Landscape Character Areas and Sensitivity Assessment

SECTION 7

7.1 Landscape Character Areas

A fundamental part of the LVIA is to understand and describe the nature and sensitivity of different components of the landscape, and to assess the landscape character in a clear and consistent process. For the purpose of this LVIA, landscape character is defined as '*the distinct and recognisable pattern of elements that occur consistently in a particular type of landscape'* (The Countryside Agency and Scottish Natural Heritage 2002).

This LVIA has identified five Landscape Character Areas (LCA's), which occur within the landscape surrounding the Collector Wind Farm site. The LCA's represent areas that are relatively consistent and recognisable in terms of their key visual elements and physical attributes; which include a combination of topography/landform, vegetation/landcover, land use and built structures (including settlements and local road corridors).

The LCA's do not occur within boundaries and are not definable as discrete areas, and characteristics within one LCA may occur within adjoining or surrounding LCA's. The LCA's have not been assessed, described or illustrated as singular 'landscape units'. For the purpose of this LVIA the LCA's have been identified as:

- *LCA 1* – Undulating grassland;
- *LCA 2* – Wetland and drainage lines;
- *LCA 3* – Slope and ridgeline areas;
- *LCA 4* – Timbered areas (cultural and remnant native);and
- *LCA 5* – Settlements and Homesteads.

7.2 Landscape Sensitivity Assessment

The British Landscape Institute describes landscape sensitivity as '*the degree to which a particular LCA can accommodate change arising from a particular development, without detrimental effects on its character'*.

The assessment of landscape sensitivity is based upon an evaluation of the physical attributes identified within each LCA, both singularly and as a combination that gives rise to the landscape's overall robustness and the extent to which it could accommodate the wind farm development. The criteria used to determine landscape sensitivity are outlined in **Table 6** and based on current good practice employed in the assessment of wind farm developments. This LVIA draws on the Land Use Consultants report on landscape sensitivity for wind farm developments on the Shetland Islands (March 2009). Landscape sensitivity is a relative term, and the intrinsic landscape values of the

surrounding landscape could be considered of a higher or lower sensitivity than other areas in the NSW/ACT Border Region Renewable Energy Precinct.

Whilst the assessment of landscape sensitivity is largely based on a systematic description and analysis of landscape characteristics, this LVIA acknowledges that some individuals and other members of the local community would place higher values on the local landscape. These values could transcend preferences (likes and dislikes) and include personal, cultural as well as other parameters.

Table 6 – Criteria for the assessment of Landscape Sensitivity

Landscape Sensitivity Assessment Criteria			
Characteristic	**Aspects indicating lower sensitivity to the wind farm development**	↔	**Aspects indicating higher sensitivity to the wind farm development**
Landform and scale: patterns, complexity and consistency	• Large scale landform • Simple • Featureless • Absence of strong topographical variety	↔	• Small scale landform • Distinctive and complex • Human scale indicators • Presence of strong topographical variety
Landcover: patterns, complexity and consistency	• Simple • Predictable • Smooth, regular and uniform	↔	• Complex • Unpredictable • Rugged and irregular
Settlement and human influence	• Concentrated settlement pattern • Presence of contemporary structures (e.g. utility, infrastructure or industrial elements)	↔	• Dispersed settlement pattern • Absence of modern development, presence of small scale, historic or vernacular settlement
Movement	• Prominent movement, busy	↔	• No evident movement, still
Rarity	• Common or widely distributed example of landscape character area within a regional context	↔	• Unique or limited example of landscape character area within a regional context
Intervisibility with adjacent landscapes	• Limited views into or out of landscape • Neighbouring landscapes of low sensitivity • Weak connections, self contained area and views • Simple large scale backdrops	↔	• Prospects into and out from high ground or open landscape • Neighbouring landscapes of high sensitivity • Contributes to wider landscape • Complex or distinctive backdrops

The criteria set out in **Table 6** have been used to evaluate each of the LCA's using a gradated score between 1 and 5 to represent levels of sensitivity from low to high. The sensitivity grades are illustrated in **Tables 7** to **11** using shading against each of the criteria set out in **Table 6**.

The overall grades of High, Medium to High, Medium, Low and Negligible landscape sensitivity were determined using the following definitions:

High (Rating of 25 to **30)** – Key characteristics of the LCA will be impacted by the proposed Project, and will result in major and visually dominant alterations to perceived characteristics of the LCA which may not be fully mitigated by existing landscape elements and features. The degree to which the landscape may accommodate the proposed Project will result in a number of perceived uncharacteristic and significant changes.

Medium to High (Rating of 17 to **24)** – Recognisable characteristics of the LCA will be altered by the proposed Project, and result in the introduction of visually prominent elements that will alter some perceived characteristics of the LCA but may be partially mitigated by existing landscape elements and features within the LCA. The main characteristics of the LCA, patterns and combinations of landform and landcover will still be evident.

Medium (Rating 12 to 16) – Distinguishable characteristics of the LCA may be altered by the proposed Project, although the LCA may have the capability to absorb some change. The degree to which the LCA may accommodate the proposed Project would potentially result in the introduction of prominent elements to the LCA, but may be accommodated to some degree.

Low Rating (7 to **11)** – The majority of the LCA characteristics are generally robust, and would be less affected by the proposed Project. The degree to which the landscape may accommodate the wind farm would not significantly alter existing landscape character.

Very Low or Negligible Rating (up to **6) -** The characteristics of the LCA would be unlikely to be impacted or visibly altered by the proposed Project.

7.3 Analysis of Landscape Sensitivity

The following section of this LVIA provides an analysis of landscape sensitivity within the viewshed of the wind farm development and considers each of the five LCA's.

7.3.1 LCA 1 Undulating grassland

Plate 1 *– Typical view across undulating grassland landscape*

Table 7 – LCA 1 - Undulating grassland -Landscape Sensitivity

	Lower Sensitivity		↔		Higher Sensitivity
	Low	Low to Med	Medium	Med to High	High
Rating	1	2	3	4	5
Landform and Scale					
	The undulating grassland LCA is a **large scale** and open landscape with a **gently undulating landform**. The structure of the landform is **simple** containing few distinct features and has a general **absence of any strong topographical elements**.				
Landcover					
	Landcover within the LCA is predominantly **simple and predictable** within the context of widespread pasture areas across the regional area of the Southern Tablelands. The overall landscape pattern created by the grass pasture is **smooth, regular and uniform**. Areas of cultural planting surround the majority of rural dwellings in the form of evergreen windbreaks.				
Settlement and human influence					
	A **dispersed settlement** pattern occurs across the LCA landscape and comprises rural farm homesteads including documented local historical structures. There is a general **absence of modern development** throughout this landscape, excluding agricultural structures and local roads and access tracks.				
Movement					
	Movement is generally **restricted** to occasional passing traffic, livestock as well as agricultural machinery.				
Rarity					
	Undulating grassland is generally **well represented and a common feature** across the NSW/ACT Border Region Renewable Energy Precinct.				
Intervisibility					
	Undulating grassland areas appear as a **simple backdrop** in views from surrounding elevated areas. Undulating landform can retain and constrict views within the landscape, but **generally contributes** to the wider landscape.				
Overall Sensitivity Rating	Medium (Score 15 out of 30)				

7.3.2 LCA 2 Wetland and Drainage Lines

Plate 2 *– Typical view across wetland area and drainage lines landscape*

Table 8 – LCA 2 – Wetland Area and Drainage Lines - Landscape Sensitivity

	Lower Sensitivity		↔		Higher Sensitivity
	Low	Low to Med	Medium	Med to High	High
Rating	1	2	3	4	5
Landform and Scale		■			
	Wetland areas and drainage line areas are generally contained by the gently sloping landform resulting in a **small** to **moderate** scale landform. The landform is simple containing **few distinct** features and has an absence of any strong topographical elements.				
Landcover		■			
	Landcover is predominantly **simple and predictable** within the context of widespread drainage areas across the broader regional area of the Southern Tablelands. The overall landscape pattern created by grass pasture within this landscape is **smooth, regular and uniform**, although mosaics of timbered stands on adjoining slopes and hillsides create some diversity and contrast in pattern.				
Settlement and human influence			■		
	There is a general **absence of settlement** within this landscape with a small and dispersed number of agricultural structures (some abandoned), minor access tracks and fences occurring throughout. Some modifications to landscape have been carried out to accommodate road access and the former railway line.				
Movement			■		
	A **lack of any significant movement** gives this landscape an overall still character.				
Rarity				■	
	Although wetland areas and drainage lines are generally **well represented** and a **common** feature across the broader regional area of the Southern Tablelands, the local Wet Lagoon Nature Reserve represents a more **limited** wetland feature found in the Southern Tablelands and is listed as an Environmental Heritage Item within the Upper Lachlan Shire Council Local Environmental Plan.				
Intervisibility		■			
	Intervisibility is limited as views from within this landscape are often contained by sloping landform rising above the river valley and drainage lines. Views along drainage lines, as well as views from areas above and across river valley and drainage lines provide links with adjoining landscape areas.				
Overall Sensitivity Rating	Medium (Score 16 out of 30)				

