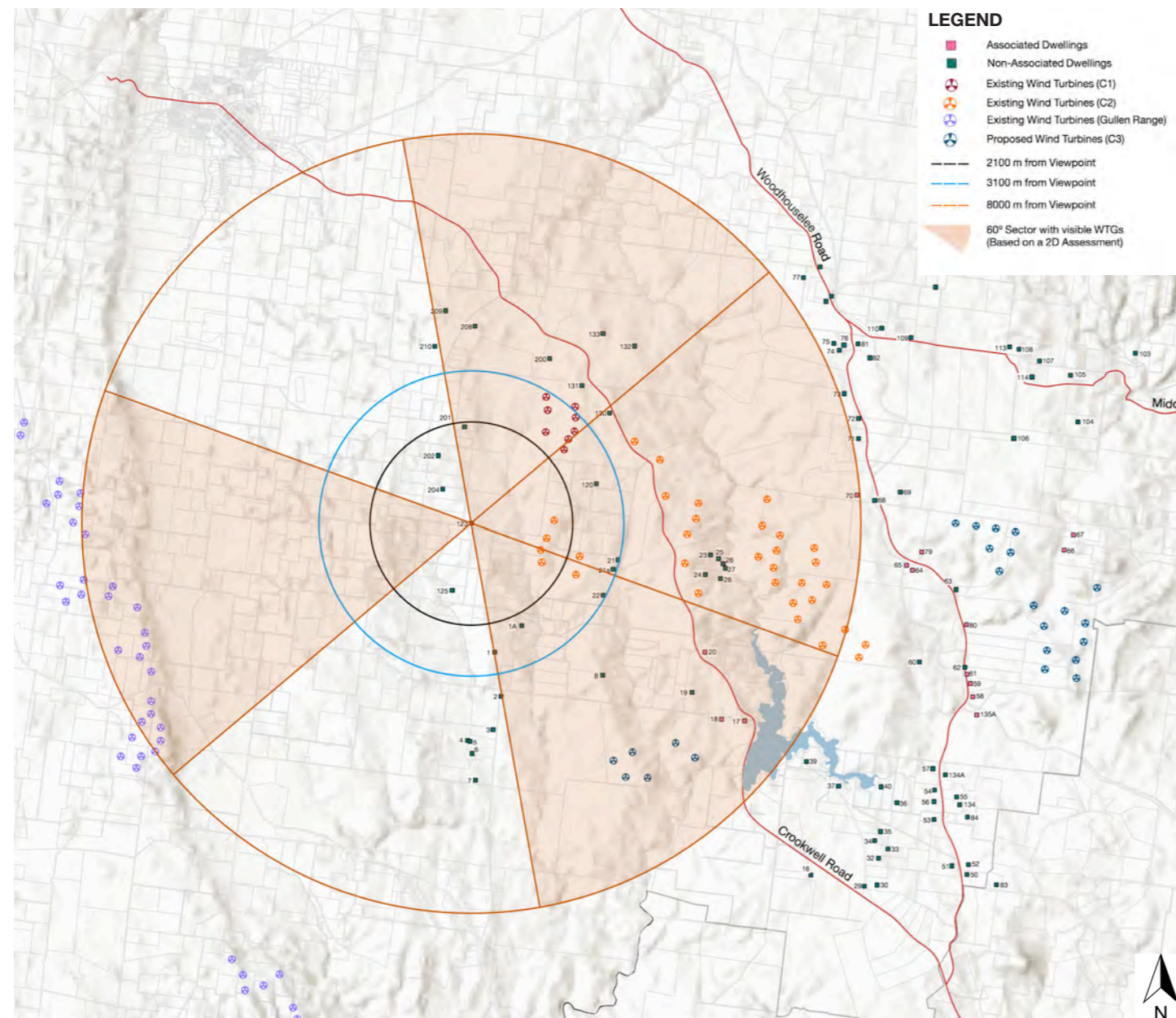


Figure C.3.A Preliminary Assessment Tool: Dwelling 123

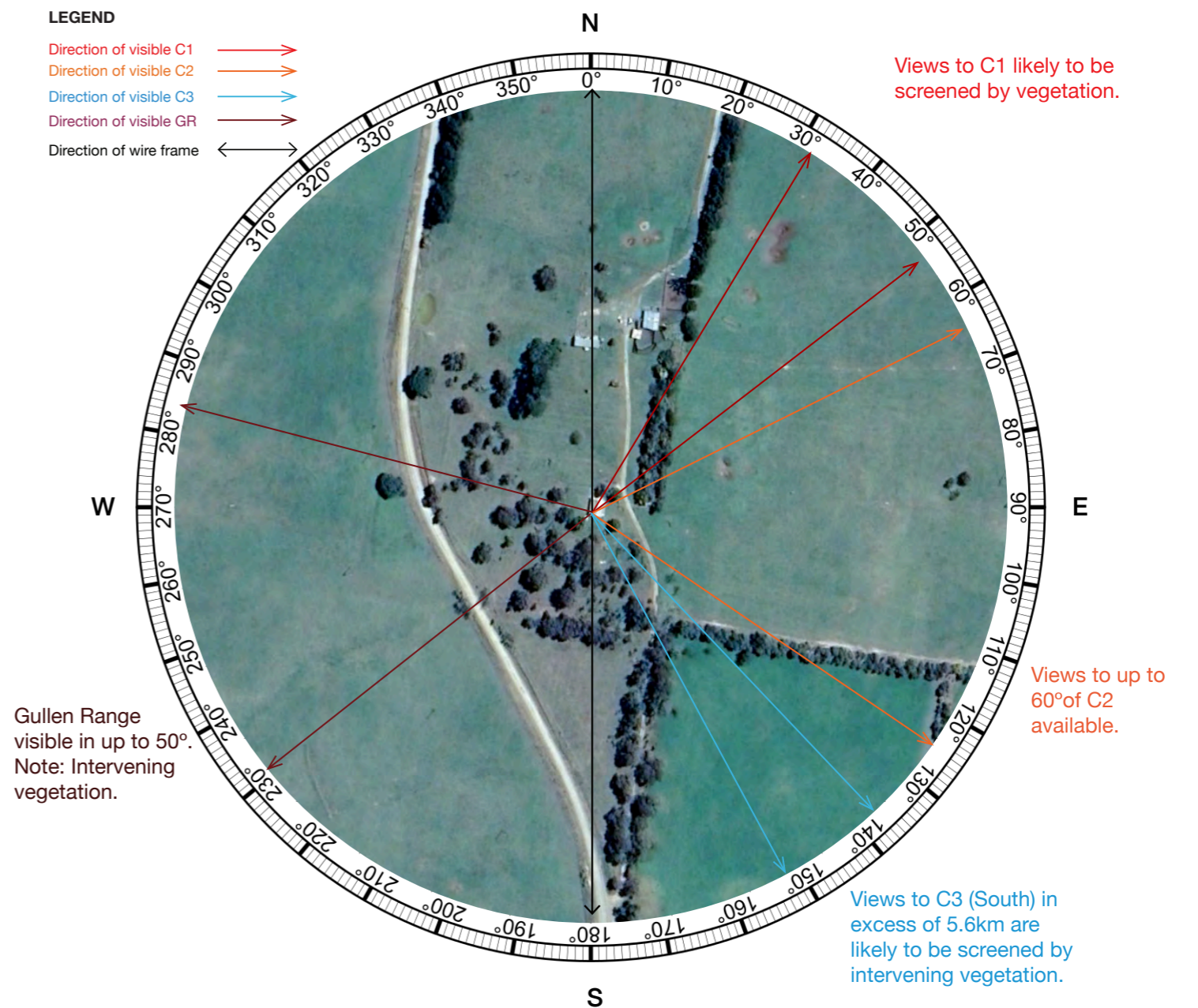
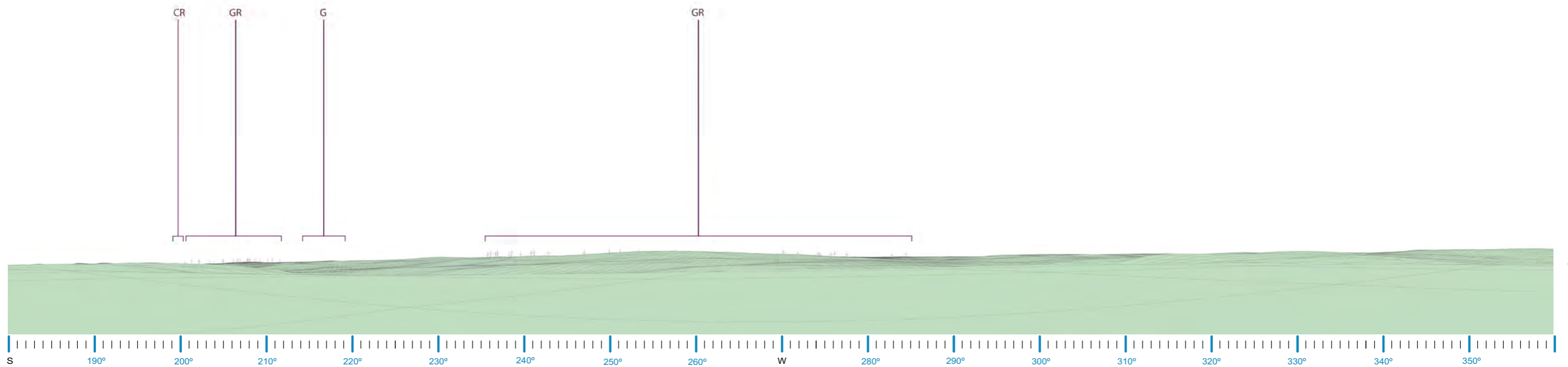
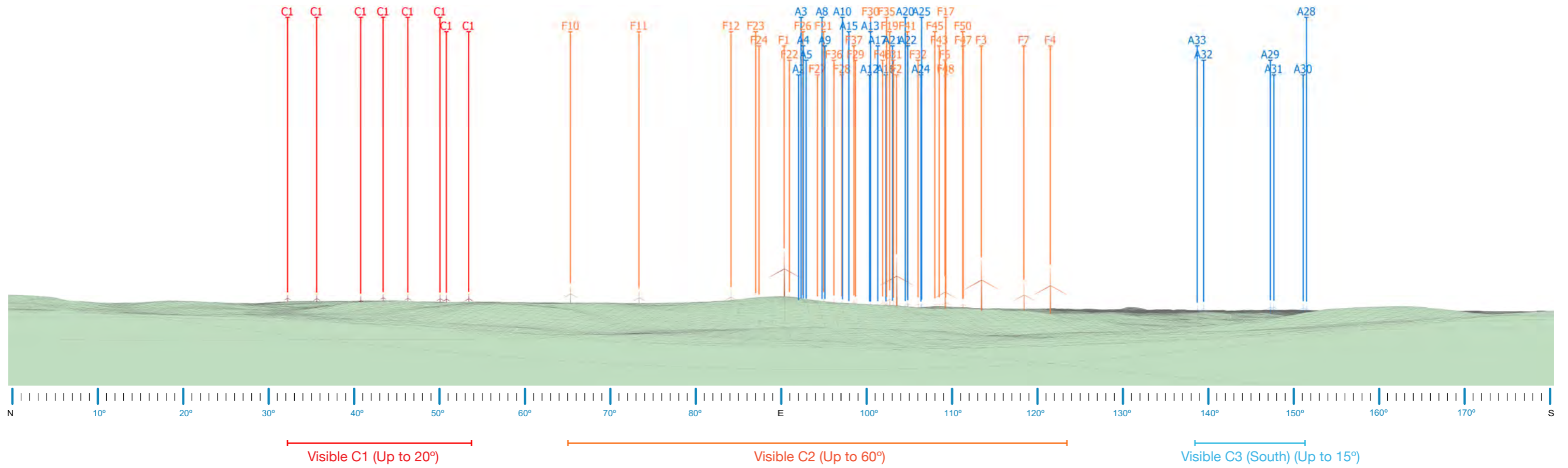


Figure C.3.B Aerial Assessment - Dwelling 123 (Source: Google Earth Imagery Date 27.09.2018)

C3. Dwelling 123 Wire frame



Note: Cullerin, Gunning and Gullen Range (South) wind farms in excess of 8kms.

- C1 = Existing Crookwell 1 Turbine
- C2 = Existing Crookwell 2 Turbine
- C3 = Proposed Crookwell 3 Turbine
- GR = Gullen Range WF
- G = Gunning WF
- CR = Cullerin Range WF

C4. Dwelling 125 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	4.6km	Nearest proposed <i>visible</i> C3 turbine (km):	4.6km	Majority of C1 & C2 turbines are screened by topography. Approximately 5 turbines associated with C2 occupy up to 35° of the view from this dwelling to the ENE. Gullen Range is not visible to the west due to vegetation. Views of up to 15° to the proposed C3 turbines (to the south east). The GBLD and O'Hanlon assessments rated the visual impact of the south C3 turbines as nil and low respectively. Vegetation along Third Creek Road is likely to reduce the potential visibility of turbines associated with C3. The visual impact including cumulative impact has been assessed as negligible.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	2	
Number of existing visible turbines (C1 & C2) (Based on topography alone)	5	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	9	

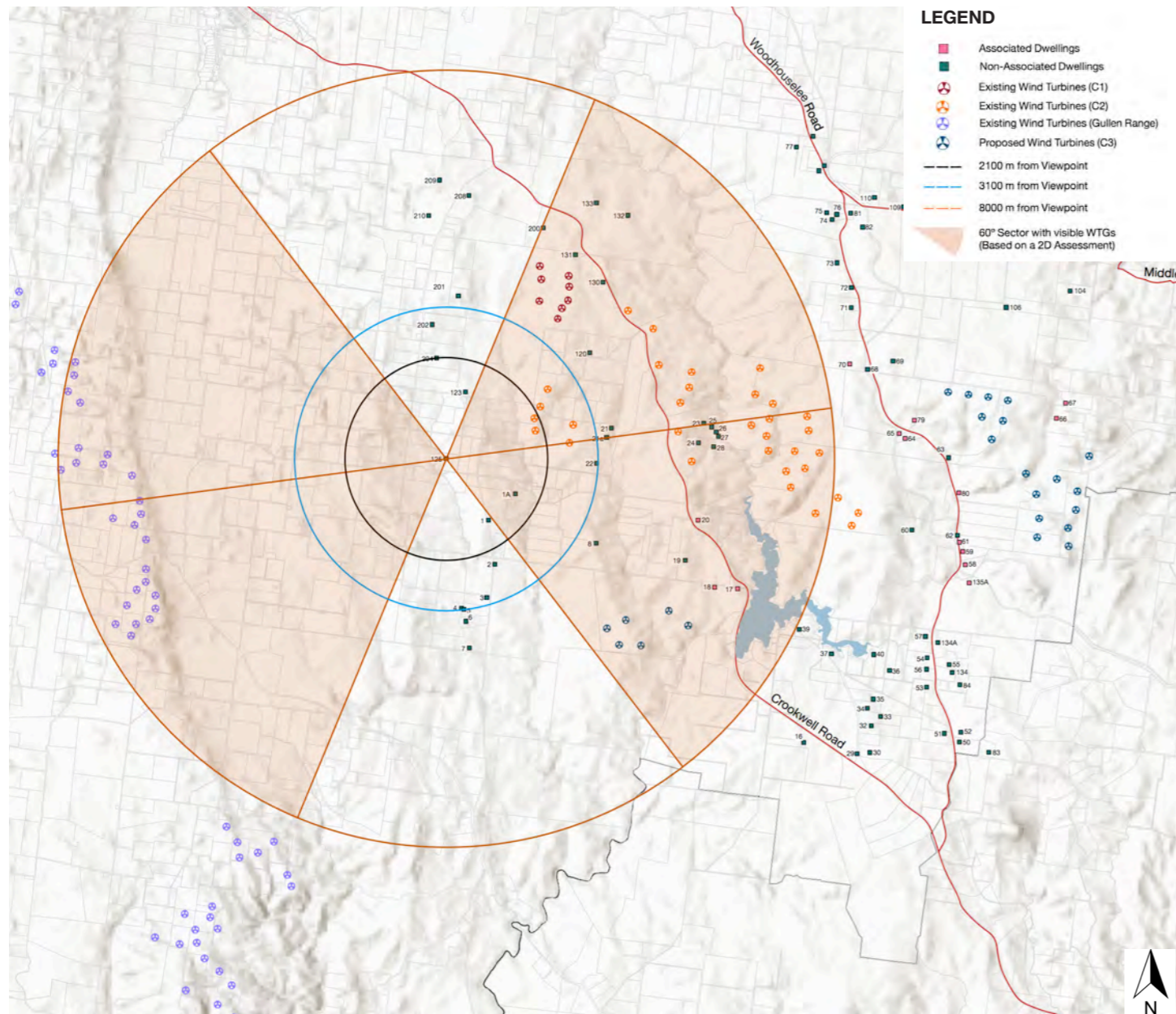


Figure C.4.A Preliminary Assessment Tool: Dwelling 125

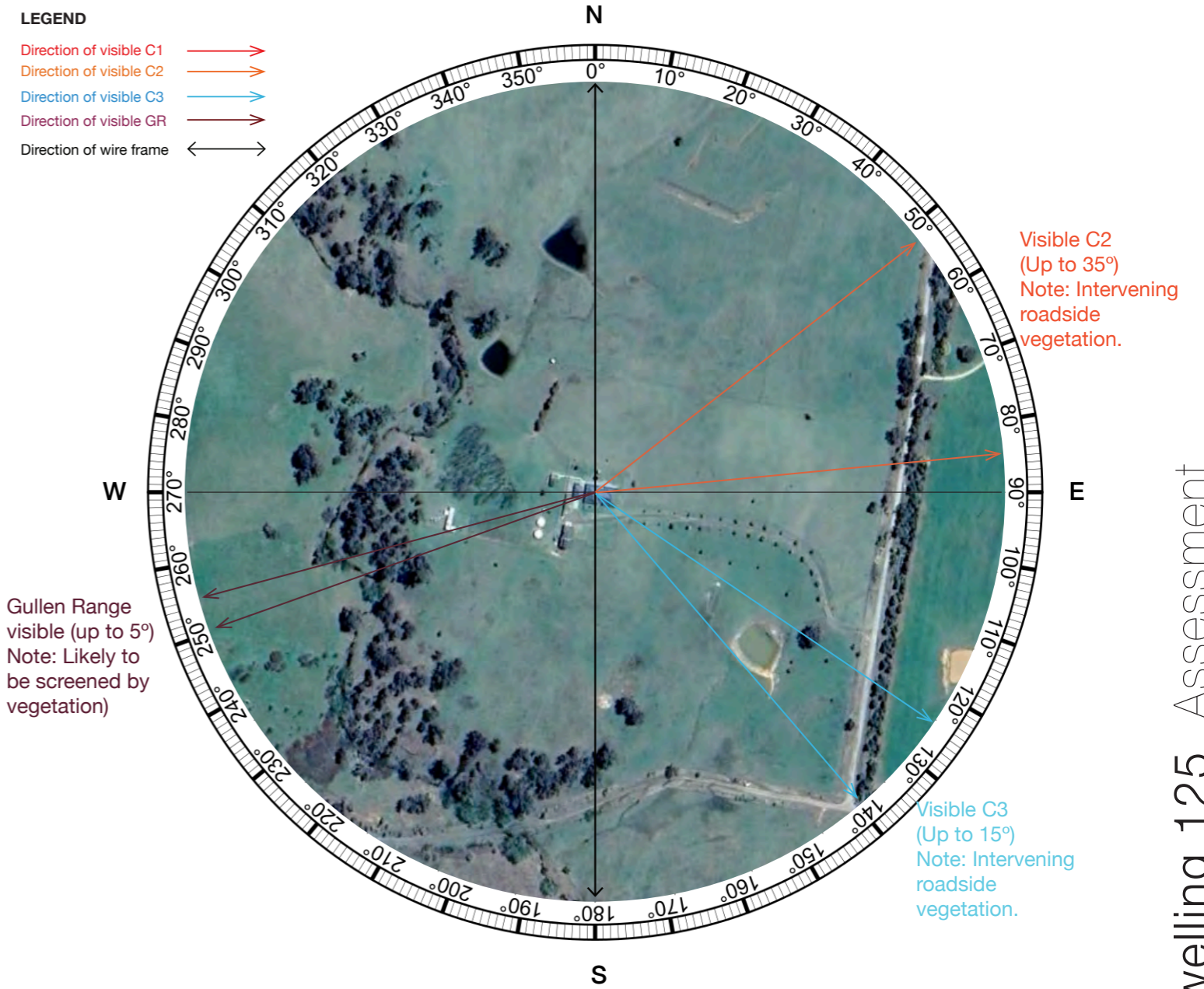
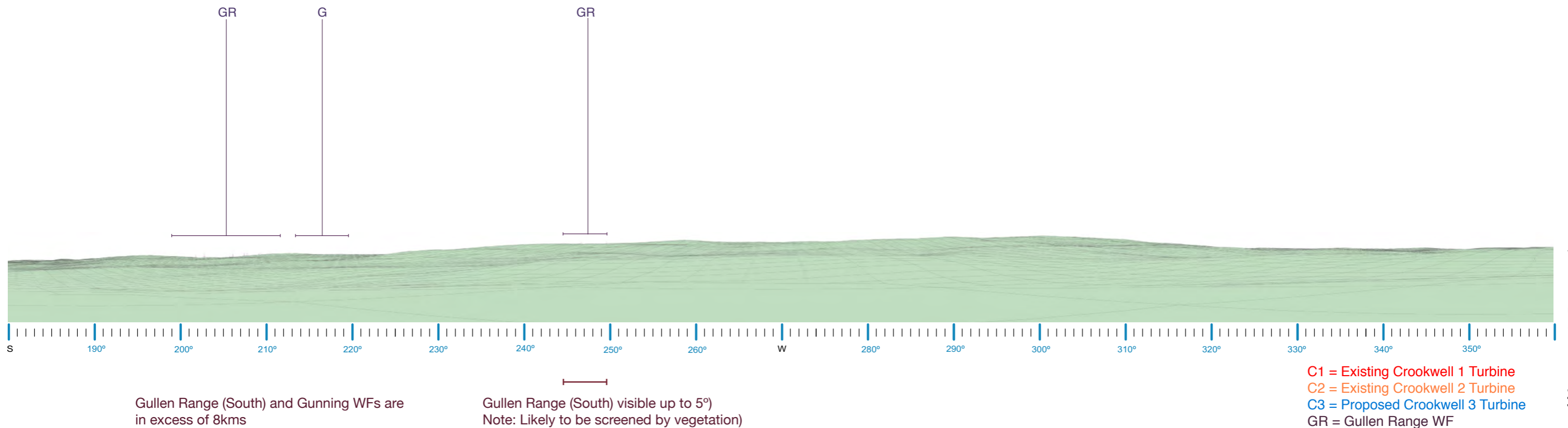
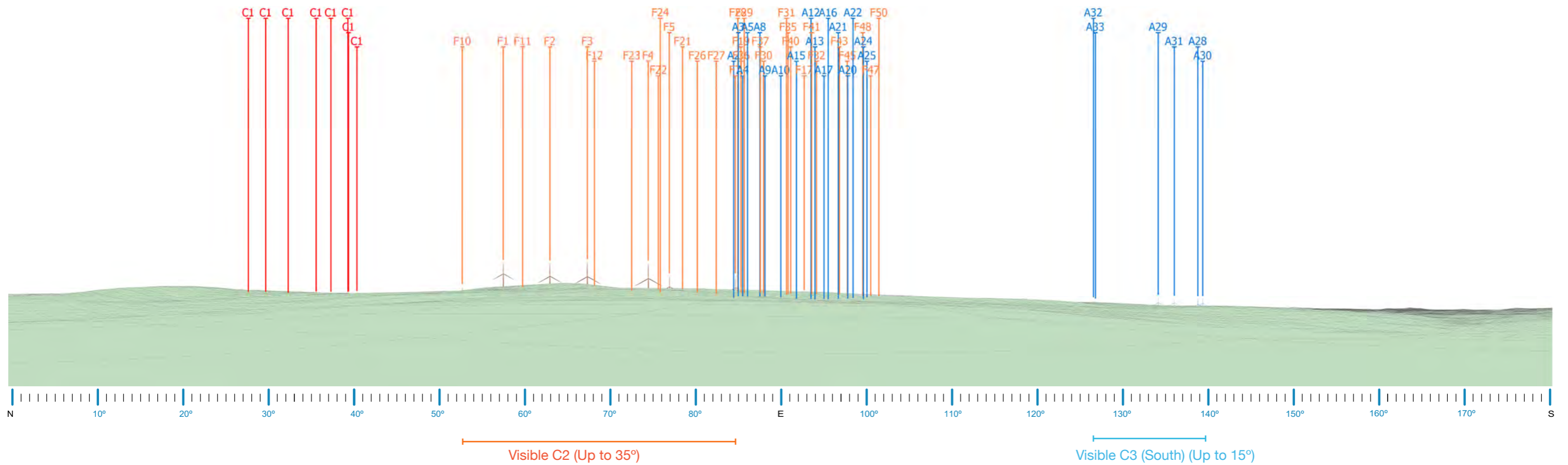


Figure C.4.B Aerial Assessment - Dwelling 125 (Source: Google Earth Imagery Date 27.09.2018)

C4. Dwelling 125 Wire frame



- C1 = Existing Crookwell 1 Turbine
- C2 = Existing Crookwell 2 Turbine
- C3 = Proposed Crookwell 3 Turbine
- GR = Gullen Range WF
- G = Gunning WF
- CR = Cullerin Range WF



Appendix D

Wayo: South Eastern Cluster

D. Wayo: South Eastern Cluster Assessment

Table D: Wayo: South Eastern Cluster

ID	Name	Location	Closest C3 WTG (km)	VIA Assessment		OHD Comments			MLA Desktop Assessment			MLA Assessment Notes:
				South	East	South	East	Cumulative	South	East	Cumulative	
16	Calamonda	Crookwell Road	3.5km	Mod	Low	Mod-High Approx. 80% visible with some veg. screening.	Nil - Low	Low	Nil - Topography	Nil - Low	1 Sector (Negligible)	Impact assessment is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility. <i>Refer to D1.</i>
36	Tyrendarra	St Stephens Road	3.5km	Low	Low	Low - Mod	Mod	Mod - High over 3 sectors	Nil - Low	Low	Up to 3 Sectors	Impact assessment is less than assessed by OHD. Intervening farm structure is likely to reduce potential visibility. <i>Refer to D2.</i>
37	Carinya	St Stephens Road	3.0km	Low - Mod	Low - Mod	Mod	Low - Mod	High over 3 sectors	Nil - Low: Vegetation	Nil - topography	*Up to 3 Sectors	Impact assessment is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility. <i>Refer to D3.</i>
39	St Stephens Church	St Stephens Road	2.3km	Low	Low	Mod - High	Low - Mod	High over 3 sectors	Low	Nil - topography	*Up to 3 Sectors	Impact assessment is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility. <i>Refer to D4.</i>
54	Ginmara	Woodhouselee Road	3.4km	Low	High	Mod - High	Mod	High over 3 sectors	Low	Moderate	Up to 3 Sectors	Impact assessment is less than assessed by OHD. Intervening farm structure is likely to reduce potential visibility. <i>Refer to D5.</i>
55	-	Woodhouselee Road	3.2km	Low	High	Low	Mod	High over 3 sectors	Low	Moderate	Up to 3 Sectors	Impact assessment is less than assessed by OHD. <i>Refer to D6.</i>
57	Kenrick	Woodhouselee Road	2.7km	Low	High	Low - Mod	Mod	High over 3 sectors	Low	Moderate	Up to 3 Sectors	Impact assessment is less than assessed by OHD. <i>Refer to D7.</i>
84	Nierrina Heights	Woodhouselee Road	2.6km	Low	High	Low	Mod - High	Mod - High over 2 sectors	Nil - Vegetation	Moderate - High	*Up to 3 Sectors	Cumulative impact assessment is less than assessed by OHD. Intervening vegetation is likely to reduce potential visibility of C3 (south). <i>Refer to D8.</i>
134	-	Woodhouselee Road	3.3km	Not rated	Not rated	Nil-Low	Mod - High	Mod - High over 2 sectors	Nil - Low	Moderate - High	Up to 3 Sectors	Cumulative impact assessment is less than assessed by OHD. <i>Refer to D9.</i>
134A	-	Woodhouselee Road	3.km	Not rated	Not rated	Low	High	High over 3 sectors	Nil - Low	Moderate - High	Up to 3 Sectors	Cumulative impact assessment is less than assessed by OHD. <i>Refer to D10.</i>
135A	-	Woodhouselee Road	1.7km	Not rated	Not rated	Low	High	High over 3 sectors	Neighbour Agreement. No further assessment required.			

KEY:

Identifies conflicting ratings (C3 South Assessment)
 Identifies conflicting ratings (Cumulative Assessment)

Identifies conflicting ratings (C3 East Assessment)
 * = Likely to be reduced by intervening vegetation

D1. Dwelling 16 Calamonda Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.5km	Nearest proposed <i>visible</i> C3 turbine (km):	3.5km	Up to 20° of views to existing C2 turbines to the north.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 17 of the proposed C3 (East) turbines (based on topography alone). GBLD rated the potential visual impact to the C3 east turbines as low and O'Hanlon rated it as nil - low. Intervening vegetation is likely to reduce potential visual impacts.
Number of theoretical 60° Sectors (Based on 2D Assessment)	2	Number of visible 60° Sectors (Based on 3D Assessment)	1	Topography screens the C3 (South) turbines.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	10	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	27	The cumulative visual impact would be negligible as all existing and proposed turbines are within one 60° sector.

