Golden Plains Wind Farm

WestWind Energy Pty Ltd (WestWind)

Surface Water Desktop Assessment

| Rev03

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Document history and status

Revision	Date	Description	By	Review	Approved
01	02/09/2016	Draft	ES, FG	PP, ST, PB	
02	13/01/2017	Updated report to include expanded site boundary	ES, FG	ST, DS, PB	
03	15/05/2017	Updated report to include new information	ES, JM	AR, PB	PB

Contents

1. Introduction

1.1 Background

WestWind Energy Pty Ltd ('WestWind') has secured approximately 173 km^2 of land at Barunah Park, south east of Rokewood, approximately 60 kilometres north west of Geelong, Victoria. WestWind is looking to progress a wind energy project at the site. The project is likely to consist of wind turbines within the 3 to 5 megawatt class with an overall height of up to 230 m and associated infrastructure.

1.2 Purpose

WestWind has commissioned Jacobs to undertake a series of preliminary assessments to progress the Golden Plains Wind Farm. These assessments will be used to support a referral under the *Environmental Effects Act 1978* (EE Act), the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and to inform the future development of the project.

The purpose of this report is to provide a desktop surface water assessment for the site in order to identify any key surface water quantity and quality issues that might be relevant to an EE Act and EPBC Act referral and to inform WestWind's ongoing project design. This report is based on a desktop review of publicly available online data such as the VicMap planning online data set and flood extents layers as well as aerial photography.

In December 2016, the proposed site boundary was significantly expanded to the north-west. Jacobs has been commissioned to update the surface water assessment report to include the expanded site boundary. This updated report incorporates the new site boundary, and provides assessment for the entire proposed site area.

1.3 Proposed Development

The proposed development site is within the Farming Zone and is used for agricultural pursuits, predominantly cropping and grazing. Information pertinent to the proposed wind farm provided by WestWind is summarised in the table below.

Construction of the project will to some extent modify the terrain of the area. Construction works will include excavations to construct foundations for wind turbine towers and hardstand areas adjacent to the turbines needed for crane support, underground cables and other electrical infrastructure as well as the construction of new and upgrade of existing roads and vehicle tracks. If not managed all of these activities can have an impact on the local hydrology and water quality of the area and are further discussed in Section 4.

Based on the preliminary project information provided, the project is expected to include up to 235 wind turbines, each with concrete foundations of approximately 20-25 metre circular diameter, or a similar rectangular dimension.

Assuming a circular foundation of 25 m diameter (worst case scenario) and up to 235 wind turbines, the total area of impervious surfaces needed across the entire site for the wind turbine foundations would be equal 11.5 ha. The additional hardstand areas adjacent to the turbines needed to support crane activity (in order to erect the turbines and maintain them) are 40 m x 40 m of crushed and compacted rock. This will add an additional 37.6 ha of impervious area.

The total of 49.1 ha of additional impervious area (turbine foundation and hardstand area) as a proportional area change will not be that substantial due to the large total area of the subject site itself. The total site area is approximately 17,345 ha and therefore the additional impervious areas associated with the construction of the turbine foundations equates to approximately 0.28% of the total site area. This is a minor proportion of the total site area.

Table 1.1 : Updated Project Information (WestWind, 2016)

Parameter	Terminology to be used
Wind turbine parameters	Capacity of wind individual wind turbines - 3-5 Megawatts (MW) Height of wind turbines - 230 m from the natural ground level to the tip.
Number of wind turbines	In the order of: • Up to 235 x 3-5 MW class turbines
Wind turbine foundations	Expected to be concrete gravity foundations (approximate depth 3.5 meters, diameter 20-25 metres subject to geotech) or rock anchor foundations. (Subject to final geotechnical assessment).
Local government area	Golden Plains Shire
Catchment Management Authority	Corangamite
Indicative site boundary	As on maps in Appendix.
Land use	Agriculture – cropping and grazing
Proposed electricity connection point	A location within the site boundary (TBC) adjacent to the existing 500 kilovolt (kv) line

2. Hydrological Assessment

2.1 Local waterways and waterbodies

There are a number of waterways present across the site. The main waterways that traverse the site are Ferrers Creek and Mia Mia Creek. There are also a number of other minor smaller unnamed channels/waterways. The site also contains several wetland areas, mapped in the Victorian Water Resources database (DELWP, 2016) as freshwater meadow, shallow freshwater marsh and deep freshwater marsh.