7.3.3 LCA 3 Slopes and ridgelines

Plate 3 *– Typical views along simple slope and ridgeline landscape*

Table 9 – LCA 3 - Slopes and ridgelines - Landscape Sensitivity

	Lower Sensitivity		↔		Higher Sensitivity
	Low	Low to Med	Medium	Med to High	High
Rating	1	2	3	4	5
Landform and Scale			■		
	Simple slope and ridgeline areas are represented by a generally open and **large scale** landform with distant views available from elevated areas within this landscape. The landform is **simple** containing **few distinct features** and has some **strong topographical elements**.				
Landcover			■		
	Landcover is predominantly **simple and predictable** within the context of similar areas across the Southern Tablelands. The overall landscape pattern created by grass pasture within this landscape is **smooth, regular and uniform**, although mosaics of timbered areas on surrounding slopes and cultural planting surrounding dwellings create some **diversity and contrast** in pattern.				
Settlement and human influence			■		
	Settlement is **occasional** and **dispersed** within this landscape and does not generally occur along the top of ridgelines or on elevated and exposed slopes. The main influences of human activity are the effects of **agricultural improvement** within the landscape.				
Movement				■	
	Movement is generally **limited** to local roads and access tracks.				
Rarity		■			
	Simple slopes and ridgelines are generally **well represented** and a **common feature** across the broader regional area of the Southern Tablelands.				
Intervisibility			■		
	Intervisibility is **limited** as views from within this landscape are often contained by undulating or sloping landform rising to ridgelines, however, potential distant views do occur from elevated landform to **provide links** to adjoining landscape areas.				
Overall Sensitivity Rating	Medium to High (Score 18 out of 30)				

7.3.4 LCA 4 Timbered Areas

Plate 5 *– Typical views across timbered areas*

Table 10 – LCA 4 - Timbered Areas- Landscape Sensitivity

	Lower Sensitivity		↔		Higher Sensitivity
	Low	Low to Med	Medium	Med to High	High
Rating	1	2	3	4	5
Landform and Scale			■		
	Timbered areas occur across a range of landform types that are generally defined by gently sloping or undulating landform resulting in a **moderate scale** landform. The landform is **simple** containing **few distinct features** and has some **strong topographical elements**.				
Landcover		■			
	Landcover is predominantly simple and predictable within the context of similar timbered areas across the Southern Tablelands. The overall landscape pattern created by timbered areas creates diversity and contrast to the smooth, regular and uniform grass pasture and cultivated areas within this landscape. The darker coloured foliage of timbered areas contrast against the surrounding backdrop of lighter toned pasture and cultivated areas.				
Settlement and human influence			■		
	Settlement is **occasional** and **dispersed** within timbered areas with the majority of dwellings visually screened from surrounding landscape areas. The main influences of human activity are the effects of **agricultural improvement** within the landscape.				
Movement			■		
	Movement is generally **limited** to local roads and access tracks.				
Rarity		■			
	Timbered areas are reasonably **well represented** and an established feature across broader regional areas of the New South Wales Southern Tablelands.				
Intervisibility			■		
	The level of intervisibility between this landscape and adjoining areas is generally determined by the location and extent of timbered area relative to view locations, but on the whole is **limited** as views from within this landscape are constrained by vegetation, combined with sloping landform. Views from scattered or lightly timbered areas **provide links** to adjoining landscape areas.				
Overall Sensitivity Rating	Medium (Score 16 out of 30)				

7.3.5 LCA 5 Settlements and Homesteads

Plate 6 *– Typical views across settlement areas*

Table 11 – LCA 5 – Settlements and Homesteads - Landscape Sensitivity

	Lower Sensitivity		↔		Higher Sensitivity
	Low	Low to Med	Medium	Med to High	High
Rating	1	2	3	4	5
Landform and Scale		■			
	Dispersed rural settlement, including homesteads and the Collector village are generally surrounded by sloping and low undulating landform resulting in an overall **small to medium scale** rural environment.				
Landcover			■		
	The overall landscape pattern is defined by human scale indicators including houses, commercial buildings and roads together with a variety of urban structures that creates some **diversity and contrast** in pattern.				
Settlement and human influence			■		
	Dwellings are dispersed beyond the regional settlement area of Goulburn and are generally associated with individual farms and rural structures.				
Movement		■			
	Low level movement through the rural landscape surrounding homesteads and the Collector village is contrasted by frequent vehicular movements along the Hume and Federal Highway including heavy goods vehicles.				
Rarity			■		
	Small scale village settlements and homesteads are **dispersed** across the landscape, as well as the broader regional area of the NSW Southern Tablelands.				
Intervisibility			■		
	Intervisibility is **limited** where views are partially contained by buildings and structures, although views from elevated areas of the settlement extend beyond and across adjoining landscape areas.				
Overall Sensitivity Rating	Medium (Score 16 out of 30)				

7.4 Summary

In terms of overall landscape sensitivity, this LVIA has determined that the landscape within the viewshed of the proposed Project has a medium sensitivity to accommodate change, and represents a landscape that is reasonably typical of the types found in surrounding areas of the NSW/ACT Border Region Renewable Energy Precinct.

As a landscape with an overall medium sensitivity to accommodate change, distinguishable characteristics of the LCA's may be altered by the proposed Project, although the LCA's may have the capability to absorb some change. The degree to which the LCA's may accommodate the proposed Project would potentially result in the introduction of prominent elements to the LCA, but may be accommodated to some degree.

In the context of landscape sensitivity, this LVIA has determined that the Project would not be an unacceptable development within the Collector Wind Farm 10km viewshed, which in a wider context also contains built elements such as roads, agricultural industry, aircraft landing strips, communication towers, power lines as well as approved and operational wind farms within and beyond the broader area of the Project viewshed.

This LVIA notes that the operational Cullerin Wind Farm is located within the Collector Wind Farm 10km viewshed and the operational Gunning Wind Farm located to the north of the Collector Wind Farm 10km viewshed. The cumulative visual impact of the Project and other wind farm developments is assessed in **Section 9** of this LVIA.

Although the physical presence of the Cullerin and Gunning Wind Farms would tend to minimise the immediate impact of the Collector Wind Farm on existing landscape characteristics, this LVIA does not suggest or conclude that the presence of operational wind farm developments negates or diminishes landscape characteristics surrounding existing wind farm developments.

Despite being 'naturalistic' in appearance large portions of the NSW Southern Tablelands landscape have been heavily modified by agricultural improvement for pasture and arable production post European settlement. Irrespective of the extent and nature of modifications to the landscape, it is not correct to assume that the landscape surrounding the Project should be any less valued as a result of modification. Physical change in the appearance of the landscape is an ongoing and constant process from both human and environmental influences and can result in both positive and negative effects.

Visual Impact Assessment Criteria and Matrices SECTION 8

8.1 Introduction

The degree of visual impact resulting from the construction and operation of the Project would result primarily from the combination of the following factors:

- The visibility or extent to which the proposed wind farm structures would be visible from surrounding areas;
- The degree of visual contrast between the Project structures and the capability of the surrounding landscape to visually accommodate the wind farm;
- The category and type of situation from which people could view the wind farm (examples of view categories include residents or motorists);
- The distance between the view location and the Collector Wind Farm turbines;
- The potential number of people with a view toward the Project from any one location;
- The duration of time people could view the Project from any static or dynamic view location; and
- The visual sensitivity of view location surrounding the Project.

An overall determination of visual impact at each view location has also been assessed and determined against the criteria outlined in **Tables 12** and **13** below**:**

Table 12 – Wind turbine visibility

Criteria	Definition
Low	around 30% of the overall wind farm visible to any portion of the wind turbine above hub height (up to 20 turbines visible);
Moderate	around 60% of the overall wind farm visible to any portion of the wind turbine above hub height (up to 40 turbines visible); and
High	over 60% of the wind turbines visible to any portion of the wind turbine above hub height (over 41 turbines visible).