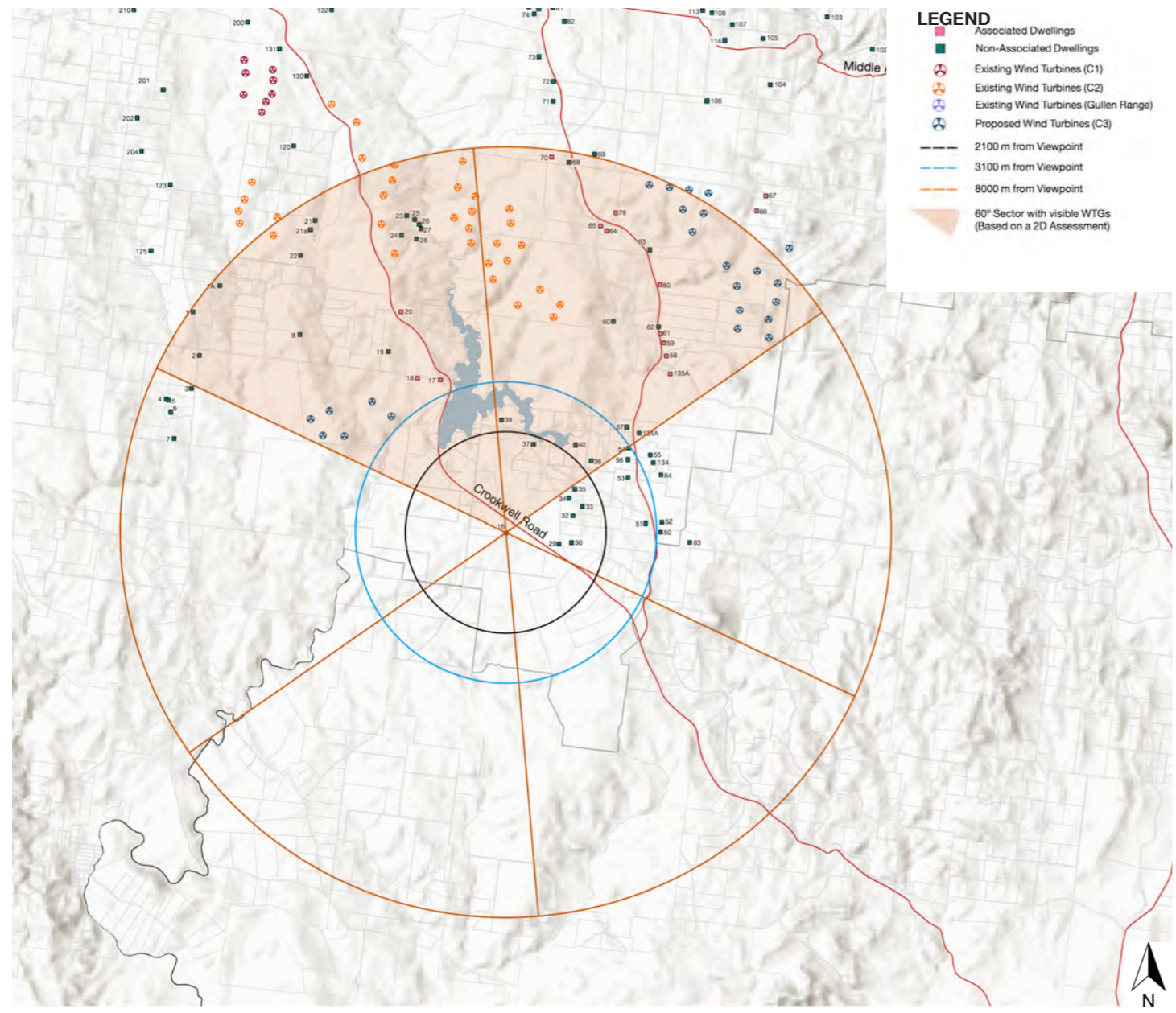


Figure D.1.A Preliminary Assessment Tool: Dwelling 16

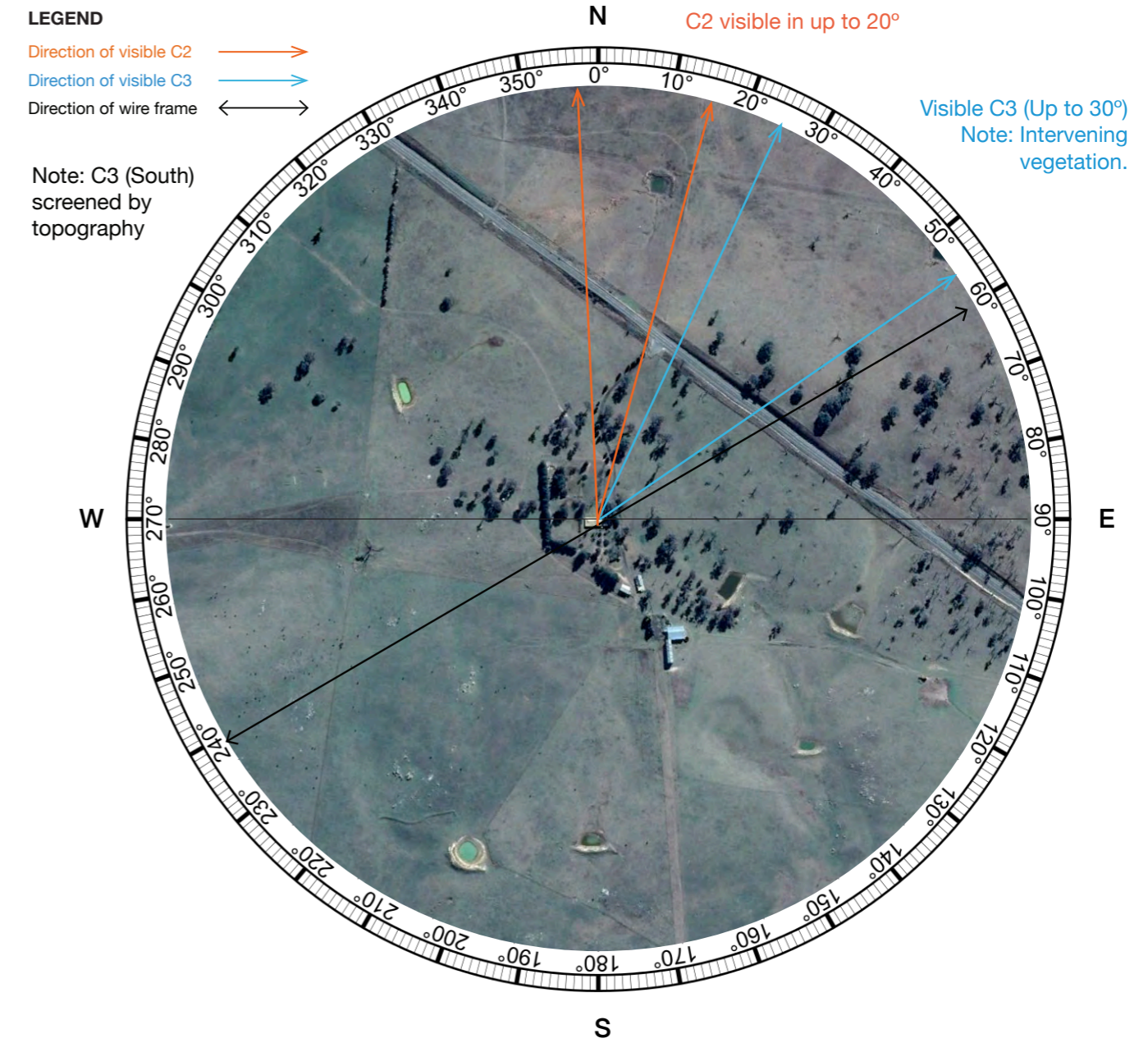
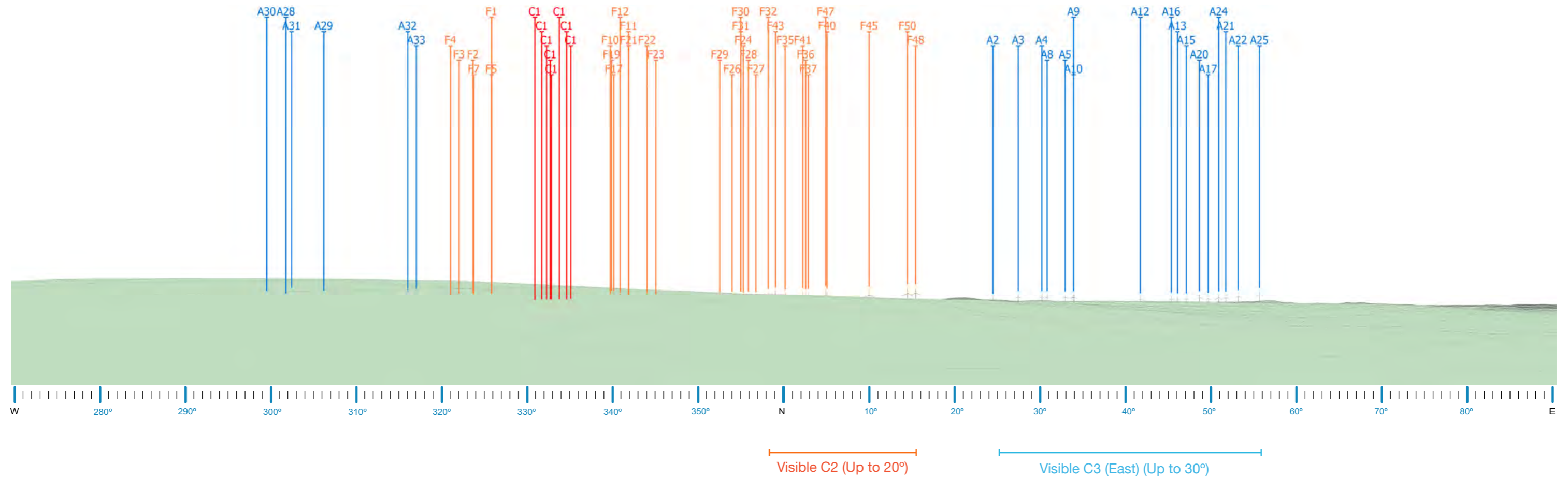


Figure D.1.B Aerial Assessment - Dwelling 16 (Source: Google Earth Imagery Date 20.08.2018)

D1. Dwelling 16 Calamonda Wire frame



- C1 = Existing Crookwell 1 Turbine
- C2 = Existing Crookwell 2 Turbine
- C3 = Proposed Crookwell 3 Turbine
- GR = Gullen Range WF
- G = Gunning WF
- CR = Cullerin Range WF

D2. Dwelling 36 Tyrendarra Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	4.2km	Nearest proposed <i>visible</i> C3 turbine (km):	4.2km	Up to 45° of views to existing C2 turbines to the north west.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 17 of the proposed C3 (East) turbines (based on topography alone). GBLD rated the potential visual impact to the C3 east turbines as low and O'Hanlon rated it as low - moderate.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3 (Total = 95°)	Views may be available to the C3 (South) turbines, viewed in the context of the Gullen Range turbines in the distance.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	36	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	59	OHD rated the cumulative visual impact as moderate to high with visible turbines in <i>over 3 sectors</i> . The actual cumulative impacts is likely to be less than assessed at <i>up to 3 sectors</i> .

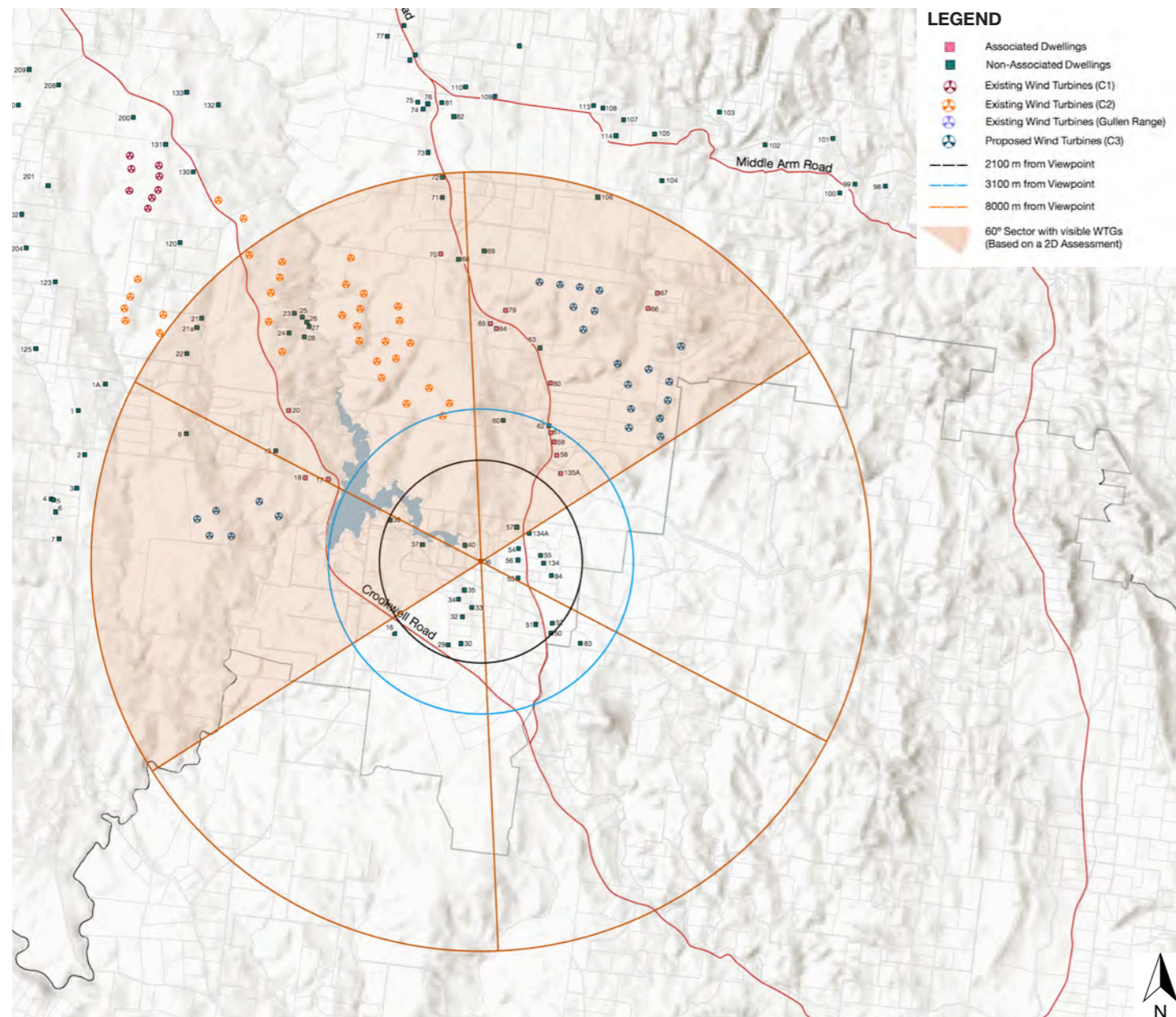


Figure D.2.A Preliminary Assessment Tool: Dwelling 36

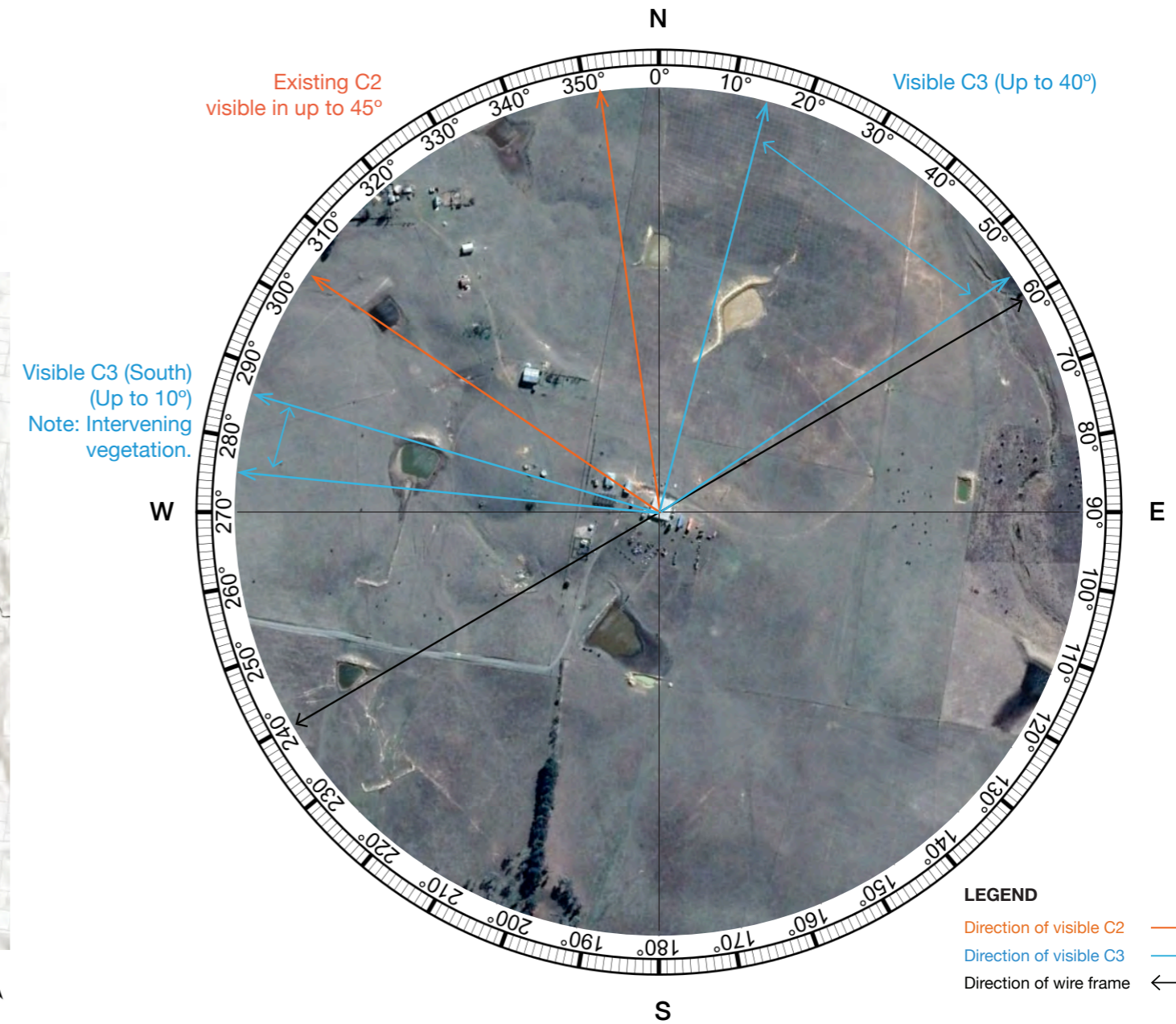
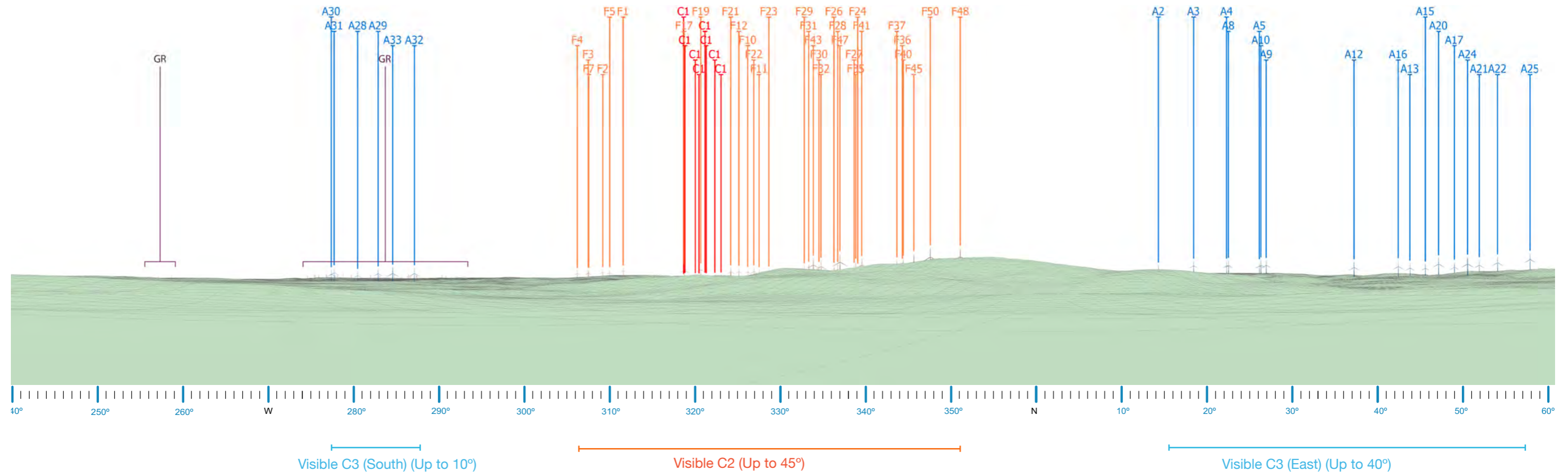


Figure D.2.B Aerial Assessment - Dwelling 16 (Source: Google Earth Imagery Date 20.08.2018)

D2. Dwelling 36 Tyrendarra Wire frame



D3. Dwelling 37 Carinya Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.0km	Nearest proposed <i>visible</i> C3 turbine (km):	3.0km	Up to 65° of views to existing C1 & C2 turbines to the NNW.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). GBLD rated the potential visual impact to the south turbines as low - moderate and O'Hanlon rated it as moderate. Intervening vegetation is likely to reduce potential visual impact to the C3 south turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3 (Total of 88°)	Topography screens the majority of the proposed C3 (East) turbines, and views are limited to 2 blade tips and 6 turbines in excess of 4.7km from the dwelling. The GBLD and O'Hanlon assessments consistently rated the visual impact of the east turbines as low - moderate.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	32	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	44	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of 'over 3 sectors'. 2D and 3D desktop assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed. Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> , and is likely to be further reduced by intervening vegetation.

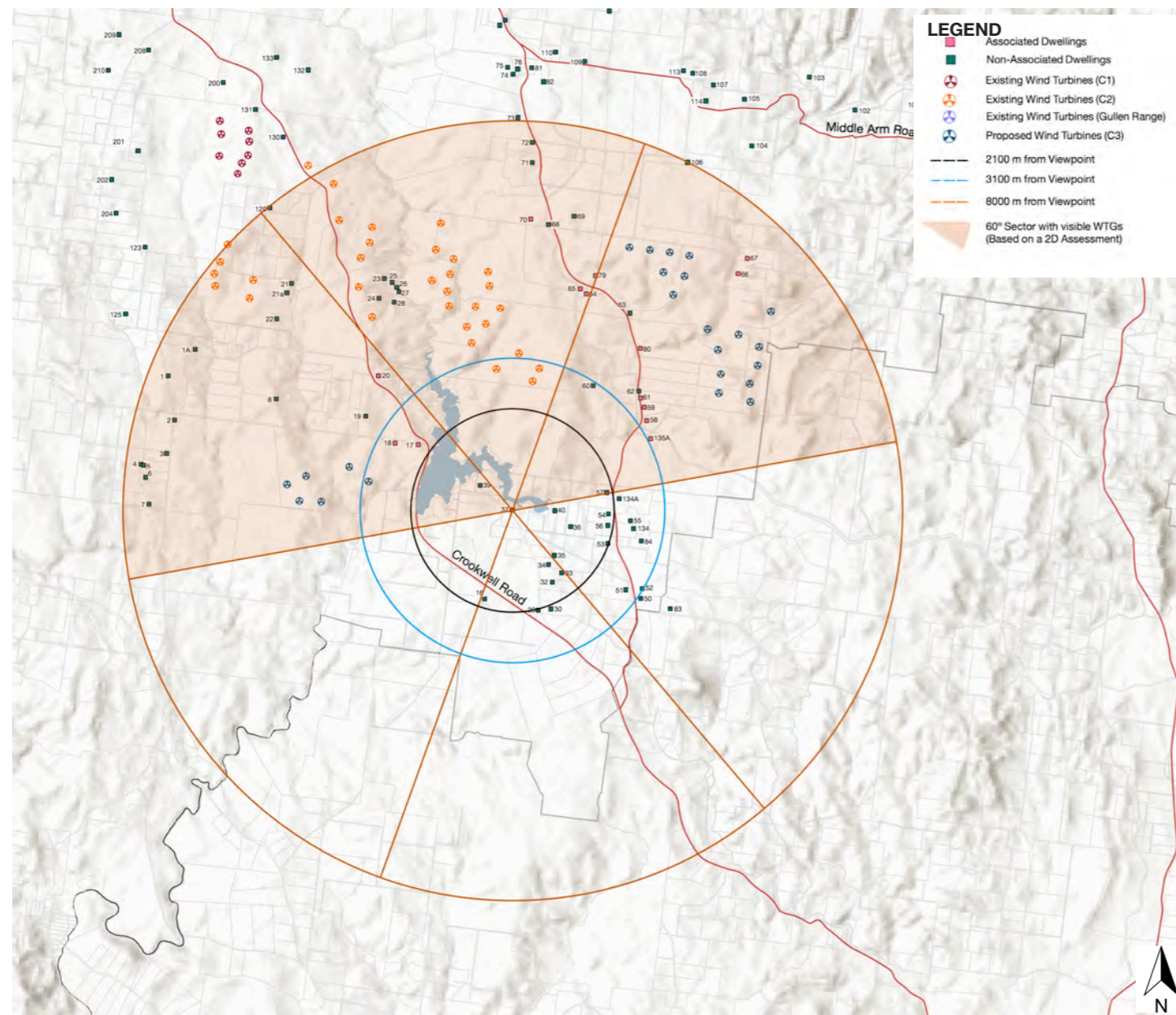


Figure D.3.A Preliminary Assessment Tool: Dwelling 37

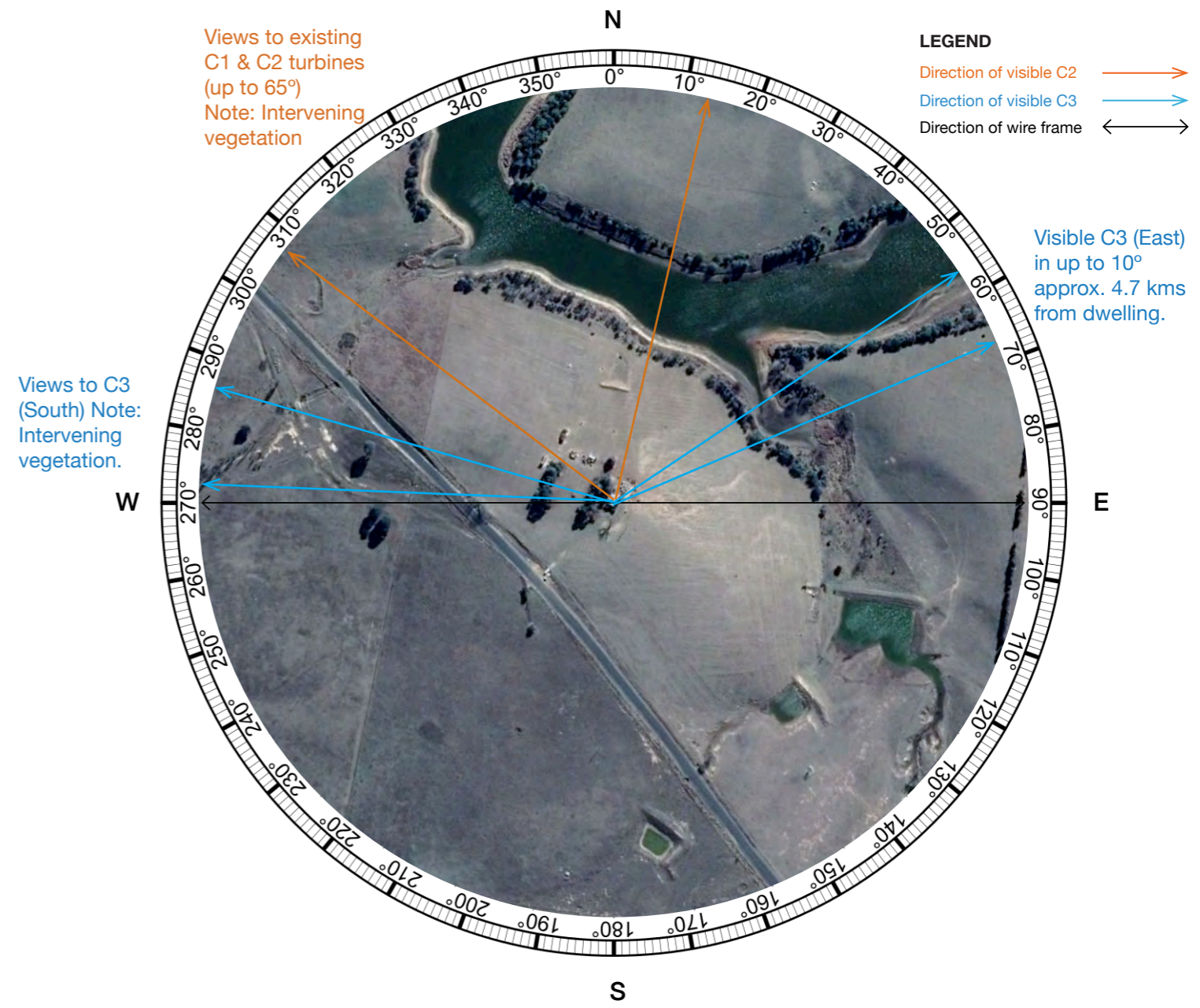
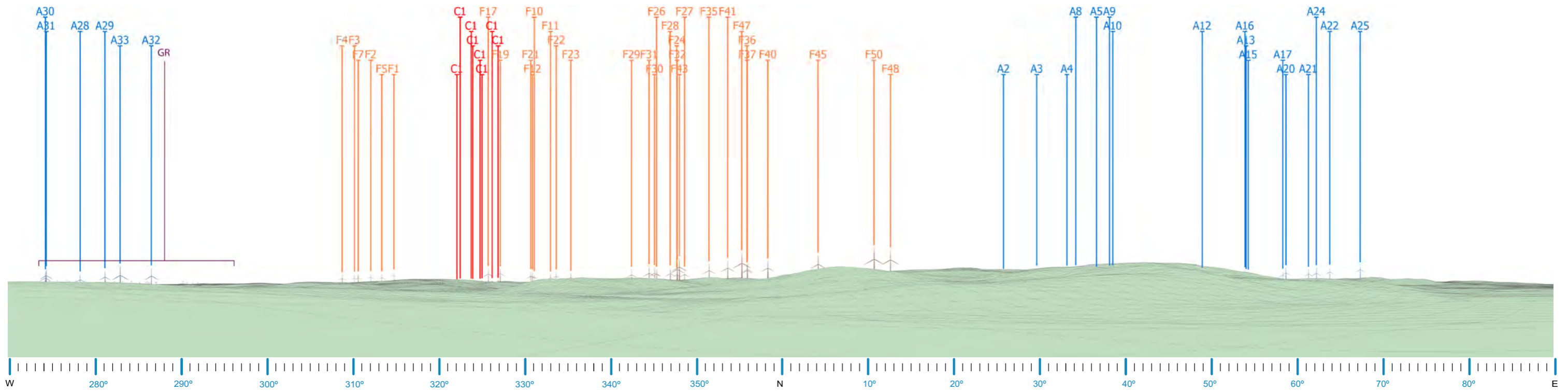


Figure D.3.B Aerial Assessment - Dwelling 37 (Source: Google Earth Imagery Date 20.08.2018)

D3. Dwelling 37 Carinya Wire frame



Visible C3 (South) (Up to 13°)
 Note: Gullen Range in the distance

Visible C1 & C2 (Up to 65°)

Visible C3 (Up to 10°)

- C1 = Existing Crookwell 1 Turbine
- C2 = Existing Crookwell 2 Turbine
- C3 = Proposed Crookwell 3 Turbine
- GR = Gullen Range WF
- G = Gunning WF
- CR = Cullerin Range WF

D4. Dwelling 39 St Stephens Church Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.3km	Nearest proposed <i>visible</i> C3 turbine (km):	2.3km	Up to 85° of views to existing C2 turbines to the north.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). GBLD rated the potential visual impact to the south turbines as low and O'Hanlon rated it as moderate - high. The proposed C3 (South) turbines occupy up to 16° of the view and intervening vegetation is likely to reduce potential visual impact.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	Up to 3 (Total = 101°)	Topography screens the majority of the proposed C3 (East) turbines, and views are limited to 2 blade tips and 6 turbines in excess of 4.7km from the dwelling. The GBLD and O'Hanlon assessments consistently rated the visual impact of the east turbines as low - moderate.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	32	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)		The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of 'over 3 sectors'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed . Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> , and is likely to be further reduced by intervening vegetation.

