RMCG

JULY 2022

Agricultural Impact Assessment – Watta Wella Renewable Energy Project

Final Report

Umwelt (Australia) Pty Ltd and RES Australia Pty Ltd

135 Mollison Street, Bendigo Victoria 3550
rmcg.com.au — ABN 73 613 135 247 — RM Consulting Group Pty Ltd
Victoria — Tasmania — ACT — NSW

Table of Contents

1 Introduction

1.1 THE PROJECT

The proposed Watta Wella Renewable Energy Project (the Project) involves a renewable energy facility comprising a wind farm, solar farm, battery energy storage system (BESS) and associated infrastructure located in western Victoria (Figure 1-1).

The Project will occur on farmland over an area over approximately 5,200 hectares (ha). The project site is adjacent to the Wimmera River, around 16 kilometres northeast of the township of Stawell, the nearest significant regional centre, with a population of 6,000.

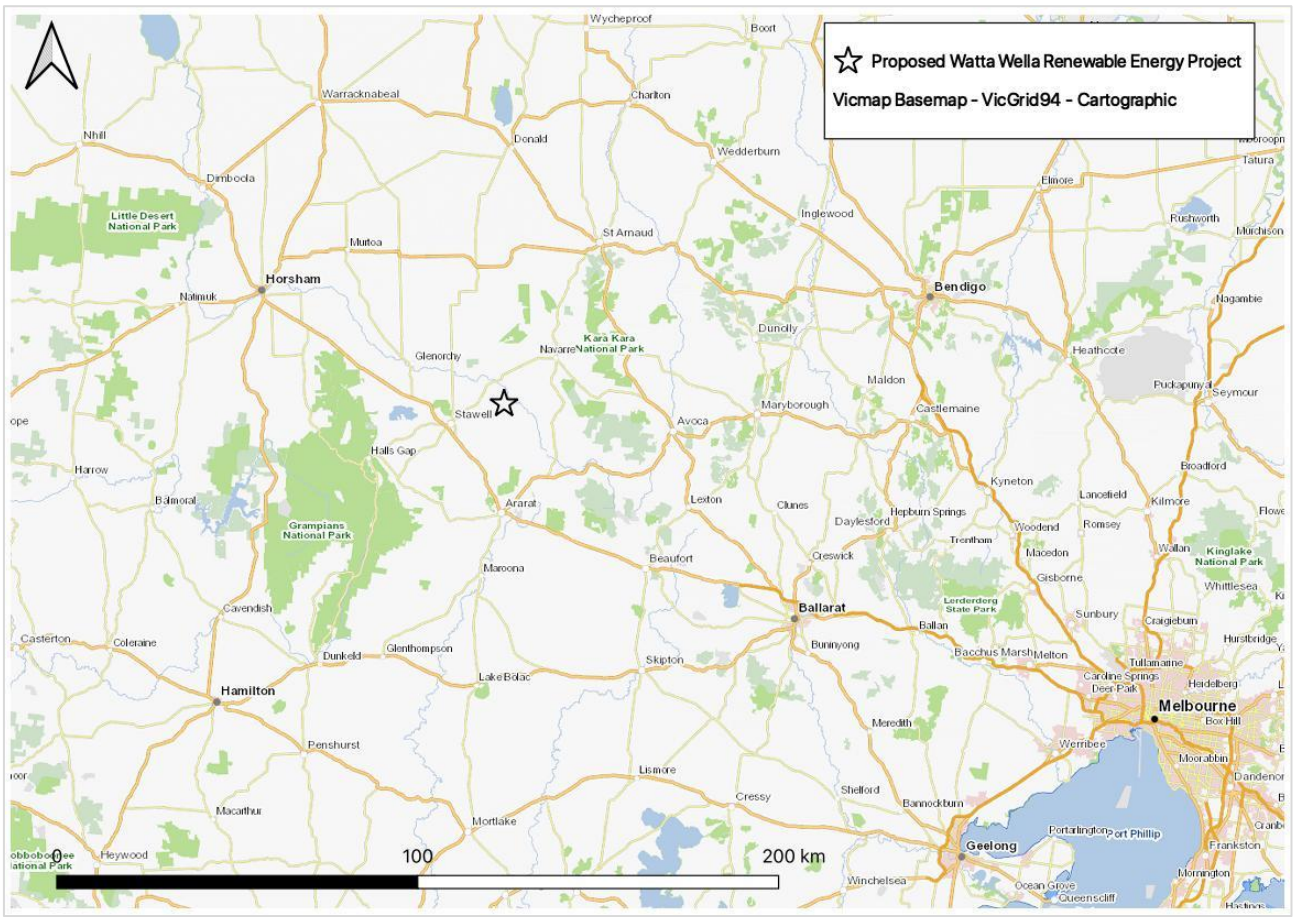


Figure 1-1: Project location

Table 1-1 Summary of key Project components

TECHNOLOGY	CAPACITY	FOOTPRINT
Wind	45 turbines, 270 MW total capacity	0.6 ha hardstand per turbine Access tracks to each turbine
Battery (BESS)	400MW / 1200MWh	12 ha
Solar	85MW	170 ha

The Project includes wind turbines, solar panels and a BESS, along with ancillary infrastructure to support the Project including access tracks, operations and maintenance facilities, construction compound areas, underground and above ground cabling, switchyards, substations, laydown areas, concrete batching plant, temporary meteorological mast and such like.

To aid the reader's understanding of the existing agriculture and the potential impacts of the proposal, the extent of the Project is shown on a series of maps contained in Appendix A, that show various base information such as road names, feature names, aerial imagery, contours, geology, town planning, land use and the project site.

To note, this assessment is based on a 45-turbine configuration whilst the EES referral considers an updated layout with 47 turbines. This assessment will be updated post-referral decision and prior to planning submission to reflect the final design.

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the Traditional Owners of the Country that we work on throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past, present and emerging and the Elders of other Aboriginal and Torres Strait Islander communities. Moreover, we express gratitude for the knowledge and insight that Traditional Owners and other Aboriginal and Torres Strait Islander people contribute to our shared work.

1.2 THIS REPORT

The purpose of the agricultural impact assessment is to determine the agricultural uses and value of the proposed Project and estimate the impacts of the Project.

Because the Project comprises different technologies (turbine towers, battery, solar panels) and associated works (such as access tracks), and these technologies impact differently on farming practices, this agricultural impact assessment considers these impacts separately. The predicted impacts are also presented as a whole.

This agricultural impact assessment will contribute to the documentation supporting an Environment Effects Statement (EES) referral and a planning permit application to the Department of Environment, Land, Water and Planning (DELWP).

This agricultural impact assessment addresses the requirements outlined in DELWP's policy and planning guidelines for the development of wind energy facilities[1] and the guideline outlining the assessment and

[1] Development of Wind Energy Facilities in Victoria: Policy and Planning Guidelines November 2019. Victorian Department of Environment, Land, Water and Planning.

development process for large scale solar energy facilities in Victoria[2]. The DELWP guidelines reference the importance of a site's land and economic attributes in determining strategically important agricultural land in Victoria.

The scope of this agricultural impact assessment is limited to aspects of the proposed Project relating to the agricultural value of the project site and impacts on production. Therefore, this impact assessment includes:

- Site features relevant to agricultural production, such as existing infrastructure, soil types, climate and water availability
- Surrounding land uses
- Impacts on agricultural production
- Agricultural commodities and production levels
- Relative agricultural value to the region and state.

The findings of the agricultural impact assessment are outlined in Section 5.

[2] Solar Energy Facilities: Design and Development Guideline, August 2019. Victorian Department of Environment, Land, Water and Planning.

2 Development guidelines and policy

2.1 INTRODUCTION

This section describes relevant local and state policy and guidelines.

2.2 SOLAR ENERGY FACILITIES

The *Solar Energy Facilities Design and Development Guideline* published by DELWP in August 2019 (subsequently referred to as the Solar Energy Facility Guidelines) informed this assessment.

As solar energy facilities are often located on, or close to, agricultural land, the Solar Energy Facility Guidelines provides specific planning strategies for the protection of agricultural land. The key measures noted in the Solar Energy Facility Guidelines are:

- Protecting strategically important agricultural and primary production land from incompatible land use
- Protecting productive agricultural land that is of strategic significance to a local area or in a regional context
- Avoiding the loss of productive agricultural land without considering the impact of the loss on the agricultural sector and its consequential effect on other sectors.

The Solar Energy Facility Guidelines also states that "Renewable energy generation can and does coexist with agricultural production, which contributes to the rural economy and supports farm incomes by diversifying property owners' revenue streams". In addition to other site considerations for solar energy facilities, the Solar Energy Facility Guidelines proposes that site selection should also consider:

- *The impact on the loss of the site if it has high-quality soils, particularly soils that are niche to a type of crop or other agricultural activity*
- *The potential loss of reliable, accessible water (such as irrigated areas) and its impact at a local or regional scale*
- *The impact of fragmentation and a change of land use to non-agriculture activity on local and regional productivity and output*
- *The impact of a change of land use on recent and/or current efforts to modernise and reform agricultural activity in the area*
- *Whether the land has specifically been set aside or defined for agricultural use and development in a planning scheme or other strategic document*
- *Whether the change in land use is to the detriment of a government's previous or existing investment and support for the site or the area*
- *Whether the proposed solar energy facility can co-locate with other agricultural activity, to help diversify farm' income without reducing productivity.*

The above considerations have been evaluated in this agricultural impact assessment.

2.3 WIND ENERGY FACILITIES

The *Development of Wind Energy Facilities in Victoria: Policy and Planning Guidelines* published by DELWP in November 2021 (subsequently referred to as the Wind Energy Facility Guidelines), provide guidance to proponents on preparing a planning permit application. *Clause 52.32* of the Victorian Planning Provisions (VPP) and *4.3.2 Site and context analysis* of the Wind Energy Facility Guidelines outlines information requirements to inform an assessment of the subject site and its surrounds. The Wind Energy Facility Guidelines states that:

> *If the land is also to be used for other purposes, such as agriculture, the site analysis should include information about this.*

This agricultural impact assessment accurately describes the agricultural land use of the project site and surrounding area.

2.4 BATTERY FACILITIES

RMCG is unaware of any specific guidelines that apply to battery projects, so we have adopted the solar and wind guidelines to assess the impact of this aspect of the Project.

2.5 LOCAL PLANNING POLICY

The Project is located within the Northern Grampians Shire local government area.