Table 12 - View Location Assessment Criteria

Criteria	Definition
Category of Viewer	
Static	Residence
Dynamic	Motorist or passenger
Number of Viewers	
High	>500 people per day
Moderate	250 - 500 people per day
Low	100 - 250 people per day
Very Low	<100 people per day
View Distance	
Long Distance	>10km
Distant	5km – 10km
Medium	3 – 5km
Short	2 – 3km
Very short	<2km
Period of View	
Long term	> 2 hours
Moderate term	30 - 120 minutes
Short term	10 – 30 minutes
Very Short Term	< 10 minutes

Table 13 – Visual Impact Criteria Matrix

	Distant and Long Distance			Medium Distance			Short Distance			Very Short Distance		
Period of View	**L/M**	**S**	**VS**	**L/M**	**S**	**VS**	**L/M**	**S**	**VS**	**L/M**	**S**	**VS**
High No. of Viewers	M	L	L	H	M	M	H	H	M	H	H	H
Moderate No. of Viewers	L	L	L	M	M	L	H	M	M	H	H	M
Low No. of Viewers	L	L	L	M	L	L	M	M	L	H	M	L
Very Low No. of Viewers	L	L	L	L	L	L	M	L	L	M	M	L

- **Period of View** L/M=Long to Moderate term, S=Short term , VS=Very Short term
- **Levels of visibility** L=low, M=medium and H=high

The visual impact criteria matrix outlined in **Table 13** is used **as a guide** to determine levels of visual impact. The determination of visual impact for each view location is also considered against other factors, which include the sensitivity of the view category and overall visibility of the Proejct from surrounding view locations. The general relationship between view category and its potential level of sensitivity is outlined in **Table 14.**

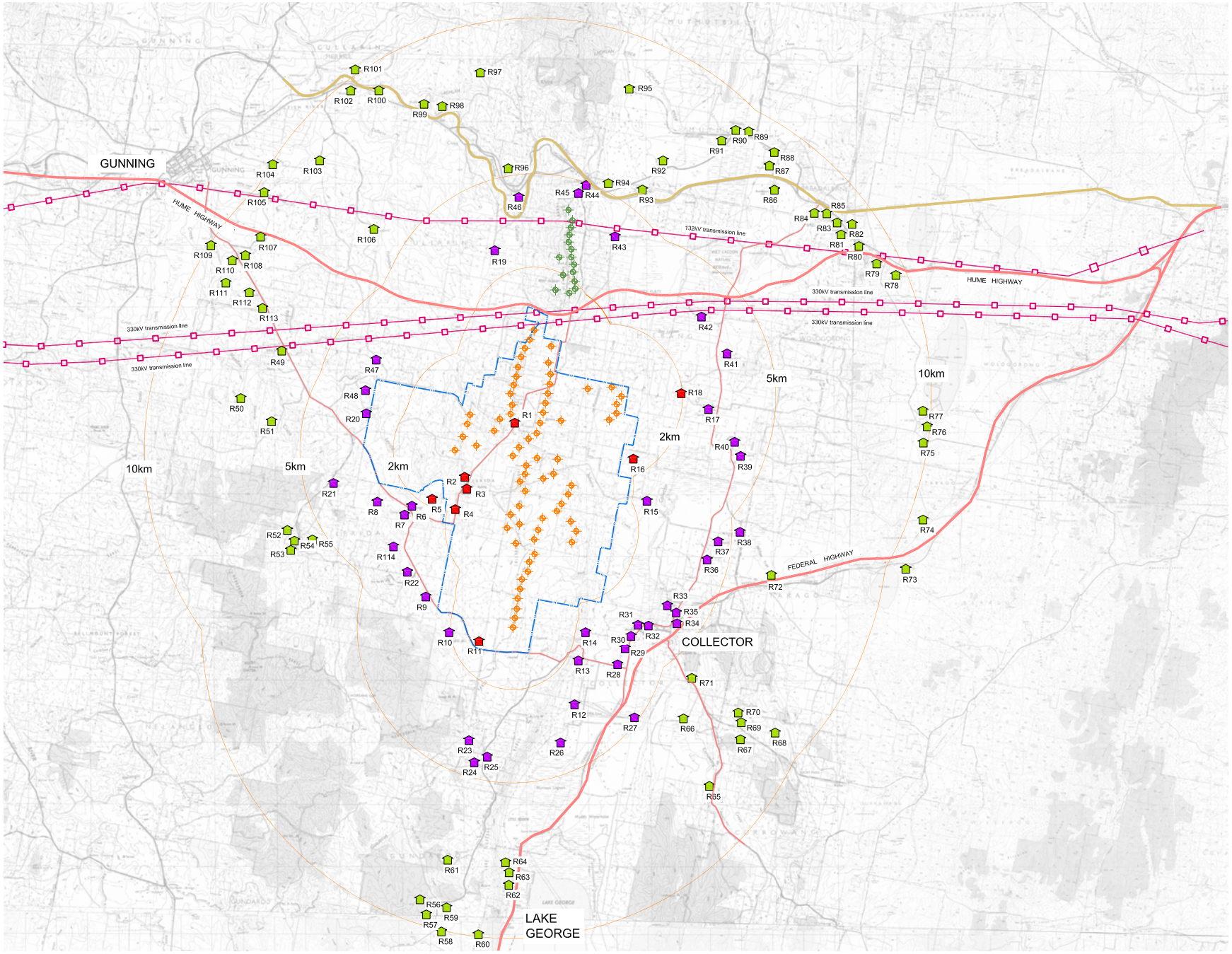
Table 14 – View Location Sensitivity

View Category	Sensitivity
Residential Properties	**Highest Sensitivity**
Pedestrians (recreational)	▽
Public Recreational Space	▽
Rural employment/farming	▽
Motorists	▽
Business (commercial)	▽
Industry	Lower Sensitivity

8.2 Residential and Public View Location Visibility Matrices

Tables 15 and **16** present Visibility Matrices for residential and public view locations within the Collector Wind Farm 10km viewshed.

Potential residential and public view locations are illustrated in **Figures 15** and **16**.



Legend

- Residence - within 2km of Collector Turbines
- Residence - between 2km and 5km of Collector Turbines
- Residence - between 5km and 10km of Collector Turbines
- Proposed Collector Turbine
- Existing Cullerin Turbine
- Collector Wind Farm Site Boundary
- Highway or Local Road
- Main Southern Railway
- Existing 132/330kV transmission line

0km 4km

Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

Figure 15
Residential View Locations

RATCH-Australia Corporation

GREEN BEAN DESIGN
landscape architects

COLLECTOR WIND FARM

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R1	Resident (Associated)	Views from residence and surrounding curtilage extend toward proximate turbines within north portion of the Project site.	270m	Very Low	Varies Potential long term views	High	High	High
R2	Resident (Associated)	Views from residence and surrounding curtilage extend toward proximate turbines within north portion of the Project site.	944m	Very Low	Varies Potential long term views	High	High	High
R3	Occasional occupation (shearing shed)	N/A	800m	Very Low	Varies Potential long term views	Medium	High	Low
R4	Resident (Associated)	Views from residence and surrounding curtilage toward the Project are partially screened by vegetation bounding residence.	1.3km	Very Low	Varies Potential long term views	High	High	Low to Moderate
R5	Resident	Views from residence and surrounding curtilage extend toward proximate turbines within the north portion of the Project site.	1.8km	Very Low	Varies Potential long term views	High	High	High
R6	Resident	Views from residence and surrounding curtilage extend toward proximate turbines within the north portion of the	2.3km	Very Low	Varies Potential long	High	High	High

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		Project site.			term views			
R7	Resident	Views from residence and surrounding curtilage toward the Project are partially screened by vegetation bounding residence.	2.7km	Very Low	Varies Potential long term views	High	Moderate	Low to Moderate
R8	Resident	Views from residence and surrounding curtilage extend toward turbines within portions of the Project site.	3km	Very Low	Varies Potential long term views	High	Moderate	Moderate to High
R9	Resident	Views from residence and surrounding curtilage toward the Project are partially screened by vegetation bounding residence and within property.	2.9km	Very Low	Varies Potential long term views	High	High	Moderate
R10	Resident	Views from residence and surrounding curtilage toward the Project are partially screened by vegetation bounding residence and within property.	2km	Very Low	Varies Potential long term views	High	High	Low to Moderate
R11	Resident (Associated)	Views from residence and surrounding curtilage extend toward turbines within portions of the Project site.	1.2km	Very Low	Varies Potential long term views	High	High	High
R12	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	3.2km	Very Low	Varies Potential long	High	Low	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
					term views			
R13	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	2.4km	Very Low	Varies Potential long term views	High	Low	Nil
R14	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	2.3km	Very Low	Varies Potential long term views	High	Low	Nil
R15	Resident	Views from residence and surrounding curtilage toward turbines are partially screened by undulating topography and vegetation..	1.5km	Very Low	Varies Potential long term views	High	Moderate	Low to Moderate
R16	Resident	Views from residence and surrounding curtilage extend toward turbines within portions of the Project site.	1.2km	Very Low	Varies Potential long term views	High	High	High
R17	Resident	Views from residence and surrounding curtilage toward the Project turbines are partially screened by vegetation and built structures surrounding residence.	2.8km	Very Low	Varies Potential long term views	High	High	Low to Moderate
R18	Resident	Views from residence and surrounding curtilage toward the Project are partially screened by vegetation and built structures surrounding residence,	1.8km	Very Low	Varies Potential long term views	High	High	Low to Moderate