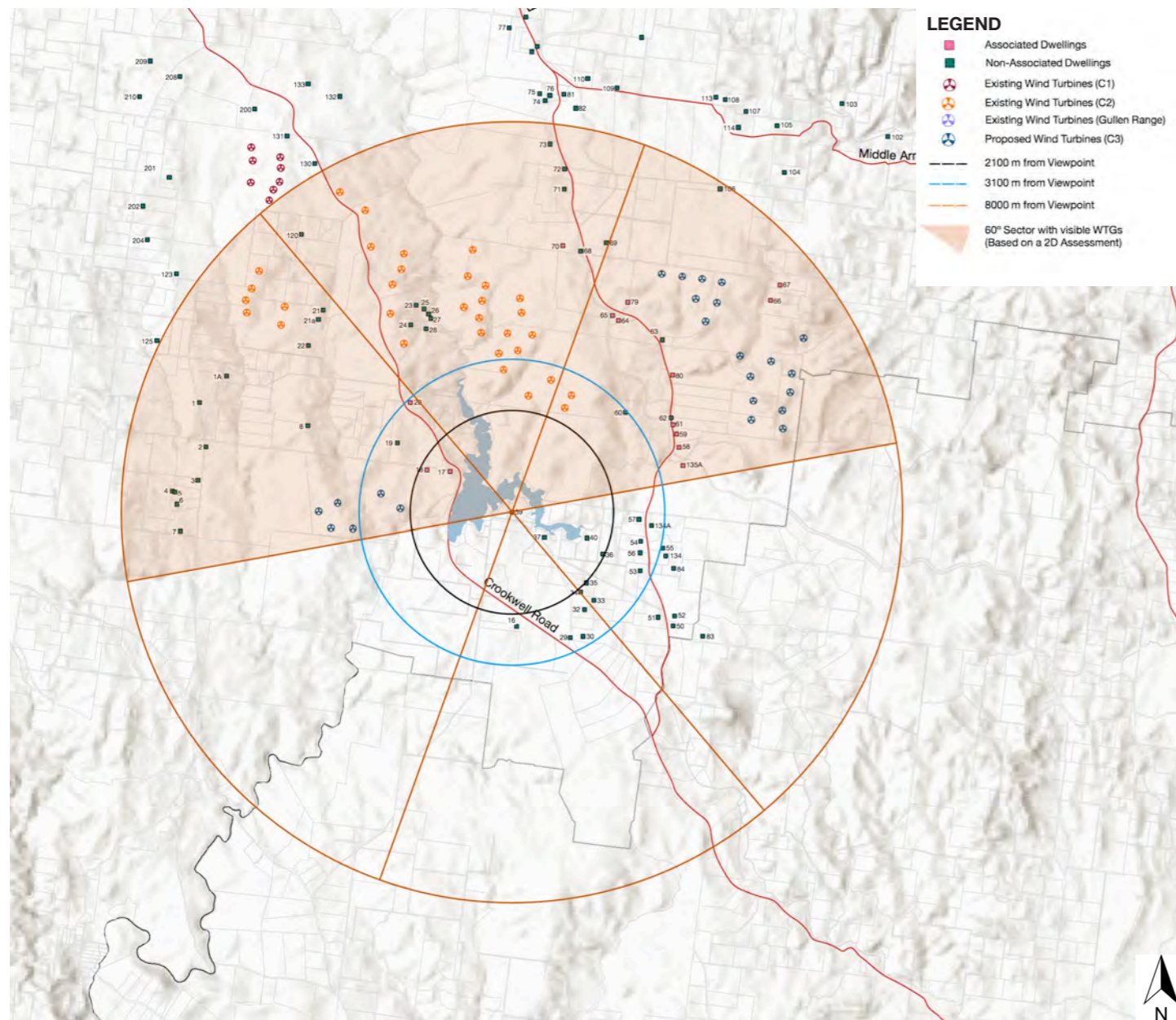


Figure D.4.A Preliminary Assessment Tool: Dwelling 39

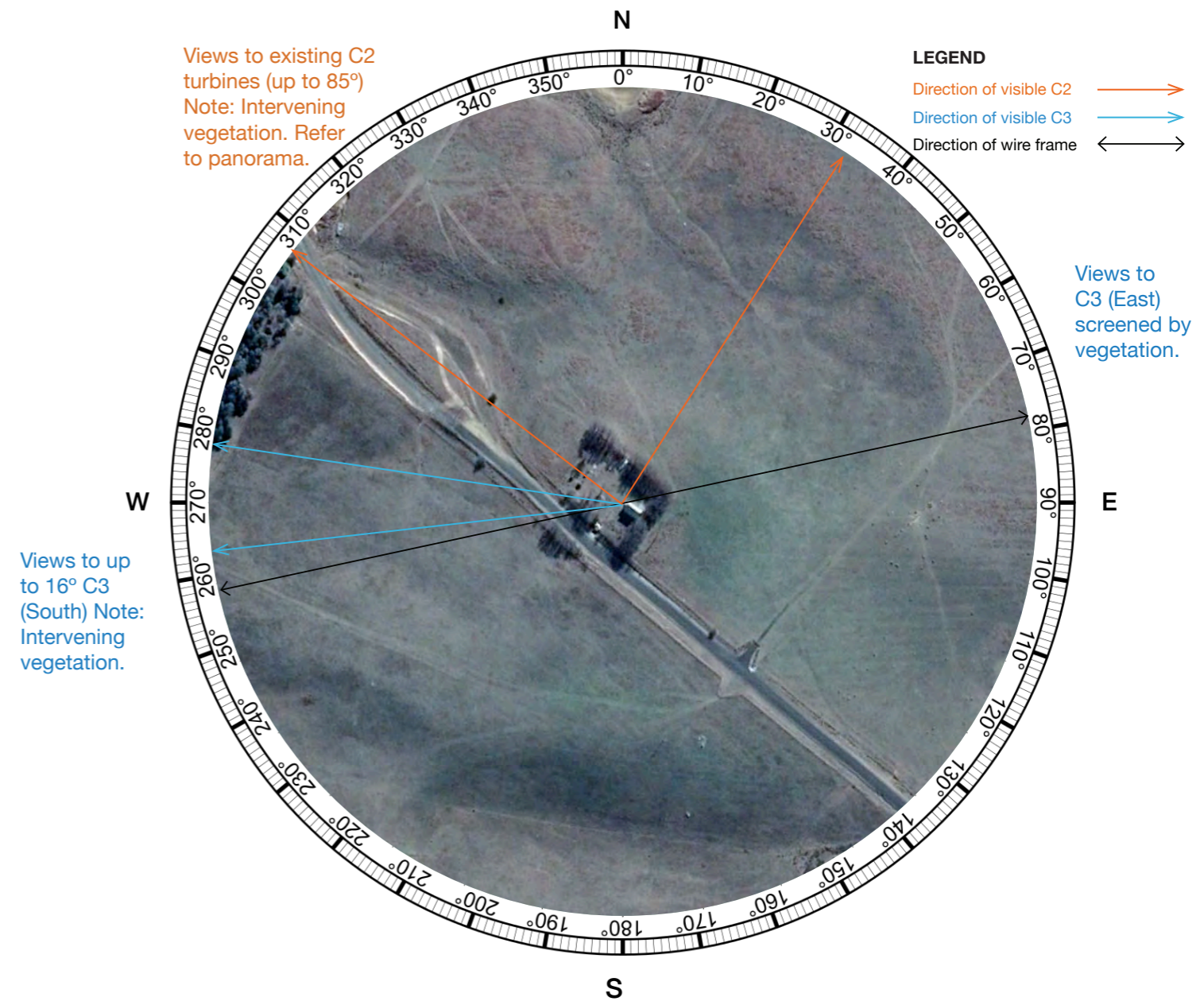
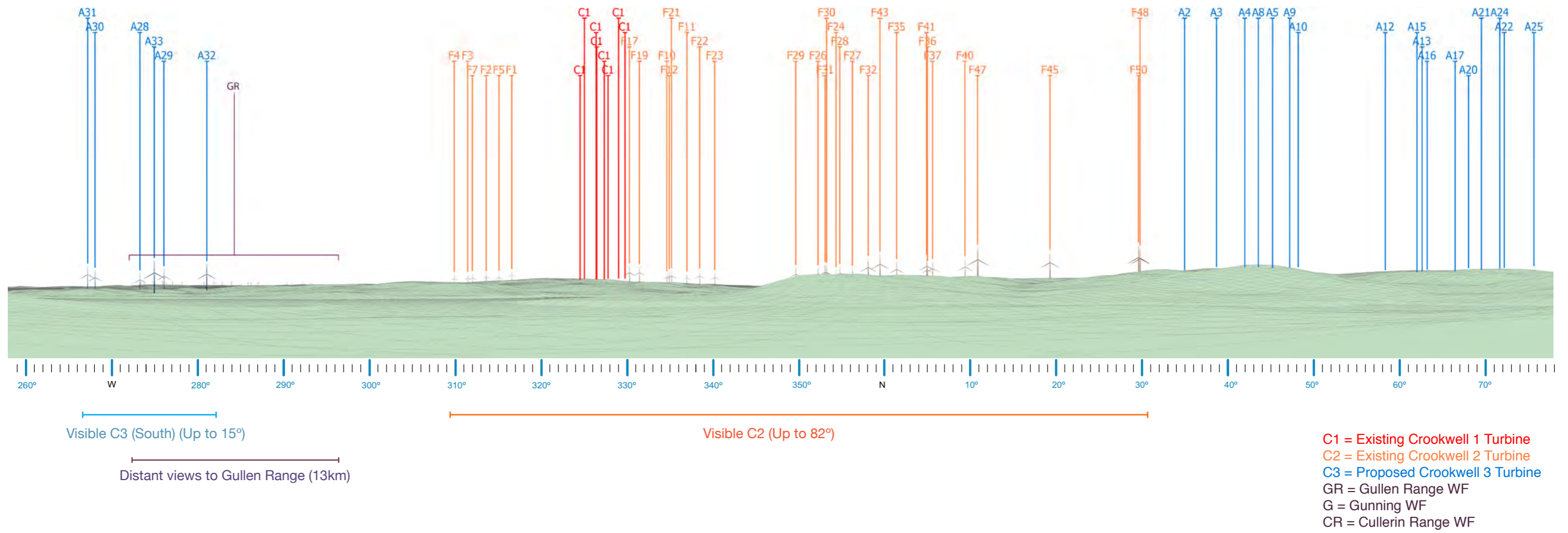
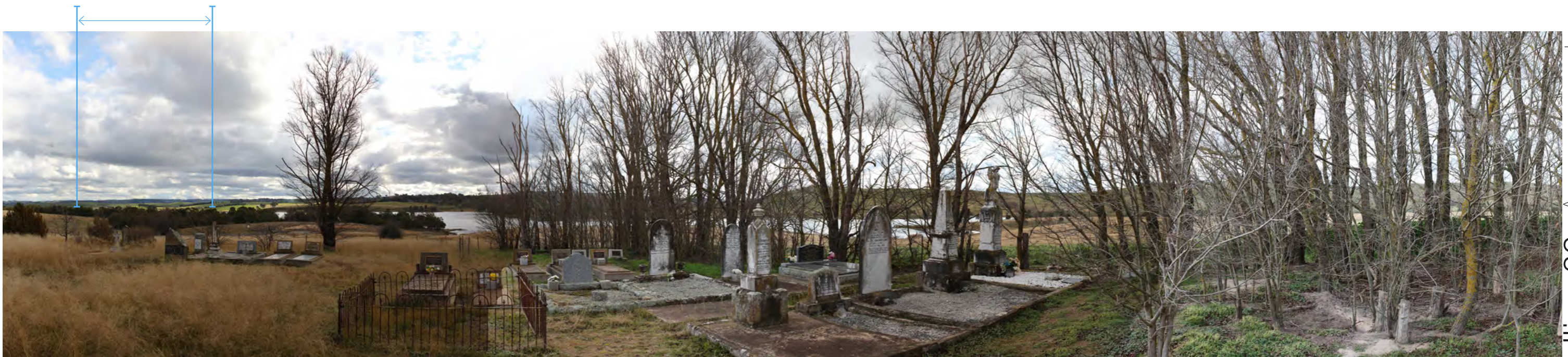


Figure D.4.B Aerial Assessment - Dwelling 39 (Source: Google Earth Imagery Date 20.08.2018)

D4. Dwelling 39 St Stephens Church Wire frame & Panorama



Indicative extent of visible C3 (South) (Up to 15°)



Panorama taken 8th July 2020

D5. Dwelling 54 Ginmara Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.4km (A34)	Nearest proposed <i>visible</i> C3 turbine (km):	3.4km (A34)	Up to 35° of views to existing C2 turbines to the north west. Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). GBLD rated the potential visual impact to the south turbines as low and O’Hanlon rated it as moderate - high. The proposed C3 (South) turbines occupy up to 10° of the view and intervening structure in the foreground is likely to screen views.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3 (Total = 95°)	All proposed C3 (East) turbines are visible to the north east. The GBLD and O’Hanlon assessments rated the visual impact of the east turbines as high and moderate. Views to the C3 (East) turbines extend across up to 50° of the view. The O’Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of ‘over 3 sectors’. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed . Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> , and is likely to be further reduced by intervening farm structures and vegetation.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	15	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	38	

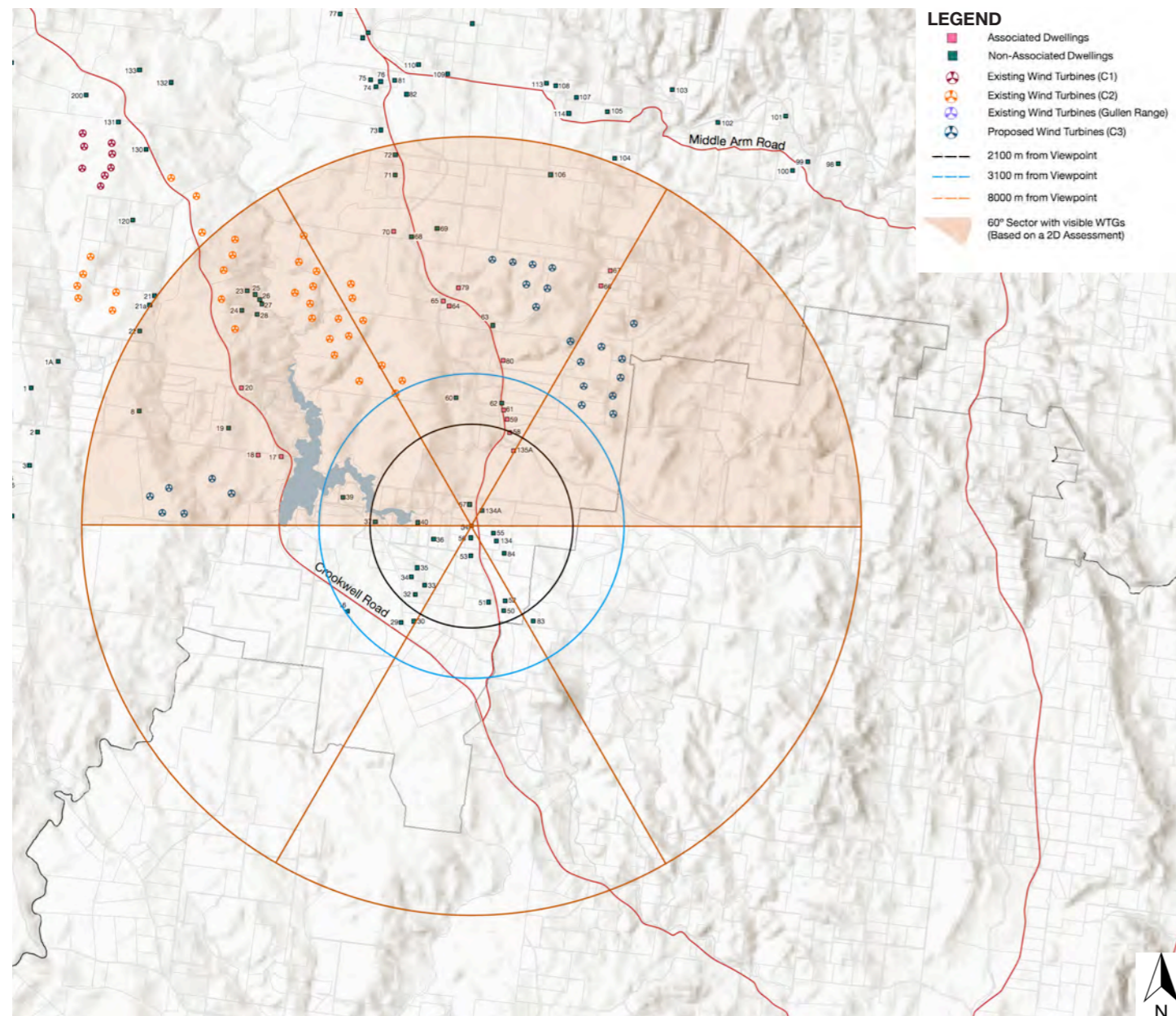


Figure D.5.A Preliminary Assessment Tool: Dwelling 54

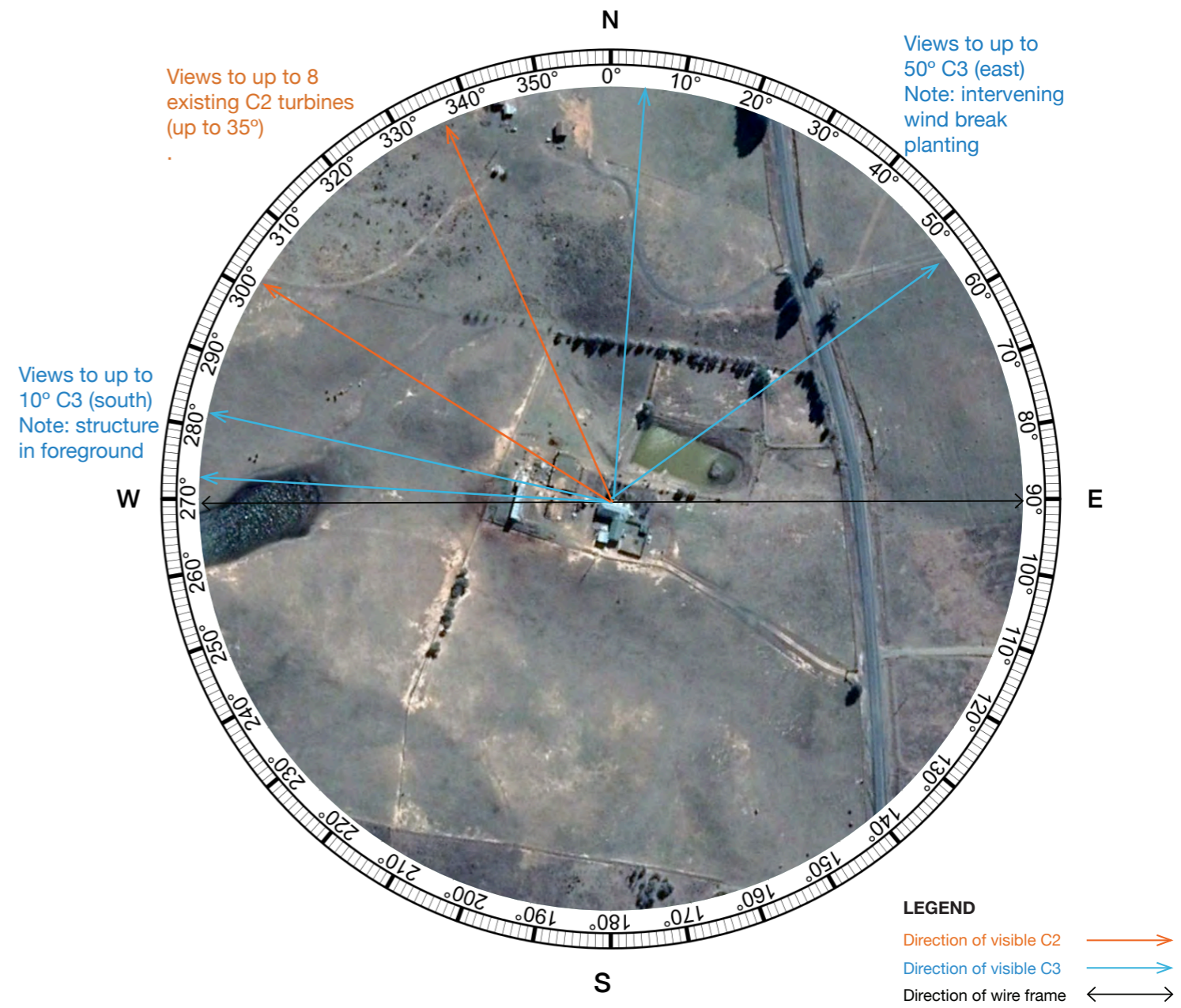
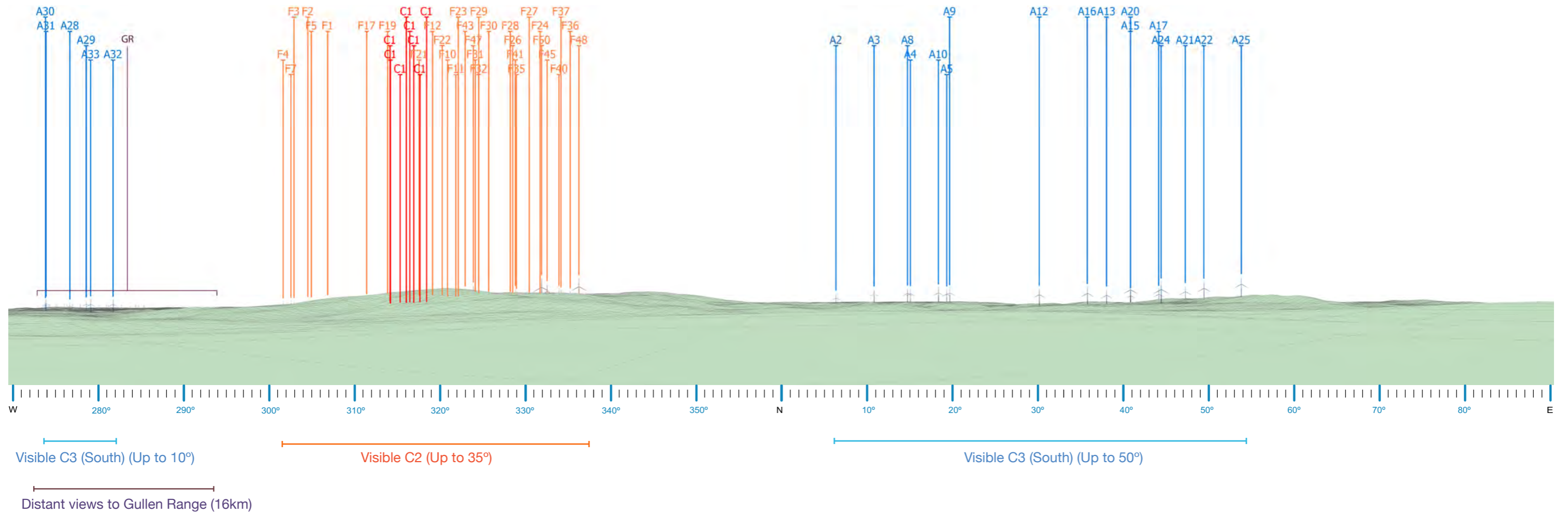


Figure D.5.B Aerial Assessment - Dwelling 54 (Source: Google Earth Imagery Date 20.08.2018)

D5. Dwelling 54 Ginmara Wire frame



D6. Dwelling 55 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.2km	Nearest proposed <i>visible</i> C3 turbine (km):	3.2km	Up to 30° of views to existing C2 turbines to the north west.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). GBLD and OHD consistently rated the potential visual impact to the south turbines as low.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3 (Total = 90°)	All proposed C3 (East) turbines are visible to the north east. The GBLD and O'Hanlon assessments rated the visual impact of the east turbines as high and moderate respectively. Views to the C3 (East) turbines extend across up to 50° of the view.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	20	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	43	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of 'over 3 sectors'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed. Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> .

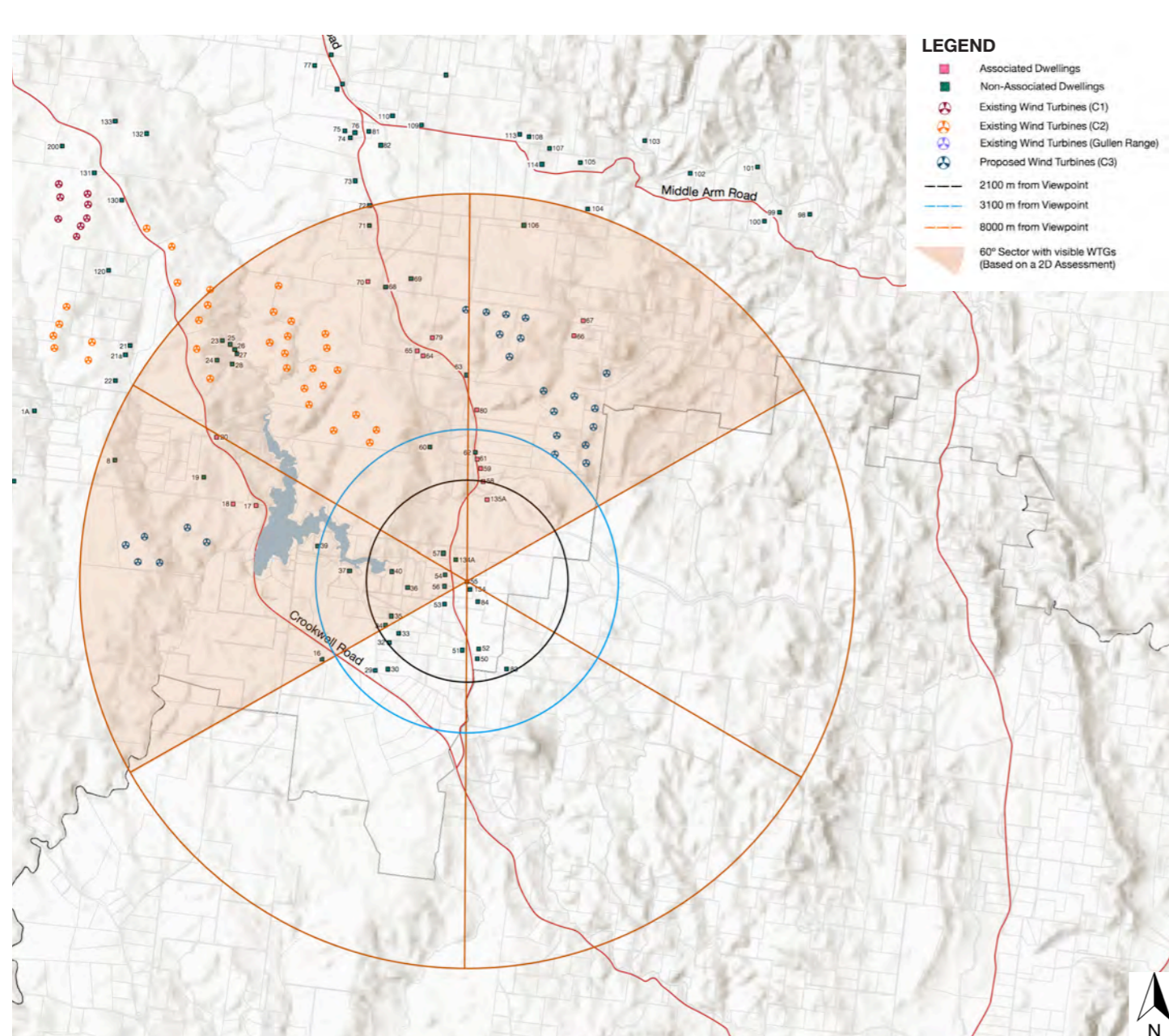


Figure D.6.A Preliminary Assessment Tool: Dwelling 55

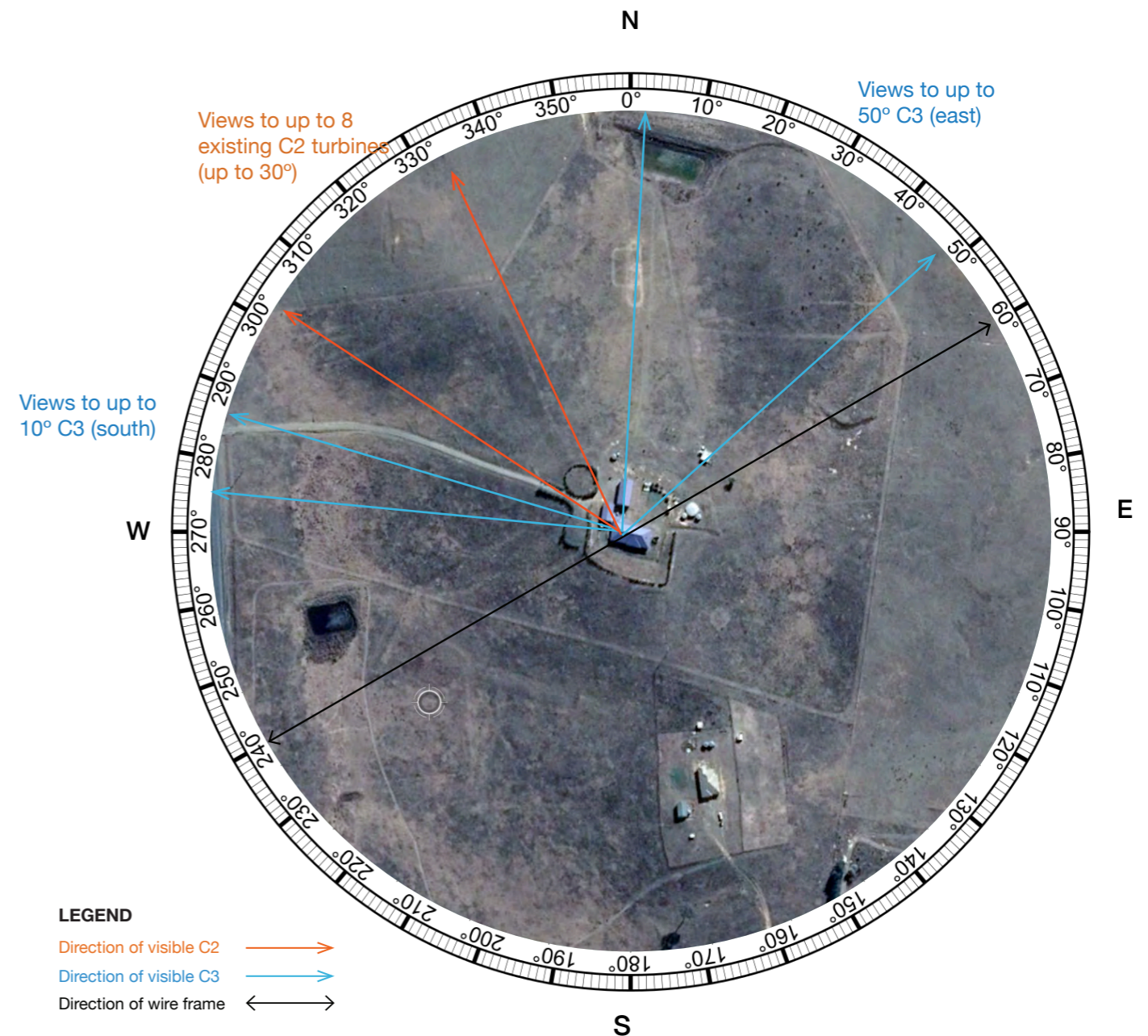
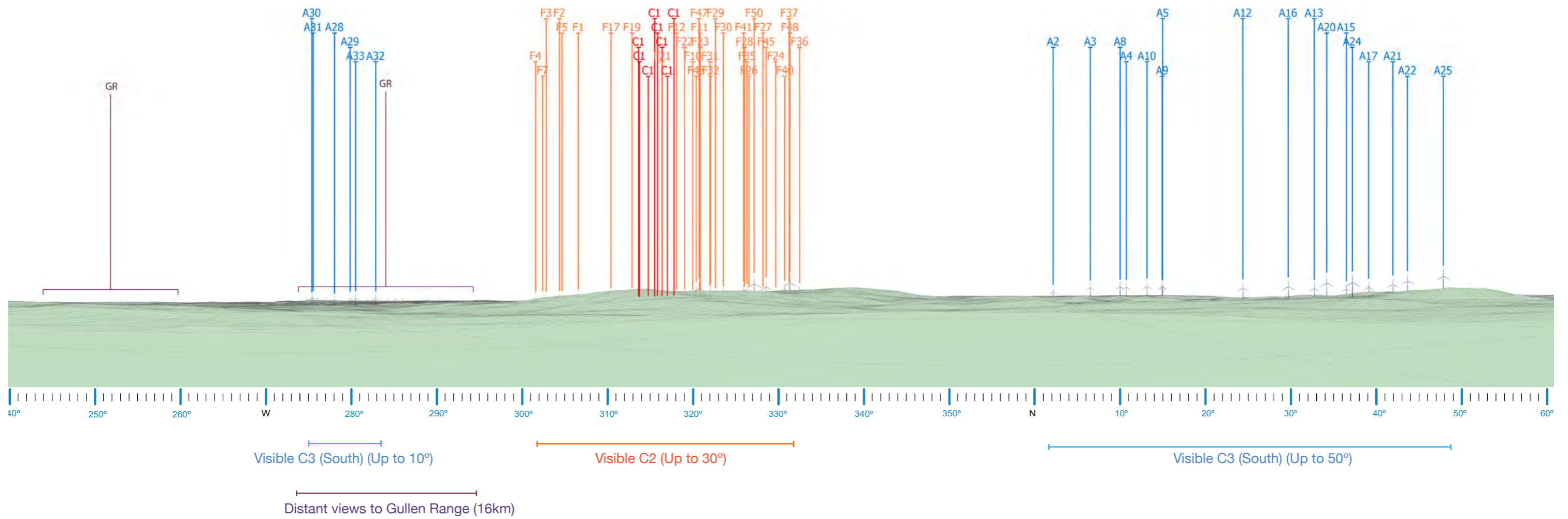


Figure D.6.B Aerial Assessment - Dwelling 55 (Source: Google Earth Imagery Date 20.08.2018)

D6. Dwelling 55 Wire frame



D7. Dwelling 57 Kenrick Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.7km	Nearest proposed <i>visible</i> C3 turbine (km):	2.7km	Up to 15° of views to existing C2 turbines to the NW.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). GBLD rated the potential visual impact to the south turbines as low and O'Hanlon rated it as low - moderate. The proposed C3 (South) turbines occupy up to 9° of the view and are in excess of 4.7km from the dwelling.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	Up to 3 (Total of 79°)	Views to all proposed C3 (East) turbines are likely to be available to the north east (55° of the view). The GBLD and O'Hanlon assessments rated the visual impact of the east turbines as high and moderate respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	5	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	28	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of 'over 3 sectors'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be less than assessed. Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> .