The expansion of the site boundary means that additional waterways are now within the site footprint. These include (from east to west):

- Karuc-A-Ruc Creek (with tributary Corindhap Creek flowing into Karuc-A-Ruc Creek just to the north of the site boundary)
- Mount Misery Creek, (also known as Little Woady Yallock Creek) which joins Woady Yallock River just outside the site. Woady Yallock River flows along the western side of the side boundary, just outside the site footprint.

The expanded site boundary straddles the division between the Corangamite and Barwon Basins. Waterways in the east of the site (e.g. Mia Mia Creek) are part of the Barwon Basin, while waterways that flow through the western side of the expanded site boundary (including Karuc-a-ruc Creek) form part of the Corangamite Basin, draining ultimately to Lake Corangamite.

Appendix A contains a map which presents the site boundary and aerial photography for the area along with all defined watercourses and waterbodies across the site.

The siting of the wind turbines will avoid creek beds and alignments and be located a minimum of 30m from the centreline of each defined watercourse and waterbody.

2.2 Site topography

The most northern portions of the site (towards the corner of Rokewood-Skipton Road and Jacobs Road) are located at the highest elevations at around 210 m AHD. The site generally slopes from north to south with levels around the most southern section of the site (along Cressy-Shelford Road) at around 140 to 150 m AHD.

Surface water flows across the site generally follow the land topography and flow north to south. They either flow towards the main watercourses (Ferrers Creek, Mia Mia Creek, Karuc-a-ruc Creek or Mount Misery Creek) or gather within other smaller channels that transport this water downstream. Higher flows would be transported to the various depressions and pond within them as well as overflow, creating a continuous flowpath.

Appendix B contains a map of the topography of the area showing the general slope of the land from north to south as well as all local waterbodies and waterways.

2.3 Flooding extents

The 100 year Average Recurrence Interval (ARI) flood event is defined as an event that has a 1% chance of being equalled or exceeded in any one year. The 100 year ARI flood extent used within this assessment has been obtained from the Department of Sustainability and Environment (DSE), now the Department of Environment, Land, Water and Planning (DELWP).

Appendix A shows the 100 year ARI flood extents in relation to the site and the waterbodies and watercourses.

The site is shown to be inundated by the 100 year ARI flood extents in certain areas. These extents are mostly around the extents of Ferrers Creek, Karuc-A-Ruc Creek, Mount Misery Creek, the most southern portion of Mia Mia Creek, as well as around other local unnamed waterways/drainage lines and other small portions of the site where natural depressions are present.

The small portions of the site that are covered by the 100 year ARI flood extent generally correspond with the waterbodies layer and as mentioned previously these waterbodies are most likely localised depressions that most likely do not permanently hold water but fill up following high rainfall events. Whilst they feature on 100 year ARI flood extent maps, they are unlikely to fill up with water on a regular basis.

There is a significant flood extent around Karuc-A-Ruc Creek, to the west of Meadows Road, east of Two Brides Road and north of Werneth-Meadown Road. It appears to be a low lying depression area that is shown on both the waterbodies and 100 year ARI flood extents layers and flows into Karuc-a-ruc Creek from the west.

Wind turbines have been located a minimum of 30 metres from a defined watercourse or waterbody and where possible, sited generally 100 metres from a watercourse or waterbody. In instances where wind turbines are to be potentially located within the 100 year ARI inundation extent a flood impact assessment shall be undertaken to support the planning permit application.

3. Water Quality Assessment

Without active management the construction of the wind farm has potential to impact on the water quality of the waterways within and surrounding the site. As described in Section 2.1, these include Karuc-A-Ruc Creek, Mount Misery Creek, Ferrers Creek and Mia Mia Creek, smaller unnamed channels and streams, and wetland areas.

This water quality assessment presents a desktop assessment of issues that should be considered in the ongoing design and development of the wind farm and subsequent approvals. The issues relate to existing water quality, potential water quality impacts associated with the project and recommended mitigation options.

3.1 Pollution point sources

The proposed development site is currently used for agriculture purposes, including cropping and grazing. There are no obvious point sources of pollutants within the site in its current state. Cropping and grazing is likely to be contributing diffuse pollutant inputs to the waterways that run through the site. These inputs include primarily nutrients, microbes from grazing stock and potentially herbicides and pesticides.