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		although more distant views may occur toward turbines within the south portion of the Project site.						
R19	Resident	Views from residence and surrounding curtilage extend south to south east across portions of the Project site.	2.8km	Very Low	Varies Potential long term views	High	High	Moderate
R20	Resident	Views from residence and surrounding curtilage toward the Project turbines are partially screened by undulating landform and timbered areas as well as vegetation within property.	3.1km	Very Low	Varies Potential long term views	High	High	Low
R21	Resident	Views toward the Project turbines are partially screened by topography and/or vegetation.	4km	Very Low	Varies Potential long term views	High	Low	Low
R22	Resident	Views from residence and surrounding curtilage toward the Project are partially screened by vegetation bounding residence and within property.	3.5km	Very Low	Varies Potential long term views	High	High	Low
R23	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	3.9km	Very Low	Varies Potential long term views	High	Low	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R24	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	4.5km	Very Low	Varies Potential long term views	High	Low	Nil
R25	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	4.3km	Very Low	Varies Potential long term views	High	Low	Nil
R26	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	4km	Very Low	Varies Potential long term views	High	Low	Nil
R27	Resident	Views toward the Project turbines are largely screened by vegetation surrounding the residential dwelling.	4.8km	Very Low	Varies Potential long term views	High	High	Low
R28	Resident	Views toward the Project turbines are largely screened by vegetation surrounding the residential dwelling.	3.6km	Very Low	Varies Potential long term views	High	Moderate	Moderate
R29	Resident	Views toward the Project turbines are partially screened by vegetation to the west of the residential dwelling.	3.7km	Very Low	Varies Potential long term views	High	High	Moderate
R30	Resident	Views toward the Project turbines are partially screened by vegetation to the	3.8km	Very Low	Varies	High	High	Moderate

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		west of the residential dwelling.			Potential long term views			
R31	Resident	Views toward the Project turbines are partially screened by vegetation to the west of the residential dwelling.	3.4km	Very Low	Varies Potential long term views	High	High	Moderate
R32	Residents – Collector Village	Views toward the Project from residential dwellings south of Goulburn Street would be afforded some degree of screening by landform and/or scattered tree cover within the village, as would some residential dwellings north of Goulburn Street and to the east of Lorn Street. A greater degree of turbine visibility would exist from residential dwellings within the north west portion of the village including those off the Collector Road between Hall Bourke Street and Lorn Street, and a small number of dwellings within the cul-de-sac at the western end of Goulburn Street.	3.5km to 4km	Very Low	Varies Potential long term views	High	High	Moderate to High
R33	Resident	Views toward the Project extend west toward the eastern portion of the wind farm although some screening is	3.7km	Very Low	Varies Potential long	High	High	Low

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		provided by vegetation to the west of the dwelling.			term views			
R34	Residents (3 Dwellings)	Views toward the Project extend west toward the eastern portion of the wind farm.	4.1km	Very Low	Varies Potential long term views	High	High	Moderate to High
R35	Resident (3 Dwellings)	Views toward the Project extend west toward the eastern portion of the wind farm.	4.6km	Very Low	Varies Potential long term views	High	High	Moderate to High
R36	Resident	Views toward the Project turbines are partially screened by vegetation to the west of the dwelling.	4.2km	Very Low	Varies Potential long term views	High	High	Low
R37	Resident	Views toward the Project turbines are partially screened by vegetation to the west of the dwelling .	4.6km	Very Low	Varies Potential long term views	High	High	Low
R38	Resident	Views toward the Project turbines are partially screened by vegetation to the west of the dwelling and beyond the property.	5.3km	Very Low	Varies Potential long term views	High	High	Low
R39	Resident	Views toward the Project turbines are partially screened by vegetation to the west of the dwelling and beyond the	4.5km	Very Low	Varies Potential long	High	High	Low

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		property.			term views			
R40	Resident	Views toward the Project turbines are partially screened by vegetation surrounding the residential dwelling.	4km	Very Low	Varies Potential long term views	High	High	Low to Moderate
R41	Resident	Views toward the Project turbines are partially screened by vegetation surrounding the residential dwelling.	3.5km	Very Low	Varies Potential long term views	High	High	Low
R42	Resident	Views toward the Project turbines are partially screened by vegetation surrounding the residential dwelling.	3.4km	Very Low	Varies Potential long term views	High	High	Moderate
R43	Resident	Views toward the Project turbines are largely screened by vegetation surrounding the residential dwelling.	4km	Very Low	Varies Potential long term views	High	Moderate	Low
R44	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	4.9km	Very Low	Varies Potential long term views	High	Low	Nil
R45	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	4.6km	Very Low	Varies Potential long term views	High	Low	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R46	Resident	Views toward the Project turbines are partially screened by undulating landform and vegetation within and beyond property.	4.3km	Very Low	Varies Potential long term views	High	Low	Low
R47	Resident	Views toward the Project turbines are partially screened by undulating landform and vegetation within and beyond property.	3.5km	Very Low	Varies Potential long term views	High	High	Moderate
R48	Resident	Views toward the Project turbines are partially screened by undulating landform and vegetation within and beyond property.	3.7km	Very Low	Varies Potential long term views	High	High	Moderate
R49	Resident	Views toward the Project turbines are partially screened by vegetation within and beyond property.	6.4km	Very Low	Varies Potential long term views	High	Moderate	Low
R50	Resident	Views toward the Project turbines are partially screened by topography and/or vegetation.	7.3km	Very Low	Varies Potential long term views	High	High	Low
R51	Resident	Views toward the Project turbines are partially screened by topography and/or vegetation.	6km	Very Low	Varies Potential long term views	High	Moderate	Low

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R52	Resident	Views toward the Project turbines are partially screened by topography and/or vegetation.	6km	Very Low	Varies Potential long term views	High	High	Low
R53	Resident	Views toward the Project turbines are partially screened by topography and/or vegetation.	6.2km	Very Low	Varies Potential long term views	High	Moderate	Low
R54	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	6km	Very Low	N/A	High	Low	Nil
R55	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	6km	Very Low	N/A	High	Low	Nil
R56	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.3km	Very Low	N/A	High	Low	Nil
R57	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.7km	Very Low	N/A	High	Low	Nil
R58	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	10km	Very Low	N/A	High	Low	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R59	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.3km	Very Low	N/A	High	Low	Nil
R60	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	10km	Very Low	N/A	High	Low	Nil
R61	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	7.5km	Very Low	N/A	High	Low	Nil
R62	Resident	Views toward the Project turbines are largely screened by topography and/or vegetation.	8.3km	Very Low	Varies Potential long term views	High	Low	Low
R63	Resident	Views toward the Project turbines are largely screened by topography and/or vegetation.	8km	Very Low	Varies Potential long term views	High	Low	Low
R64	Resident	Views toward the Project turbines are largely screened by topography and/or vegetation.	7.6km	Very Low	Varies Potential long term views	High	Low	Low
R65	Resident	Distant views toward south eastern portion of the Project site.	8.1km	Very Low	Varies Potential long	High	High	Low

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
					term views			
R66	Resident	Views toward the Project turbines are partially screened by vegetation surrounding the residential dwelling.	6.2km	Very Low	Varies Potential long term views	High	High	Low
R67	Resident	Views toward the Project turbines are partially screened by timbered areas and vegetation surrounding the residential dwelling.	8.1km	Very Low	Varies Potential long term views	High	High	Nil
R68	Resident	Views toward the Project turbines are partially screened by timbered areas and vegetation surrounding the residential dwelling.	9.1km	Very Low	Varies Potential long term views	High	High	Nil
R69	Resident	Distant views toward south eastern portion of the Project site.	8km	Very Low	Varies Potential long term views	High	High	Low
R70	Resident	Distant views toward south eastern portion of the Project site.	7.7km	Very Low	Varies Potential long term views	High	High	Low
R71	Resident	Views toward the Project turbines are partially screened by timbered areas and vegetation surrounding the	6km	Very Low	Varies Potential long term views	High	High	Low