Agriculture is the dominant land use in the Northern Grampians Shire and the local planning scheme's strategic direction aims to ensure that agricultural land is protected for its productive use and protect strategically important agricultural and primary production land from incompatible uses[3].

The location of the project site is not identified as high quality or strategically important agricultural land by the Northern Grampians Planning Scheme (the Planning Scheme).

Of relevance to this agricultural impact assessment, Clause 53.13 (Renewable Energy Facility (other than wind energy)) of the Planning Scheme includes Clause 53.13-3 (Decision guidelines), where the responsible authority must consider:

> *The impact of the proposal on strategically important land, particularly declared irrigation districts.*

The project site is not within a designated or declared Victorian irrigation district and has no connection to modernised irrigation infrastructure.

The Planning Scheme also supports renewable energy. Clause 19.01-2S (Renewable energy) details the objectives and strategies for the provision of renewable energy, stating the strategies are to:

- *Facilitate renewable energy development in appropriate locations*
- *Protect energy infrastructure against competing and incompatible uses*
- *Develop appropriate infrastructure to meet community demand for energy services. Set aside suitable land for future energy infrastructure*
- *Consider the economic and environmental benefits to the broader community of renewable energy generation while also considering the need to minimise the effects of a proposal on the local community and environment*

[3] Northern Grampians Planning Scheme, Clause 02.03-4 Natural resource management p. 8; Clause 14.01-1S Protection of agricultural land p. 86.

- *Recognise that economically viable wind energy facilities are dependent on locations with consistently strong winds over the year.*

Also, Clause 19.01-2R (Renewable energy – Wimmera Southern Mallee) supports the development of locally generated renewable energy, including bioenergy clusters as part of the Renewable energy - Wimmera Southern Mallee Strategy.

Clause 52.32 (Wind Energy Facility) facilitates the establishment and expansion of wind energy facilities, in appropriate locations, with minimal impact on the amenity of the area.

3 Site and context analysis

3.1 SITE DETAILS

The project site is approximately 5,200 ha covering parts of 13 separately owned and operated farm properties in the Northern Grampians Shire Council area, Joel.

On 9 June 2021, Jencie McRobert and Duncan Wallis visited the project site, met with three landowners and observed the general land uses in the vicinity of the Project and in the general locality. They held discussions on farming systems and production, and made observations on the land use, landform, soil types and agricultural productive capacity.

In order to accurately describe the project site, this agricultural impact assessment also relies on interpretation of many spatial data sources, which have been accessed and evaluated. A series of maps has been prepared to inform the agricultural impact assessment and are attached in Appendix A. The maps are:

- A1 – Cartographic Locality
- A2 – Google Satellite
- A3 – Works Footprint
- A4 – Planning Scheme Zones
- A5 – Planning Scheme Overlays
- A6 – Geology and Soils
- A7 – Land Use
- A8 – Relief.

3.2 LAND USE

The project site is currently used for dryland mixed farming, predominantly sheep for wool and meat (estimated to be 30% wool: 70% prime lamb), and cropping; mostly cereals for grain and hay. Some cattle grazing and cropping growing oil seeds, vetch and pasture seed also occurs.

The Victorian Land Use Information System (VLUIS) indicates that the project site and surrounding land is all classified as “Mixed Farming and Grazing”, as shown in Appendix A7.

Grazing by livestock is predominantly on a mix of annual and perennial improved pastures (annual subclover and rye, and perennials including lucerne on the alluvial flats and tall fescue, phalaris and cocksfoot on the rises). The quality of the pasture ranges from moderate to poor depending on soils, slope and level of improvement. Pastures on the steepest slopes with shallower soil, tend to be annual grasses with a higher level of weediness whereas better quality pastures occur on the lower slopes and alluvial soils in the creek lines and other drainage depressions.

Farm sizes within the project site range between 1,000 and 3,000 ha. The average area of holding of farm businesses across the wider district is 780 ha[4].

The photographs presented in Figure 3-1 illustrate the main farming uses in the project site.

[4] ABS Agricultural Census 2015/16, Stawell statistical area level SA2.

Figure 3-1: Typical cropping and grazing land uses in project site

3.3 SOILS AND LANDFORMS

The Project is located on the foot slopes, terraces and rises of the Wimmera River valley[5]. It's a deeply weathered landscape of undulating low hills and rises of sedimentary (Ordovician and Tertiary) origin rising above the alluvial (Quaternary) sediments in the drainage depressions and higher terrace.

A generalised geology map outlining the main landform types is shown in Appendix A6.

Appendix A8 shows the physical relief across the site using one metre contours. This shows that the proposed wind turbines are generally positioned away from the flattest areas but appear also to have been sited to avoid the steepest land. The proposed solar panels and batteries are located on relatively low relief land.

Texture contrast or duplex soil are dominant and tend to be yellow, brown or grey Sodosols (with often sodic sub soils) and sometimes Chromosols.

The soils in the alluvial drainage depression or creek line areas tend to have sandier surface soils (dark grey/brown) overlying medium to heavy mottled grey clays.

The higher terrace alluvial soils are predominately loamy sands overlying yellow medium to heavy clays.

In summary, the weathered tertiary and sedimentary rises are predominately yellowish or greyish brown duplex soils (i.e., sandy loam or clay loam topsoils with a bleached hard setting layer overlying yellow/brown medium and heavy clay sub soils – both layers are slightly acidic). The medium clay subsoils are mottled indicating poor drainage[6].

3.4 CLIMATE

Data from the Bureau of Meteorology, Landsborough (station 079027) was used to gather climate statistics, as shown in Table 3-1.

Table 3-1: Climate data

FACTOR	VALUE
Rainfall	Long term mean = 510 millimetres (mm) per year
Temperature	Mean maximum monthly temperature = 20.7 Mean minimum monthly temperature = 8.5

Most rainfall occurs during May and October. When episodic high rainfall occurs over the summer months, this can cause considerable erosion if ground cover is inadequate.

Mean daily and monthly temperature affects plant growth and is an important determinant of evaporative losses in the catchment. Evaporation values are in excess of 6 mm/day in the summer months and annual evaporation is far in excess of annual rainfall[7].

[5] Wimmera Land Resource Assessment, 2005 Department of Primary industries, Victoria.

[6] Land Inventory of the Wimmera System and Rocklands Water Supply Catchments – a reconnaissance survey 1985, Department of Conservation, Forests and Lands, Victoria.

[7] http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=079027.

3.5 WATER SOURCES – SURFACE WATER AND GROUNDWATER

The Project is positioned between the Wimmera River and Seven Mile Creek as shown on Map A8. Surface flows are suitable for stock and domestic water supply. Farm businesses rely both on catchment dams and groundwater bores. Surface water resources can be limited when dry seasons prevail or during drought conditions. During these times many farmers rely on groundwater for livestock water.

Dryland salinity is evident in the project site, with local groundwater flows mostly discharging at the break of slope or into drainage depressions. Stream salinities and groundwater salinities vary but will usually be suitable for livestock purposes.

3.6 VEGETATION

The dominant vegetation communities across the project site include Heathy Woodland, Box Ironbark Forest on the rises and Plains Grassy and Sedge Woodland in the depressions[8].

The landscape has been intensively modified for farming now largely a mix of exotic annual and perennial pasture and weed species.

There are remnants of former forest and woodland, in particular along the creek lines (red gum and yellow box) and mid to lower slopes (grey box and red box) and yellow gum and ironbark on the shallowest soils on the steepest slopes.

3.7 INFRASTRUCTURE

The following on-farm infrastructure was observed during the site visit:

- Livestock – yards, shearing sheds
- Fencing – internal and boundary fencing: generally plain wire of 5–7 line cyclone or standard “sheep proof” fencing
- Other farm sheds
- Water supply – catchment dams, bores and water troughs
- Access – farm tracks, gateways, and some fenced stock laneway systems.

Figure 3-2 shows the shearing shed located within proximity of the solar project site, noting that the farm business owner indicated that the shearing shed would stay in use during the operation of the facility.

[8] Wimmera Land Resource Assessment, 2005 Department of Primary industries, Victoria.

Figure 3-2: Shearing shed located within solar farm project site

3.8 CONCLUSION

Based on observations made during the site visit, and a desktop review of available information the agricultural land use in the surrounding area is consistent with that mapped by the Victorian Land Use Information System (refer Appendix A7). The whole of the farming area within ten kilometres of the Project is considered to be “mixed farming and grazing”.

4 Agricultural impact assessment

4.1 METHOD

To understand the relative agronomic importance of the project site in a local, regional and state context, the agricultural attributes were investigated. The solar and wind facility guidelines also reference the importance of a project site's land and economic attributes in determining its strategic agricultural significance. An analysis of the agricultural capability, relative value and district level and state significance of the project site has been conducted.

The approach taken involved:

- Desktop review of available information sources
- Field visit on 9 June 2021 to make observations on the land use, landform, soil types and agricultural productive capacity. Three farm properties were visited, and landholders were interviewed to confirm:
  - Type of farming operation (size, enterprise mix)
  - Livestock carry capacity and crop yields
  - Potential impacts of the project on both.

4.2 AGRICULTURAL CAPABILITY

OVERALL

Agricultural capability is determined primarily according to the land's ability to sustainably support a particular type and intensity of use. A system of land classification based on integrating data on climate, landform, geological materials, soils, native vegetation and land use provides a framework for assessing agricultural capability[9]. Agricultural capability class criteria have been developed as a means of classifying land types according to their susceptibility to land degradation. These are shown in Table 4-1.

Table 4-1: Agricultural capability class criteria[10]

CRITERIA	HIGH	MEDIUM	LOW
Climate-rainfall (mm)	500–1,200	500–1,200	<500 or >1,200
Landscape slope (%)	0–5%	5–10%	>10%
Soil characteristics:			
Topsoil depth	>20 cm	10–20 cm	<10 cm
Surface (topsoil) texture	Loams, Sandy Loams, Silty Loams, Sandy Clay Loams, Clay Loam	Clay Loam, Fine Sandy Loams, Light Clays	Heavy Clays, Sands
Subsoil Texture	Light – Medium Clay & lighter	Medium – Heavy Clay & lighter	All
Subsoil colour	Red, brown	Brown, grey, yellow	Brown, grey, yellow
Topsoil pH	> 6	> 4 to < 6	< 5
Sub soil pH	5.5 to 7	5 to 5.5	< 5 or > 7

[9] Early work undertaken by: Land Protection Division, Conservation, Forests & Lands, 1987.

[10] Adapted from DNRE 2002, Land resource assessment for the North East CMA Region, Department of Natural Resources & Environment, Vic.