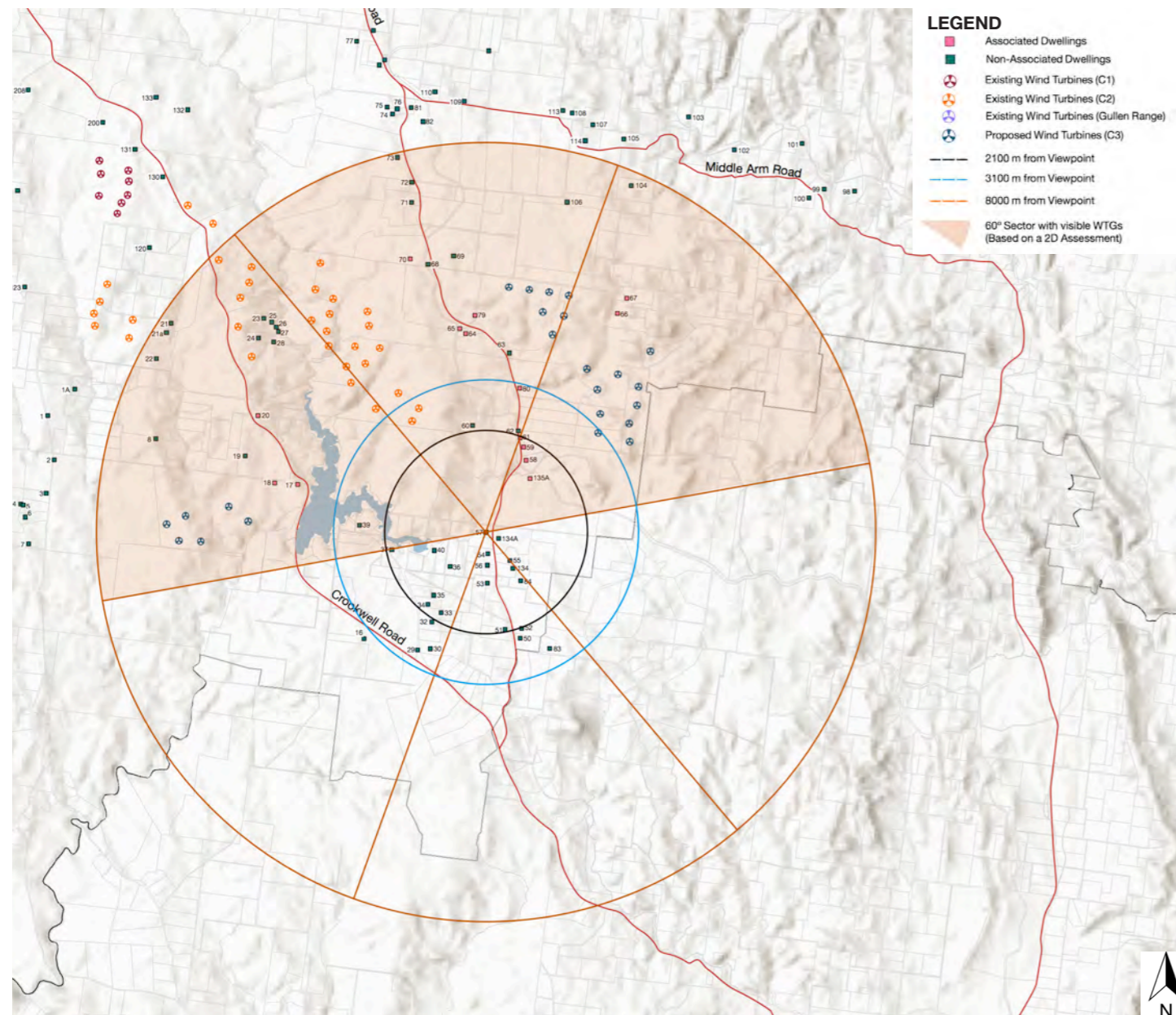


Figure D.7.A Preliminary Assessment Tool: Dwelling 57

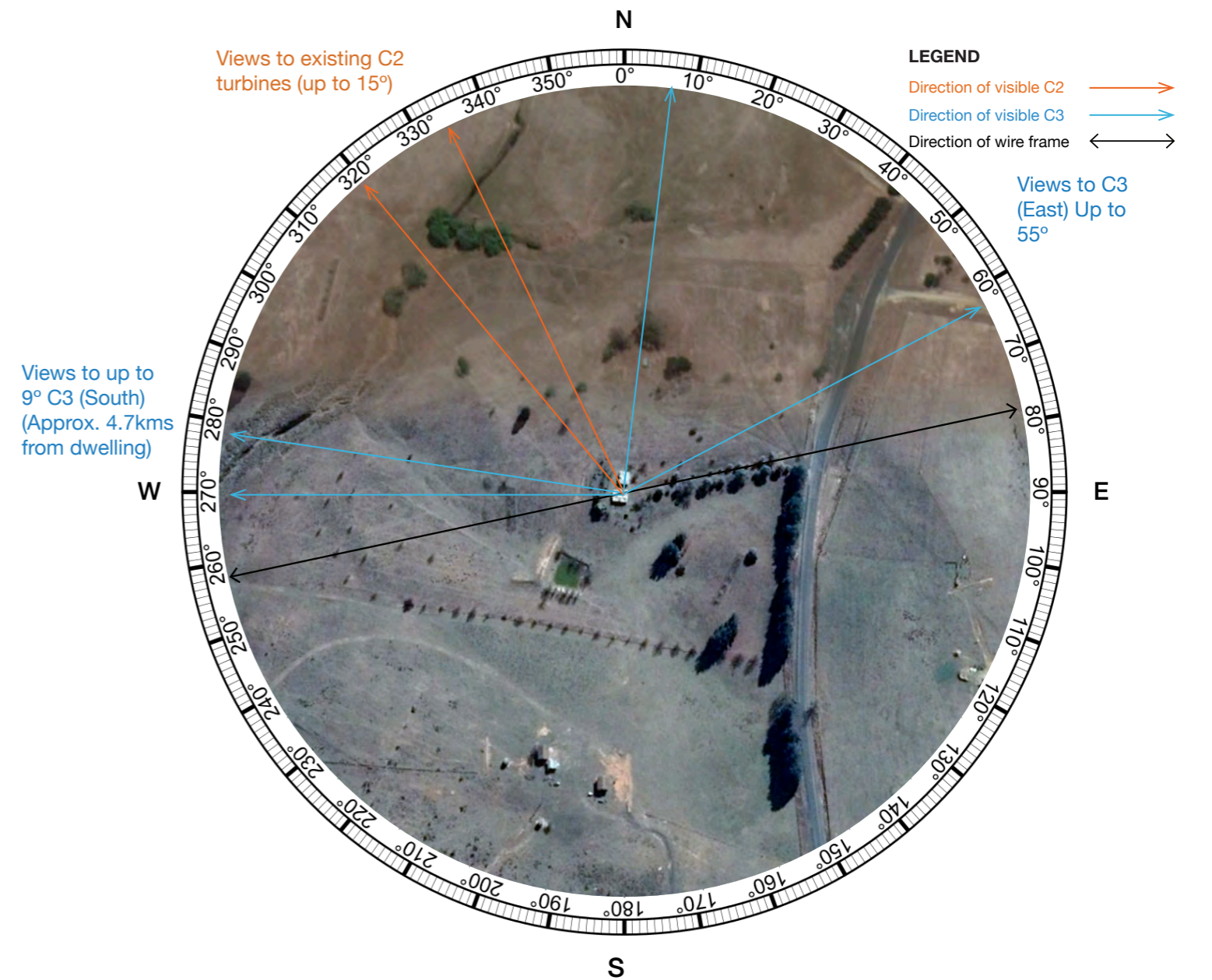
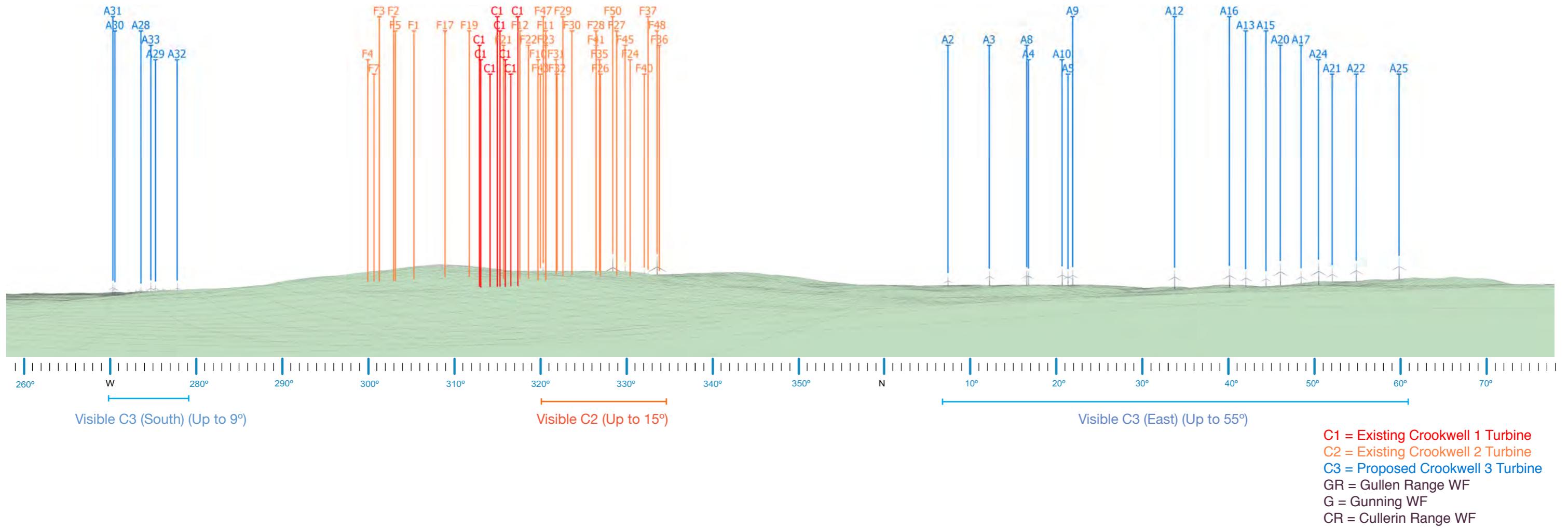


Figure D.7.B Aerial Assessment - Dwelling 57 (Source: Google Earth Imagery Date 23.01.2020)

D7. Dwelling 57 Kenrick Wire frame



D8. Dwelling 84 Nierrina Heights Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.4km	Nearest proposed <i>visible</i> C3 turbine (km):	3.4km	Up to 30° of views to existing C2 turbines to the NW. Intervening vegetation exists in the form of wind break planting.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). GBLD and OHD rated the potential visual impact to the south turbines as low. The proposed C3 (South) turbines occupy up to 10° of the view and are in excess of 5.5km from the dwelling. Existing wind break planting is likely to screen views to the C3 (south) turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3	Views to all proposed C3 (East) turbines are likely to be available to the north east (42° of the view). The GBLD and O'Hanlon assessments rated the visual impact of the east turbines as high and moderate-high respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	30	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	53	The O'Hanlon VIA gave a cumulative visual impact rating of mod-high based on a 2D assessment of 'over 2 sectors'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment. Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> and likely only 2 sectors due to vegetation screening C3 (south) turbines.

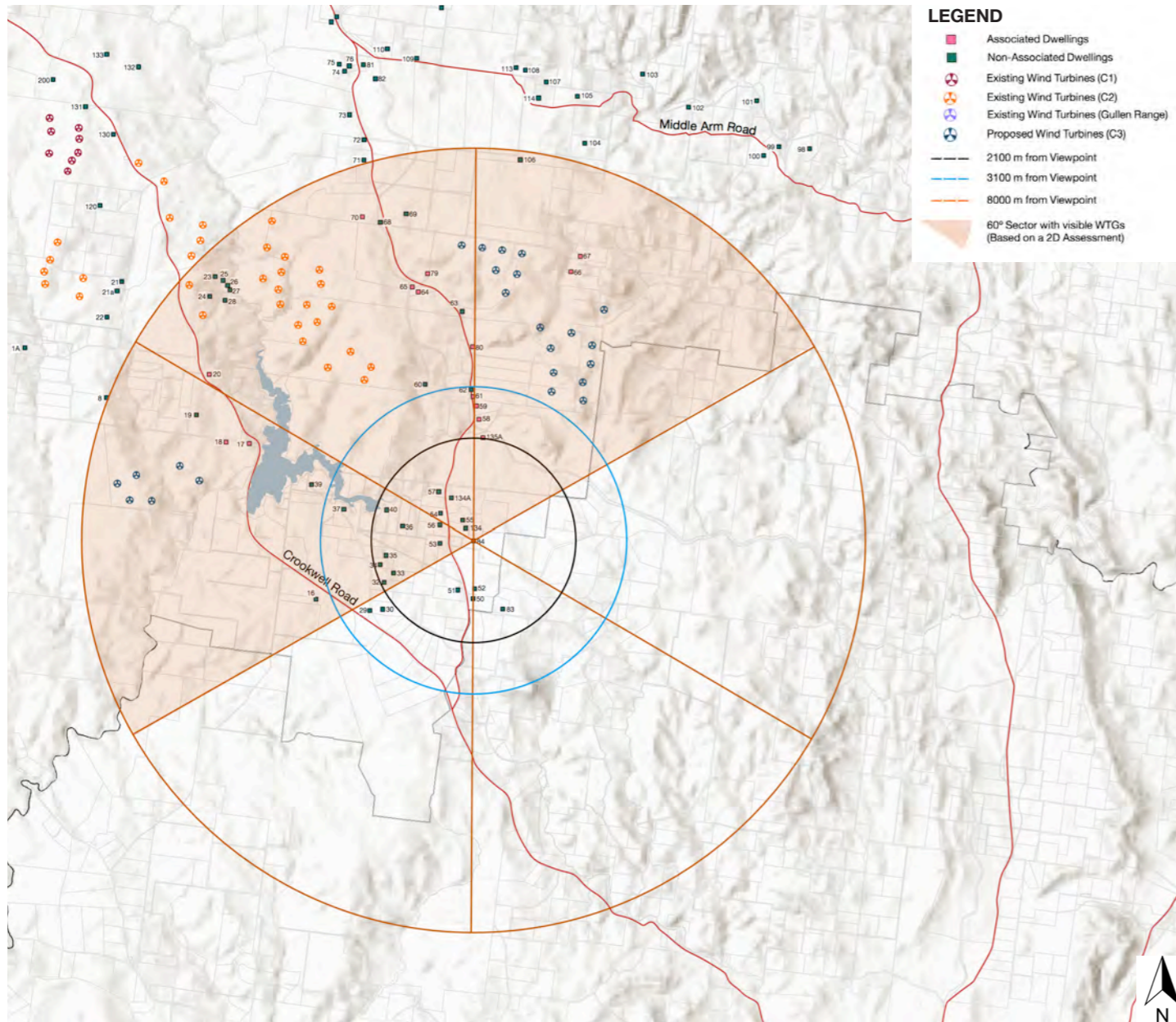


Figure D.8.A Preliminary Assessment Tool: Dwelling 84

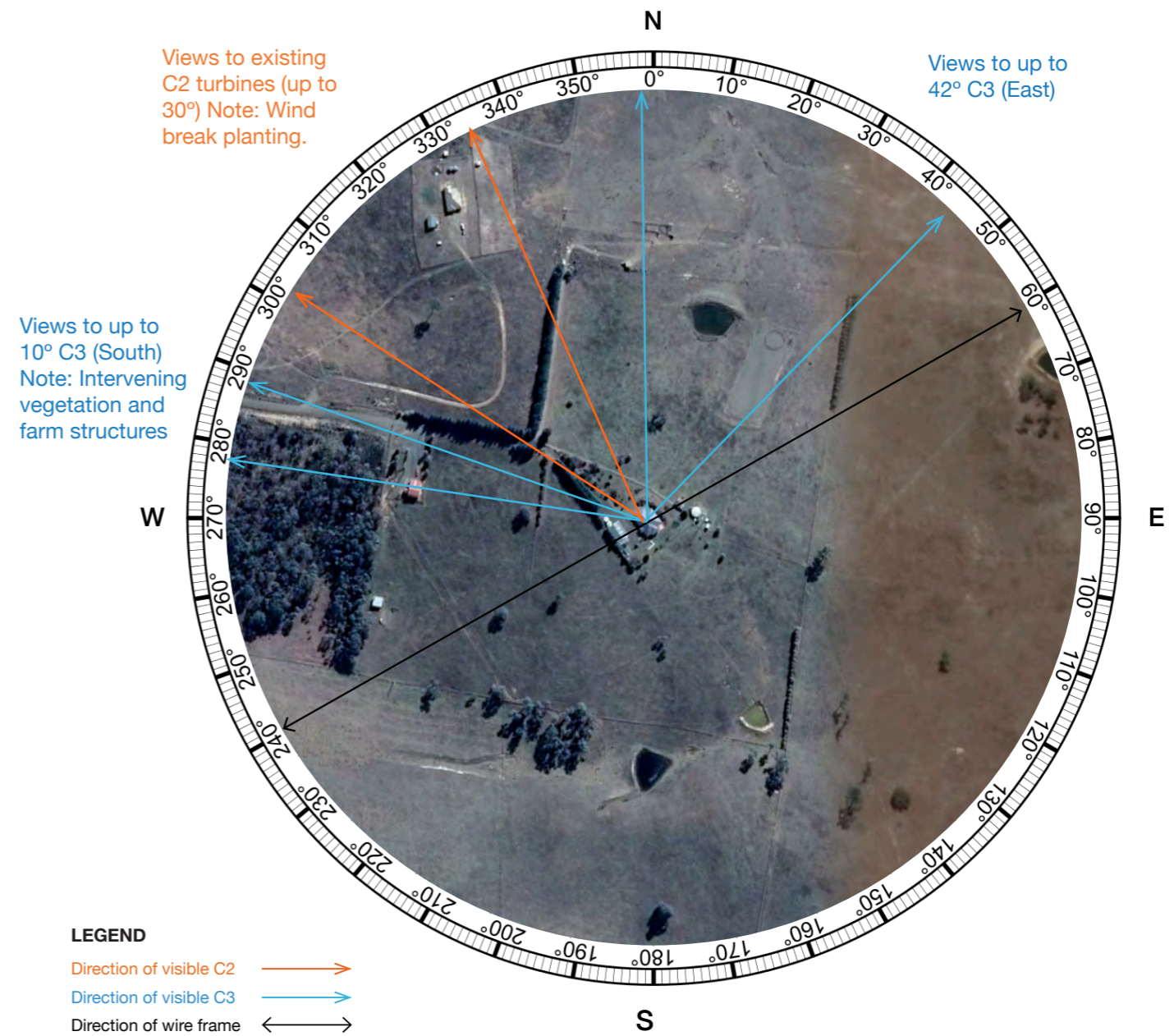
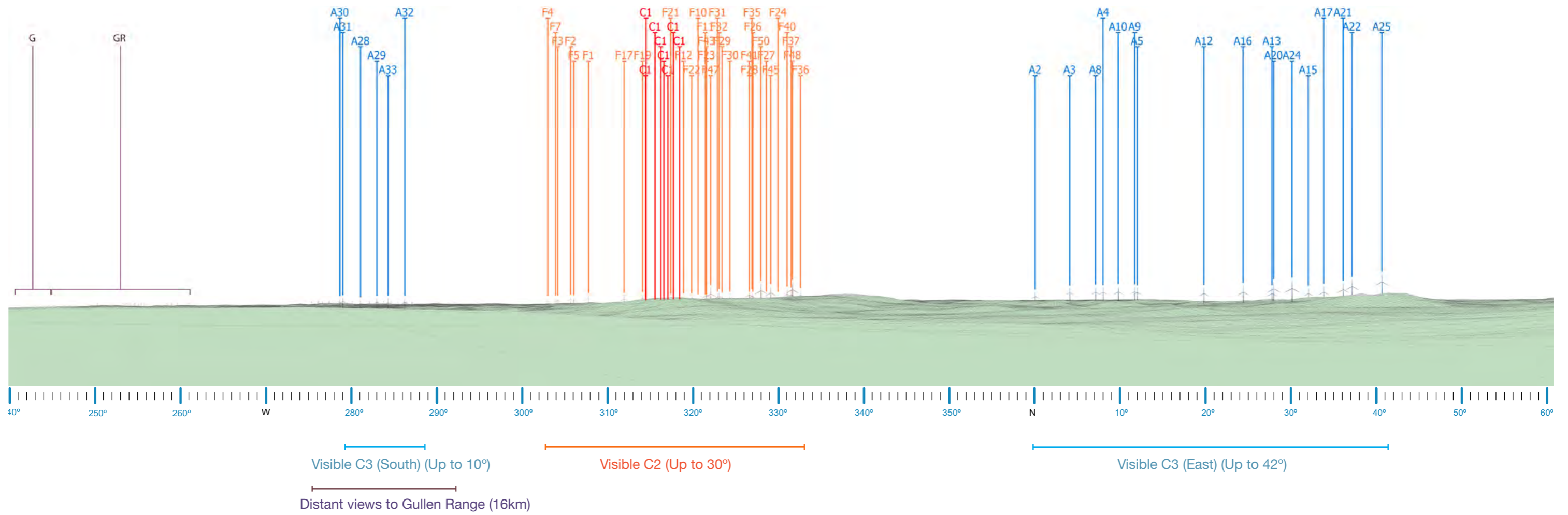


Figure D.8.B Aerial Assessment - Dwelling 84 (Source: Google Earth Imagery Date 23.01.2020)

D8. Dwelling 84 Nierrina Heights Wire frame



D9. Dwelling 134 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.3km	Nearest proposed <i>visible</i> C3 turbine (km):	3.3km	Up to 30° of views to existing C2 turbines to the NW.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). OHD rated the potential visual impact to the south turbines as nil - low. The proposed C3 (South) turbines occupy up to 10° of the view and are in excess of 5.5km from the dwelling.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3	Views to all proposed C3 (East) turbines are likely to be available to the north east (45° of the view). The O'Hanlon assessment rated the visual impact of the east turbines as moderate-high.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	25	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	48	The O'Hanlon VIA gave a cumulative visual impact rating of mod-high based on a 2D assessment of 'over 2 sectors'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment.