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		residential dwelling.						
R72	Resident	Views toward the Project turbines are partially screened by vegetation surrounding the residential dwelling.	6.5km	Very Low	Varies Potential long term views	High	High	Low
R73	Resident	Elevated and distant views toward portions of the Project site.	10km	Very Low	Varies Potential long term views	High	High	Low
R74	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	<10km	Very Low	Varies Potential long term views	High	Nil	Nil
R75	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	10km	Very Low	Varies Potential long term views	High	Nil	Nil
R76	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.8km	Very Low	Varies Potential long term views	High	Nil	Nil
R77	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.6km	Very Low	Varies Potential long term views	High	Nil	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R78	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.5km	Very Low	Varies Potential long term views	High	Nil	Nil
R79	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.4km	Very Low	Varies Potential long term views	High	Nil	Nil
R80	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.8km	Very Low	Varies Potential long term views	High	Nil	Nil
R81	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.5km	Very Low	Varies Potential long term views	High	Nil	Nil
R82	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9km	Very Low	Varies Potential long term views	High	Nil	Nil
R83	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.6km	Very Low	Varies Potential long term views	High	Nil	Nil
R84	Resident	Views toward the Project turbines are screened by topography and/or	8.3km	Very Low	Varies	High	Low	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		vegetation.			Potential long term views			
R85	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.5km	Very Low	Varies Potential long term views	High	Nil	Nil
R86	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8km	Very Low	Varies Potential long term views	High	High	Nil
R87	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.5km	Very Low	Varies Potential long term views	High	High	Nil
R88	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9km	Very Low	Varies Potential long term views	High	High	Nil
R89	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.2km	Very Low	Varies Potential long term views	High	High	Nil
R90	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9km	Very Low	Varies Potential long term views	High	High	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R91	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.5km	Very Low	Varies Potential long term views	High	High	Nil
R92	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	6.8km	Very Low	Varies Potential long term views	High	High	Nil
R93	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	5.7km	Very Low	Varies Potential long term views	High	High	Nil
R94	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	5.2km	Very Low	Varies Potential long term views	High	Moderate	Nil
R95	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.3km	Very Low	Varies Potential long term views	High	Low	Nil
R96	Residents	Views toward portions of the Project site occur beyond the proximate view toward the Cullerin wind farm turbines.	5.2km	Very Low	Varies Potential long term views	High	Low	Low
R97	Resident	Views toward the Project turbines are screened by topography and/or	8.4km	Very Low	Varies	High	Low	Nil

Table 15 - Residential View Location Matrix

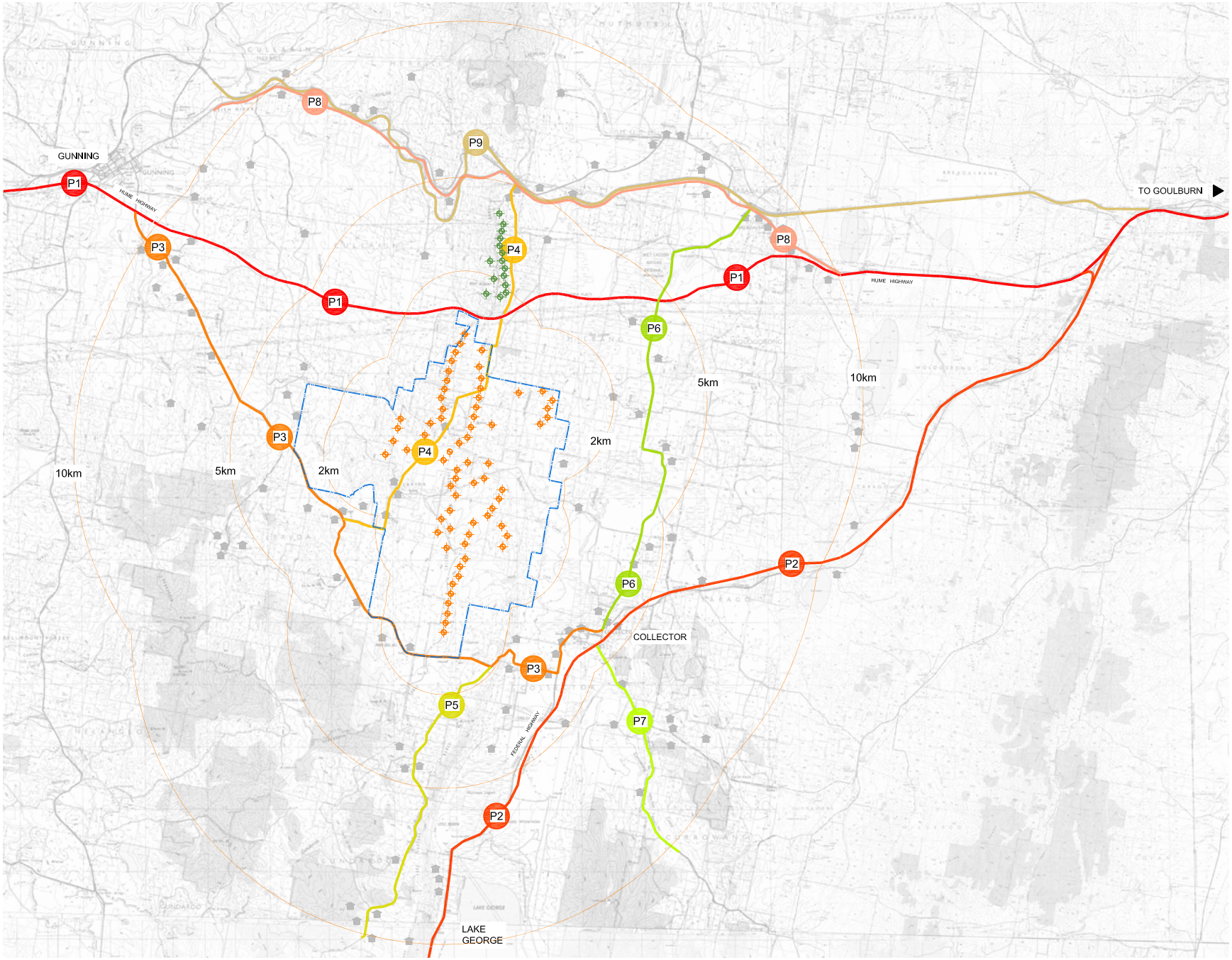
View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		vegetation.			Potential long term views			
R98	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	7.8km	Very Low	Varies Potential long term views	High	Low	Nil
R99	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8km	Very Low	Varies Potential long term views	High	Low	Nil
R100	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.2km	Very Low	Varies Potential long term views	High	High	Nil
R101	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	10km	Very Low	Varies Potential long term views	High	Moderate	Nil
R102	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.7km	Very Low	Varies Potential long term views	High	Moderate	Nil
R103	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.8km	Very Low	Varies Potential long term views	High	Moderate	Nil

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
R104	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.9km	Very Low	Varies Potential long term views	High	Low	Nil
R105	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	9.7km	Very Low	Varies Potential long term views	High	Low	Nil
R106	Resident	Distant views toward portions of the Project.	6km	Very Low	Varies Potential long term views	High	High	Low
R107	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.8km	Very Low	Varies Potential long term views	High	Low	Low
R108	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.8km	Very Low	Varies Potential long term views	High	Low	Low
R109	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	10km	Very Low	Varies Potential long term views	High	Low	Low
R110	Resident	Views toward the Project turbines are screened by topography and/or	9.2km	Very Low	Varies	High	Low	Low

Table 15 - Residential View Location Matrix

View Location	Category of Potential View Location	View context from residence toward Collector wind farm	Approximate distance to closest turbine	Relative number of people	Period of view	View Location sensitivity	Estimated ZVI Hub height visibility rating	Visual Impact
		vegetation.			Potential long term views			
R111	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8.9km	Very Low	Varies Potential long term views	High	Low	Low
R112	Resident	Views toward the Project turbines are screened by topography and/or vegetation.	8km	Very Low	Varies Potential long term views	High	Low	Low
R113	Resident	Views from residence and surrounding curtilage extend toward turbines within portions of the Project site.	7.5km	Very Low	Varies Potential long term views	High	High	Low to Moderate
R114	Resident	Views from residence and surrounding curtilage extend toward turbines within portions of the Project site.	3.7km	Very Low	Varies Potential long term views	High	High	Moderate



Legend

- P1 Hume Highway
- P2 Federal Highway
- P3 Gunning Collector Road
- P4 Lerida Road South & North (Bicentennial National Trail)
- P5 Marked Tree Road
- P6 Collector Road
- P7 Currawang Road
- P8 Old Hume Highway
- P9 Main Southern Railway
- Proposed Collector Turbine
- Existing Cullerin Turbine
- Residential dwelling or structure

0km 4km

Figure 16 -
Public View Locations

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Table 16 - Public View Location Matrix

View Location	Category of Potential View Location	View context	Approximate length of road or rail line within Collector 10km viewshed	Approximate distance to closest wind turbine	Relative number of people	Period of view	View location sensitivity	Visual Impact
P1 Hume Highway	Motorist	Both eastbound and westbound views would extend toward portions of the Project; however, visibility will be determined by the direction of travel relative to turbine locations as well as the extent of tree planting alongside the road corridor.	11.5km eastbound 12km westbound	650m	High	Very Short Term	High	Low
P2 Federal Highway	Motorist	Views from vehicles travelling both north and southbound along the Federal Highway will have opportunities to view turbines within the east portion of the Project site and views from southbound vehicles are likely to view a greater number of turbines from more distant and elevated locations of the highway.	20km (northbound and southbound)	4km	High	Very Short Term	High	Low
P3 Gunning Collector Road	Motorist	Largely indirect views toward the Collector wind turbines occur from sections of the unsealed road from vehicles travelling in both directions. Undulating landform between the road and the wind farm site would restrict views along some sections of the road, as would a reasonable extent of tree cover alongside and beyond the road corridor. Very short term indirect glimpsed views through roadside vegetation occur proximate to the	23km (southeast and northwest bound)	840m	Very Low to Low	Very Short Term	Low	Low