Potential pollution point sources are associated with the wind farm construction. Chemicals, fuels and oils that may be used in construction pose a potential risk if spills or leaks occur and reach waterways. These risks are discussed in Section 4.

3.2 Water quality data and objectives

Available data that describes existing water quality in the sites waterways is limited.

The Victorian online Water Measurement Information System (DELWP, 2016) shows water quality monitoring sites in the area. There are no monitoring sites within the wind farm site footprint, though there are several nearby. Water quality data from sites downstream of the windfarm can be used as baseline data against which to monitor potential impacts such as increased turbidity and suspended solids during construction phase, nutrient concentrations, and alterations to flow.

Table 3.1 : Water Quality Data

Site Number	Name	Available data
234215	Naringhil Creek – 5 km upstream of Woady Yallock River	Stream water level, discharge, conductivity
234201	Woady Yallock River at Cressy	Stream water level, discharge, conductivity, pH, dissolved oxygen, temperature, turbidity, suspended solids, nutrients, some metals (single data point only)
233223	Warrambine Creek at Warrambine	Stream water level, discharge, conductivity; minimal data for pH, dissolved oxygen, temperature, turbidity, suspended solids, nutrients, major ions

Index of Stream Condition data is available for Karuc-a-ruc Creek, Ferrers Creek and Mia Mia Creek. The Victorian online Water Measurement Information System (DELWP, 2016) displays ISC condition ratings for Karuc-a-ruc Creek, Mia Mia Creek and Ferrers Creek at the project site and other nearby streams.

The stream condition is 'poor' for Ferrers Creek and 'moderate' for Mia Mia Creek and Karuc-a-ruc Creek (based on 2004 data). The upper reaches of Karuc-a-ruc Creek, upstream of the site, are rated as 'good' condition. Nearby stream data shows a condition rating of moderate for Little Woady Creek near the site and good in higher reaches, and poor in Naringhil Creek.

Based on 2010 data, condition is 'moderate' for Ferrers Creek and Karuc-a-ruc Creek, and 'poor' for Mia Mia Creek based on 2010 data. Data for Naringhil Creek near the site shows the reaches are in poor condition. The ISC assessment considers a variety of variables that affect overall stream condition and waterway health, including hydrology, physical form, water quality and aquatic life. There are no recorded Waterwatch data for the streams or wetlands on the site.

Objectives for water quality at the site can be obtained from the State Environment Protection Policies (SEPPs) for the study area *(State environment protection policy (Waters of Victoria),* EPA 2004). SEPPs are designed to protect water environments by setting uses and values that the community wishes to protect (beneficial uses) and establishing water quality objectives that will achieve that protection.

The SEPP water quality objectives that apply to the site are those for the *Cleared Hills and Coastal Plains - lowlands of Barwon, Moorabool, Werribee, Maribyrnong, Curdies & Gellibrand catchments* as set out in the policy. SEPP water quality objectives specify maximum levels for key water quality variables, including nutrients (total nitrogen and total phosphorous), turbidity and conductivity. A range is specified for dissolved oxygen and pH, which should be within certain limits (i.e. neither too high nor too low) if water quality and ecological health are to be maintained. Water quality objectives are as follows:

Table 3.2 : Water Quality Objectives

Total phosphorous (µg/L) 75th percentile	Total nitrogen (µg/L) 75th percentile	Dissolved oxygen % saturation	Turbidity (NTU) 75th percentile	Electrical conductivity (µS/cm) 75th percentile	pH (pH units)
≤ 45	< 600	25th percentile ≥ 85, Maximum 110	<10	≤1500	25th percentile ≥ 6.5, 75th percentile ≤ 8.3

4. Impacts and Mitigation

4.1 Impact assessment

As mentioned previously, the construction and operation of the wind farm will to some extent modify the terrain of the area. Construction works will include excavations to construct foundations for turbine towers, underground cables and other electrical infrastructure as well as construction of new and upgrading of existing vehicle tracks. All of these elements have the potential to have an impact on surface water flows and water quality in the area as described below.