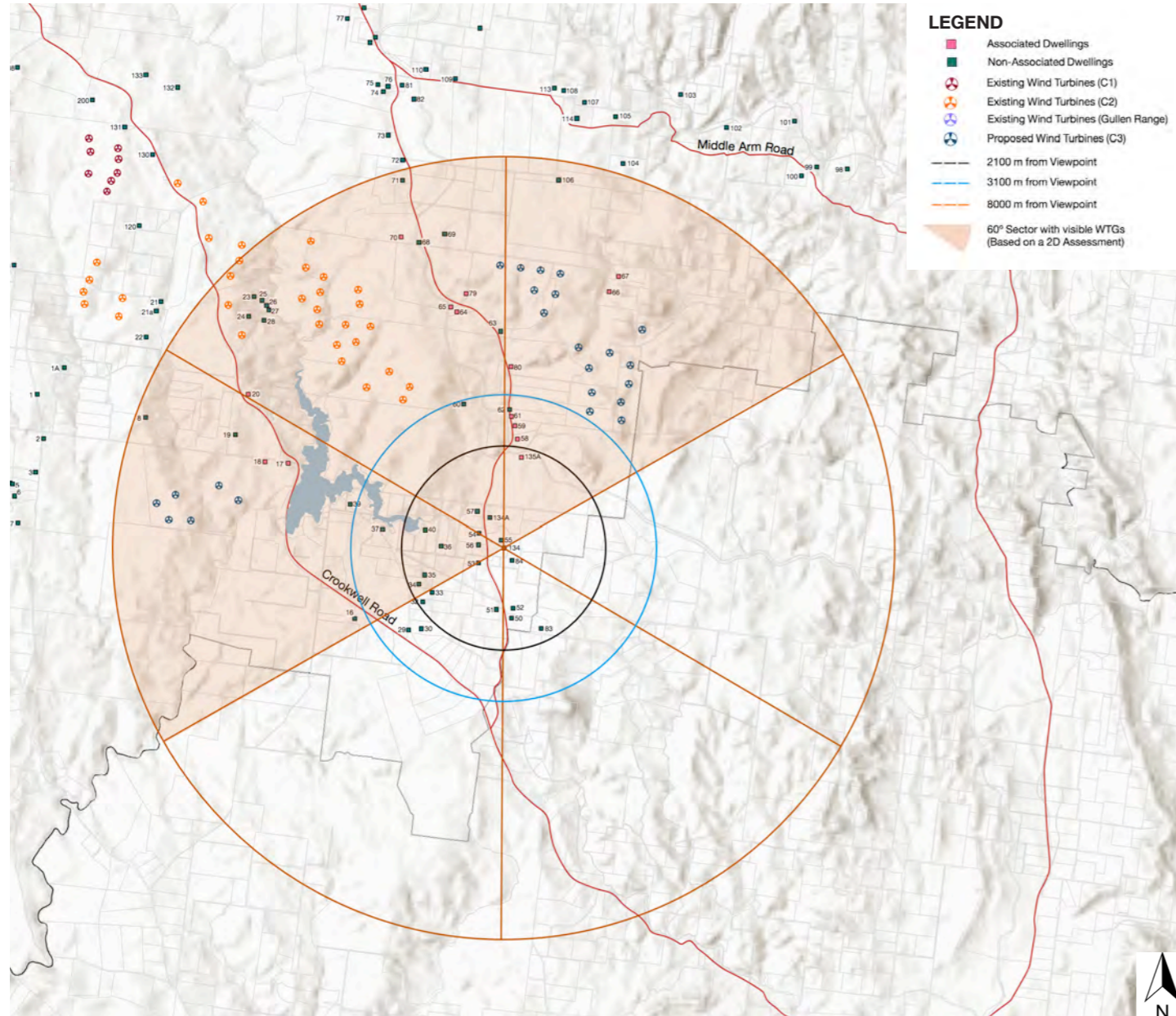


Figure D.9.A Preliminary Assessment Tool: Dwelling 134

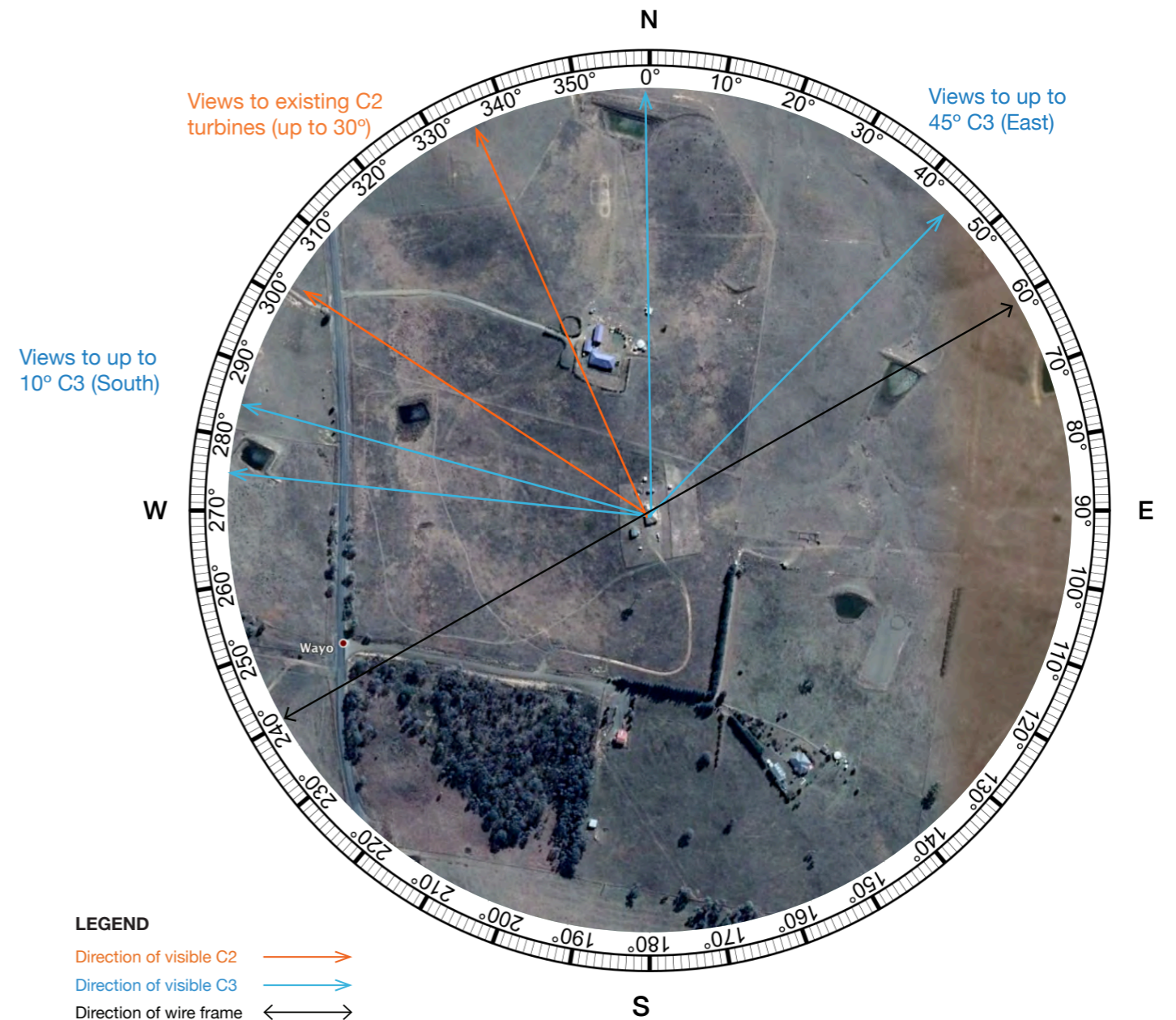
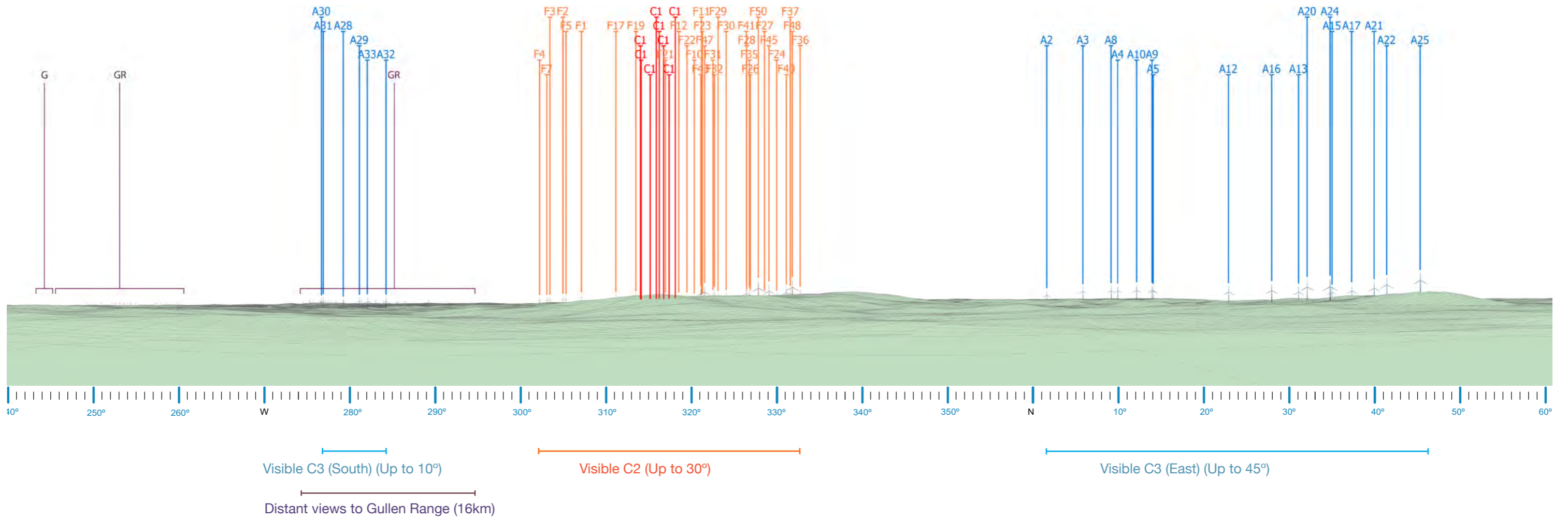


Figure D.9.B Aerial Assessment - Dwelling 134 (Source: Google Earth Imagery Date 23.01.2020)

D9. Dwelling 134 Wire frame



D10. Dwelling 134A Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.0km	Nearest proposed <i>visible</i> C3 turbine (km):	3.0km	Up to 15° of views to existing C2 turbines to the NW.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone). OHD rated the potential visual impact to the south turbines as low. The proposed C3 (South) turbines occupy up to 10° of the view and are in excess of 5.5km from the dwelling.
Number of theoretical 60° Sectors (Based on 2D Assessment)	3	Number of visible 60° Sectors (Based on 3D Assessment)	3	Views to all proposed C3 (East) turbines are likely to be available to the north east (55° of the view). The O’Hanlon assessment rated the visual impact of the east turbines as moderate-high.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	8	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	31	The O’Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of ‘over 3 sectors’. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be less than this assessment. Cumulative views to proposed and existing turbines would be in <i>up to three sectors</i> .

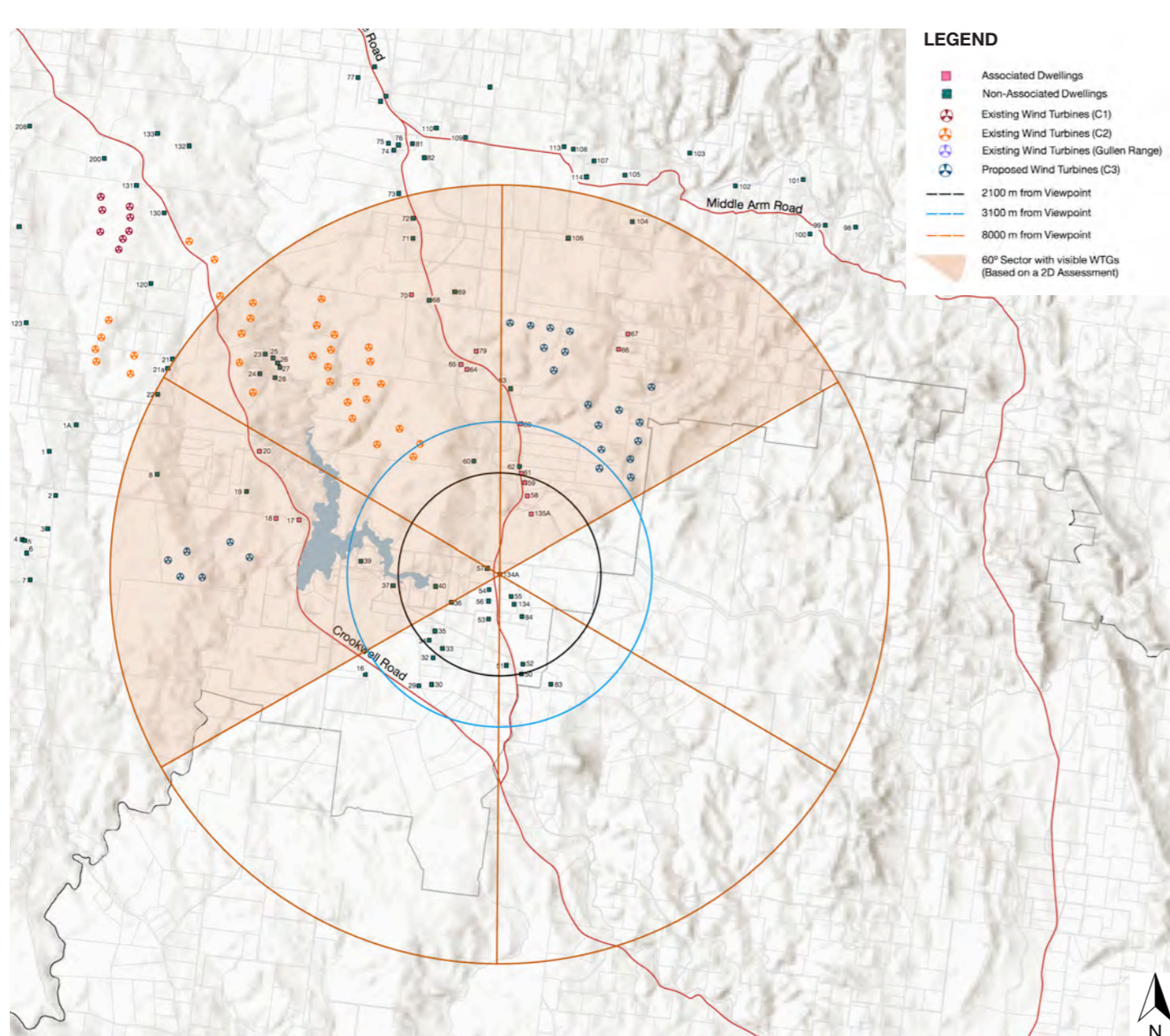


Figure D.10.A Preliminary Assessment Tool: Dwelling 134A

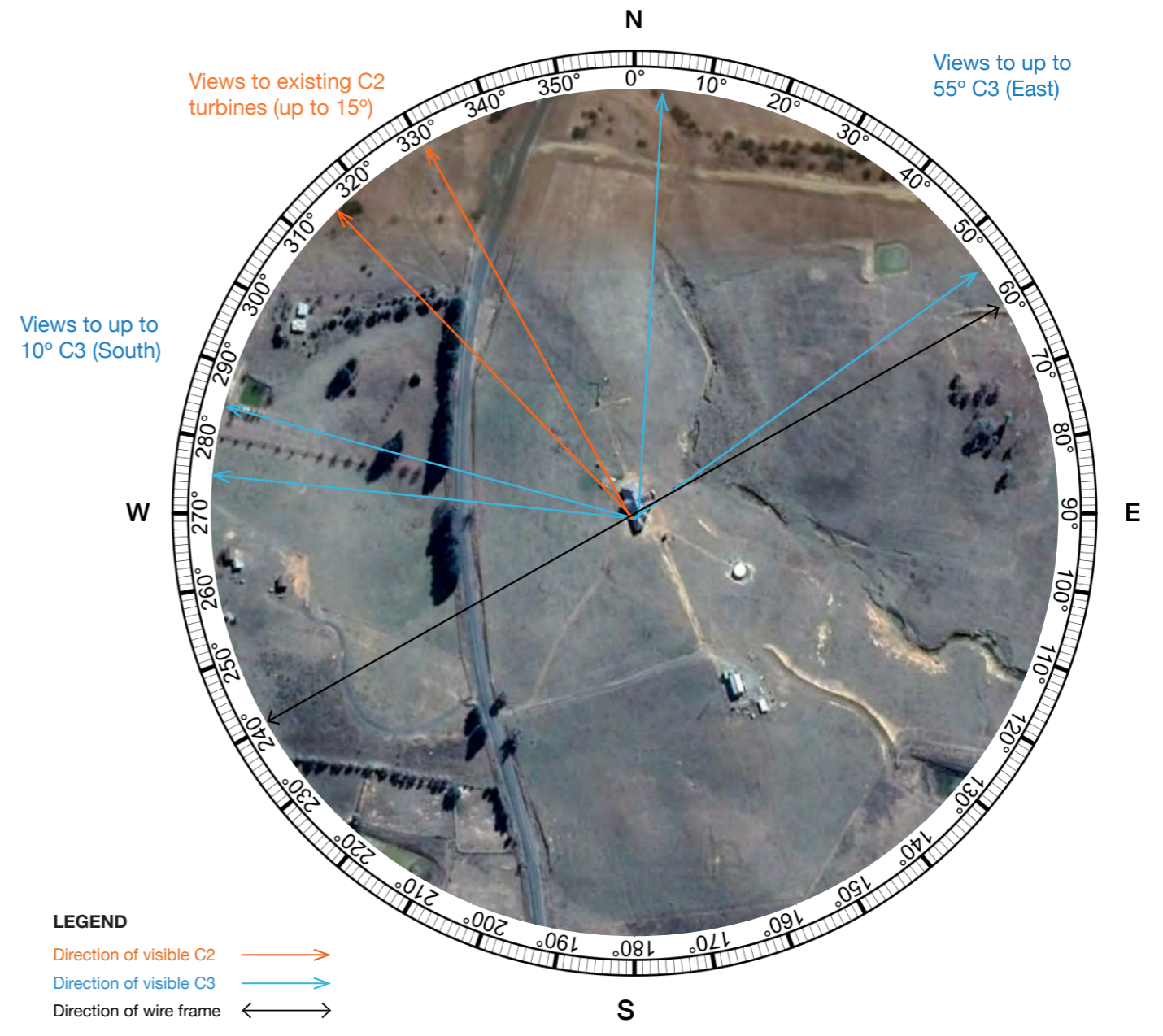
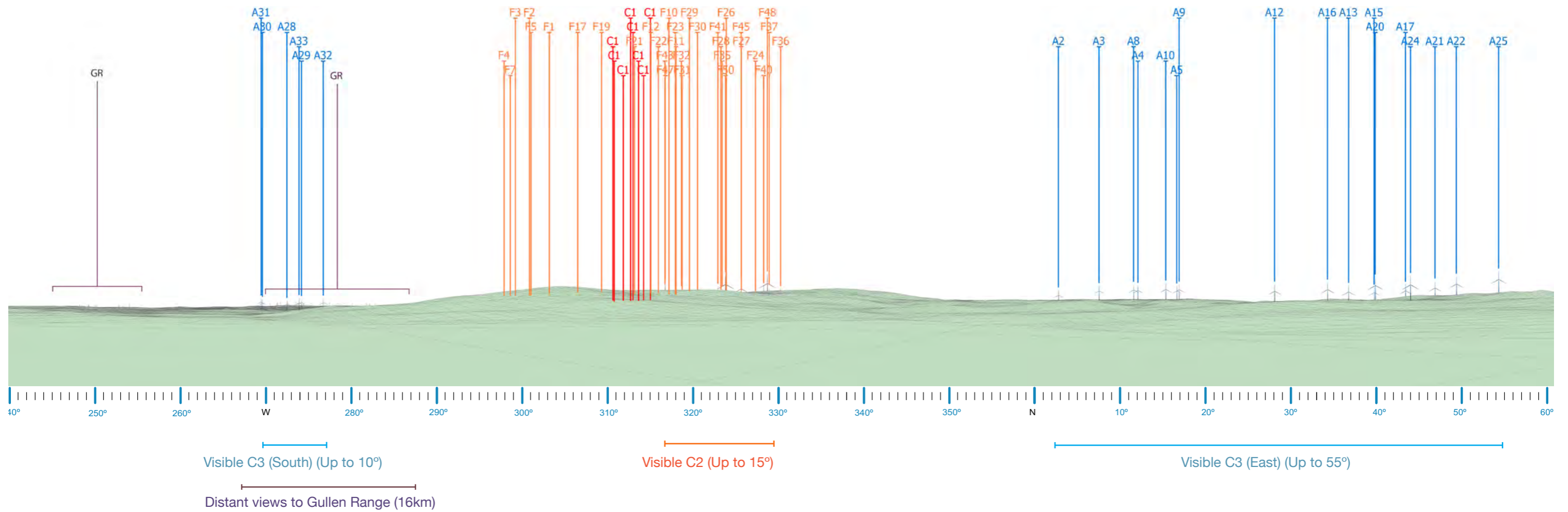


Figure D.10.B Aerial Assessment - Dwelling 134A (Source: Google Earth Imagery Date 23.01.2020)

D10. Dwelling 134A Wire frame





Appendix E

Pejar: South Western Cluster

E. Pejar: South Western Cluster Assessment

Table E: Pejar: South Western Cluster

ID	Name	Location	Closest C3 WTG (km)	VIA Assessment		OHD Comments			MLA Desktop Assessment			MLA Assessment Notes:
				South	East	South	East	Cumulative	South	East	Cumulative	
2	Bendemere	Dawsons Creek Road	2.9km	Mod - High	Low	Mod-High Approx. 80% visible with some veg screening.	Nil - Low	Low 2 Sectors with C2	Mod - High	Nil - Low	2	Gullen Range visible in distance screened by vegetation.
3	D'Ambrosio	Dawsons Creek Road	2.6km	Mod - High	Low	Mod-High Approx. 80% visible	Nil - Low	Low - Mod 4 sectors with C2 and Gullen Range	Mod - High	Nil - Low	Up to 4 sectors with C2 and Gullen Range	Gullen Range visible in distance. Views to C2 and C3 intervening vegetation.
4	-	Dawsons Creek Road	3.2km	Mod - High	Low	Mod-High Approx. 80% visible	Nil - Low	Low 2 Sectors with C2	Mod - High	Nil - Low	Up to 2 Sectors	Gullen Range screened by topography.
5	-	Dawsons Creek Road	2.9km	Mod	Low	Moderate Approx. 80% visible	Nil - Low	Low	Mod	Nil - Low	Up to 2 Sectors	Gullen Range screened by topography.
6	-	Dawsons Creek Road	2.9km	Mod - High	Low	Mod-High Approx. 80% visible some curtilage screening	Nil - Low	Low	Mod - High	Nil - Low	Up to 2 Sectors	Gullen Range screened by topography.
7	Emohruo	Dawsons Creek Road	2.9km	Mod - High	Low	High. Fully visible viewer elevated.	Nil - Low	Low	Mod - High	Nil - Low	Up to 2 Sectors	Gullen Range screened by vegetation.
8	Narangi	Pejar Road	2.1km	High	Low	High Extensive views of A28, A29, A30, A31, A32 and A33	Low	High > 4 Sectors including C2 less than 2km and Gullen Range	High	Low	Up to 4 Sectors	Majority of visible sectors associated with existing C2 turbines.
19	Wombat Hollow		1.0km	High	Low	High Extensive views of A28, A29, A30, A31, A32 and A33 all from 1-2km distance	Low	High > 4 sectors plus Gullen Range	High	Low	Up to 4 sectors	Majority of visible sectors associated with existing C2 turbines.

KEY:

- Identifies conflicting ratings (C3 South Assessment)
- Identifies conflicting ratings (Cumulative Assessment)
- Identifies conflicting ratings (C3 East Assessment)
- * = Likely to be reduced by intervening vegetation

E1. Dwelling 2 Bendemere Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.9km	Nearest proposed <i>visible</i> C3 turbine (km):	2.9km	Existing C2 turbines are visible to the north east in up to 70° of the view. Some intervening vegetation may reduce potential visibility of these turbines.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone) in up to 20° of the view. OHD and GBD rated the potential visual impact of the south turbines as moderate - high.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	2	Views to the tips of the proposed C3 (East) turbines are likely to be available to the north east. The OHD and GBD assessments rated the visual impact of the east turbines as nil - low and low respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	31	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	48	The O'Hanlon VIA gave a cumulative visual impact rating of low based on a 2D assessment of '2 sectors with C2'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment. Existing roadside vegetation is likely to screen views to Gullen Range from this location.

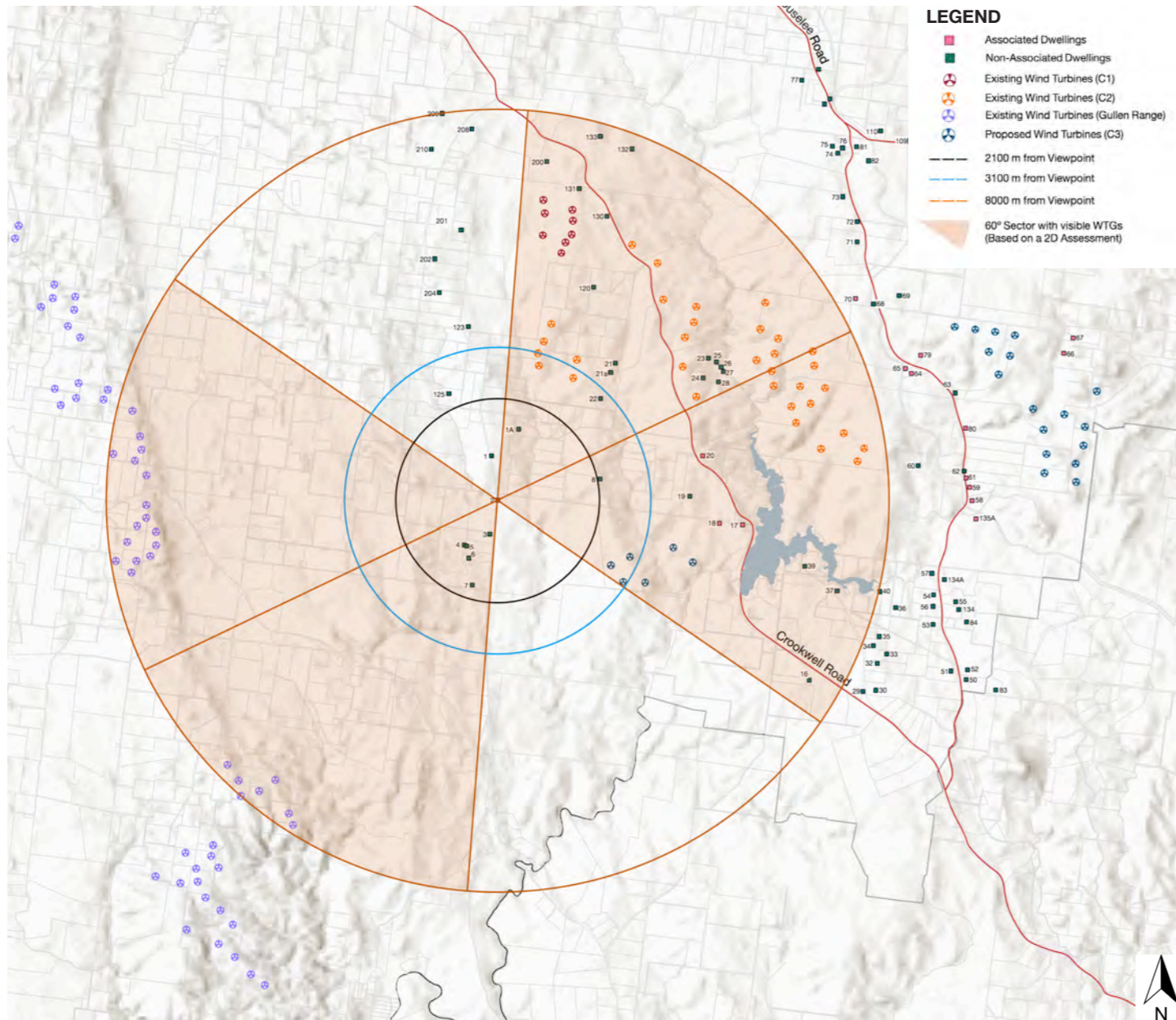


Figure E.1.A Preliminary Assessment Tool: Dwelling 2

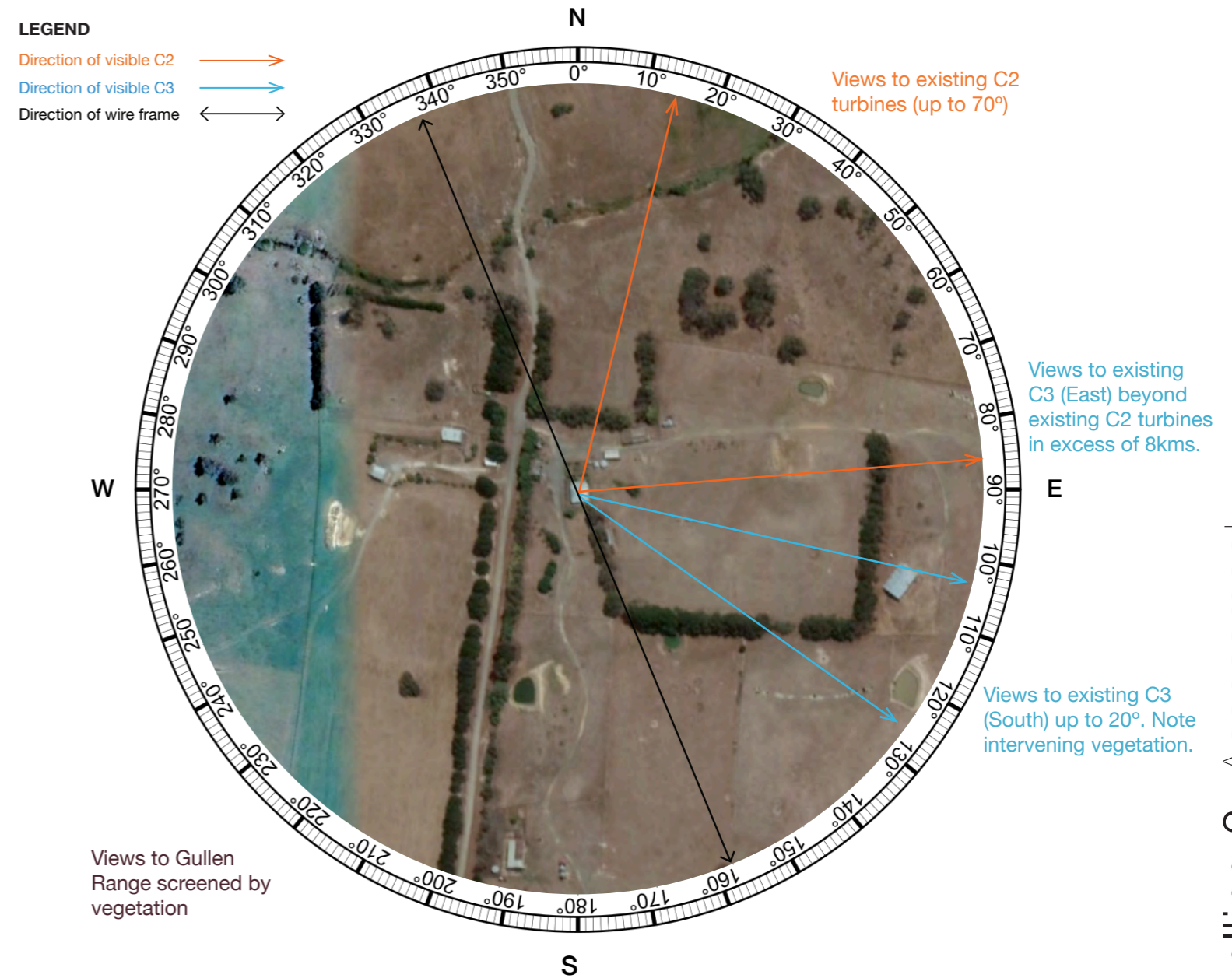
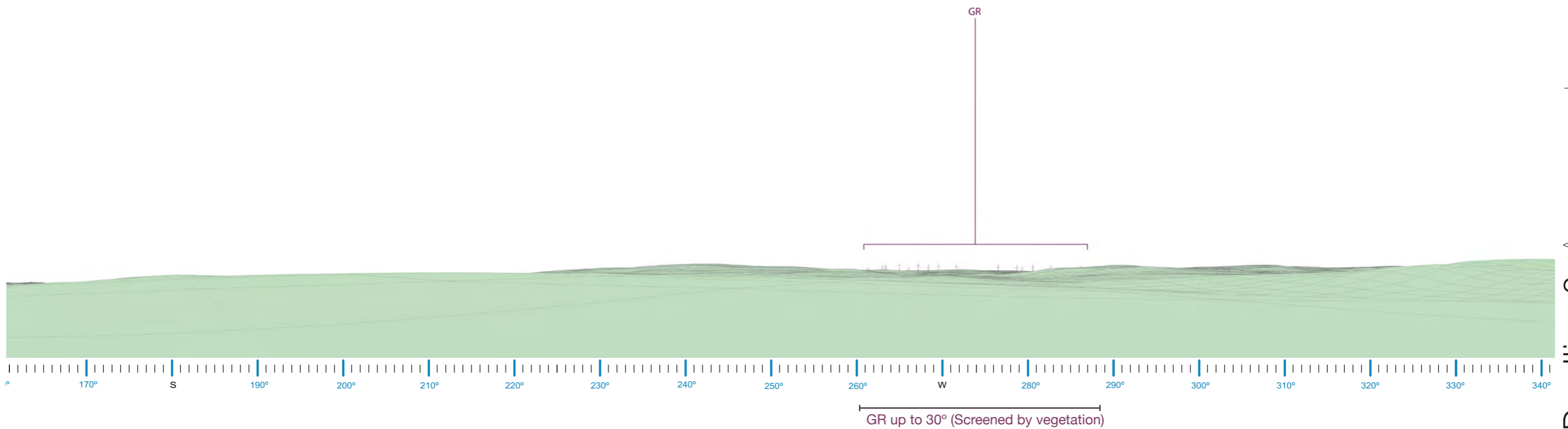
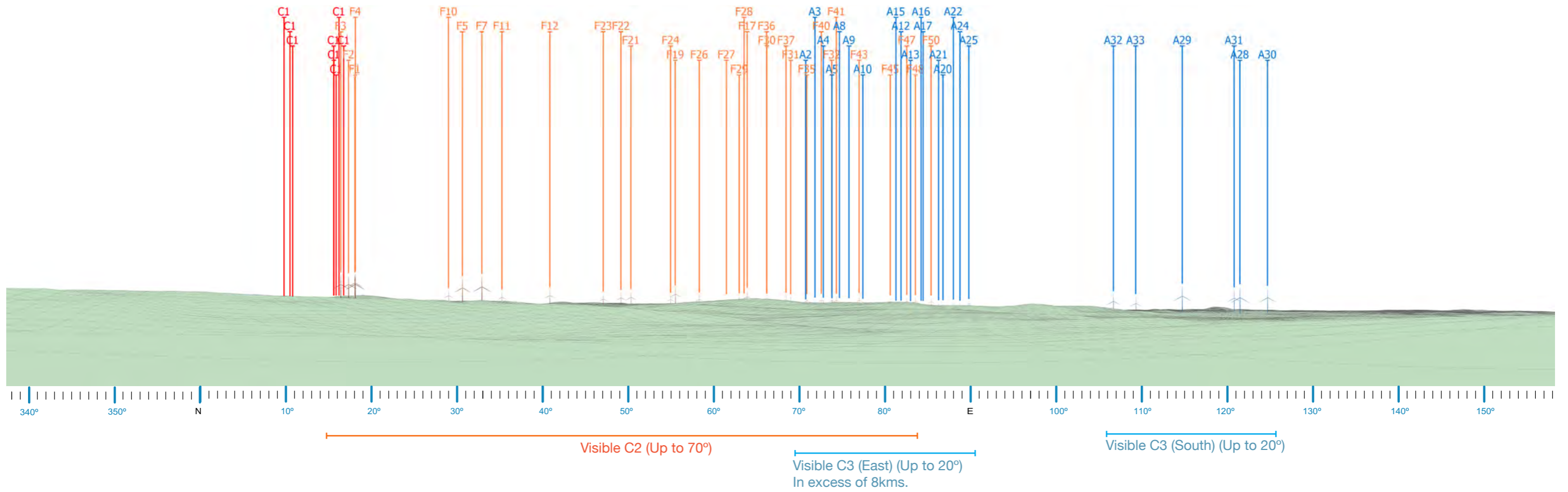


Figure E.1.B Aerial Assessment - Dwelling 2 (Source: Google Earth Imagery Date 23.01.2020)

E1. Dwelling 2 Bendemere Wire frame



E2. Dwelling 3 D'Ambrosio Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.6km	Nearest proposed <i>visible</i> C3 turbine (km):	2.6km	Existing C2 turbines are visible to the north east in up to 70° of the view. Roadside vegetation along Dawsons Creek Road may reduce potential visibility of these turbines.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	Up to 2	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone) in up to 15° of the view. OHD and GBD both rated the potential visual impact of the south turbines as moderate - high.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	35	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	47	Views to the tips of several C3 (East) turbines are likely to be available to the north east in excess of 8kms. The OHD and GBD assessments rated the visual impact of the east turbines as nil - low and low respectively.
				The O'Hanlon VIA gave a cumulative visual impact rating of low - mod based on a 2D assessment of '4 sectors with C2 and Gullen Range'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be less than this assessment. Existing roadside vegetation is likely to significantly reduce potential views to C3 from this dwelling.