Table 16 - Public View Location Matrix

View Location	Category of Potential View Location	View context	Approximate length of road or rail line within Collector 10km viewshed	Approximate distance to closest wind turbine	Relative number of people	Period of view	View location sensitivity	Visual Impact
		turbines at the southern end of the wind farm site.						
P4 Lerida Road South and Bicentennial Trail	Motorist, Horse, Cyclist or Hiker	Direct and proximate views toward turbines would occur along portions of Lerida Road South as it passes parallel to, and between turbines located on two of the principal ridgelines within the Project site boundary. Motorists travelling south will also have direct views toward the Cullerin wind farm turbines when travelling north. The Bicentennial Trail follows Lerida Road South between the Gunning Collector Road to the south of the wind farm and the Hume Highway on the north boundary of the wind farm site. The Trail extends along the east coast of Australia for around 5,330 km from Victoria to North Queensland, and is available to horse riders, hikers and bicycles. The opportunity to experience wind turbines in close proximity would not be unique to the Collector Wind Farm as the Bicentennial Trail also passes the Cullerin, Gullen and Crookwell Wind Farm sites.	9.7km	50m	Very Low to Low	Motorists Very Short Term Horse Riders, Hikers and Cyclists Moderate to Short Term	Low	Low

Table 16 - Public View Location Matrix

View Location	Category of Potential View Location	View context	Approximate length of road or rail line within Collector 10km viewshed	Approximate distance to closest wind turbine	Relative number of people	Period of view	View location sensitivity	Visual Impact
P5 Marked Tree Road	Motorist	Views from vehicles travelling north along the Marked Tree Road would be subject to a large degree of screening by landform and timbered areas extending beyond the road corridor.	11km	1.9km	Very Low	Very Short Term	Low	Low
P6 Collector Road	Motorist	Direct and indirect views from vehicles travelling north and south between Collector and Breadalbane toward the eastern portion of the Project.	16km	3km	Very Low to Low	Very Short Term	Low	Low
P7 Currawang Road	Motorist	Direct views from vehicles travelling north to northwest toward the Federal Highway junction would include views of the Collector wind farm and turbines within the eastern portion of the wind farm area.	8km	4.4km (at junction to Federal Highway)	Low	Very Short Term	Low	Low
P8 Old Hume Highway	Motorist	Views toward the Project would occur from small sections of the Old Hume Highway, although the majority of views toward the wind farm would be screened by a combination of undulating landform and vegetation alongside and beyond the road corridor.	22km	4.4km	Very Low	Very Short Term	Low	Low

Table 16 - Public View Location Matrix

View Location	Category of Potential View Location	View context	Approximate length of road or rail line within Collector 10km viewshed	Approximate distance to closest wind turbine	Relative number of people	Period of view	View location sensitivity	Visual Impact
P9 Main Southern Railway	Passenger	Views toward the Project from the Main Southern Railway are largely contained by landform and portions of the railway line in cutting within the 10km viewshed.	5km	3.7km	Moderate to High	Very Short Term	Low	Low

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8.3 Future residential dwellings

A number of residential dwellings in the vicinity of the Project are located below surrounding ridgelines to maximise potential for shelter from prevailing wind, and/or where exposed tend to include a degree of shelter from windbreak planting or tree planting around dwellings. The tendency to locate residential dwellings in sheltered situations also acts to limit the extent of available views across the surrounding landscape for the majority of residential view locations, although there are a small number of dwellings that appear to have been located on properties to take advantage of distant and panoramic views.

Although future planning for residential dwellings is limited by the existing settlement pattern and minimum allotment size for subdivision, potential development would be able to take advantage of any approved layout design for the Collector Wind Farm when determining the optimal location for residential dwellings on individual portions of land to minimise views toward wind turbines if desired. In some circumstances future residential dwellings could be located to take advantage of local topographic features in order to screen views toward wind turbines or implement advance mitigation measures such as tree planting for windbreak and/or screening purposes.

Should additional residential dwellings be constructed on existing portions of land immediately adjacent to the Project site, then there is likely to be an associated visual impact not only with additional residential structures within the landscape but also a range of domestic infrastructure associated with it.

8.4 Summary of Visual Impact (Residential View Locations)

This LVIA identified a total of 114 residential view locations (including two clusters of three residential dwellings) within the 10km Collector viewshed; however, one of these view locations were determined to be non residential structures.

Table 17 outlines the assessment of residential view locations within the Collector Wind Farm 10km viewshed.

Table 17 – Summary of Visual Impact Rating within 10km viewshed

	Visual Impact Rating within 10km Collector viewshed (Total from 114 residential dwellings and rounded percentage)					
	Nil	Low	Low to Moderate	Moderate	Moderate to High	High
Collector Wind Farm	50 (43.9%)	36 (31.5 %)	8 (7.1%)	10 (8.8%)	4 (3.5%)	6 (5.2%)

The field assessment for the majority of residential view locations was undertaken from the closest publicly accessible location, with a conservative approach adopted where there was no opportunity to

confirm the actual extent of available view from areas within or immediately surrounding the residence. It is anticipated that some visibility ratings would be less than those determined subject to a process of verification from private property.

A total of 3 residential dwellings determined to have a high visual impact have been identified as associated residential dwellings.

8.5 Summary of Visual Impact (Public View Locations)

A total of nine public view locations were identified as part of the LVIA. An assessment of the visual impact for each public view location indicated that for the Collector Wind Farm layout:

- 0 of the 9 public view locations have been determined to have a high visual impact;
- 0 of the 9 public view locations have been determined to have a moderate visual impact;
- 9 of the 9 public view locations have been determined to have a low visual impact; and
- 0 of the 9 public view locations have been determined to have a nil visual impact.

GBD acknowledge that the proposed Project may have the potential to impact people engaged in predominantly farming or recreational activities, where views toward wind turbines occur from surrounding agricultural areas. Ultimately the level of visual impact would depend on the type of activities engaged in as well as the location of the activities together with the degree of screening provided by local landform or vegetation within individual properties. Whilst views toward the turbines will occur from a wide area of surrounding rural agricultural land, this LVIA has determined that the sensitivity of visual impacts is less for those employed or carrying out work in rural areas compared to potential views from residential dwellings; however the sensitivity of individual view locations will also depend on the perception of the viewer.

It should be noted that the term ‘visual impact’ does not necessarily imply or represent an individual’s negative response toward the visibility of wind turbines, and that perceptions of wind farms amongst individuals within any community can be positive, negative or neutral.

Cumulative Visual Impact Assessment

SECTION 9

9.1 What is Cumulative Impact Assessment?

A cumulative landscape and visual impact could result from the Collector Wind Farm being constructed in conjunction with other existing, operational or proposed wind farm developments, which could be either associated or separate to it.

Other wind farm developments occur within the Collector Wind Farm 10km viewshed and are also located within a regional context where visibility is largely dependent on a journey between each site or an individual project viewshed.

There are three distinctive types of cumulative impact that have been assessed and determined in this LVIA which include:

- Direct cumulative impact;
- Indirect cumulative impact; and
- Sequential cumulative impact.

'Direct' cumulative visual impact could occur where two or more winds farms have been constructed within the same locality, and could be viewed from the same view location simultaneously.

'Indirect' cumulative visual impact could occur where two or more winds farms have been constructed within the same locality, and could be viewed from the same view location but not within the same field of view.