Potential impacts on surface water flows and water quality relate primarily to the following factors:

- **Building within the 100 year ARI flood extent**
  - Construction of any structures within or near the 100 year ARI flood extent or within or immediately adjacent to waterways plus permanent or ephemeral waterbodies poses the risk of the infrastructure being flooded during or following high rainfall events. Building within the 100 year ARI flood extent and/or depressions across the site may result in the displacement or diversion of storm water flows. This may result in an increase in flood levels in the immediate vicinity of the newly constructed infrastructure and also further out.
  - Flooding of the infrastructure could result in damage to the turbines and appurtenances but may also restrict maintenance access and limit operating times while also introducing potential Occupational Health and Safety (OH&S) issues.
- **Physical damage to waterways of waterbodies**
  - Physical damage to the water ways and bodies may occur as a direct result of construction activities throughout the site, in particular where crossings of waterways are installed. Direct works in or over waterways, such as bridges, culverts and crossings, can result in direct and indirect impacts. Potential impacts include increased instream erosion and sedimentation, direct damage to waterway bed and banks, and the creation of instream barriers that affect water flow and movement of aquatic biota.
  - Direct physical damage will occur if infrastructure or construction activities take place in wetland areas.
- **Changes to hydrology of the area**
  - Direct construction work and alterations to the floodplain may result in greater volumes of runoff and increased flow velocities, particularly as a result of an increase in the area of impervious surfaces within the site. The extent to which this occurs will depend on the size of the impervious area; for example, whether the turbine footings are concrete or covered and the amount of sealed work areas/roads that will be constructed. Based on the preliminary project design, it is anticipated that the turbine foundations will result in an increase in total impervious areas within the site, and this will directly influence the volume, timing and velocity of surface water runoff. Although this will result in a significant total increase in impervious areas across the site, the proportional area change will not be quite as substantial due to the large total area of the subject site itself.
  - Changes to the land also have an effect on the timing of inflows into waterways – with higher flow peaks and shorter flow durations due to the increase of impervious surfaces. Higher peak flows and velocities can increase site-based pollutant and sediment transport to waterways, and can also create in-stream scour, generating additional sediment. Construction of infrastructure that diverts flows away from roads or other infrastructure through drainage systems that capture surface flows and discharge into a different location in a waterway can also have an impact on flows – altering natural flow paths and potentially depriving a stream reach of natural flow. Implementation of water diversions or consumptive water uses throughout the construction and operational period (e.g. for dust suppression during construction) could lead to the loss of natural

flow to waterways. Reduction of flows to a stream reach affects water quality and can result in loss of specific in-stream habitat types.

- Impeding flow within a waterway due to the construction of a waterway crossing. The size and position of obstructions such as bridge piers or fords has the potential to impact flood water conveyance, local flow regime and floodplain storage.
- The project will require significant excavation works. If excavations result in groundwater interactions, there is potential for saline groundwater intrusion into streams and wetlands. Groundwater studies should be conducted to assess potential interactions with, and impacts on groundwater. There are also Salinity Management Overlays over southern areas of the site and also west of Karuc-A-Ruc Creek between Rokewood and Cressy, meaning that changes to surface water flows could result in increased salinity in runoff.

- **Inflow of pollutants and increased sediment loads**
  - A key potential impact on water quality from construction work is an increase in sediment runoff from disturbed construction areas and exposed soil. Unsealed areas may be created through the construction of access tracks, or from other construction activities. Increased sediment loads can also be expected during construction, due to excavation works and temporary stockpiling of excess material. Natural runoff from the site carries soil and sediment into waterways, where it can significantly impact water quality through increased suspended solids and turbidity in the water column.
  - In addition to physical impacts, an increase in runoff and sediment particles is likely to be associated with increased nutrient transport into the waterways, as nutrients adsorb to sediment particles. Based on the current land use, the site soils may be high in nutrients associated with grazing activities, and may also contain chemical toxicants associated with herbicides or pesticides used in cropping. Herbicides and pesticides can be directly toxic to aquatic life. Excess nutrients, including nitrogen and phosphorus in their bioavailable forms, are ecosystem stressors that are rapidly assimilated by plants and algae. Ammonia can also have a direct toxic impact in high enough concentrations. Phosphorus, in particular can be a limiting nutrient in freshwater systems and any increase in phosphorus in the waterways may initiate the growth of nuisance plants and algae. This risk particularly applies during summer when there are warm water temperatures and increased light. Construction works may result in the exposure of soils which contain high nutrient levels; if these are transported into waterways then this may result in increased nutrient load and concentration in the water column.
  - Creation of unsealed roads throughout the site could also lead to increased generation of dust due to an increase in vehicle movement throughout the site, resulting in an increase in pollutants and sediment reaching the local waterways.
- **Spills of construction or associated materials**
  - There is a risk of spillage of chemicals such as oils, fuels, and sprays associated with construction activities. Spills or leaks of liquids have potential to impact water quality and aquatic biota in wetland and stream areas of the site if they reach waterways. Spills and leaks can also collect on constructed hard surfaces, and wash into waterways with stormwater runoff.
- **Vegetation clearance**
  - Clearing of vegetation from the site could lead to increased erosion and sediment runoff. Clearance of riparian vegetation can cause erosion, destabilisation or undercutting of banks, leading to increased sediments in the stream
  - Loss of riparian or site vegetation can lead to a loss of natural nutrient buffer/filter capacity. This can result in greater concentrations of nutrients entering waterways in surface runoff.
  - On-site wetland areas (deep and shallow freshwater marsh, meadows) may support distinct vegetation which is important for the maintenance of wetland water quality. Direct clearance of wetland vegetation is likely to impact the water quality in those areas.