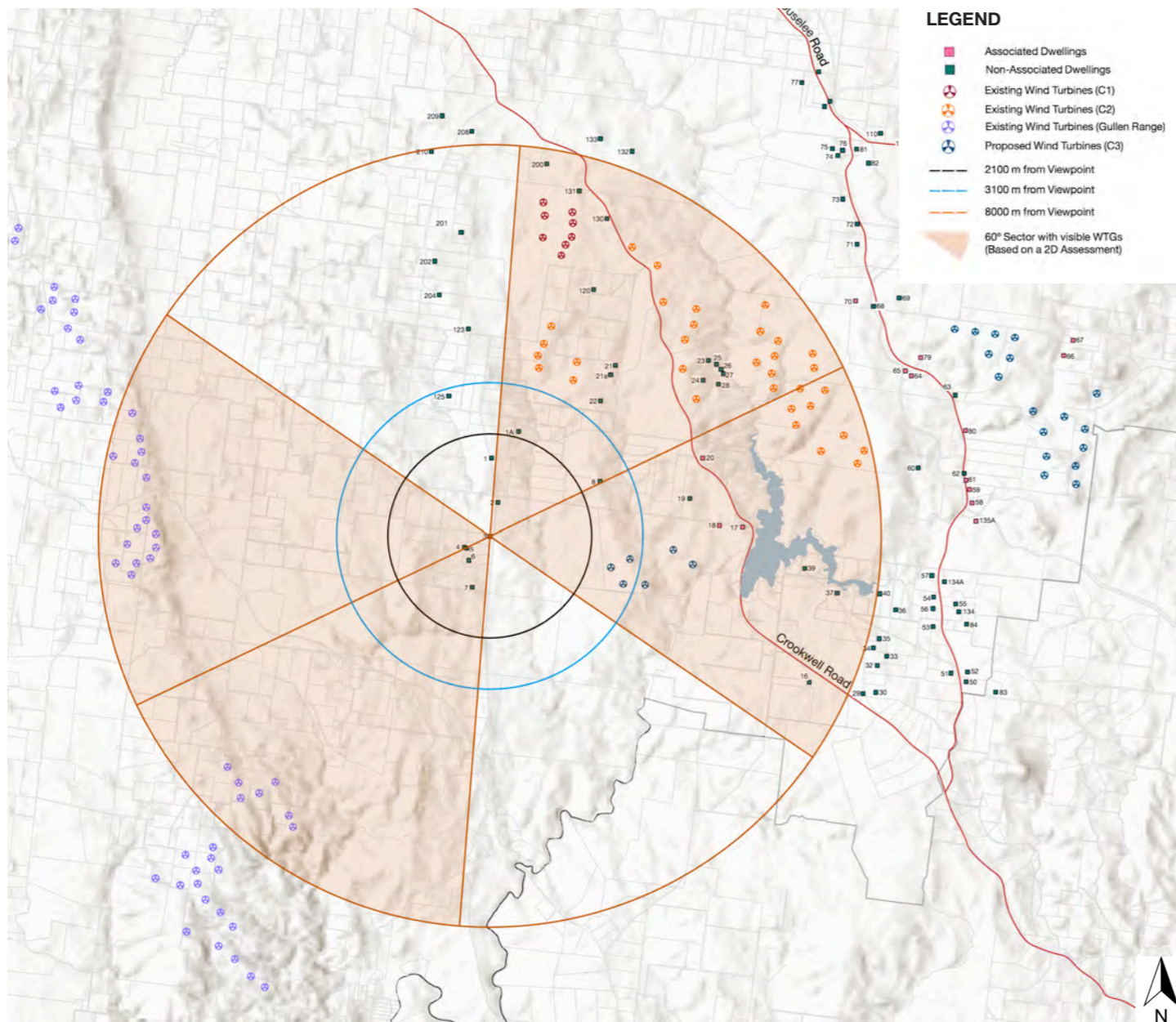


Figure E.2.A Preliminary Assessment Tool: Dwelling 3

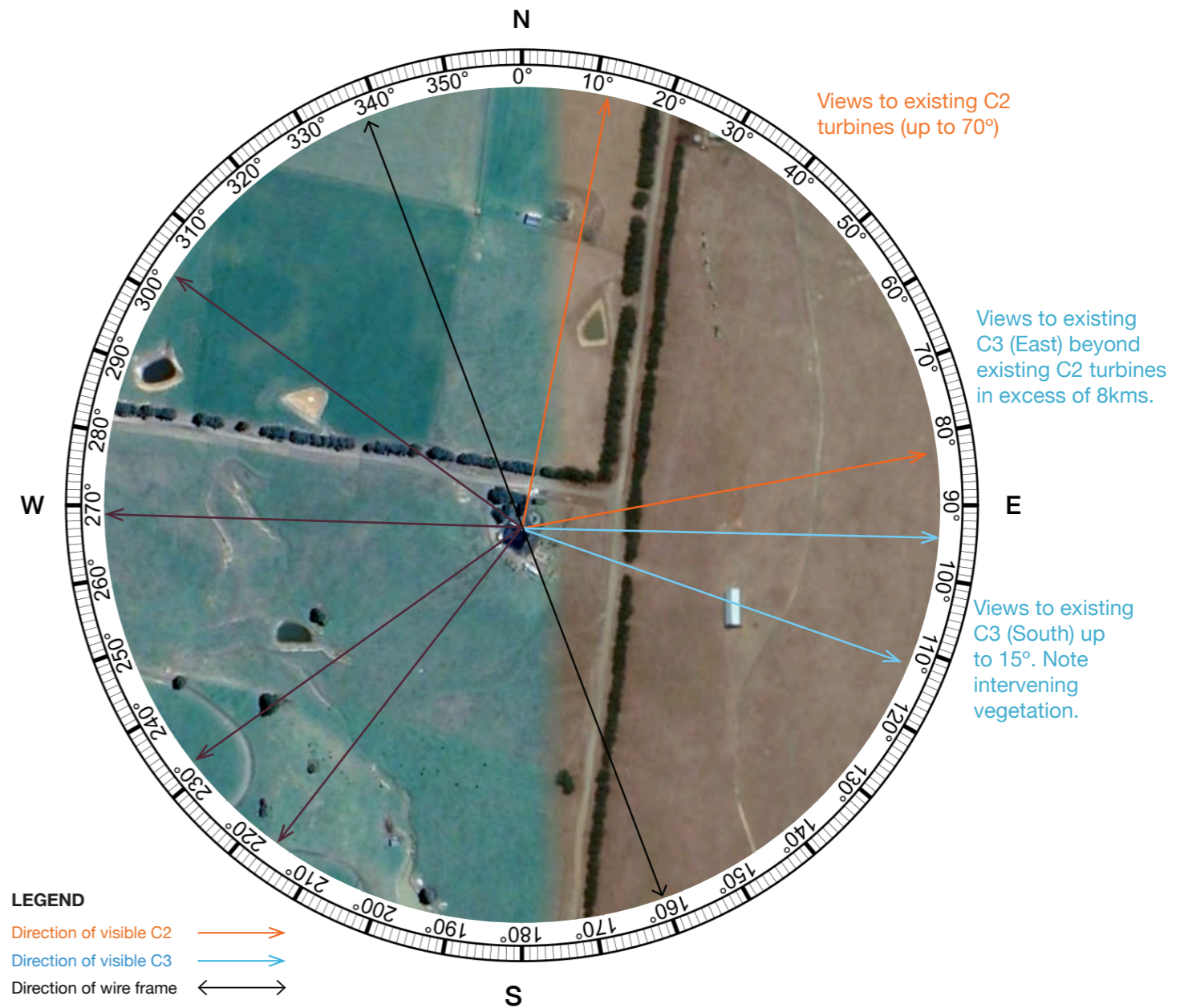
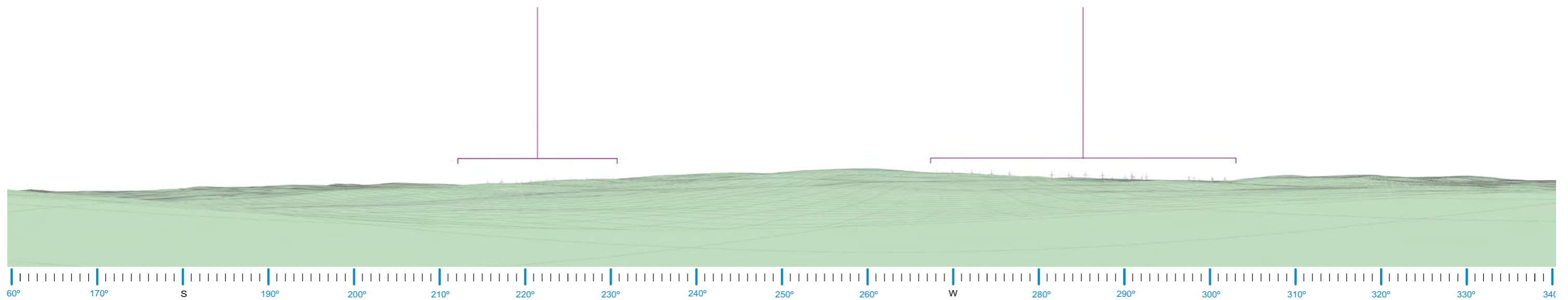
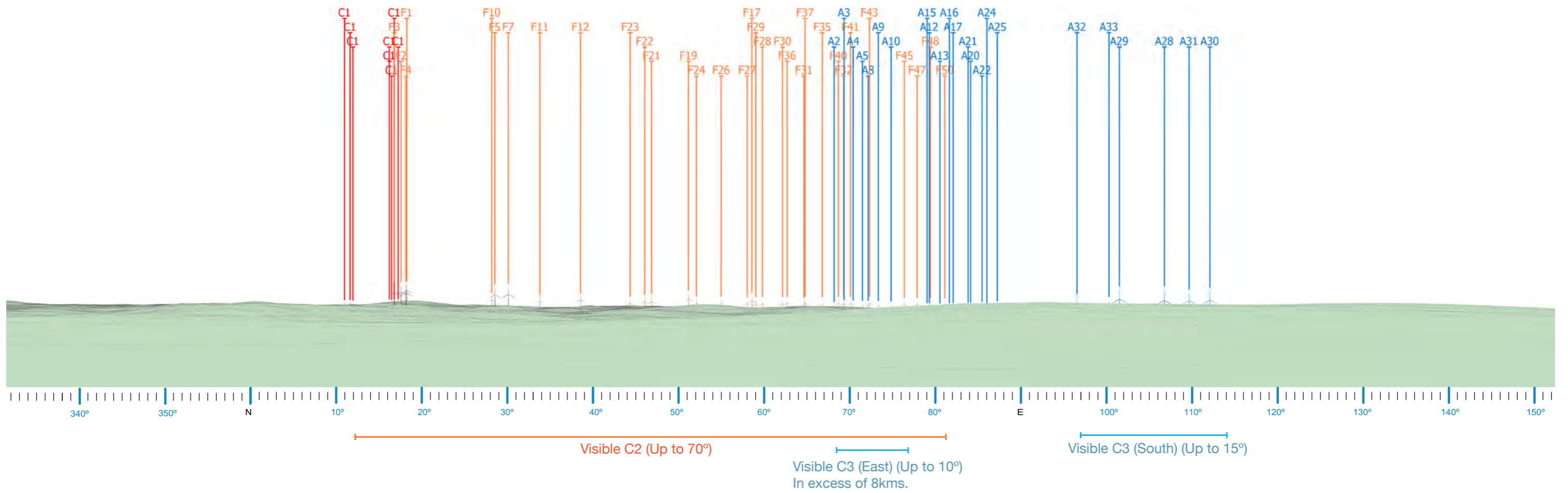


Figure E.2.B Aerial Assessment - Dwelling 3 (Source: Google Earth Imagery Date 23.01.2020)

E2. Dwelling 3 D'Ambrosio Wire frame



E3. Dwelling 4 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	3.0km	Nearest proposed <i>visible</i> C3 turbine (km):	3.0km	Existing C2 turbines are visible to the north east in up to 70° of the view.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone) in up to 15° of the view. OHD and GBD both rated the potential visual impact of the south turbines as moderate - high. Existing vegetation may reduce potential visibility of the C3 (south) turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	Up to 2	Views to all proposed C3 (East) turbines are likely to be available to the north east in excess of 8kms (20° of the view). The OHD and GBD assessments rated the visual impact of the east turbines as nil - low and low respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	41	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	58	The O'Hanlon VIA gave a cumulative visual impact rating of low based on a 2D assessment of '2 sectors with C2'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment.

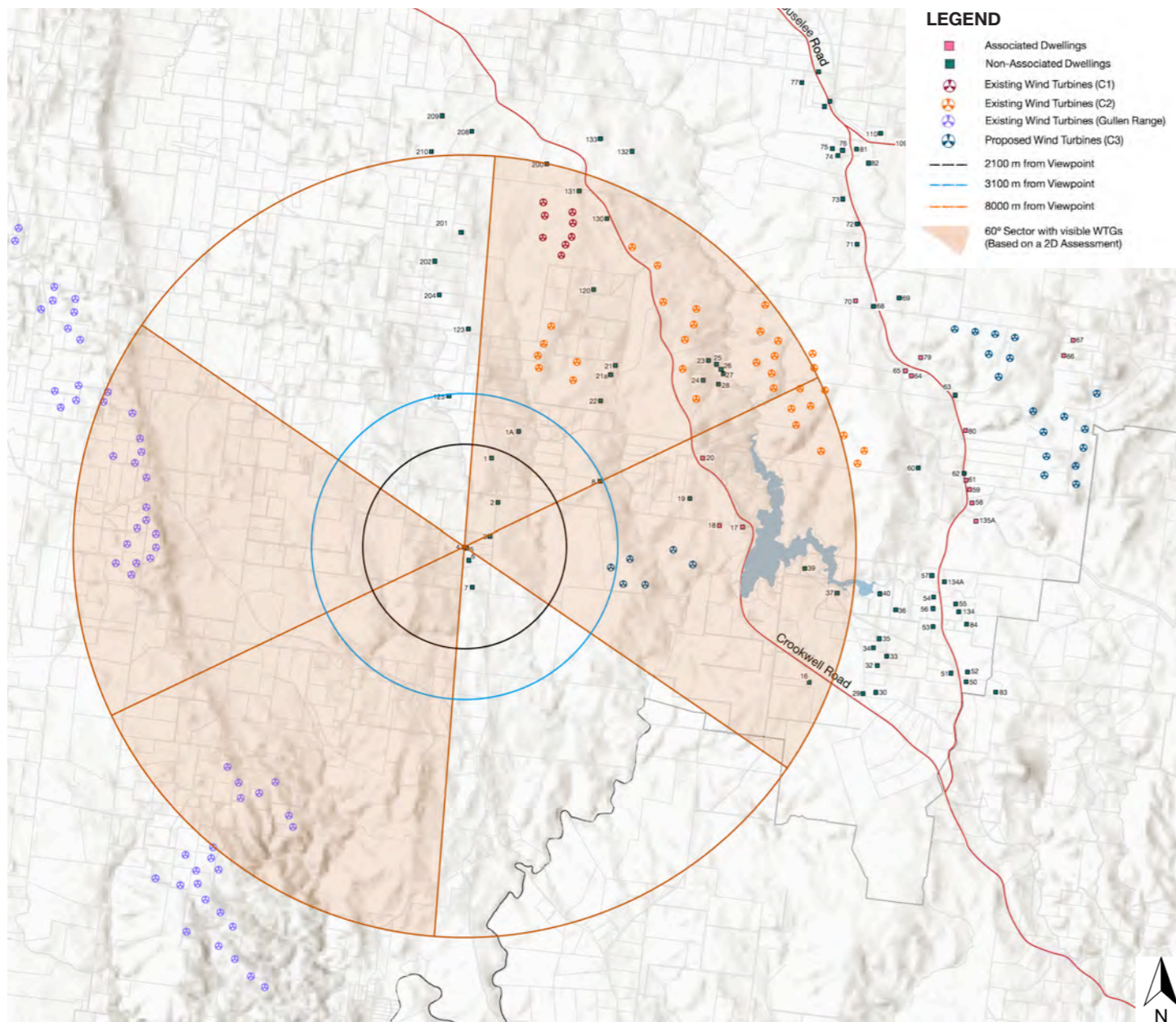


Figure E.3.A Preliminary Assessment Tool: Dwelling 4

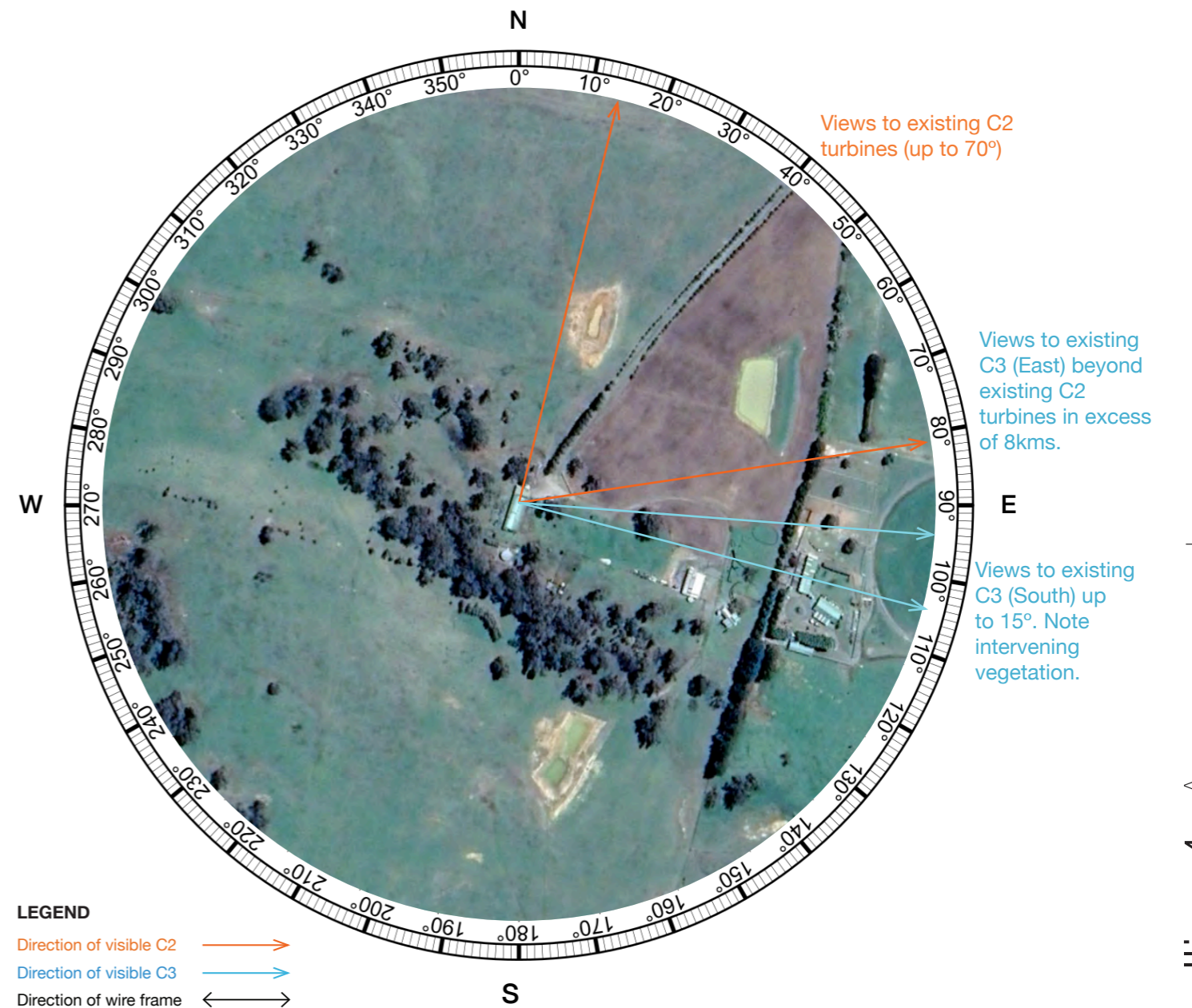
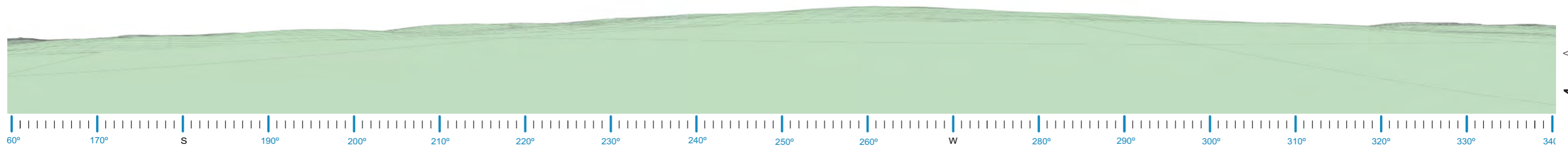
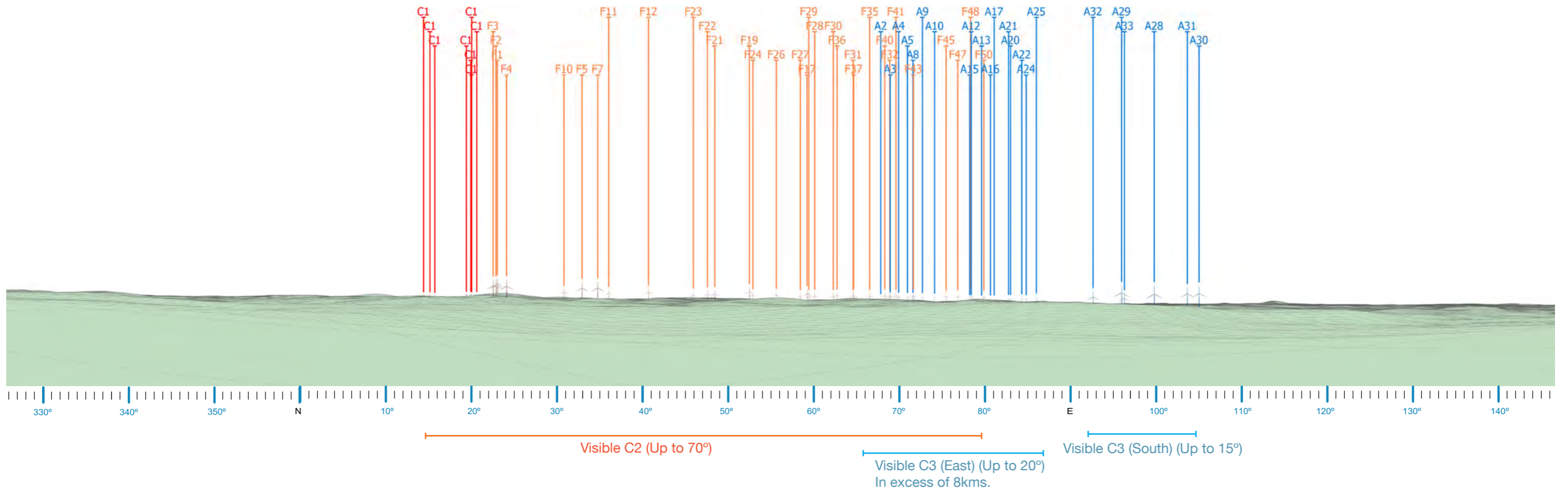


Figure E.3.B Aerial Assessment - Dwelling 4 (Source: Google Earth Imagery Date 23.01.2020)

E3. Dwelling 4 Wire frame



E4. Dwelling 5 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.9km	Nearest proposed <i>visible</i> C3 turbine (km):	2.9km	Existing C2 turbines are visible to the north east in up to 70° of the view.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone) in up to 15° of the view. OHD and GBD both rated the potential visual impact of the south turbines as moderate. Existing vegetation may reduce potential visibility of the C3 (south) turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	2	Views to all proposed C3 (East) turbines are likely to be available to the north east in excess of 8kms. The OHD and GBD assessments rated the visual impact of the east turbines as nil - low and low respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	40	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	57	The O'Hanlon VIA gave a cumulative visual impact rating of low based on a 2D assessment of '2 sectors with C2'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment as Gullen Range is screened by topography.