Based on the annual rainfall, and slope and soil characteristics, the majority of farmland has been assessed as having 'medium' agricultural capability. This includes the alluvial creek flats and higher terraces and low sedimentary rises forming the broad valley south of the Wimmera River. The steeper sedimentary landforms with shallower soils form only a minor part of the project site, and these have medium to low capability.

The project site is best suited to relatively low-to-medium value agricultural enterprises such as dryland livestock grazing or cropping for cereals and hay production (i.e., the production value is low when compared to irrigated cropping, dairy or horticultural enterprises conducted elsewhere, for example).

SOIL TYPES

Soil classification is useful for understanding the range of primary production that will prosper. Although topsoil can be improved or modified to some extent, the soil classifications are an inherent characteristic of the site. Therefore, the agricultural capability of the project site is predominantly determined by rainfall in conjunction with soil type and group classification.

In summary, the description of the soils and geology according to the available reference material indicates that the project site can support moderate pasture growth and relatively low yielding winter crops. As outlined in Section 3.3, most of the project site comprises of sandy or clay loams overlying medium clay subsoils.

The soils on the gentle rises, generally have poorer drained soils that, depending on seasons, can be impacted by water logging leading to reduced pasture and crop growth. These rises also have dispersible clay subsoils that when disturbed are susceptible to erosion and tend to have lower pH (between 4 and 5) that require liming to adjust when undertaking pasture improvement.

It is noted that the geological landform and soil maps do not provide the detail to a paddock level and that the resolution of the maps do not capture the specific characteristics of the project site. The site inspection and discussions with the farm business owners, however, confirm that the generalised soil types of the district are also typical of their farms.

RAINFALL

Rainfall is another inherent site characteristic used to inform the agricultural capability of a site. Mean annual rainfall is in the order of 510 mm, based on all available data.

Annual rainfall is sufficient for dryland agriculture and well suited to mixed farming with a dominant enterprise of livestock grazing (primarily sheep) on improved pasture and some winter season cereal and other crops. Rainfall is not sufficient for a wider range of enterprises including summer cropping or horticulture, without access to additional water sources for irrigation. Cattle grazing enterprises at this rainfall tend to be smaller or conservative operations where cattle are habitually sold when seasons turn dry.

DRAINAGE

Drainage and flooding can impact on a site's agricultural productivity. That is, if a site has poor drainage and is within a flood or inundation overlay area, it's agricultural productivity could be negatively affected. As shown in Appendix A5, the two major drainage lines (Wimmera River and Seven Mile Creek) have been mapped and are subject to Flood Overlay – Schedule 1 and Land Subject to Inundation Overlay – Schedule 1 under the Planning Scheme. The proposed works appear to be located away from the flooded areas, but some of the access tracks will cross the floodways and will need to be appropriately designed.

Parts of the dominant landforms across this landscape are subject to waterlogging and this restricts its stock carrying capacity and crop production potential. This is largely due to the relatively poor internal drainage capacity of the subsoils dominant in the sedimentary rises, evidenced by their clayey texture and yellow/grey colour.

ACCESS TO IRRIGATION INFRASTRUCTURE

The DELWP guideline requires consideration of any previous or existing investment and support for the district and the impact of the Project. In an agricultural context this would normally include irrigation infrastructure, but the project site is not within a Victorian Irrigation District and has no connection to modernised irrigation infrastructure. Therefore, RMCG concludes that the project site is not serviced by irrigation infrastructure and therefore does not have irrigation capability.

4.3 PRODUCTION LEVELS

SOLAR FARM PROJECT SITE

The solar farm project site is approximately 170 ha and the proposed location is on part of a mixed farm producing prime lambs, as shown in Figure 4-1 and Figure 4-2.

Figure 4-1: Overview of grazing land within the proposed solar farm project site

Figure 4-2: Sheep grazing on lucerne pasture

An interview with the farm business owner provided the following information that has been used to assess typical agricultural production levels from this land. The main characteristics of the farming system at this site are summarised in Table 4-2.

Table 4-2: Characteristics of farming system on solar farm project site

#	FEATURE	DESCRIPTION
1	Main enterprise	Mixed dryland farm.
		Sheep (meat) (90% of land): 4,000 cross bred ewes. Set stocking grazing predominantly improved pasture and cereals. Purchase of ewe lambs rather than self-replacing flock. Stocking rate ~ 9 DSE/ha.
		Winter cropping (160 ha/year 10% land) – grazed cereals and cereals harvested mainly for hay and grain used for supplementary feeding sheep.
2	Total grazing area	1,500 ha.
3	Proposed solar site	170 ha or 11% of farming property area.

The solar farm project site agricultural capability was assessed as "medium" or moderate (previous Section 4.2). Its main agricultural use – prime lamb production – is an appropriate use for the site and optimises the potential agricultural production.

The total production potential, based on current livestock numbers and discussions with the farmer has been estimated and the results shown in Table 4-3.

The average stocking rate for the property owner interviewed has been assessed at approximately 9 dry sheep equivalents (DSE[11]) per hectare. This is comparable to average stocking rates in regions with similar agricultural capability (and soils and rainfall) of between 8 and 12 DSE/ha[12].

Table 4-3: Carrying capacity and prime lamb production potential gross income[13]

#	ENTERPRISE	DSE VALUE[14]	NO. HEAD	TOTAL DSE	STOCKING RATE
1	Crossbred ewes	3.5	4,000	14,000	9 DSE/ha

#	COMMODITY	NO. HEAD	PRICE: $/KG CARCASS WEIGHT	CARCASS WEIGHT KG	TOTAL GROSS VALUE/ANNUM
2	Prime lambs	6,000[15]	$5.55[16]	23	$766,000

#	COMMODITY	NO. HEAD	PRICE: $/KG CLEAN	FLEECE WEIGHT KG	TOTAL GROSS VALUE/ANNUM
3	Crossbred wool	4,000	$5.20[17] @ 65% yield	3.5	$50,000

The total gross farm income has been assessed at approximately $0.82M per annum or $545/ha. Therefore, the gross farm income generated from the proposed solar site is estimated at approx. $93,000/annum or 11% of the farm's total income (from 170 ha out of a total of 1500 ha).

[11] DSE is value based on energy requirements of a 2-year-old 50kg Merino wether.
[12] Livestock Farm Monitor Project Victoria – 2019-20.
[13] The lamb and wool prices are 2015-16 prices so the relative gross value can be compared with the 2015/16 regional and statewide ABS Agricultural Census data.
[14] Prograze Manual 2017 Ninth Edition, Meat and livestock Australia and NSW Department of Primary Industries.
[15] Lambing rate reported as 1.5.
[16] MLA Over the Hook (OTH) lamb indicator 2015/16, 555 cents/kg carcass weight.
[17] Historical wool prices accessed 29 June'21 https://tradingeconomics.com/commodity/wool.

BESS PROJECT SITE

The BESS project site is on similar land capability (medium) to the solar farm project site. The BESS project site has an approximate area of 12 ha, which will be removed from agricultural production[18]. This represents an annual loss of $6,500/annum.

WIND FARM PROJECT SITE

Interviews with three farm business owners provided information on their enterprises. This has been used to assess typical agricultural production levels from this land. The main characteristics of the farming system (including an estimated gross income per hectare) across the proposed wind turbine site are summarised in Table 4-4.

Table 4-4: Characteristics of farming system on wind farm project site

FEATURE	DESCRIPTION	ESTIMATED GROSS INCOME $/HA
Main enterprises	Mixed dryland farms	
70%	Sheep (meat:wool) (70:30%): Set stocking grazing predominantly improved pasture Stocking rate ~ 9 DSE/ha	Sheep (meat) $545 (70%) Sheep (wool) $460 (30%)
30%	Winter cropping – mainly cereals (wheat, barley, oats) and some oilseeds (canola) and legumes (vetch) Wheat yields = 1.2 t/ha (district average)	$320
	Est. Gross income $/ha **Assumptions:** **49% sheep meat, 21% sheep wool** **30% cropping (wheat)**	**$460/ha**

The mixed farming system across the wind farm project site has been generalised as 70% sheep (comprising 70% meat: 30% wool) and 30% winter cropping (cereals/wheat). Stocking rates of 9 DSE/ha are assumed to be at similar levels to the proposed solar farm site.

The dryland cropping system was reported to be primarily cereals (wheat, barley and oats) and some oil seeds (canola) or legumes (vetch). In the absence of farm records, the average yield from the cropping area is based on ABS 2015–16 data (Stawell statistical area level, SA2), which had an average wheat yield of 1.2 tonnes/ha[19]. A generalised estimate of gross income from cropping (wheat crop) is $320/ha. This is based on an average 2015/16 wheat price of $268/t.

The assessment has used 2015/16 commodity prices to allow a comparison with available district level and Statewide ABS Agricultural Census data. Noting that the 2019/20 ABS data is due for release in mid 2022.

[18] At the time of our site visit the location of the battery storage was not known. Examination of aerial imagery and other datasets suggest the solar and battery site is very similar from an agricultural land use and production point of view.

[19] http://www.agriculture.gov.au/abares/data/agricultural-census-visualisations#gross-value-of-production.

5 Impact on production

5.1 INTRODUCTION

This agricultural impact assessment assesses the direct impact on agriculture from the whole project site footprint. The footprint is made up of three main components (solar farm, BESS and wind farm) combined with associated works (such as cabling, tracks, substations, laydown and concrete batching areas, etc).

Losses of grazing and cropping potential are expected due to the direct works footprint. However, generalised losses across the balance of the project site (beyond the works footprint) are expected to be negligible because there is not expected to be any impact on the wider operations of the balance of those farms.

RMCG is unaware of any potential impacts that the solar panels, batteries and wind turbines could have on the surrounding land uses. Providing road access is not inhibited, we find no reason for the agricultural activities of the neighbouring properties to be impacted by construction or operation of the proposed Project. The works can co-locate with the existing agricultural activity in the immediate and surrounding areas. There is nothing to suggest that the existing wind turbines (Bulgana Wind Farm) south of the site have caused any impact on neighbouring farms since their operation.

The assessments below are based on RMCG's knowledge of the various industries and published statistics, which were verified for this locality through discussion on site with a selected sample of farmers.

5.2 SOLAR FARM AND BESS

The proposed solar farm and BESS will have a direct impact on agricultural production at this site both during construction and on-going, due to the intensity of infrastructure required. It is apparent that approximately 182 ha will be removed from 'normal' or usual sheep grazing production (170 ha for solar farm and 12 ha for BESS).