- The physical disruption of removal of riparian vegetation can affect water quality in a number of ways. These include loss of shading which in turn has the potential to increase water temperature and lead to a drop in dissolved oxygen and nuisance plant/algal growth. Loss of riparian vegetation can also lead to a decline in organic inputs to the stream.

- **Aquatic impacts**
  - Impacts to water quality have potential to affect aquatic biota. Although this is outside the scope of this report, water quality changes (for example, increased turbidity and sediment, potential toxicant input, physical alterations to waterways) have been considered in this context. It is assumed that a comprehensive flora and fauna survey will be undertaken at the site, incorporating the expanded site boundary, to survey aquatic, terrestrial and wetland species present at the site, and to identify the presence of any significant species.
  - A preliminary search of online databases (EPBC Protected Matters, Victorian Biodiversity Atlas) for the expanded boundary has returned a number of survey records which are similar to those in the original site boundary. The Victorian Biodiversity Atlas shows records of several frog and toad species, while the EPBC search tool indicates the site may contain species or species habitat for two protected fish (Eastern Dwarf Galaxias *Galaxiella pusilla*, and Australian Grayling *Prototroctes maraena*); groundtruthing of records is required. Potential impacts on water quality and subsequent effects on aquatic habitat and biota should be considered further.

4.2 Mitigation measures and recommendations

The major mitigation measures recommended to control hydrological and water quality risks at the site relate to prevention of significant alterations in flow, sediment and erosion control, spill control, and avoiding direct impacts on waterways.

The ability of the waterways to meet SEPP objectives for water quality should not be compromised by site activities. Baseline water quality monitoring to characterise existing conditions would be beneficial, as current conditions may not meet SEPP objectives and more appropriate 'background' objectives could be set.

The following mitigation measures are recommended:

- Avoid locating infrastructure within floodplain areas or along major drainage lines and riparian zones in order to avoid increasing flood levels or diverting flood flows. The wind turbines have been sited a minimum of 30 metres from a watercourse or waterbody and where possible, sited generally 100 metres from a watercourse or waterbody, however due to site constraints some may be sited within or near a 100 year ARI flood extent, or near a watercourse that has shifted from the centreline location as identified within the provided DELWP GIS layers. If determined that a turbine location is within a watercourse/flood overlay area then a flood impact assessment would be undertaken to quantify impacts in accordance with planning approval requirements and the approved EMP. This investigation may include detailed site survey, catchment hydrology and flood modelling for the affected turbine sites and this assessment will form part of the planning permit application.
- Minimise increases in flood levels associated with construction of culverts and/or bridges on access roads across creeks and major drainage lines through appropriate consideration in the design of these structures. If creek crossings cannot be avoided the use of ford crossings is recommended.
- Implement appropriate sediment and erosion control measures to minimise the amounts of sediment entering the waterways. This should be done both throughout the construction period (where more rigorous sediment controls will need to be implemented due to high soil disturbances associated with excavation works) and operation period.
- Implement appropriate spill control and bunding measures to control and contain spills; minimise the amount of fuels and chemicals stored on site; implement contingency plans to handle spills.
- During construction divert clean stormwater away from the parts of the site where the soil will be disturbed, so as to not contaminate clean stormwater.