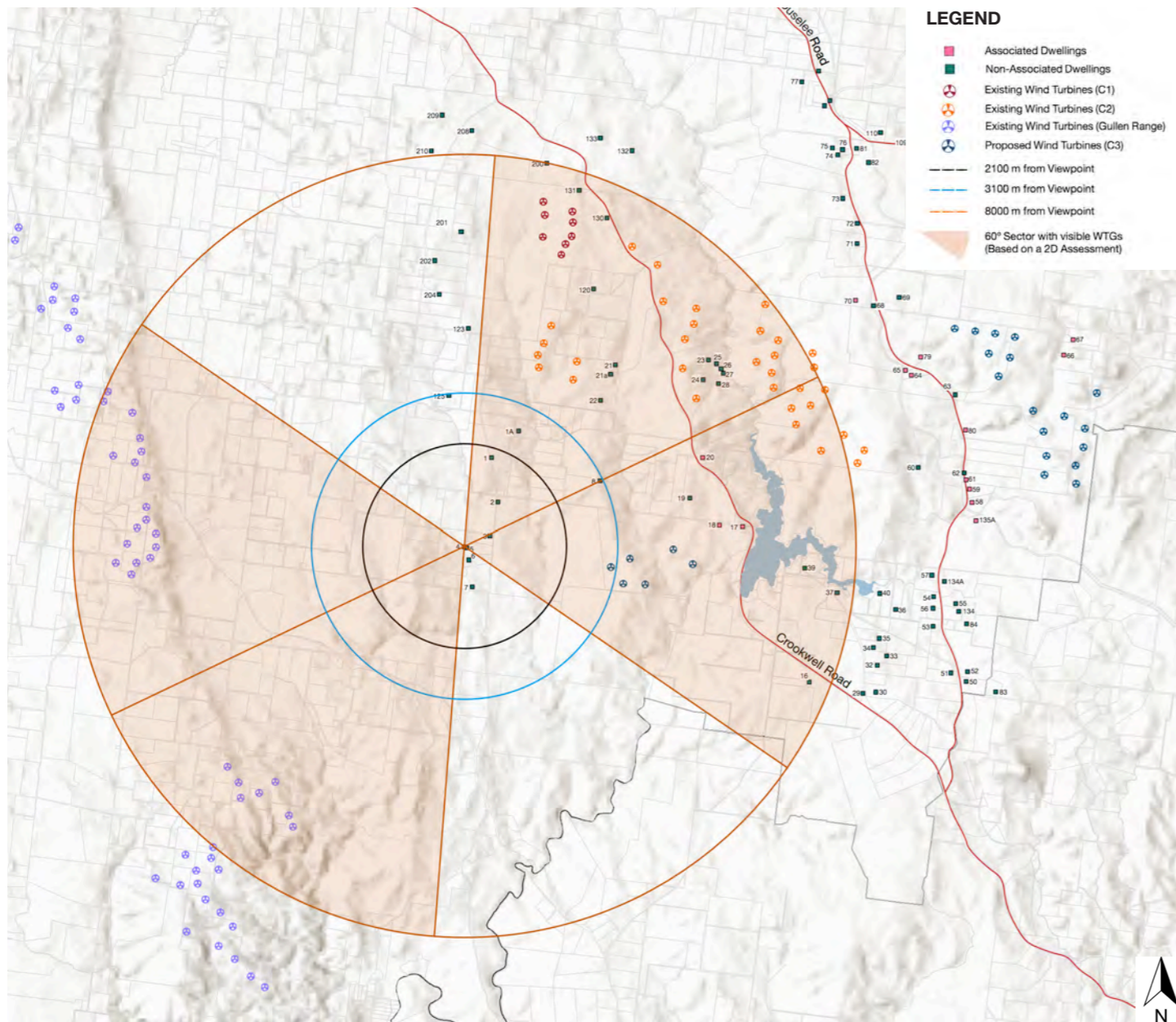


Figure E.4.A Preliminary Assessment Tool: Dwelling 5

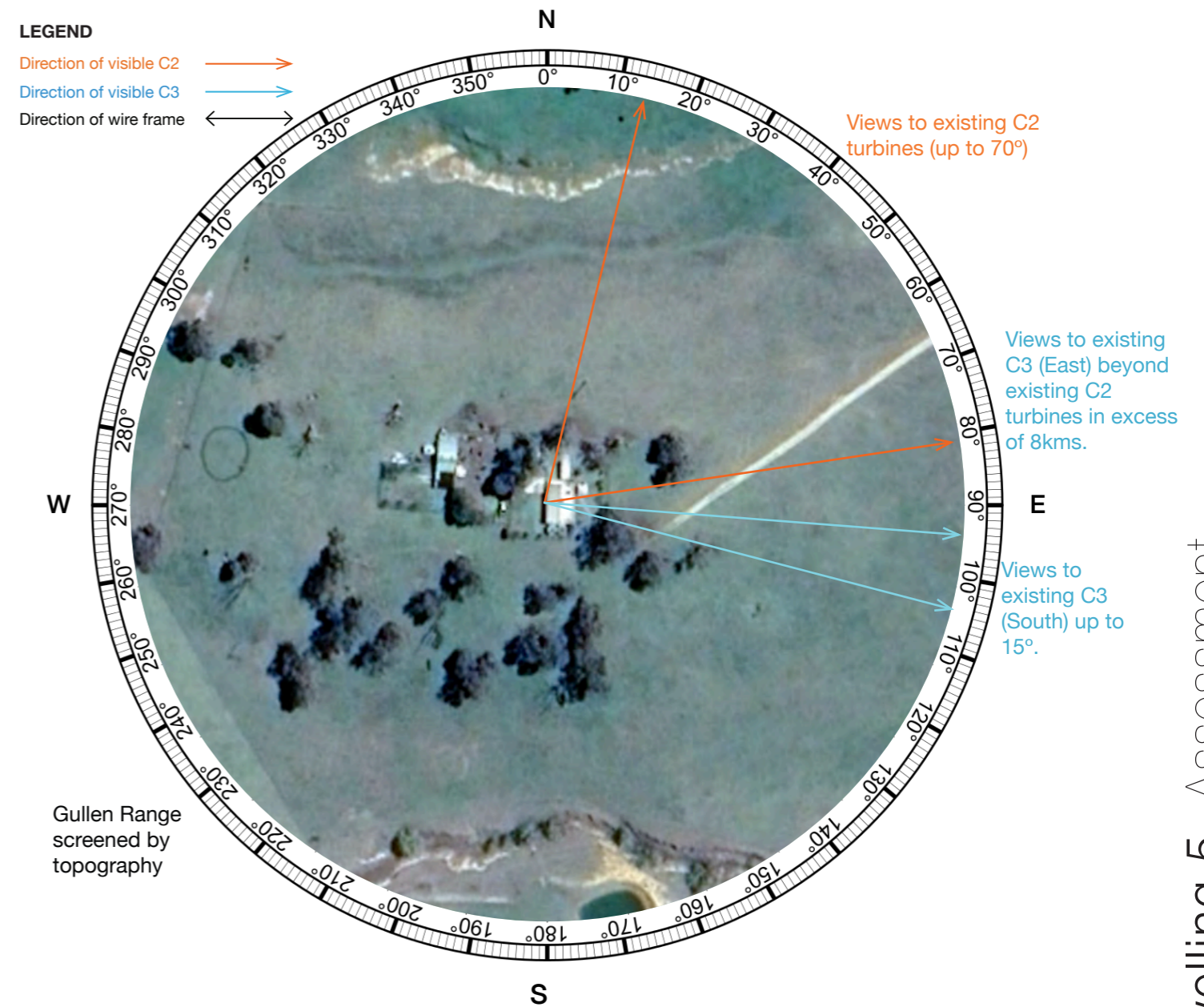
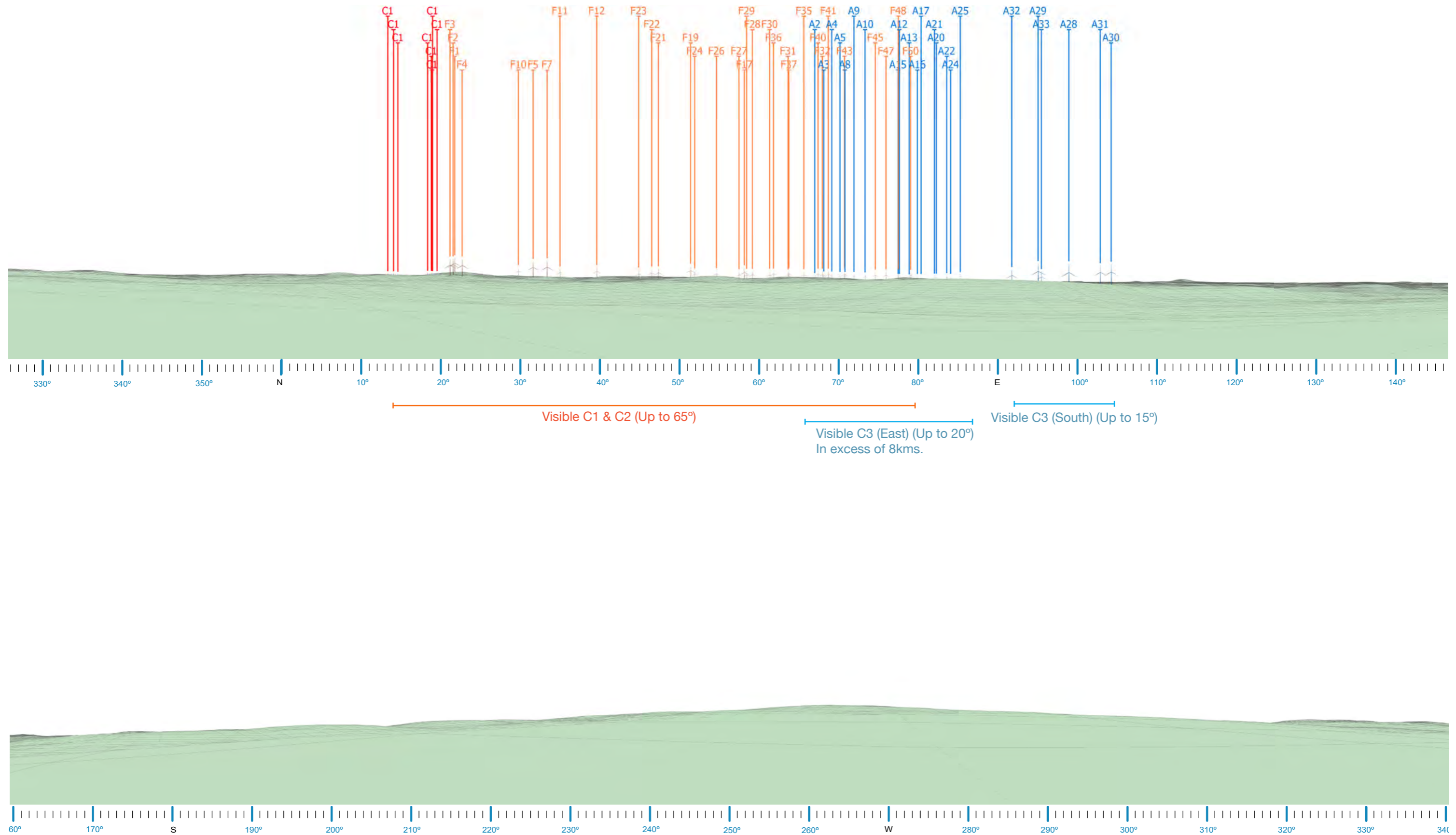


Figure E.4.B Aerial Assessment - Dwelling 5 (Source: Google Earth Imagery Date 23.01.2020)

E4. Dwelling 5 Wire frame



E5. Dwelling 6 Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.9km	Nearest proposed <i>visible</i> C3 turbine (km):	2.9km	Existing C2 turbines are visible to the north east in up to 65° of the view.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone) in up to 15° of the view. OHD and GBD both rated the potential visual impact of the south turbines as moderate - high.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	2	Views to all proposed C3 (East) turbines are likely to be available to the north east in excess of 8kms (20° of the view). The OHD and GBD assessments rated the visual impact of the east turbines as nil - low and low respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	30	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	43	The O'Hanlon VIA gave a cumulative visual impact rating of low based on a 2D assessment of '2 sectors with C2'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment as Gullen Range is screened by topography.

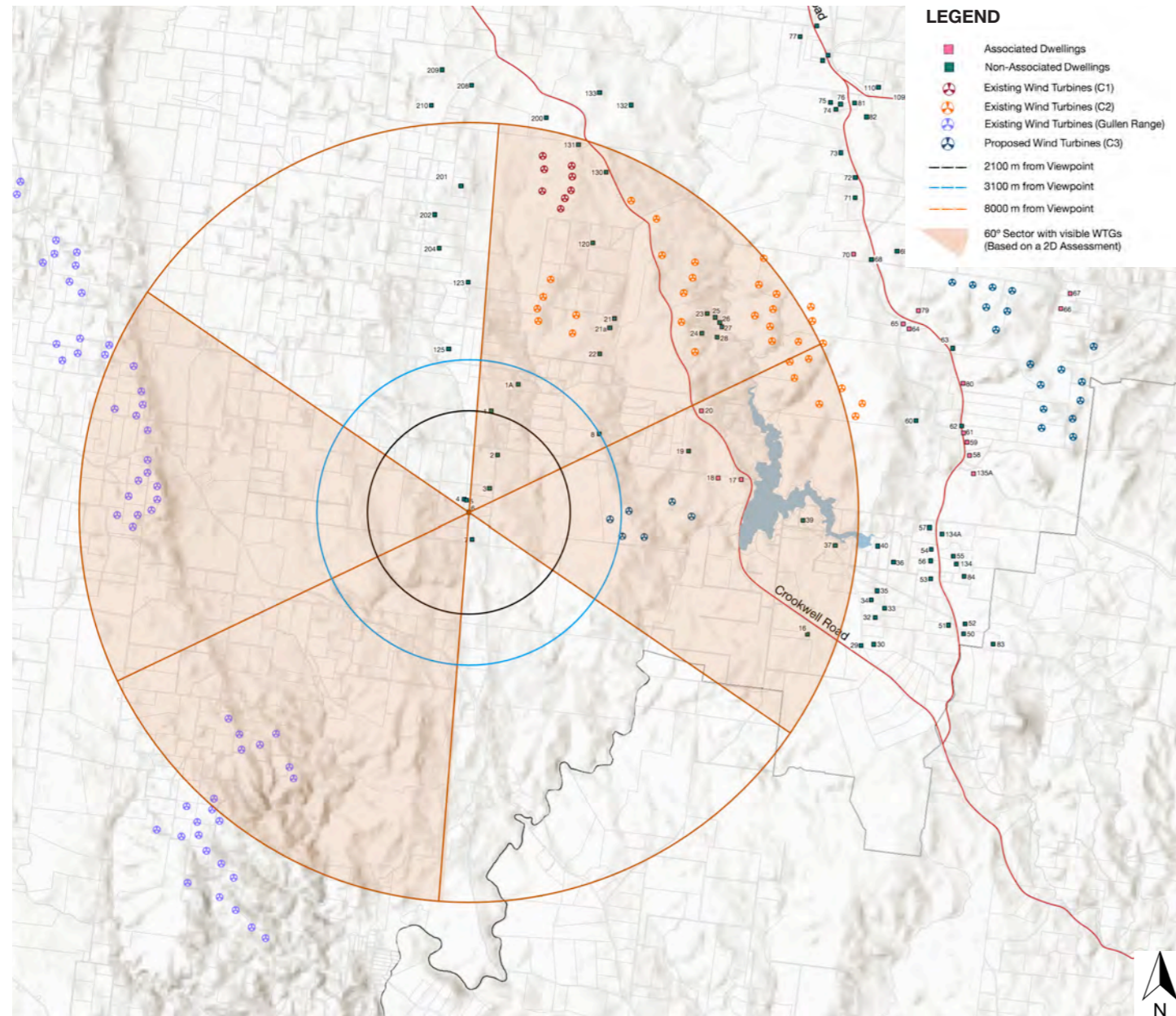


Figure E.5.A Preliminary Assessment Tool: Dwelling 6

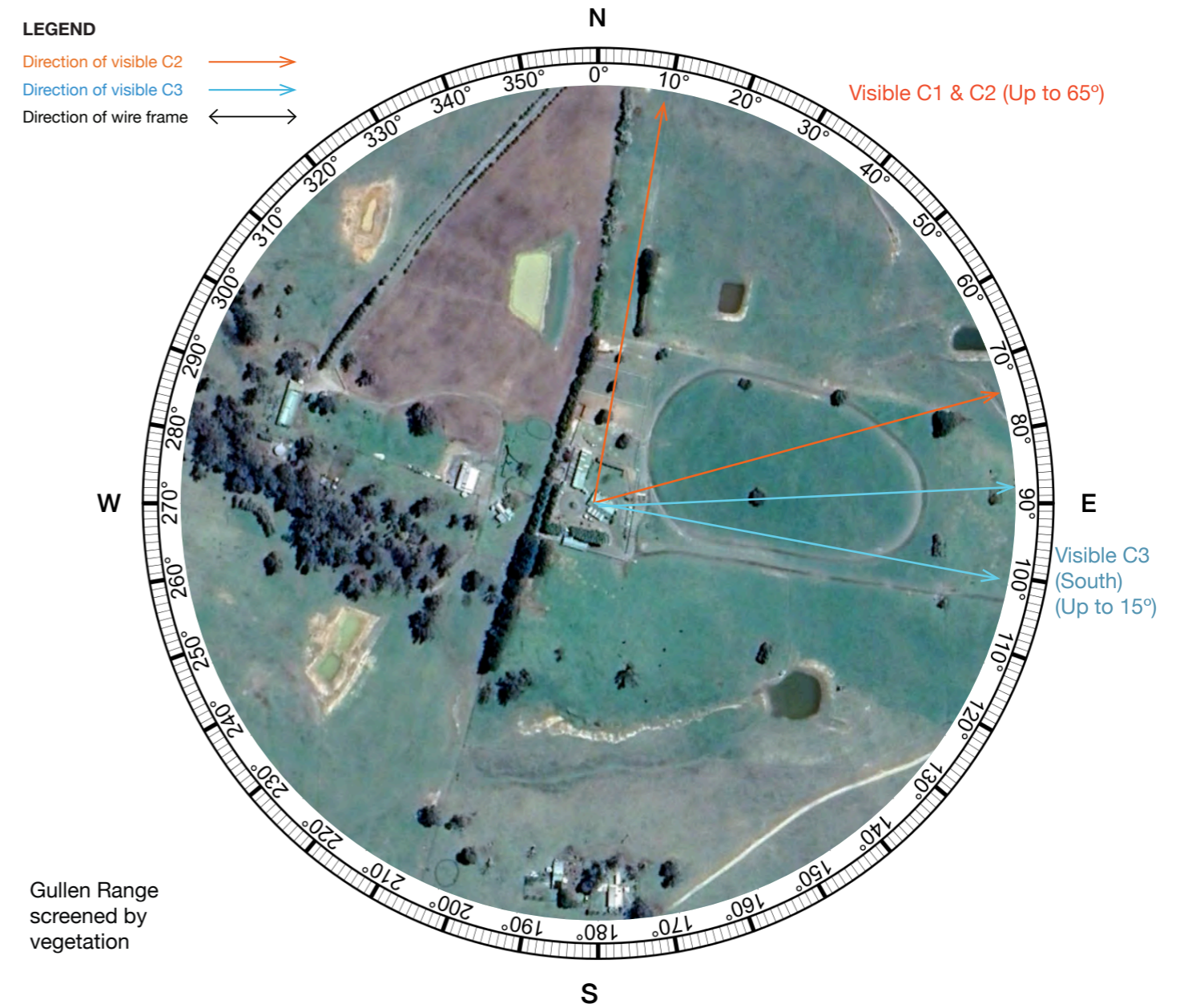
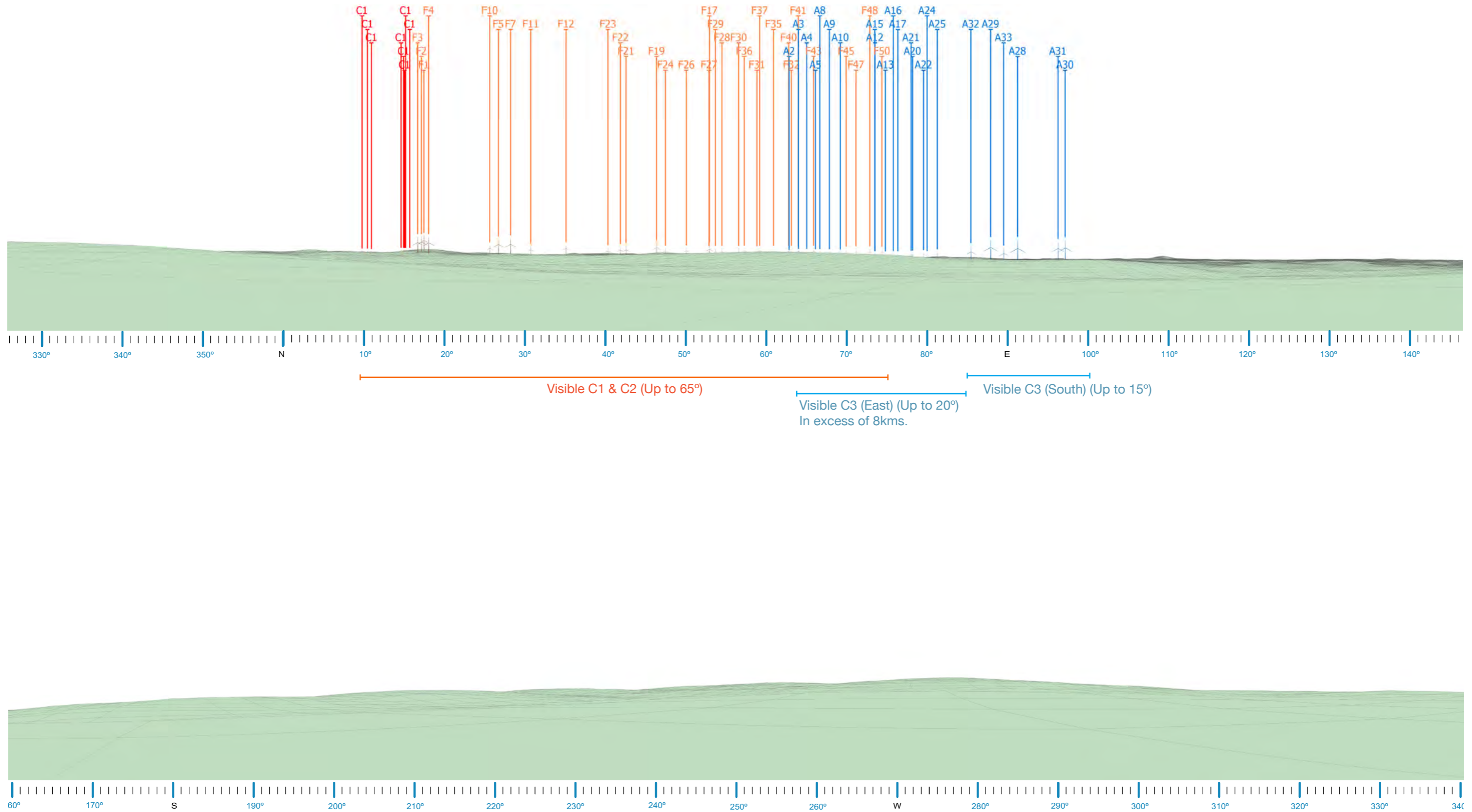


Figure E.5.B Aerial Assessment - Dwelling 6 (Source: Google Earth Imagery Date 23.01.2020)

E5. Dwelling 6 Wire frame



E6. Dwelling 7 Emohruo Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	2.9km	Nearest proposed <i>visible</i> C3 turbine (km):	2.9km	Existing C2 turbines are visible to the north east in up to 60° of the view.
Number of proposed C3 turbines within 2100m:	0	Number of <i>visible</i> C3 turbines within 2100m:	0	Views are available to all 6 of the proposed C3 (South) turbines (based on topography alone) in up to 10° of the view. OHD and GBD rated the potential visual impacts of the south turbines as moderate - high and high respectively.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	2 (Total = 80°)	Views to all proposed C3 (East) turbines are likely to be available to the north east in excess of 8kms (20° of the view). The OHD and GBD assessments rated the visual impact of the east turbines as nil - low and low respectively.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	39	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	62	The O'Hanlon VIA gave a cumulative visual impact rating of low based on a 2D assessment of '2 sectors with C2'. Both 2D and 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment as Gullen Range is screened by topography.

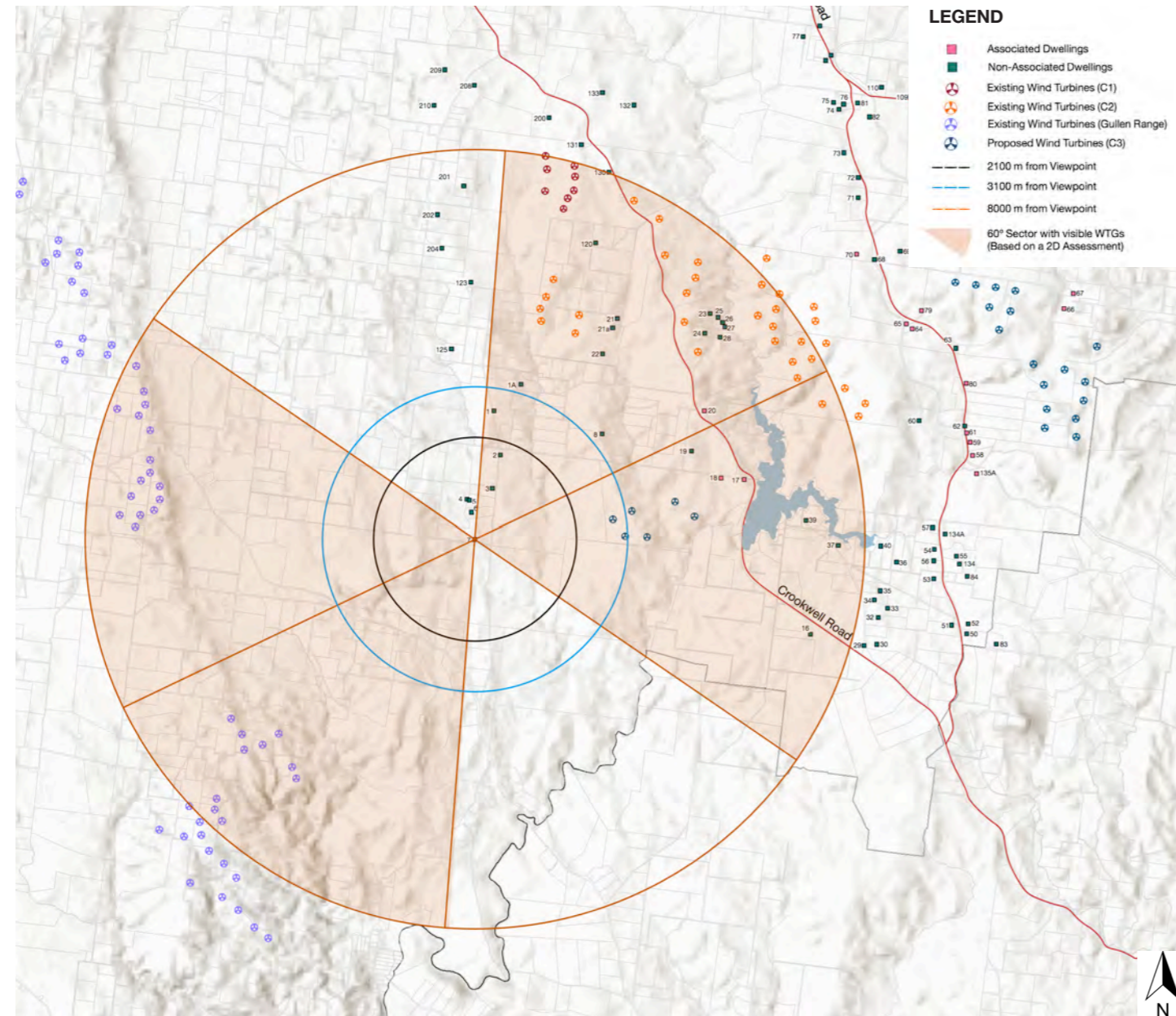


Figure E.6.A Preliminary Assessment Tool: Dwelling 7

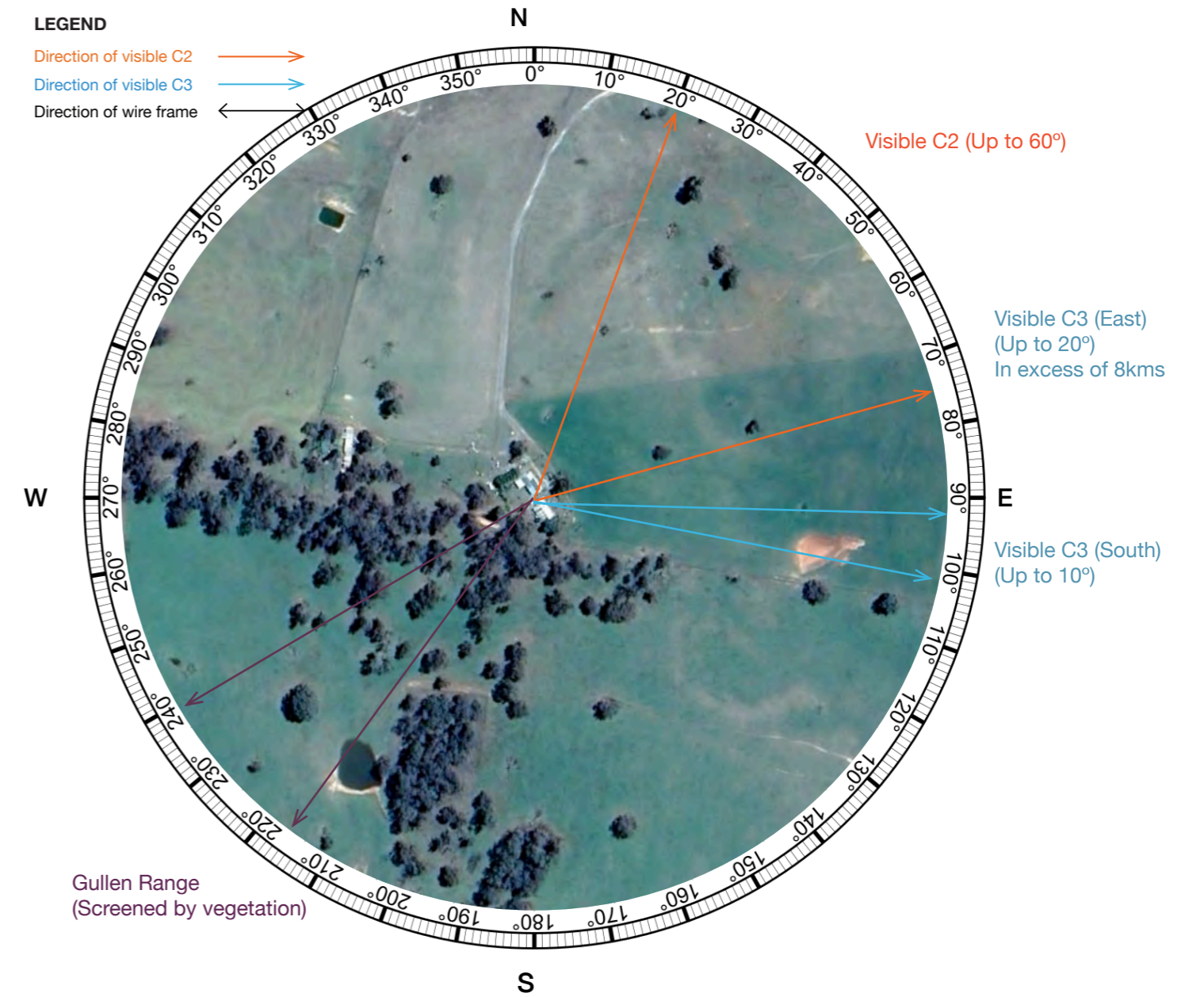
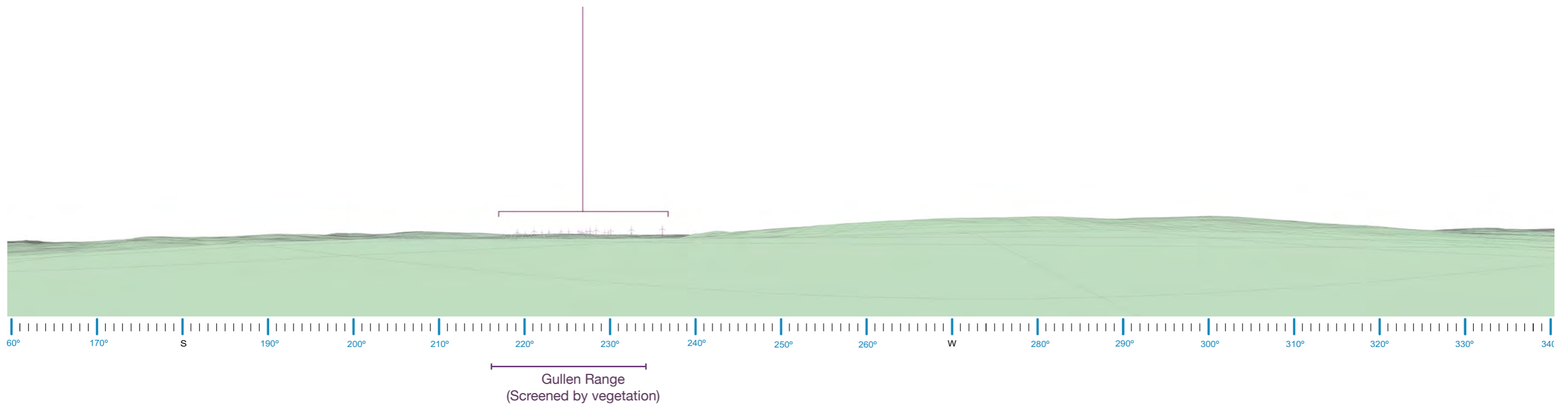
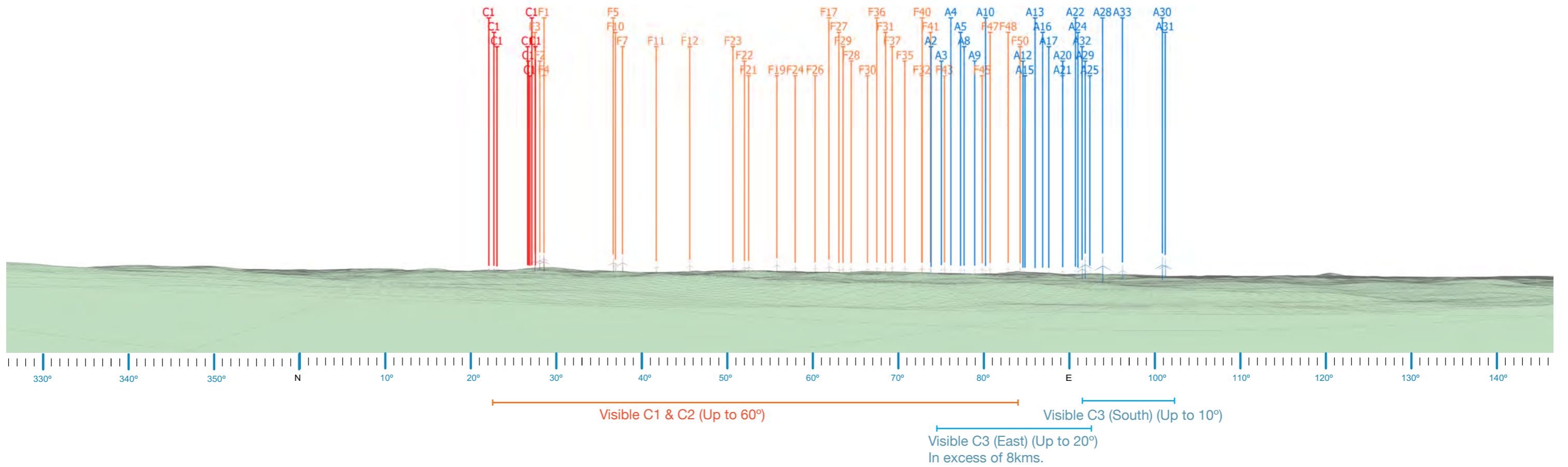


Figure E.6.B Aerial Assessment - Dwelling 7 (Source: Google Earth Imagery Date 23.01.2020)

E5. Dwelling 7 Emohruo Wire frame



E7. Dwelling 8 Narangi Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	1.7km	Nearest proposed <i>visible</i> C3 turbine (km):	1.7km	Existing Crookwell 2 Wind Turbines are visible up to 120° from the NNW to the E.
Number of proposed C3 turbines within 2100m:	3	Number of <i>visible</i> C3 turbines within 2100m:	3	Views to Crookwell 3 (east) turbines associated with the eastern cluster would be distant (in excess of 8 kms) and viewed through the existing Crookwell 2 turbines.
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	4	Six (6) Crookwell 3 (south) turbines would be visible to the south in up to 45° of the view to the SSE of the dwelling.
Number of existing visible turbines (C1 & C2) (Based on topography alone)	24	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	36	The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of '4 sectors with C2'. 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment noting the majority of sectors are due to the existing C2 turbines.