For the solar farm project site, RMCG understands that the woolshed and associated sheep handling yards, and access tracks for farmers and stock, will remain operational and not be impacted on by the works.

As calculated in Section 4.3, the maximum direct loss in gross farm income generated from the proposed solar farm and BESS is estimated to be approx. $99,000/annum i.e. 182 ha of production at an estimated gross income of $545/ha as summarised in Table 5-1.

Table 5-1 Maximum direct loss in farm income for solar and batteries

PROJECT COMPONENT	AREA LOST (HA)	GROSS INCOME LOSS ($/ANNUM)
Solar Farm	170	$93,000
BESS	12	$6,500

Notwithstanding, there is likely to be opportunity for sheep grazing in conjunction with the solar panel structures that will reduce the agricultural production losses. The farm business owner is optimistic that while he accepted that he may need to change practices on this site, there will be some grazing value retained during the solar facility's operation. He stated the following: *I'm hoping to make it work…. I may need to run ewe lambs rather than ewes and lambs on the site depending on the panel configuration…. it will depend on the ultimate set up of the site. [interviewed, 9 June 2021]*

5.3 WIND FARM

The impact of the proposed wind farm on agricultural production will be felt during construction and ongoing. Loss of income from not being able to graze sheep on the relatively small areas hosting wind turbine infrastructure will be the main direct impact. Table 5-2 summarises the estimated loss of grazing land related to the wind turbine project. RMCG understands that this impact is expected to be offset by construction disruption payments as well as ongoing lease payments which have been negotiated with landowners.

Table 5-2 Loss of grazing for the various elements of wind farm works[20]

ELEMENT OF PROJECT	LOSS OF GRAZING LAND DURING CONSTRUCTION	LOSS OF GRAZING LAND DURING ONGOING OPERATION
Turbine foundations and surrounding hardstands and drainage	45 turbines x 0.6 ha/turbine = 27 ha	27 ha
Access tracks	60 km of track (including erosion and sediment controls either side) x 7.5 m width = 45 ha	45 ha
Underground cabling	65 km of cabling x 10 m corridor = 65 ha	Nil – assumed land is reinstated to similar grazing capability
Above ground cabling	600 m x 5m corridor = 0.3ha	Nil – assumed land is reinstated to similar grazing capability
On-site substation (2.4 ha), O&M areas (2 ha),	4.4 ha	4.4 ha
Laydown areas (2 x 1 ha), concrete batching areas (2 x 1 ha), meteorological mast (1 ha), compound area (2 ha),	7.0 ha	Nil – assumed land is reinstated to similar grazing capability
TOTAL	**~150 ha**	**~80 ha**

Discussions with local farmers raised the following potential impacts and issues with farming in conjunction with the wind farm as a land use (during construction and on-going):

- Disruption to crop and pasture spraying programs (autumn and springtime)
- Sheep management gateway system (colour coded red/green) not always followed by contractors, which can lead to mobs of sheep being “boxed”. If boundary gates are breeched by livestock there can be biosecurity issues (e.g. transmission of lice, foot rot, ovine Johne’s disease, for example)
- Farm machinery bogged in newly laid cable trenches.
- Loss of grazing from turbine foundations and surrounding hardstand areas and tracks
- Sheep camping on disturbed ground can get dust in wool

[20] The elements and their dimensions are based on those provided in spreadsheet: *7059 Watta Wella Assumptions Spreadsheet_V2.xlsx*

- Dispersible clay subsoils in the sedimentary rises have potential for on-going track erosion and sedimentation if drainage structures are inadequate to cope with increased runoff or concentrated flows.

The potential impact of the wind farm on agricultural production was assessed as minor. The direct loss in agricultural production is estimated to be small:

- 150 ha during construction at $460/ha, or $69,000 gross income
- 80 ha ongoing operation at $460/ha, or $37,000 gross income per annum.

5.4 MITIGATION STRATEGIES

Some mitigation strategies that could be considered include:

1. During operation:
    a. Communicate clearly between landholders and contractors
    b. Landholders to notify contractors of intentions to spray crops
    c. Better systems for communicating gate status (closed/open)
    d. Implement paddock protocols to specify access points and requirement prior to access, contact details for permission and periods during which access may be restricted.
2. During construction:
    a. Avoid driving near cable trenches and align with tracks where possible
    b. Ensure cable trenches are correctly backfilled and compacted to prevent subsidence
    c. Drainage design that avoids or accommodates increased and concentrated surface water runoff
    d. Design access tracks to accommodate land drainage characteristics both local catchment and where located in the regional floodplain
    e. Minimise crops grown in affected paddocks during construction period.
    f. Fencing off construction areas to separate construction activities from farming activities.

5.5 SUMMARY

The estimated potential ongoing impact on agricultural production of the Project is outlined in Table 5-3.

Table 5-3: Estimated potential ongoing impact on agricultural production value

PROJECT COMPONENT	ESTIMATED AREA OF GRAZING LAND LOST (HA)	TOTAL GROSS VALUE PER ANNUM (2015/16 PRICES)
Solar Farm and BESS	182	$99,000
Wind Farm	80	$37,000
Project	**262**	**$136,000**

6 Relative value – region and state

To put the agricultural value of the site into a regional perspective, the value of production calculated in Section 5 can be compared to that of the local area. ABS 2015/16 Agricultural data for the Stawell statistical area level (SA2) is shown in Appendix B. This statistical area is highly representative of the agricultural production value of the site and represents approximately 50% of the land area in the Northern Grampians Shire. The total gross agricultural value for the Stawell SA2 area[21] was in the order of $54.5 million. The relative share of the main groupings of agricultural commodities (by gross value) is shown in Figure 6-1 and Figure **6-2**. Sheep meat and wool are the main agricultural enterprises representing 66% of gross value followed by cereals for grain and hay.

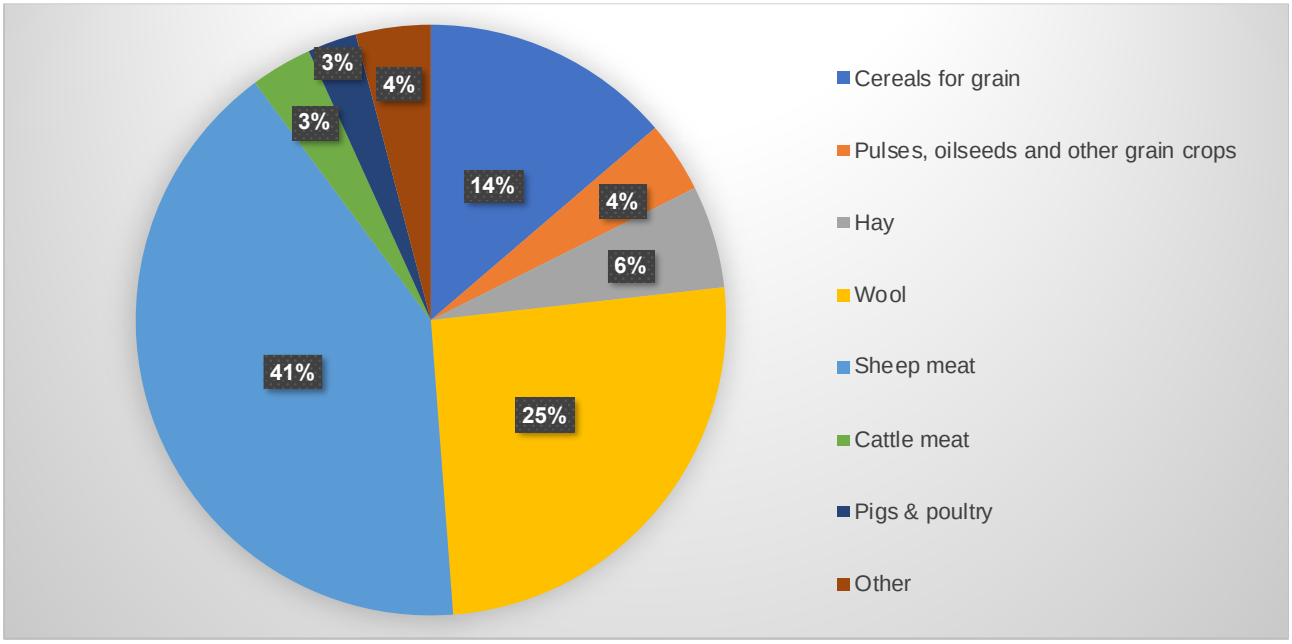


Figure 6-1: Proportion of each agricultural commodity: Stawell SA2, 2015/16

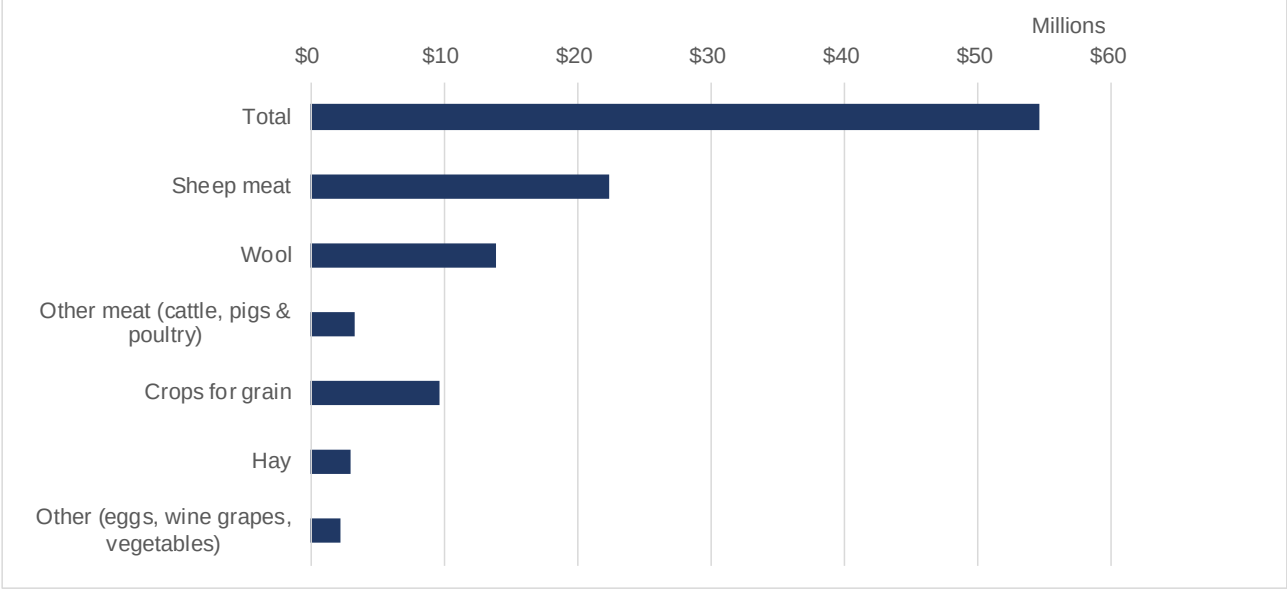


Figure 6-2: Gross value of each agricultural commodity: Stawell SA2, 2015/16[22]

[21] The Stawell SA2 area approximates the southern 50% of the Northern Grampians Shire Council area and is highly representative of faming activity in the project site.