- Avoid any instream or riparian works that could cause direct damage to waterways, including loss of riparian or instream vegetation, or construction or installation of instream barriers.
- Prevent dust generation by applying dust suppression methods, to avoid increase in dust and soils entering waterways.In general, these measures can be achieved through compliance with all industry standard guidelines relating to construction, sediment and erosion control. Permits such as “works on waterways” permits which may be required by the Catchment Management Authority will include standard conditions for issue and guidelines to avoid damage and ensure permit compliance.

An Environmental Management Plan (EMP) is required to be prepared to support a future planning permit application. Following project approval, it is typical that planning permit conditions will require the EMP (submitted with the application) to be updated in order to incorporate new information and for the construction and operation of the wind farm to be in accordance with the EMP. The EMP must address identified environmental issues including surface water impacts and mitigation responses to ensure that relevant SEPPs relating to water quality can be met. The EMP will be prepared in consultation with DELWP, CCMA, Golden Plains Council and will be endorsed by the Minister for Planning to form part of the planning permit for the wind farm.

5. Conclusions

The purpose of this report is to provide a desktop surface water assessment for the site in order to identify any key surface water quantity and quality issues that might be relevant to the ongoing design of the project and future planning and environmental approvals process.

Our assessment has indicated that:

- There are a number of waterways present across the site. The main waterways that traverse the site are Ferrers Creek, Mia Mia Creek, Kuruc-A-Ruc Creek and Mount Misery Creek. There are also a number of other minor smaller unnamed channels/waterways, and wetland areas. A 30 metre wind turbine exclusion zone has been adopted, where possible.
- The site is shown to be partially inundated by the 100 year ARI flood extents. These extents are mostly around the extents of Ferrers Creek, Kuruc-A-Ruc Creek, Mount Misery Creek and the most southern portion of Mia Mia Creek, as well as throughout other small portions of the site where natural depressions are present. Where possible, the 100 year ARI flood extents have been avoided. However, in instances where the turbine locations are currently proposed within or directly adjacent to a 100 year ARI flood extent, further assessment will be required. This assessment may include site survey, catchment hydrology and flood modelling for the affected turbine sites. This assessment would form part of the planning permit application and where appropriate mitigation responses will be incorporated into an outline EMP for the project site. This will be undertaken in consultation with DELWP, Golden Plains Shire Council and the Corangamite Catchment Management Authority.
- There are no obvious point sources of pollutants within the site in its current form. Cropping and grazing are likely to be contributing diffuse pollutant inputs to the waterways that run through the site, primarily nutrients, microbes from grazing stock, and potentially herbicides/pesticides. Water quality data for this site is limited.
- The wind farm project has potential to impact surface water quality and quantity in a number of ways. Key potential impacts relate to changes to site hydrology and surface water flows; increased sediment generation and transport into waterways, and direct impacts on waterways and vegetation. The changes to the topography of the area via the construction of foundations for such a large total amount of wind turbines are expected to be significant, although it has been identified that the proportional area change will not be quite as substantial due to the large total area of the subject site itself. These impervious area changes can result in the displacement of stormwater flows, impacting flood flow pathways and have the potential to result in increases in flood levels in the immediate vicinity of the newly constructed infrastructure and also further out.
- The wind turbines have been sited a minimum of 30 metres from a watercourse or waterbody and where possible, sited generally 100 metres from a watercourse or waterbody, however due to site constraints some may be sited within or near a 100 year ARI flood extent, or near a watercourse that has shifted from the centreline location as identified within the provided DELWP GIS layers. If determined that a turbine location is within a watercourse/flood overlay area then a flood impact assessment would be undertaken to quantify impacts in accordance with planning approval requirements and the approved EMP. This investigation may include detailed site survey, catchment hydrology and flood modelling for the affected turbine sites and this assessment will form part of the planning permit application.

The recommended mitigation measures as outlined in this report will help to control risks associated with impacts upon surface water and water quality at the site.

These measures can be achieved through compliance with all industry standard guidelines relating to construction, flood management plus sediment and erosion control. A Works on Waterways Permit may be required and will include standard conditions for issue and guidelines to avoid damage and ensure permit compliance.