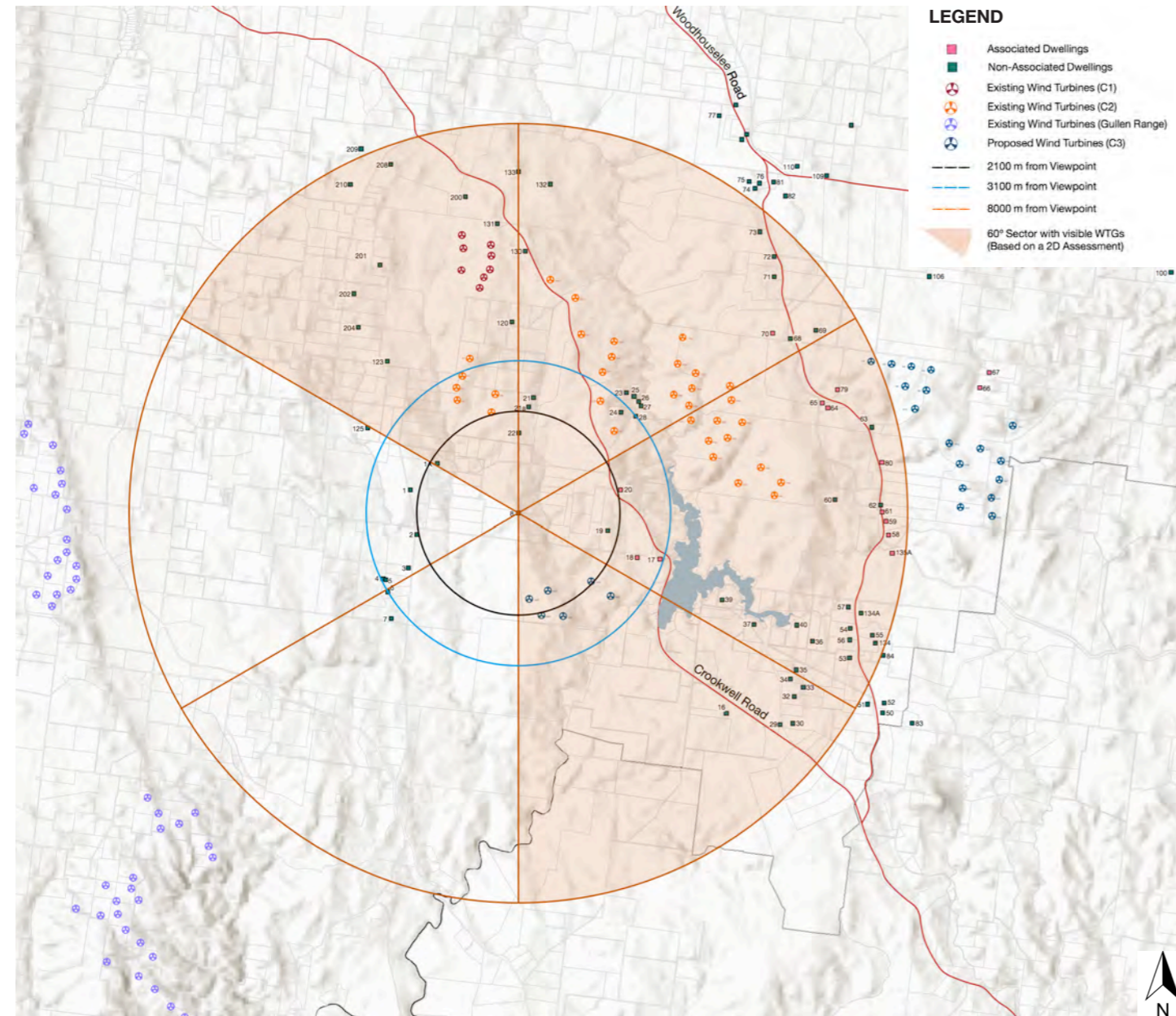


Figure E.7.A Preliminary Assessment Tool: Dwelling 8

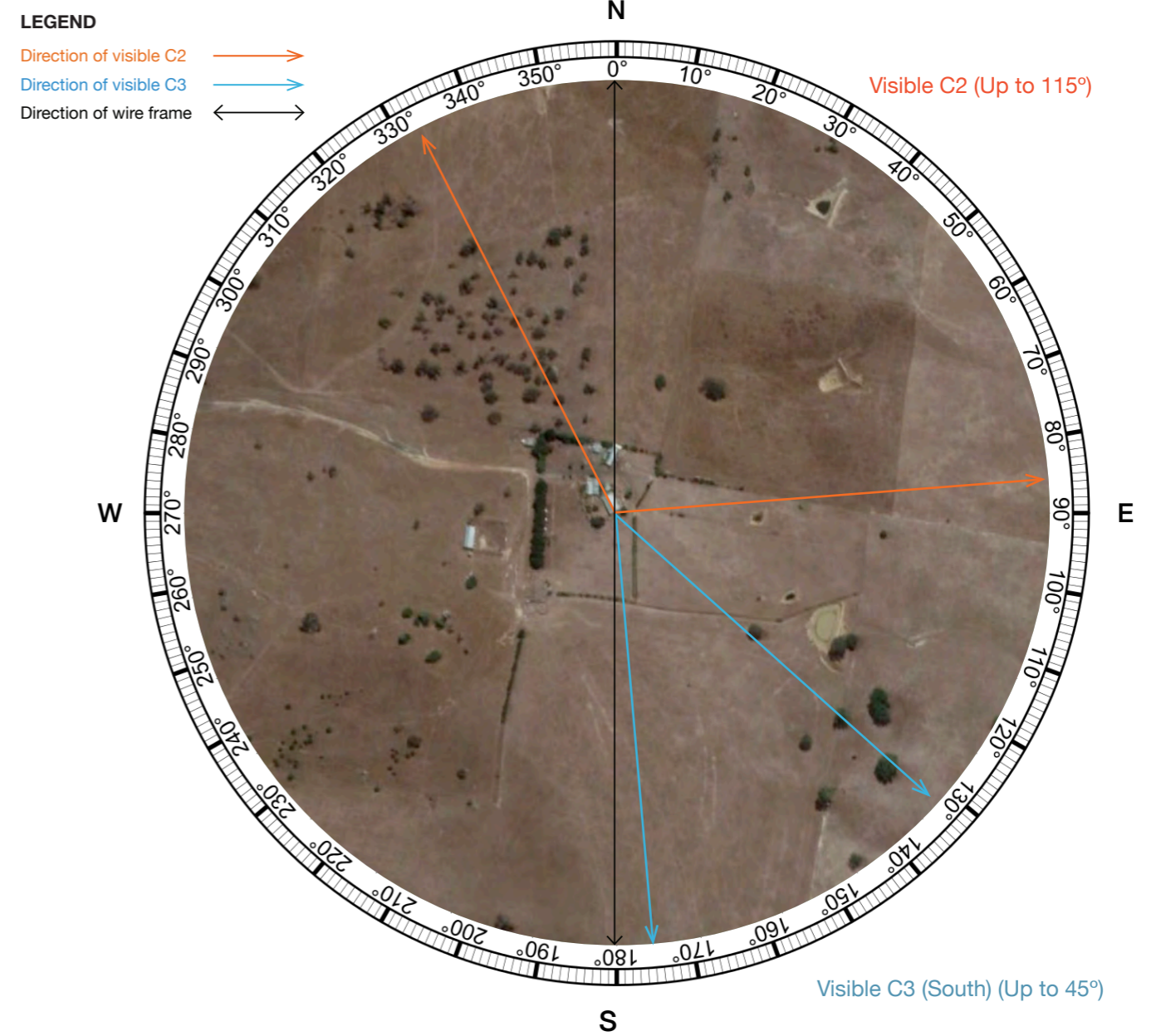
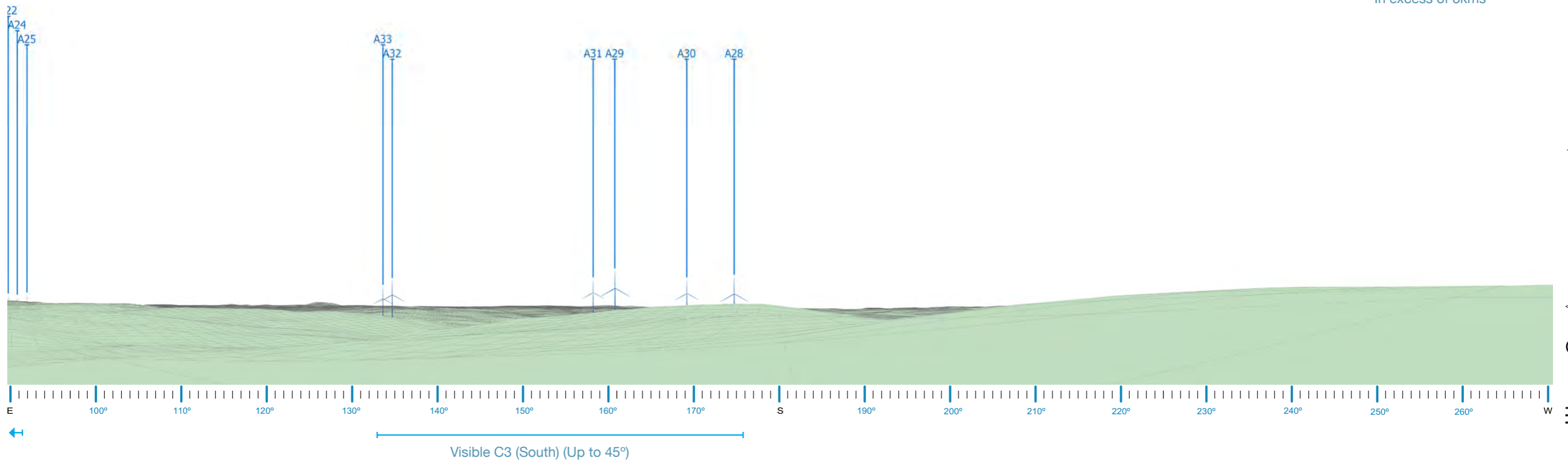
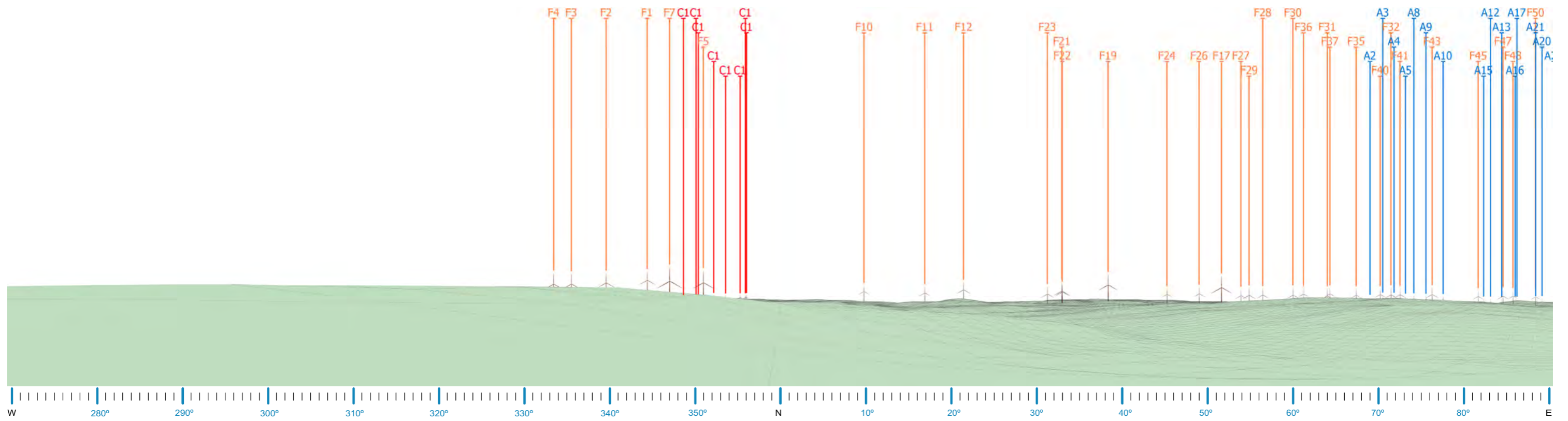


Figure E.7.B Aerial Assessment - Dwelling 8 (Source: Google Earth Imagery Date 23.01.2020)

E7. Dwelling 8 Narangi Wire frame



E8. Dwelling 19 Wombat Hollow Assessment

Preliminary Assessment Tools:		Assessment Notes:		
Nearest proposed C3 turbine (km):	1.1km	Nearest proposed <i>visible</i> C3 turbine (km):	1.1km	Existing Crookwell 2 Wind Turbines are visible up to 130° from the NW to E. Intervening vegetation to the north east is likely to reduce these existing views. Views to Crookwell 3 (east) turbines associated with the eastern cluster would be distant (in excess of 6 kms) and viewed through the existing Crookwell 2 turbines. Six (6) Crookwell 3 (south) turbines would be visible to the south in up to 55° of the view to the SSW of the dwelling. The O'Hanlon VIA gave a cumulative visual impact rating of high based on a 2D assessment of '4 sectors with C2'. 3D assessment undertaken by Moir LA found the cumulative impact is likely to be similar to this assessment noting the majority of sectors are due to the existing C2 turbines, however some existing vegetation would reduce the impact.
Number of proposed C3 turbines within 2100m:	4	Number of <i>visible</i> C3 turbines within 2100m:	4	
Number of theoretical 60° Sectors (Based on 2D Assessment)	4	Number of visible 60° Sectors (Based on 3D Assessment)	4	
Number of existing visible turbines (C1 & C2) (Based on topography alone)	32	Number of proposed <i>visible</i> turbines (C1, C2 & C3) (Based on topography alone)	50	

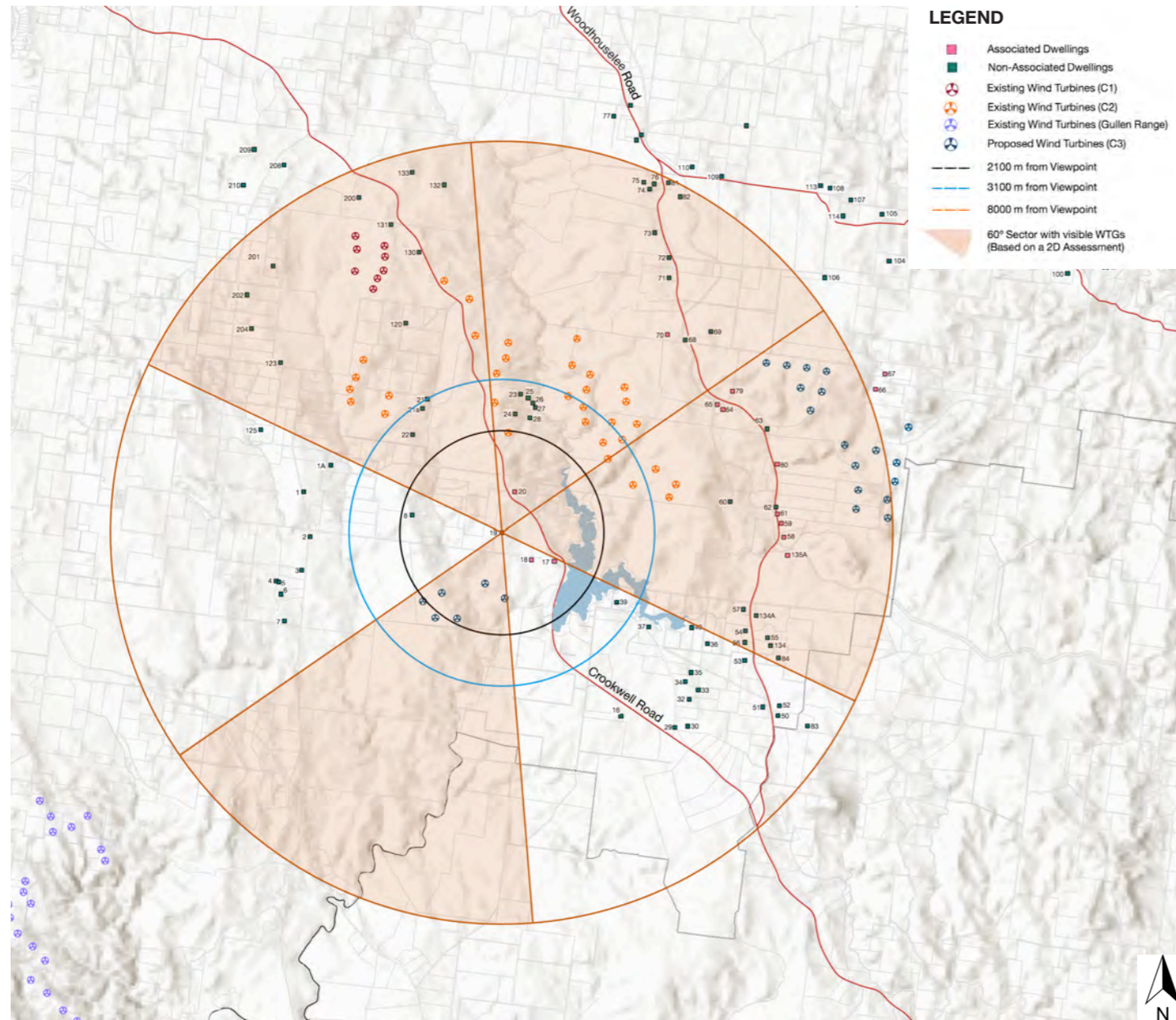


Figure E.8.A Preliminary Assessment Tool: Dwelling 19

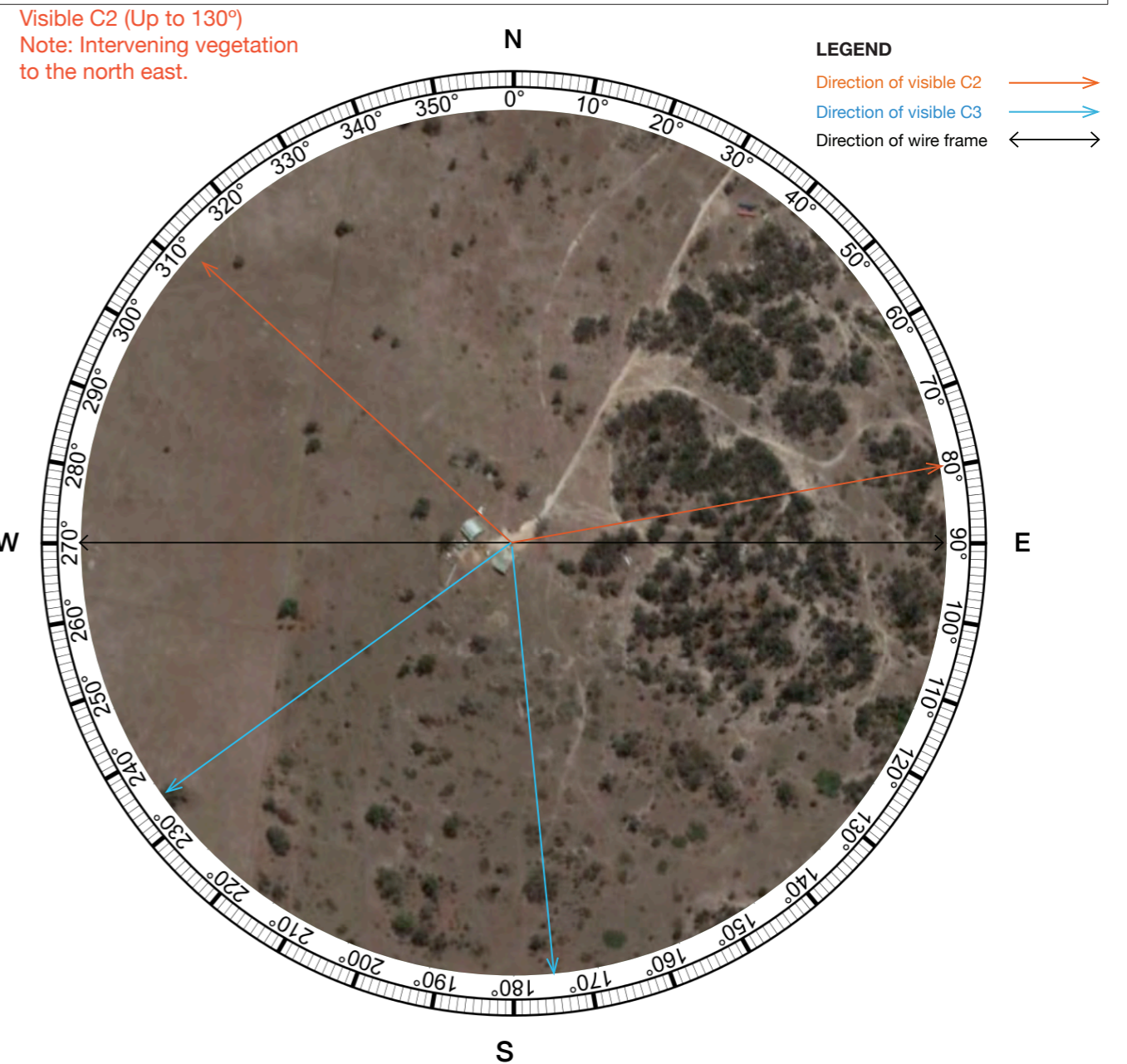
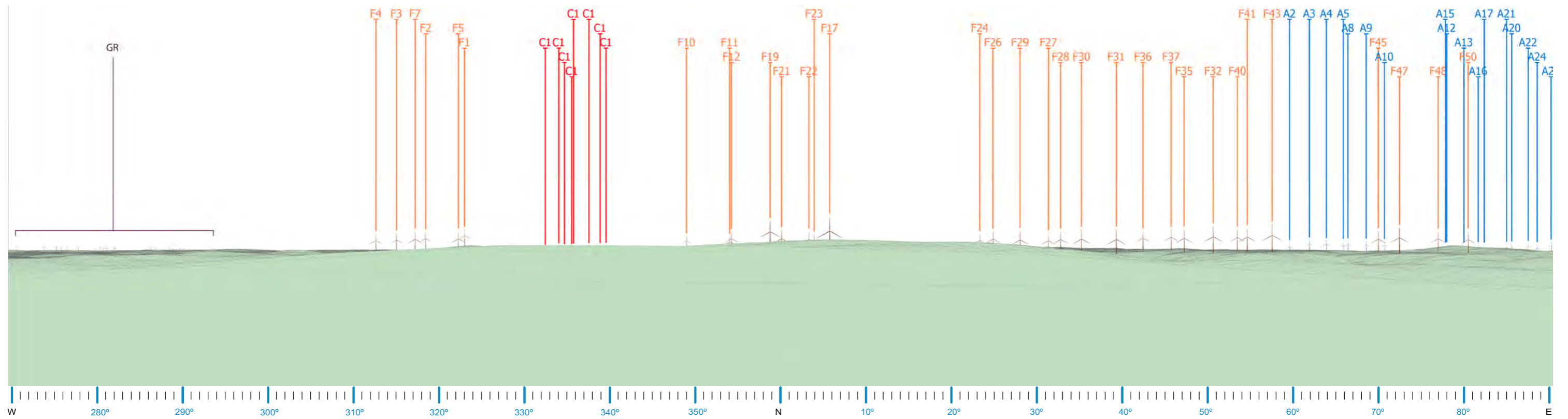
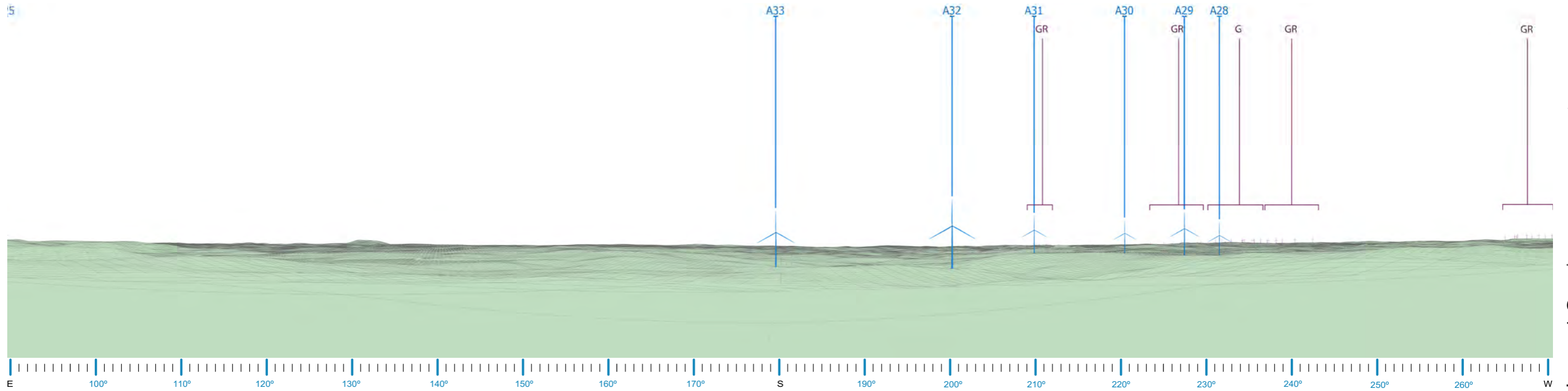


Figure E.8.B Aerial Assessment - Dwelling 19 (Source: Google Earth Imagery Date 23.01.2020)

E8. Dwelling 19 Wombat Hollow Wire frame



Visible C1 & C2 (Up to 130°) Visible C3 (East) (Up to 30°
(In excess of 6kms away))



Visible C3 (South) (Up to 55°)

Dwelling 19 Assessment



Appendix F

Visual Influence Zone Methodology

Visual Influence Zone Methodology

VIEWER SENSITIVITY LEVEL

Level 1 Sensitivity: High	<ul style="list-style-type: none"> Residential areas and rural villages Recreation, cultural or scenic sites and viewpoints of National or State significance. Any buildings, historic rural homesteads/residences on the State or local Government Heritage List
Level 2 Sensitivity: Moderate	<ul style="list-style-type: none"> Rural dwelling Tourist and visitor accommodation (definition in Standard Instrument Local Environmental Plan) Recreation, cultural or scenic sites and viewpoints of regional significance
Level 3 Sensitivity: Low	<ul style="list-style-type: none"> Interstate and state passenger rail lines with daily daylight services State highways, freeways and classified main roads, classified tourist roads Land management roads with occasional recreation traffic Walking tracks of moderate local significance or infrequent recreation usage Other low use and low concern viewpoints and travel routes Navigable waterways

Table F1: Viewer Sensitivity Level

VISIBILITY DISTANCE ZONES


0 – 500 m	Near Foreground (NF)	Zone of Greatest Visual Influence 
500 m – 1 km	Mid Foreground (MF)	
1 – 2 km	Far Foreground (FF)	
2 – 4 km	Near Middleground (NM)	
4 – 8 km	Far Middleground (FM)	
8 – 12 km	Near Background (NB)	
12 – 20 km	Mid Background (MB)	
20 – 32+ km	Far Background (FB)	Zone of Least Visual Influence

Table F2: Visibility Distance Zones

SCENIC QUALITY CLASS


LOW	MODERATE	HIGH
		
Landform		
Waterbodies		
Vegetation		
Human Influence		
Activity		
Rarity		
Relationship with adjoining landscapes		

Table F3: Scenic Quality Class

VISUAL INFLUENCE ZONE MATRIX

VIEWER SENSITIVITY LEVEL		SCENIC QUALITY CLASS		
- VISIBILITY DISTANCE ZONE		HIGH	MODERATE	LOW
LEVEL 1 HIGH SENSITIVITY VIEWPOINTS				
Near Foreground (NF)	0 – 500 m	VIZ1	VIZ1	VIZ1
Mid Foreground (MF)	500 m – 1 km	VIZ1	VIZ1	VIZ1
Far Foreground (FF)	1 – 2 km	VIZ1	VIZ1	VIZ1
Near Middleground (NM)	2 – 4 km	VIZ1	VIZ2	VIZ2
Far Middleground (FM)	4 – 8 km	VIZ2	VIZ2	VIZ2
Near Background (NB)	8 – 12 km	VIZ2	VIZ2	VIZ2
Mid Background (MB)	12 – 20 km	VIZ2	VIZ2	VIZ3
Far Background (FB)	20 – 32+ km	VIZ2	VIZ2	VIZ3
LEVEL 2 MODERATE SENSITIVITY VIEWPOINTS				
Near Foreground (NF)	0 – 500 m	VIZ1	VIZ1	VIZ1
Mid Foreground (MF)	500 m – 1 km	VIZ1	VIZ1	VIZ1
Far Foreground (FF)	1 – 2 km	VIZ1	VIZ1	VIZ2
Near Middleground (NM)	2 – 4 km	VIZ2	VIZ2	VIZ2
Far Middleground (FM)	4 – 8 km	VIZ2	VIZ2	VIZ3
Near Background (NB)	8 – 12 km	VIZ2	VIZ3	VIZ3
Mid Background (MB)	12 – 20 km	VIZ2	VIZ3	VIZ3
Far Background (FB)	20 – 32+ km	VIZ3	VIZ3	VIZ3
LEVEL 3 LOW SENSITIVITY VIEWPOINTS				
Near Foreground (NF)	0 – 500 m	VIZ1	VIZ1	VIZ2
Mid Foreground (MF)	500 m – 1 km	VIZ2	VIZ2	VIZ2
Far Foreground (FF)	1 – 2 km	VIZ2	VIZ2	VIZ3
Near Middleground (NM)	2 – 4 km	VIZ2	VIZ3	VIZ3
Far Middleground (FM)	4 – 8 km	VIZ2	VIZ3	VIZ3
Near Background (NB)	8 – 12 km	VIZ3	VIZ3	VIZ3
Mid Background (MB)	12 – 20 km	VIZ3	VIZ3	VIZ3
Far Background (FB)	20 – 32+ km	VIZ3	VIZ3	VIZ3
Areas not visible		VIZ3	VIZ3	VIZ3

Table F4: Visual Influence Zone Matrix