[22] http://www.agriculture.gov.au/abares/data/agricultural-census-visualisations#gross-value-of-production.

A summary of the impact of the Project in terms of potential loss in agricultural production (in the project site) is provided in Table 6-1. To put this value into a regional perspective, the gross value of production can be compared to that of the Stawell SA2 area or district. The estimated value of agricultural production from the site represents approximately 0.25% of the district agricultural value.

Table 6-1: Relative value of potentially forgone agricultural production

IMPACT LEVEL	TOTAL GROSS VALUE 2015/16 PER ANNUM	CONTRIBUTION TO REGIONAL GROSS VALUE
Stawell (SA2) district	$54,504,813	100%
Watta Wella Renewable Energy Facility	$136,000	0.25%

For further comparison, ABS data indicates that the area of land that will potentially be removed from agriculture represents 0.22% of the district's agricultural land i.e., 260 ha out of a total area of farm holdings of 116,000 ha. At a state level, the economic output from this land represents a minute fraction of the state's agricultural value of output ($13 billion[23]).

In conclusion, the expected forgone agricultural output from the site is not considered to be significant at either a district or state level.

[23] ABS Catalogue no.7503.0 – Victoria's total agriculture value 2015/16 – 13,079,964,644.

7 Conclusion

RMCG has inspected the project site, spoken to some of the key landowners and conducted a desktop review of production data and other spatial information. The findings are presented in earlier chapters.

A summary of RMCG's agricultural impact assessment of the strategic or other significance of the proposed project site in relation to protection of agricultural land follows:

- **Soils and landscape** – as outlined in Section 4.2, the agricultural capability and soil attributes of the site are not considered to be high quality, nor are they niche or versatile. The project site is capable of supporting moderate pasture growth and crop yields.
- **Water and climate** – as outlined in Section 3.3, the site does not have access to an irrigation water resource or infrastructure and has only moderate rainfall. The project site is not considered to be relatively more resilient to the impacts of climate change than other agricultural areas in Victoria.
- **Fragmentation and regional productivity** – the proposed change in land use will not substantially impact local or regional productivity and output. The Project could take a maximum of 270 ha of land out of agricultural production and replace it with energy production. This is a small fraction of the land used for mixed farming regionally and across the state. The Project can co-locate with existing agricultural activity and diversify farm business income with only a minimal impact on productivity; evidence provided in Sections 5 and 6.
- **Structural reform or modernisation** – the project site is not considered to have any structural attributes that would make it of strategic significance. Prime lamb production requires some post-farm processing but as it represents only 0.03% of the regional lamb production it would have a very minor impact on any post-farm processing.
- **Local planning scheme –** the location of the project site is not identified as high quality or strategically important agricultural land by the Northern Grampians Planning Scheme.

Based on the large area of land available in the surrounding area and across regional Victoria for prime lamb production and cropping, and the relatively small area of land that will be removed from agricultural production, we have determined that the impact of the proposed Project on agricultural activity in the district is relatively minor.

Based on the agricultural impact assessment of the site, it is concluded that:

- The Project is not located on agriculturally significant land
- Potential agricultural production losses from the Project are small at both a regional and state-wide level
- There is opportunity for sheep grazing in conjunction with the solar panel infrastructure that could reduce the agricultural production losses
- Any disruption to farming activities during the construction will be manageable and temporary.

Once the Project reaches its design life and following decommissioning, the land could be returned to agricultural production. If the infrastructure was removed and the land condition reinstated, we understand that the properties would be able revert to current or comparable carrying capacity and production levels, pre-development.