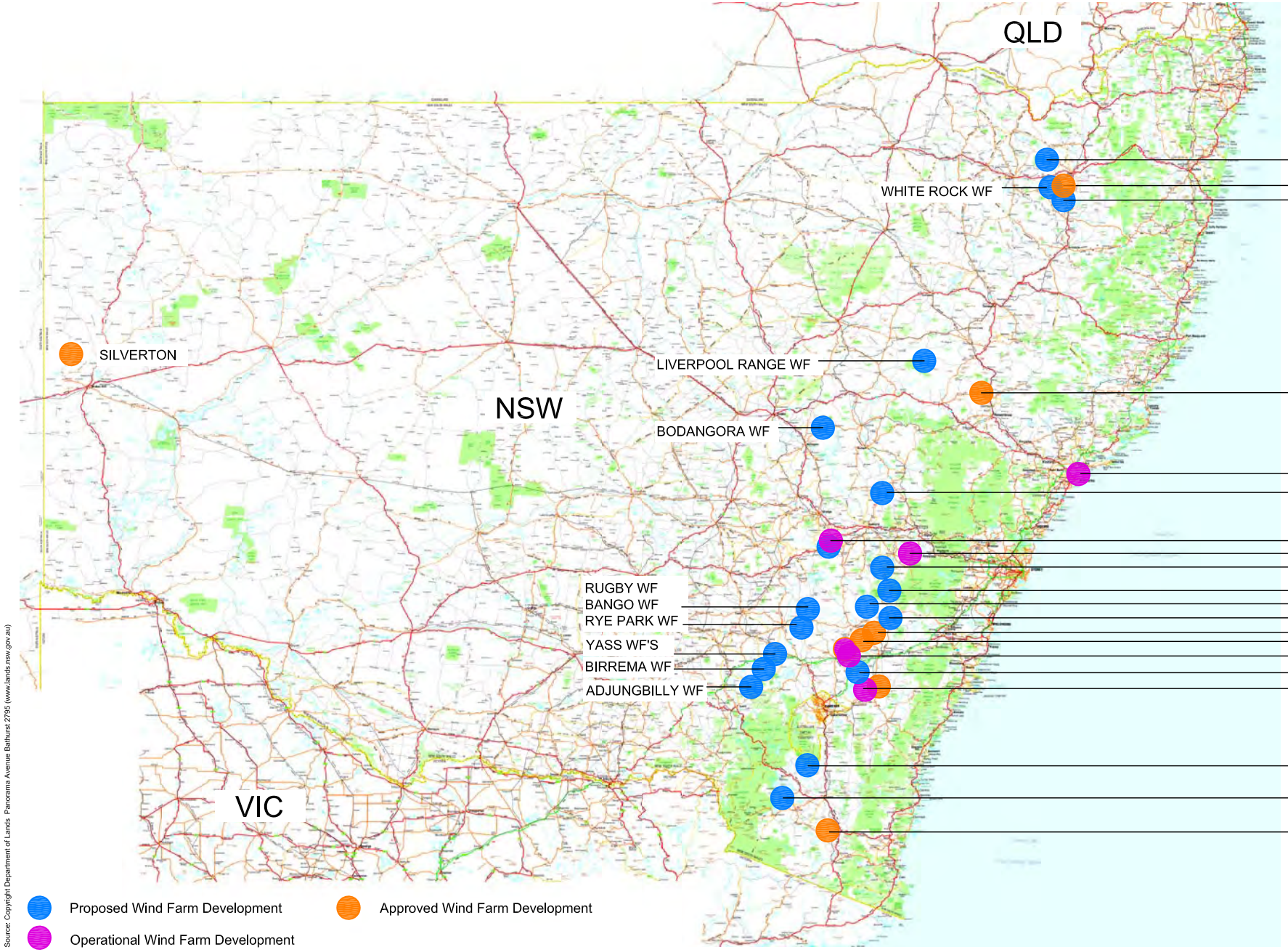
'Sequential' cumulative visual impacts could arise as a result of multiple wind farms being observed at different locations during the course of a journey (e.g. from a vehicle travelling along a highway or from a network of local roads), which could form an impression of greater magnitude within the construct of short term memory.

There are a number of proposed, approved and operating wind farm developments within New South Wales which have been illustrated in **Figure 17**. The general regional location of wind farms surrounding the Collector Wind Farm are illustrated in **Figure 18**. These figures illustrate the location of wind farms known at the time this LVIA was prepared. The number and location of wind farms is likely to change as more wind farm projects are announced in the future.

9.2 Other wind farm developments in the NSW Southern Tableland Region

The DoPI website identifies seven wind farm developments that are currently operational, approved or proposed within the same regional context as the Collector Wind Farm which have been identified and described in **Figure 18** and **Table 18**.

Figure 17
NSW wind farm locations
(as of December 2011)



Not to scale

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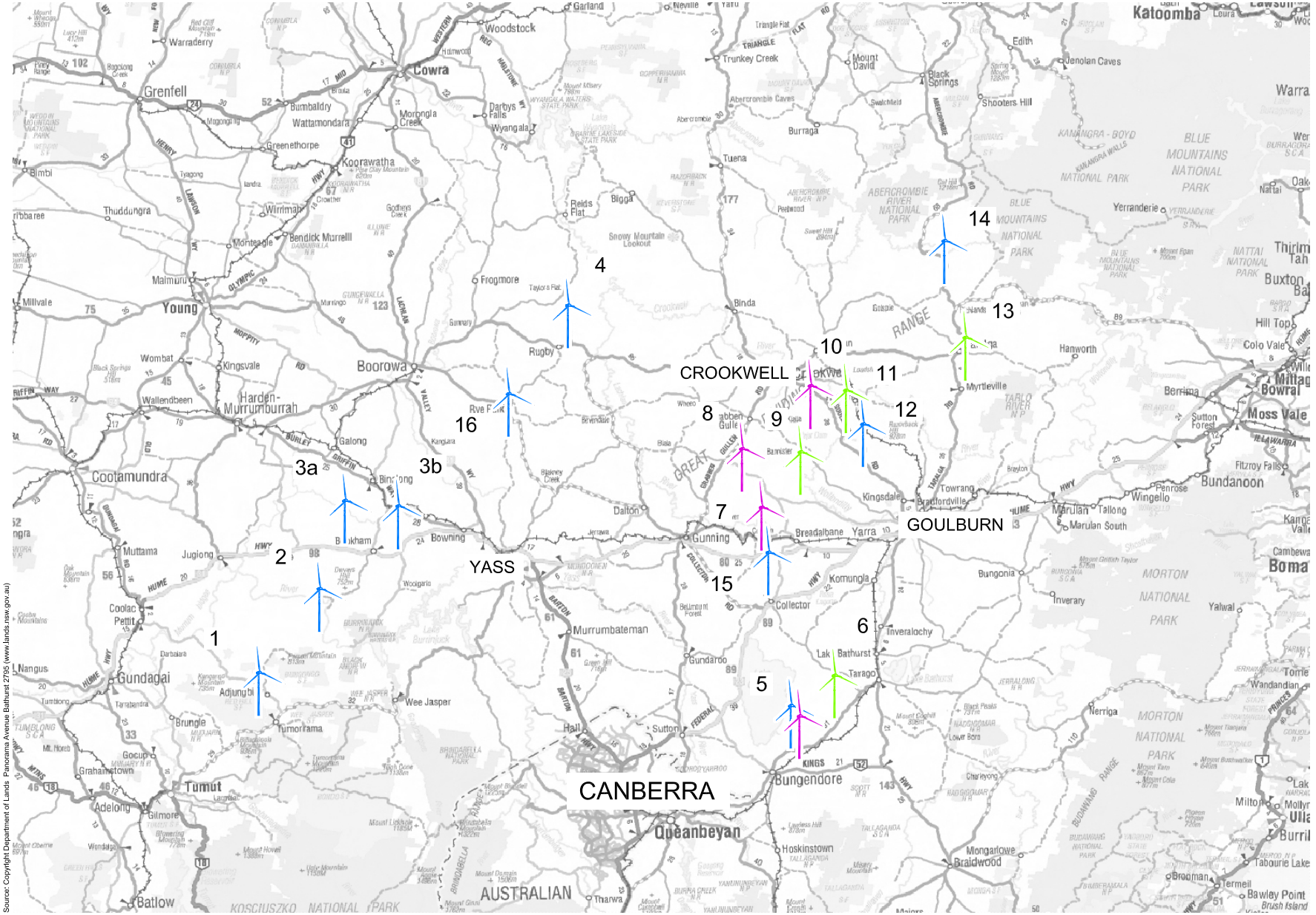

Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

Figure 18
NSW Southern Tablelands
Wind Farm Locations
(as of December 2011)

Legend

1 Adjunbilly Wind Farm
2 Birrema Wind Farm
3a Yass Wind Farm (Coppabella)
3b Yass Wind Farm (Marilba)
4 Rugby Wind Farm
5 Capital Wind Farm (I & II)
6 Woodlawn Wind Farm
7 Cullerin Wind Farm
8 Gunning Wind Farm
9 Gullen Range Wind Farm
10 Crookwell Wind Farm
11 Crookwell 2 Wind Farm
12 Crookwell 3 Wind Farm
13 Taralga Wind Farm
14 Paling Yards Wind Farm
15 Collector Wind Farm
16 Rye Park Wind Farm

Proposed wind farm development
Approved wind farm development
Operational wind farm development

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Not to scale

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Table 18 - Regional Wind Farm Developments

Wind Farm	Proponent or Owner	Status	Number of turbines
Crookwell 1	Eraring Energy Pty Ltd	Operational	8
Crookwell 2	Crookwell Development Pty	Approved	46
Crookwell 3	Crookwell Development Pty	Proposed	30
Gullen Range	Gullen Range Wind Farm Pty Ltd	Approved	Up to 98
Paling Yards	Union Fenosa	Proposed	Up to 60
Rugby	Suzlon Energy and Windlab	Proposed	Up to 90
Taralga	CBD Energy Pty Ltd	Approved	62

9.3 Other wind farm developments in the Collector Wind Farm locality (25km)

The DoPI website also identifies four additional wind farm developments that are currently operational or proposed within the same locality as the Project and are identified in **Table 19**.