As part of the planning approvals process for a wind energy facility it is typical that a planning permit will require the preparation and approval of an Environment Management Plan (EMP). The EMP must address identified environmental issues and constraints including surface water impacts and mitigation responses to the satisfaction of the relevant statutory and referral authorities.

6. References

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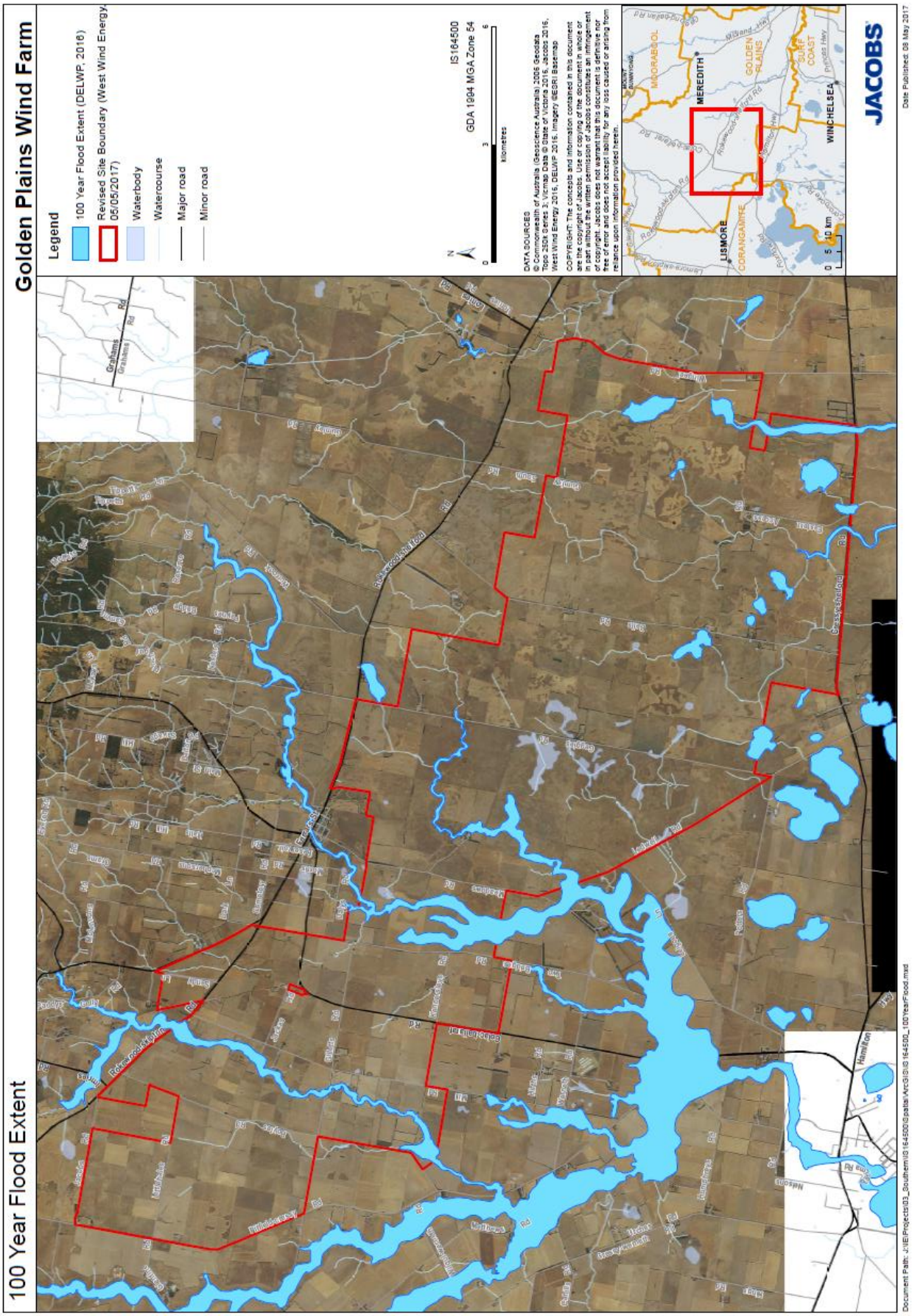
Appendix A. Waterways and Waterbodies Map



Appendix B. Site Topography Map