Appendix A: Map series

A1 – Cartographic Locality

A2 – Google Satellite

A3 – Works Footprint

A4 – Planning Scheme Zones

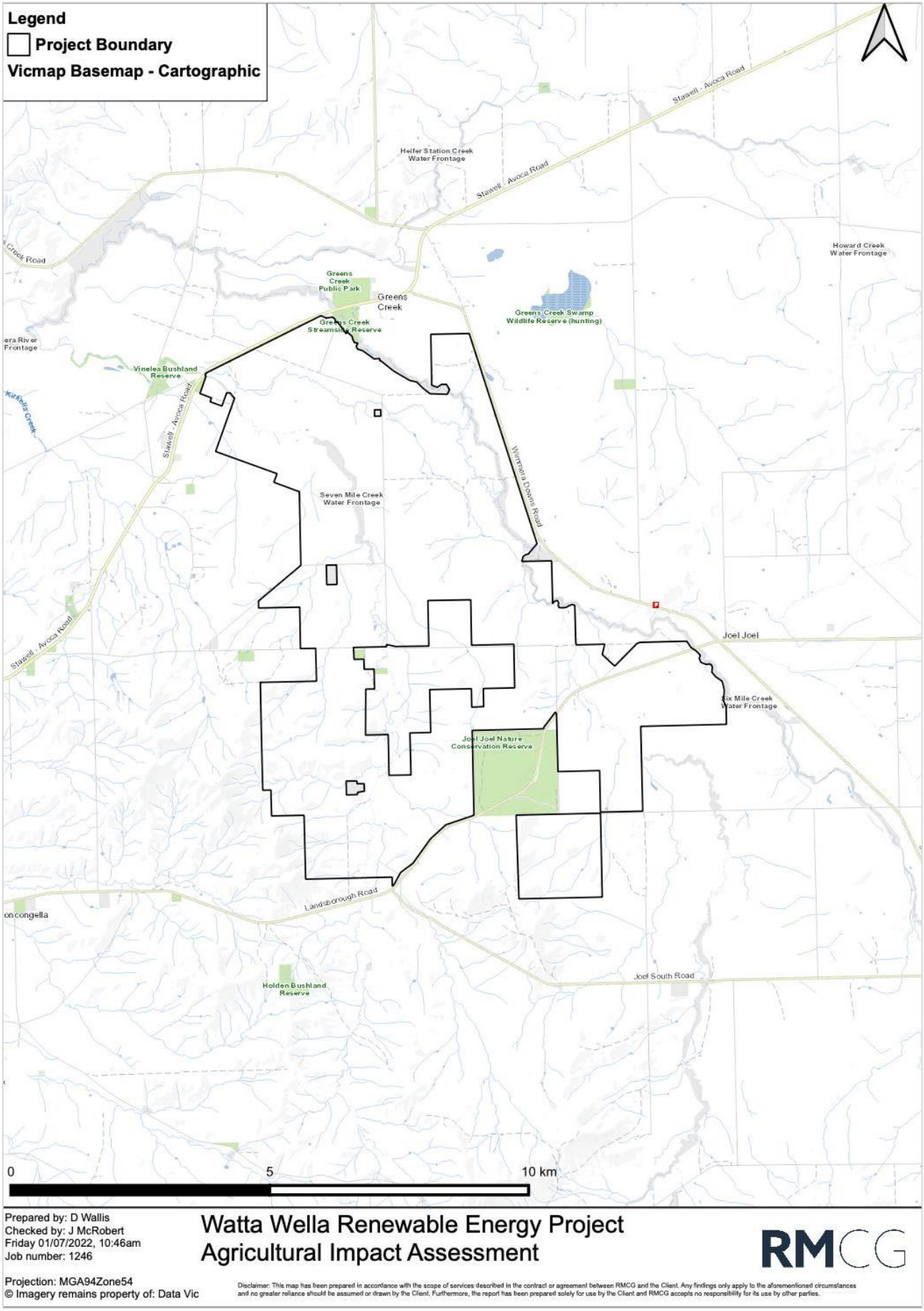
A5 – Planning Scheme Overlays

A6 – Geology and Soils

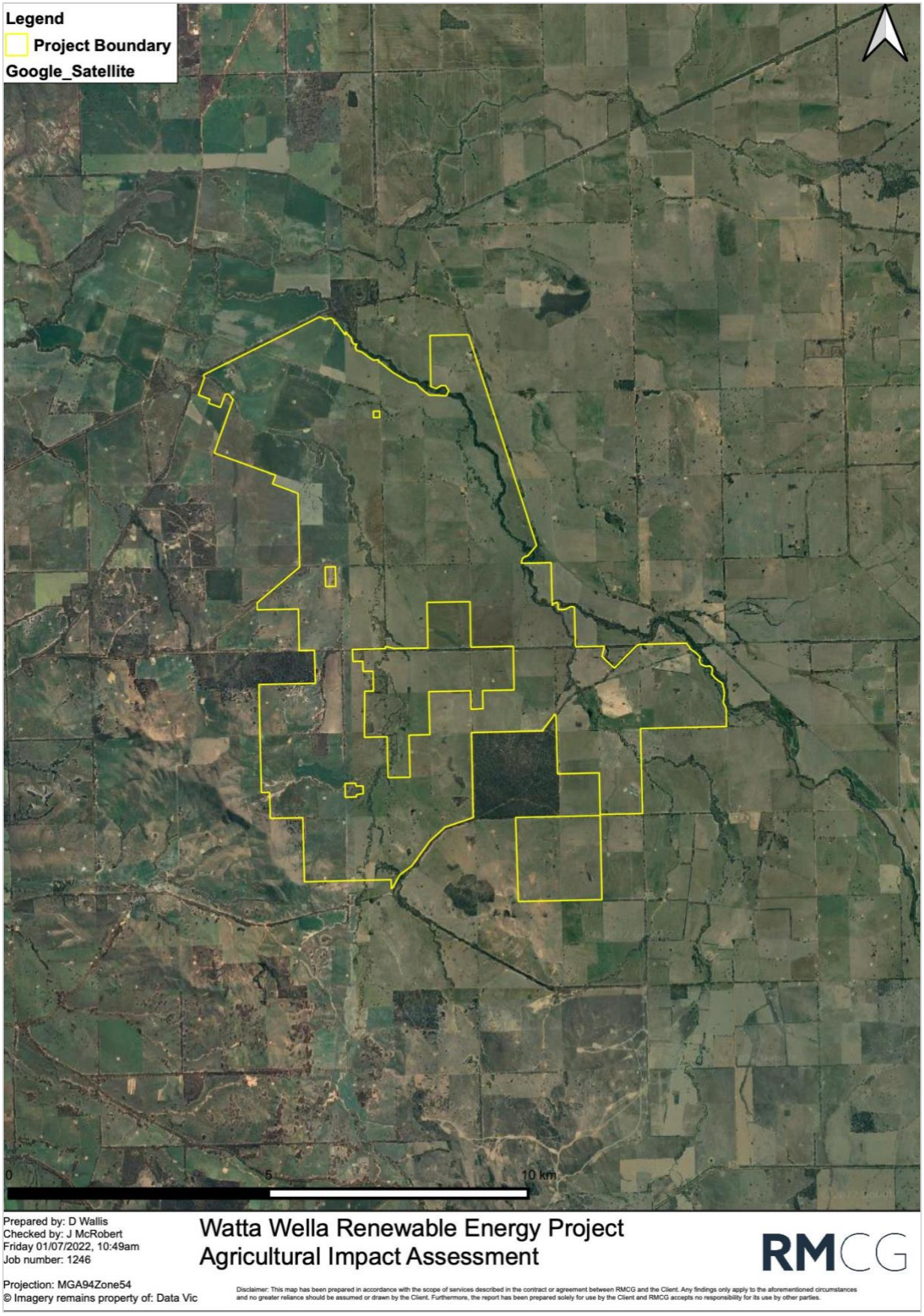
A7 – Land Use

A8 – Relief.