Table 19 Other Local Wind Farm Developments

Wind Farm	Proponent/ Operator	Status	Number of turbines
Gunning	Delta Electricity	Operational	32
Capital I	Infigen	Operational	67
Capital II	Infigen	Approved	41
Woodlawn	Infigen	Operational	23

GBD is not aware of any smaller wind farm developments that are currently lodged, or being assessed by the Upper Lachlan Shire Council.

9.4 Other wind farm turbines within the Collector Wind Farm 10km viewshed

The Cullerin Wind Farm is located within the Collector Wind Farm 10km view shed. The extent and location of wind turbines within the Collector Wind Farm 10km viewshed are outlined in **Table 20** and illustrated in **Figure 2**.

Table 20 Other wind turbines within Collector 10km viewshed

Wind Farm	Approximate number of turbines within Collector 10km viewshed	General location of other wind farms relative to the Collector Wind Farm	Approximate distance between closest Collector wind turbine and other wind farm turbine
Cullerin	15	The Cullerin Wind Farm extends north south along the Cullerin Range for around 3.5km to the north of the Collector Wind Farm site.	4.2km

9.5 Collector and Cullerin Wind Farm intervisibility

The potential for the Collector Wind Farm turbines to be visible from various view locations together with the Cullerin Wind Farm turbines are considered in **Table 21**.

Table 21 Collector and Cullerin Wind Farm intervisibility

View Location	View description between the Collector and Cullerin Wind Farms		
	'Direct' Views	**'Indirect' Views**	**'Sequential' Views**
Residential View Locations	Direct views toward the Collector and Cullerin wind farm turbines would occur from a number of residential view locations within the Collector Wind Farm 10km viewshed, including areas to the south, west and east of the viewshed. Direct views toward the Cullerin wind turbines would be restricted or partially obscured in some areas by undulating topography and scattered tree or more heavily timbered areas.	Indirect views toward the Cullerin Wind Farm would occur from a number of residential view locations within the Collector Wind Farm10km viewshed. Direct views toward the Cullerin wind turbines would be restricted or partially obscured in some areas by undulating topography and scattered tree or more heavily timbered areas.	N/A
Public View Locations	Direct views toward the Cullerin Wind Farm would	Indirect views toward the Cullerin Wind Farm would	Sequential views would occur for

Table 21 Collector and Cullerin Wind Farm intervisibility

View Location	View description between the Collector and Cullerin Wind Farms		
	'Direct' Views	**'Indirect' Views**	**'Sequential' Views**
	occur from a number of public view locations, including road corridors within the Collector Wind Farm 10km viewshed.	occur from a number of public view locations, including road corridors within the Collector Wind Farm 10km viewshed.	motorists travelling north south along the Lerida Road South as well as local roads around the Cullerin Wind Farm development. Views from the Hume Highway would tend to present as direct views given the alignment of each wind farm relative to direction of travel.

9.6 Collector and Gunning Wind Farm intervisibility

The potential for the Collector Wind Farm turbines to be visible from various view locations together with the Gunning Wind Farm turbines are considered in **Table 22**.

Table 22 Collector and Gunning Wind Farm intervisibility

View Location	View description between the Collector and Gunning Wind Farms		
	'Direct' Views	**'Indirect' Views**	**'Sequential' Views**
Residential View Locations	There would be limited opportunity for direct views from residential view locations toward the Collector and Gunning wind turbines within the Collector 10km viewshed. A view was obtained to both wind farm sites from the top of Gun Gun Hill to the south west of the Collector project site; however this hill is in private ownership and provides a site for a Telecom transmitter tower.	There would be a limited potential for indirect views toward the Collector and Gunning Wind Farms from a small number of residential dwellings where located on elevated ground to the north west of the Collector Wind Farm site.	N/A
Public View Locations	There would be few opportunities to obtain a direct view between the Collector	Indirect views may occur from short sections of roads or highway to the west and	Sequential views would occur for motorists travelling

Table 22 Collector and Gunning Wind Farm intervisibility

View Location	View description between the Collector and Gunning Wind Farms		
	'Direct' Views	**'Indirect' Views**	**'Sequential' Views**
	and Gunning Wind Farms from public view locations within the Collector Wind Farm 10km viewshed.	northwest of the Collector Wind Farm project area; however views would be relatively short term and extend across long distances.	along local roads between Collector and Gunning, and then proceeding north of Gunning toward Grabben Gullen and Crookwell. Sequential views along this route would also include views toward the Gullen Range and Crookwell wind farm developments.

9.7 Collector, Capital and Woodlawn Wind Farm intervisibility

The potential for the Collector Wind Farm turbines to be visible from various view locations together with the Capital and Woodlawn Wind Farm turbines are considered in **Table 23**.

Table 23 Collector and Capital/Woodlawn wind farm intervisibility

View Location	View description between the Collector, Capital and Woodlawn Wind Farms		
	'Direct Views'	**'Indirect' Views**	**'Sequential' Views**
Residential View Locations	There would be limited opportunity for direct views from residential view locations toward the Collector and Capital or Woodlawn wind turbines within the Collector Wind Farm 10km viewshed.	There would be limited potential for indirect views toward the Collector and Capital or Woodlawn Wind Farms largely due to the Lake George Range to the west of the lake as well as timbered hills and slopes to the north east of the lake.	N/A
Public View Locations	There would be few opportunities to obtain a direct view between the Collector and Capital or Woodlawn Wind Farms from public view locations within the Collector Wind Farm 10km viewshed.	There would be limited potential for indirect views toward the Collector, Capital or Woodlawn Wind Farms largely due to the Lake George Range to the west of the lake as well as timbered hills and slopes to the north	Sequential views would occur for motorists travelling along the Federal Highway although views from vehicles travelling along the highway toward the

Table 23 Collector and Capital/Woodlawn wind farm intervisibility

View Location	View description between the Collector, Capital and Woodlawn Wind Farms		
	'Direct Views'	**'Indirect' Views**	**'Sequential' Views**
		east of the lake.	Capital and Woodlawn wind farm turbines extend for around 10km across the lake.

9.8 Cumulative Visual Impact Summary

There would opportunities for 'direct' and 'indirect' views toward the Collector and Cullerin Wind Farms from surrounding residential dwellings and public view locations including local roads and highways; however, visibility toward both wind farms would be restricted in some locations due to tree cover and undulating landform within the surrounding landscape.

The relatively small size of the Cullerin Wind Farm development would minimise potential for significant cumulative visual impact, as would the general alignment and layout of the Collector Wind Farm in relation to the Cullerin Wind Farm where, from a majority of surrounding view locations, both wind farm developments would be observed as a continuation along the same topographic feature of the local landscape.

There would be a limited and very small number of residential view locations, within the Collector Wind Farm 10km viewshed, with direct or indirect views toward the Gunning and Collector Wind Farm turbines. This would be largely due to tree cover and undulating landform within the surrounding landscape as well as the distance between them.

A sequential view would occur for motorists travelling along the Hume Highway and/or sections of local roads in a north south alignment that would take in views toward the Cullerin, Gunning and Collector Wind Farm projects. Despite the presence of additional wind farm development, the journey between the wind farms would include a range of views extending toward and beyond wind turbines within the landscape. A journey through the local landscape would also follow the low undulating nature of a landform typical across much of the NSW Southern Tablelands, where views may extend over regional areas from highpoints and ridgelines, or be contained and compartmentalised by rising or sloping landforms together with timbered and vegetated areas.

The extent and overall visibility of turbines would also be influenced by the direction of travel relative to the alignment of wind turbines as well as the relatively short travel time along the highway and local road network alongside and between the wind farm turbines.

'Direct' and 'indirect' intervisibility between the Capital, Woodlawn and Collector Wind Farms would be limited by topographical features including the Lake George escarpment to the west of the lake

and low timbered hills north east of the lake, extending across the Currawang Road toward the Collector village.

A sequential view would occur for motorists travelling along the Federal Highway, passing the Collector Wind Farm with distant views toward the Capital and Woodlawn Wind Farms. Although traffic volume and number of potential viewers is high on the Federal Highway, the potential for cumulative impact is considered to be low as the view distance toward the Capital and Woodlawn wind turbines is around 10km from the Federal Highway and travel time is very short term whilst passing each wind farm development.

This LVIA determined that the Collector Wind Farm is unlikely to result in any significant 'direct', 'indirect' or 'sequential' cumulative visual impact resulting from associated views toward operational wind farm developments within the Collector Wind Farm 10km viewshed.