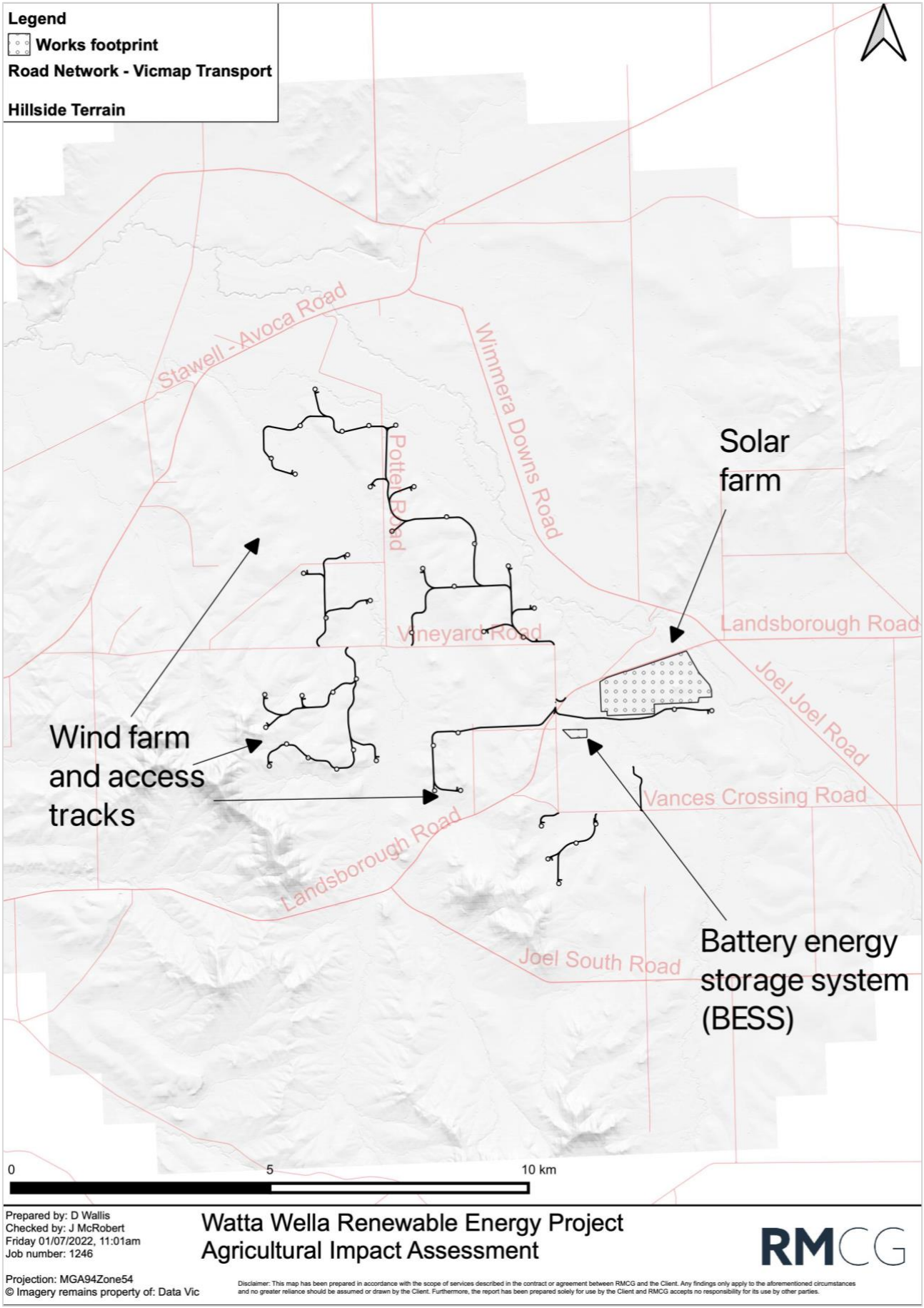
A1 – CARTOGRAPHIC LOCALITY



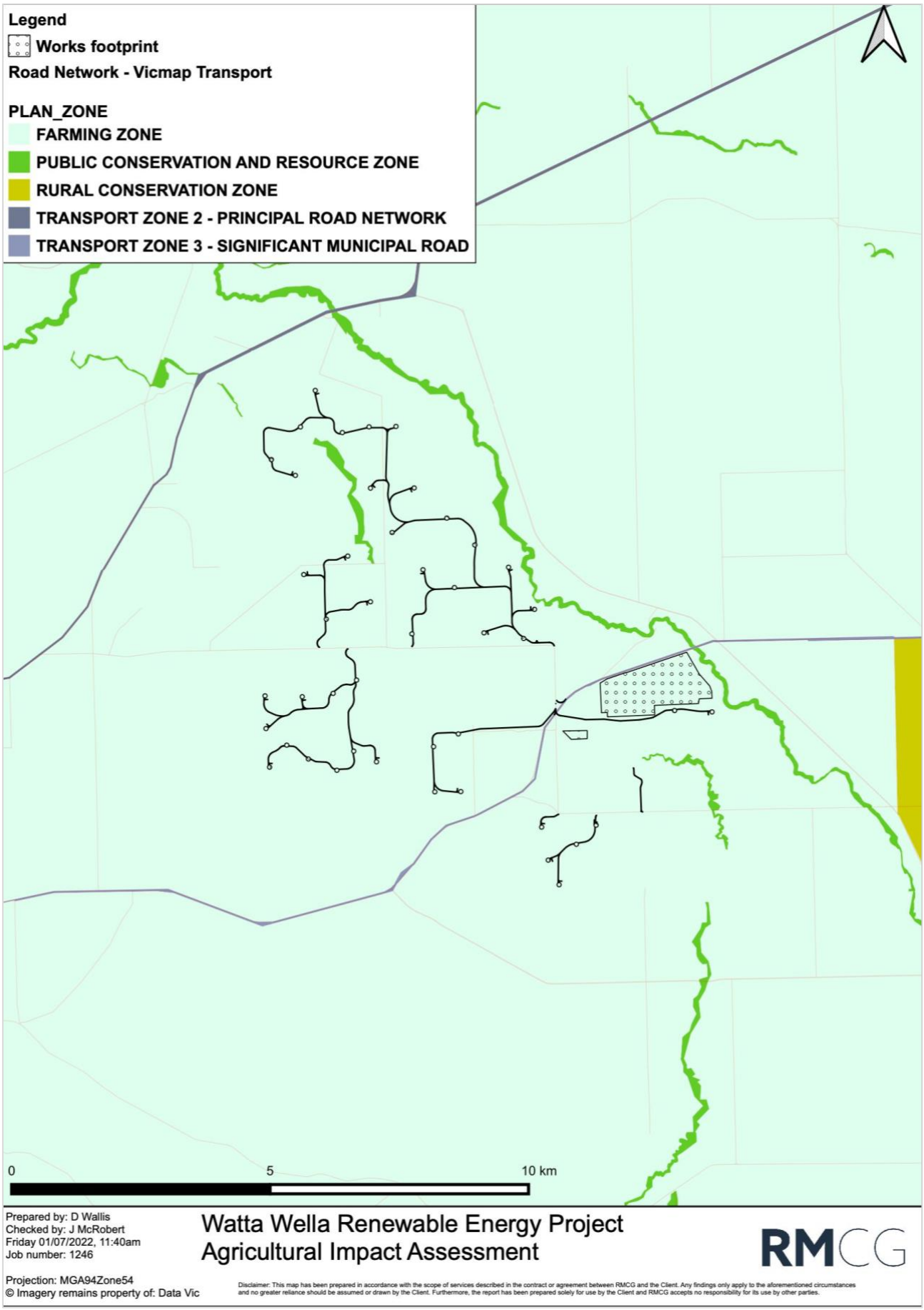
A2 – GOOGLE SATELLITE



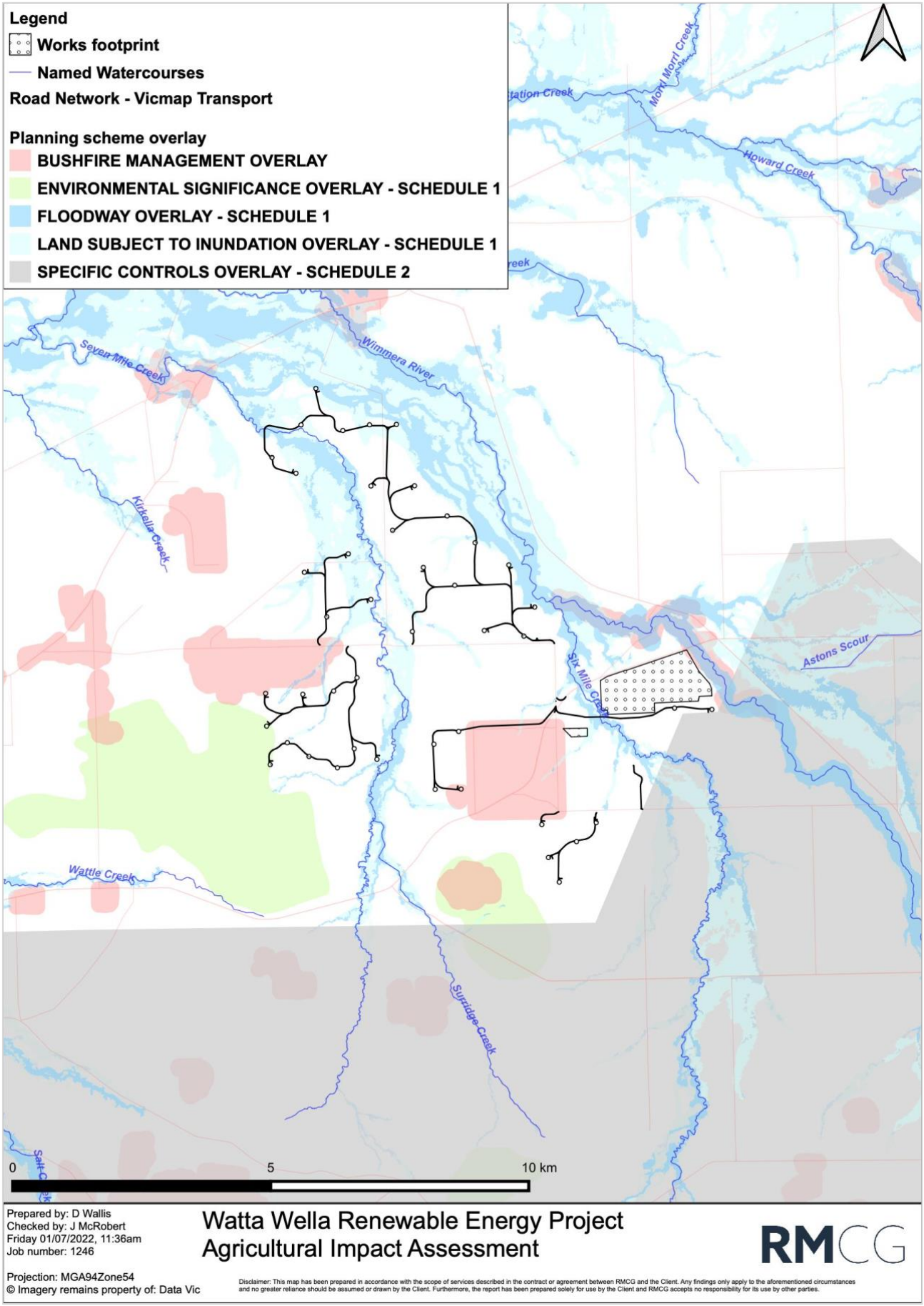
A3 – WORKS FOOTPRINT

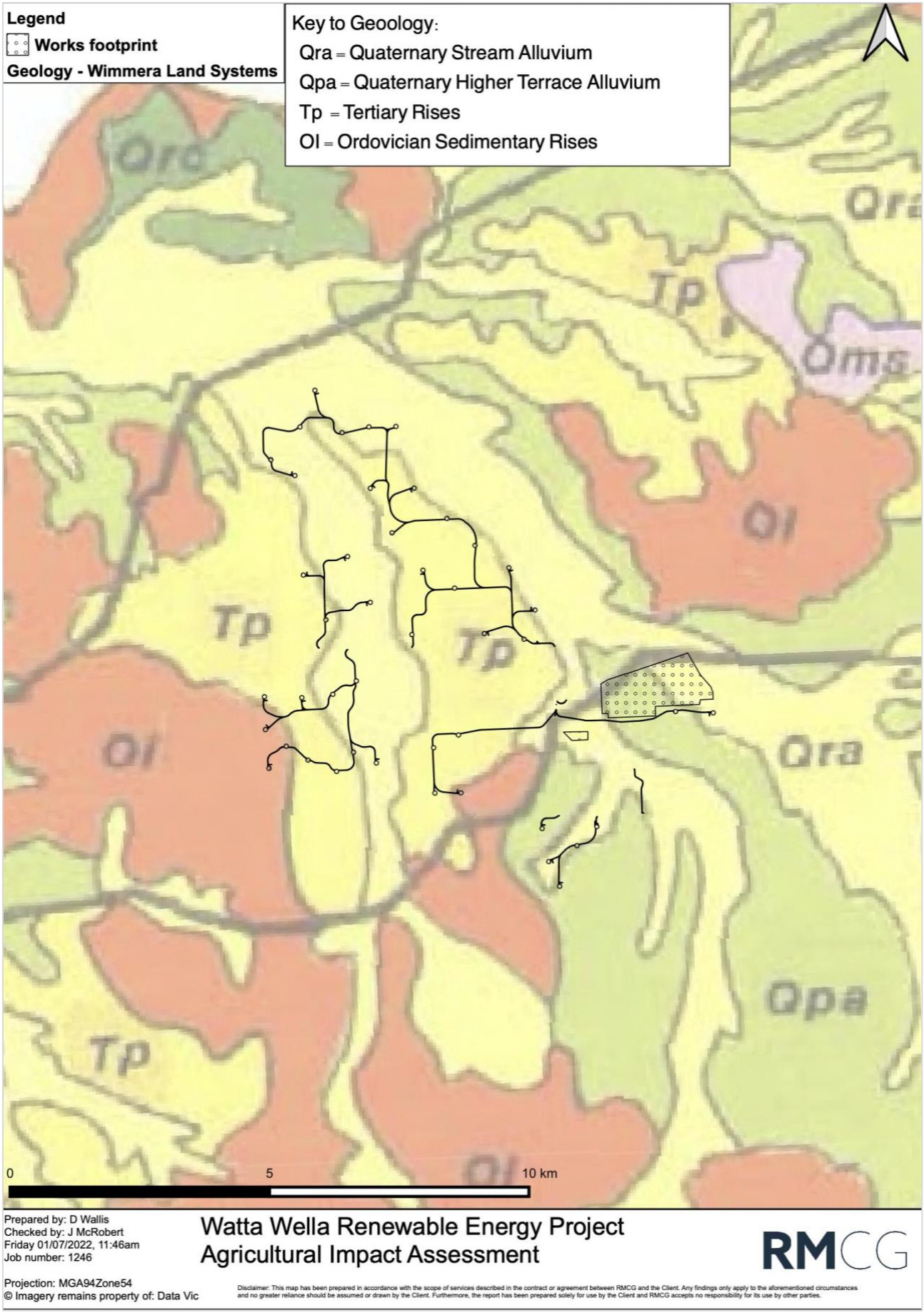


A4 – PLANNING SCHEME ZONES

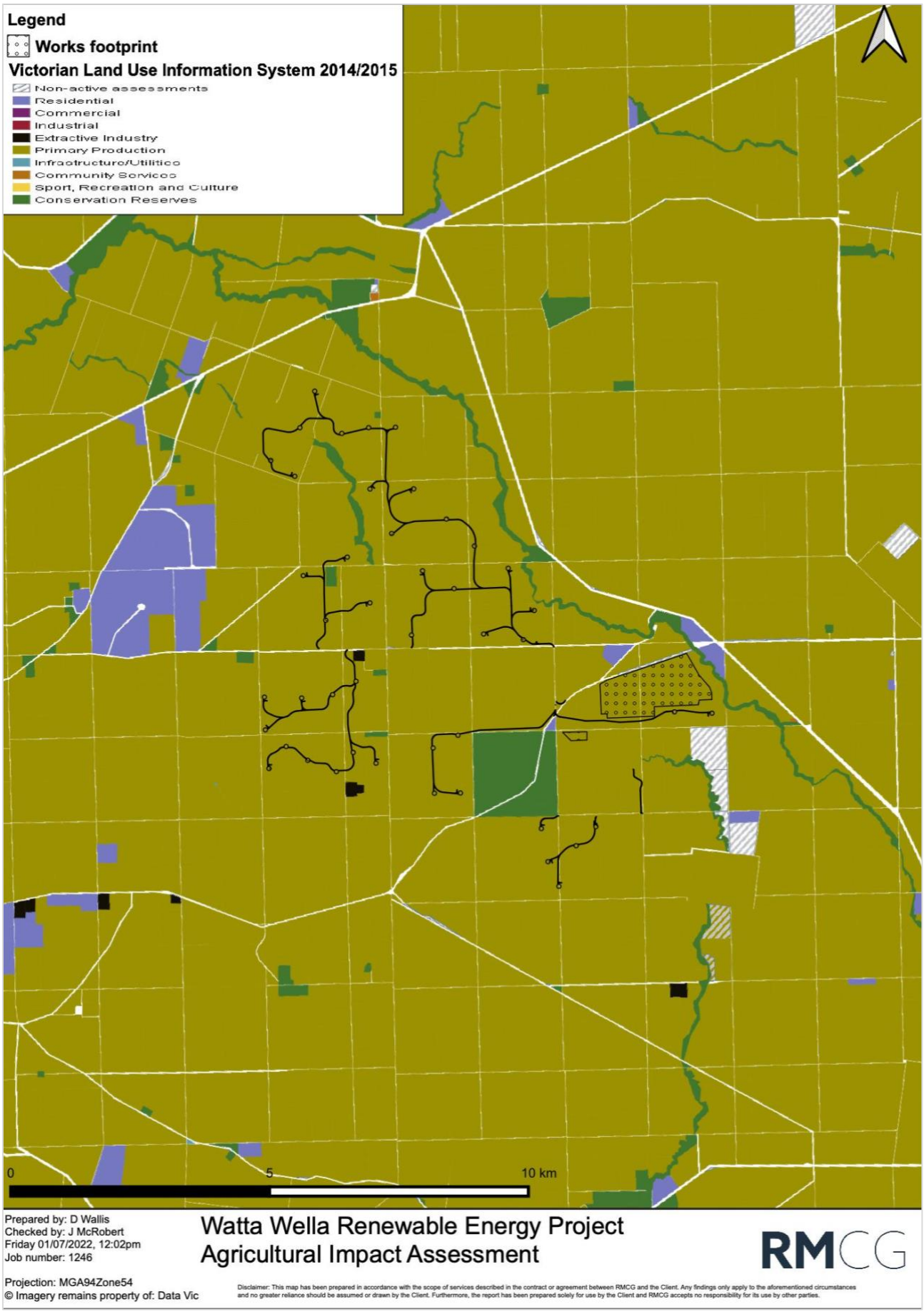


A5 – PLANNING SCHEME OVERLAYS

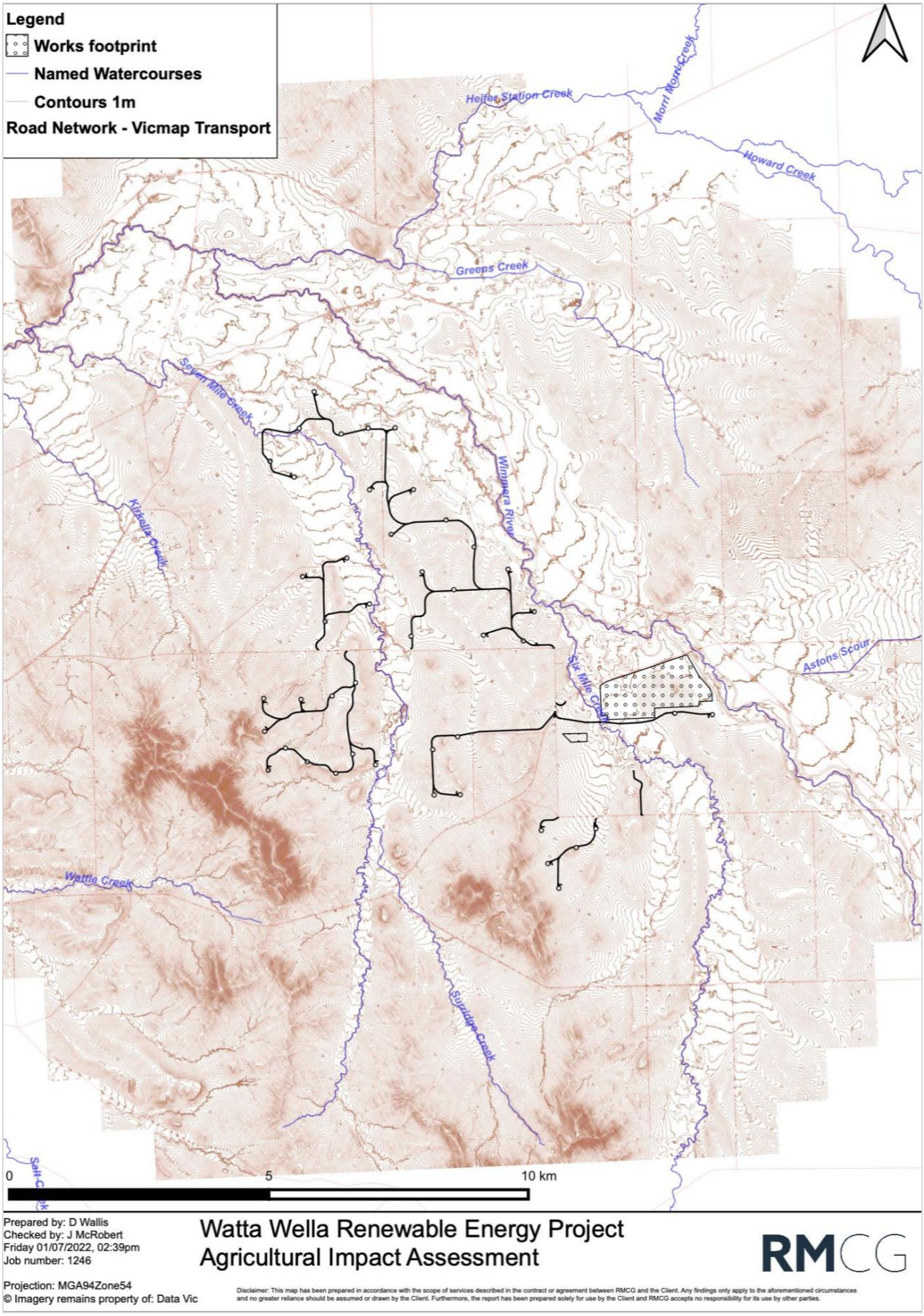



Legend
Works footprint
Geology - Wimmera Land Systems
Key to Geoology:
Qra = Quaternary Stream Alluvium
Qpa = Quaternary Higher Terrace Alluvium
Tp = Tertiary Rises
Ol = Ordovician Sedimentary Rises
Qra
Tp
Oms
Ol
Tp
Tp
Ol
Qra
Qpa
Tp
Ol
0
5
10 km
Prepared by: D Wallis
Checked by: J McRobert
Friday 01/07/2022, 11:46am
Job number: 1246
Projection: MGA94Zone54
© Imagery remains property of: Data Vic
Watta Wella Renewable Energy Project
Agricultural Impact Assessment
RMCG
Disclaimer: This map has been prepared in accordance with the scope of services described in the contract or agreement between RMCG and the Client. Any findings only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and RMCG accepts no responsibility for its use by other parties.

A7 – LAND USE


Legend
Works footprint
Victorian Land Use Information System 2014/2015
Non-active assessments
Residential
Commercial
Industrial
Extractive Industry
Primary Production
Infrastructure/Utilities
Community Services
Sport, Recreation and Culture
Conservation Reserves
0
5
10 km
Prepared by: D Wallis
Checked by: J McRobert
Friday 01/07/2022, 12:02pm
Job number: 1246
Projection: MGA94Zone54
© Imagery remains property of: Data Vic
Watta Wella Renewable Energy Project
Agricultural Impact Assessment
RMCG
Disclaimer: This map has been prepared in accordance with the scope of services described in the contract or agreement between RMCG and the Client. Any findings only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and RMCG accepts no responsibility for its use by other parties.

A8 – LAND RELIEF



Appendix B: Regional gross agricultural value

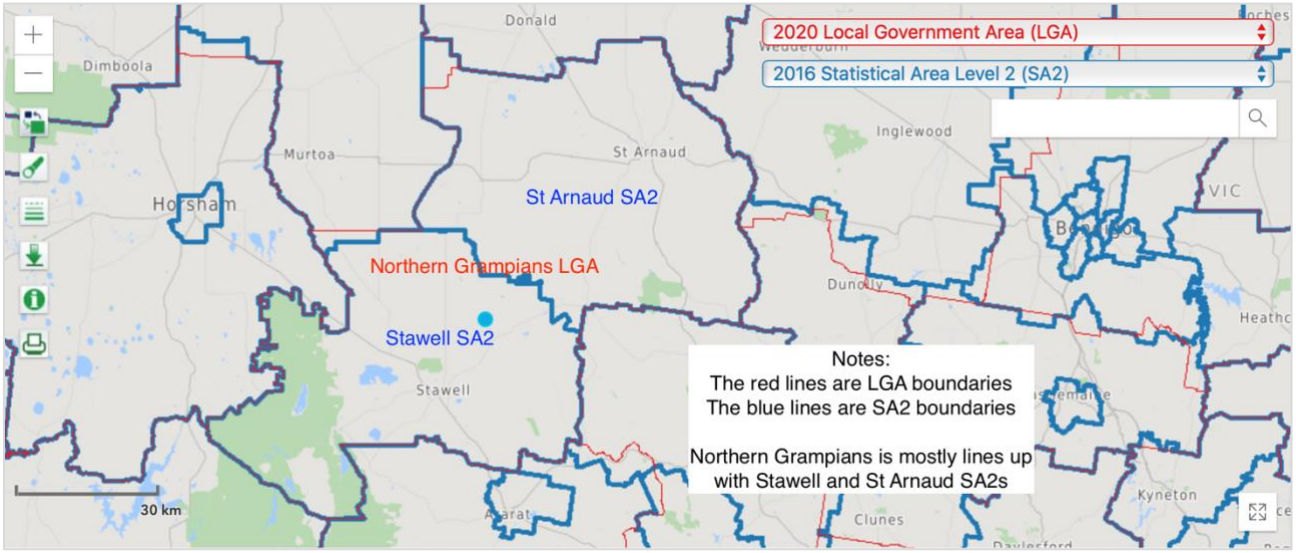
Table AB-1: Regional gross agricultural value

SA2 LEVEL 1		STAWELL LEVEL 4	GROSS VALUE 2015/16	GROSS VALUE BY CATEGORY	%
Broadacre crops	Cereals	Wheat for grain	$2,674,676	$12,658,795	23%
		Oats for grain	$2,291,254		
		Barley for grain	$2,443,488		
		Triticale for grain	$63,125		
		Other cereals for grain or seed	14,930		
	Pulses	Lentils	$20,576		
		Lupins	$184,477		
		Faba beans	$196,709		
		Other pulses	$59,093		
	Oil seeds	Canola	$1,636,355		
	All other crops		$19,568		
	Hay	Cereal cut for hay	2,189,479		
		Other crops cut for hay	490,322		
		Pasture cut for hay	344,538		
		Lucerne cut for hay	30,205		
Fruit & nuts		Grapes for wine production	108,352	108,352	0.2%
Vegetables		Peas for human consumption	46,651	46,651	0.1%
Livestock products		Wool	13,937,753	16,018,772	29%
		Eggs	2,081,020		
Livestock slaughtered		Sheep & lambs	22,371,993	25,672,242	47%
		Cattle & calves	1,836,119		
		Pigs	646,871		
		Poultry	817,259		
Total			**$54,504,813**	**$54,504,813**	**100%**

Source: CAT 75030DO005_201516 Value of Agricultural Commodities Produced, 2015–16.

ABS Agricultural Census.

BOUNDARIES OF STAWELL STATISTICAL AREA LEVEL SA2



This report has been prepared by:

RM Consulting Group Pty Ltd trading as RMCG

135 Mollison Street, Bendigo Victoria 3550

(03) 5441 4821 — rmcg.com.au — ABN 73 613 135 247

Offices in Victoria, Tasmania, ACT and NSW

Key RMCG contact

Duncan Wallis

0429 145 169 — duncanw@rmcg.com.au

Document review and authorisation

Project Number: #1246

Doc Version	Final/Draft	Date	Author	Project Director review	BST QA review	Release approved by	Issued to
1.0	Draft	29/06/2021	J. McRobert D. Wallis	D. Wallis	M. Sandford	D. Wallis	R. Brozovich
2.0	Final	03/08/2021	J. McRobert D. Wallis	D. Wallis	J. Belz	D. Wallis	R. Brozovich
3.0	Revised final	13/09/2021	J. McRobert D. Wallis	J McRobert	--	D Wallis	R. Brozovich
4.0	Revised final with changes for review	15/06/2022	J. McRobert D. Wallis		M. McIntosh	D. Wallis	Kaylah Malishev
5.0	Final changes	04/07/2022	J. McRobert D. Wallis		E. Kelly	D Wallis	Kaylah Malishev