

REPORT

West Wyalong Solar Farm

Water Assessment

Submitted to:

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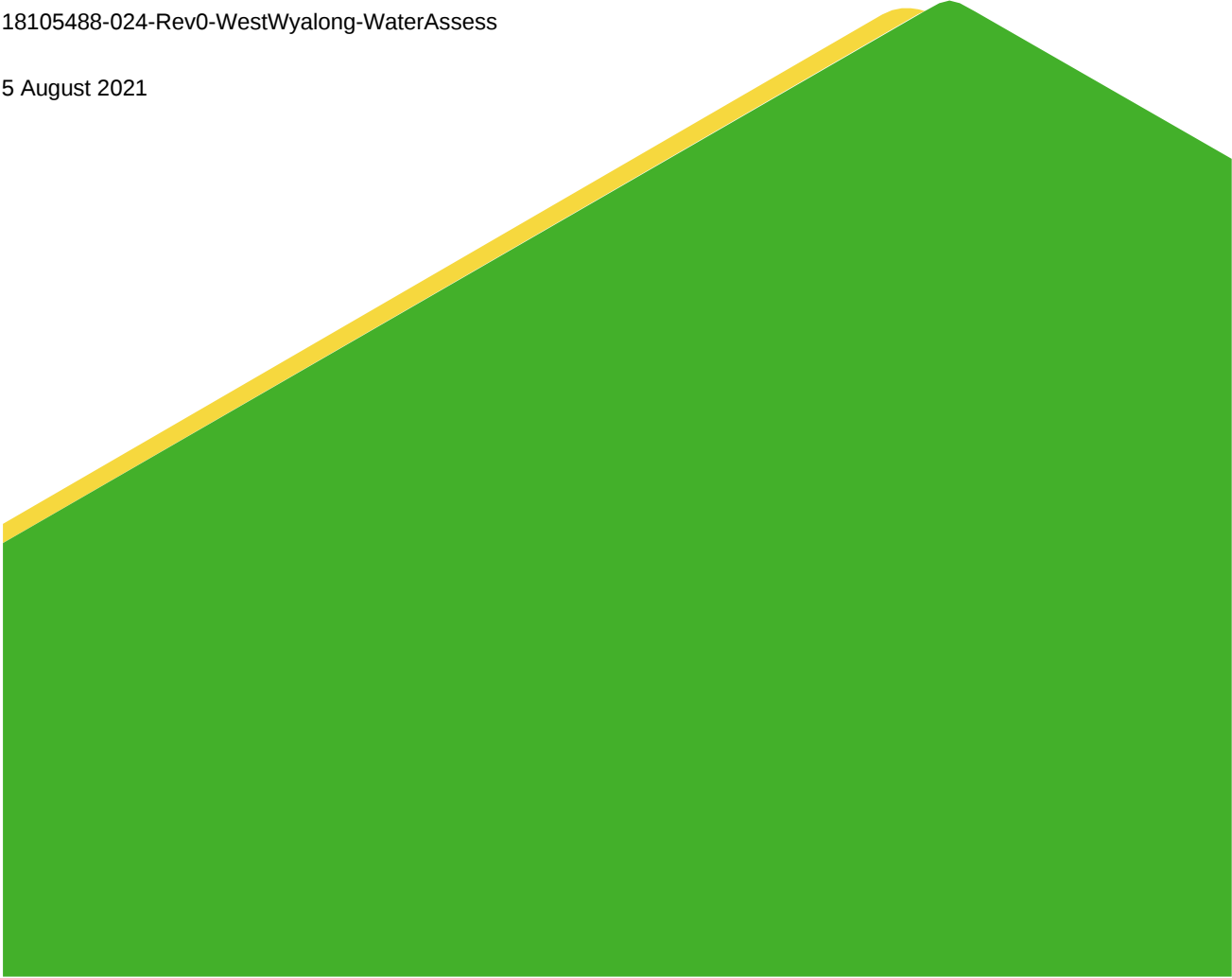
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18105488-024-Rev0-WestWyalong-WaterAssess

5 August 2021



Distribution List

ITP Development Pty Ltd

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APPENDICES**APPENDIX A**

Important Information Relating to this Report

1.0 INTRODUCTION

The proposed West Wyalong five-megawatt (MW) Solar Farm (the Project) is located on Wargin Road, West Wyalong, approximately three kilometres (km) south of the town of West Wyalong, New South Wales (NSW). The Project site is within Lot 563 on Plan 753135. ITP Development Pty Ltd (ITPD) proposes to construct a solar power facility within the site.

This report, which provides a desktop water assessment to support the Development Application for the Project, includes:

- Desktop review of local hydrology and catchment and water quality data;
- Desktop review of surface and groundwater quality data;
- Desktop review of the flood risk potential against the published references, Local Environmental Plan and Land-use Plan;
- Desktop impact assessment against NSW policies and referenced industry standards for solar arrays as relating to water aspects; and
- Desktop management assessment with mitigation measures recommend for construction and operation.

1.1 Limitations of assessment

The assessment is based on publicly available information and data and does not include a site inspection, sampling, or any additional hydrological and/or hydraulic modelling.

1.2 Important information relating to this report

Your attention is drawn to the document titled - "Important Information Relating to this Report", which is included in Appendix A of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder Associates has under the contract between it and its client.

2.0 PROJECT DESCRIPTION

West Wyalong is in southern NSW, approximately 490 km west of Sydney. It lies 262 m AHD above sea level and is found within the South Western Slopes Bioregion. This region falls on the western side of the Great Diving Range and spans to the edge of the Riverina Bioregion. Within this region, the site falls within the Lower Subregion. The Lower Subregion has Ordovician to Devonian folded and faulted sedimentary sequences with inter-bedded volcanic rocks and large areas of intrusive granites. There are also large areas of Tertiary and Quaternary alluvium (NPWS, 2003).

This site falls within the Lachlan River Catchment, which is within the Murray-Darling Basin. This river is 1,339 km long and its annual stream flow is approximately 834 GL per year. The water is predominantly used for urban, stock and domestic water supply, irrigated agriculture and mining purposes. The groundwater in this catchment exists in alluvial deposits along the river from Cowra to Condobolin, as well as in the tributaries. The main resource of groundwater, however, is in alluvial aquifers across the western part of the catchment in an area of approximately 3,300 km².

ITPD is proposing to construct a solar farm with a DC capacity of 6.4 MWp and AC output of 5.0MW on an approximately 16.17 hectare (ha) site located on Wargin Road, West Wyalong. This site falls within the Bland

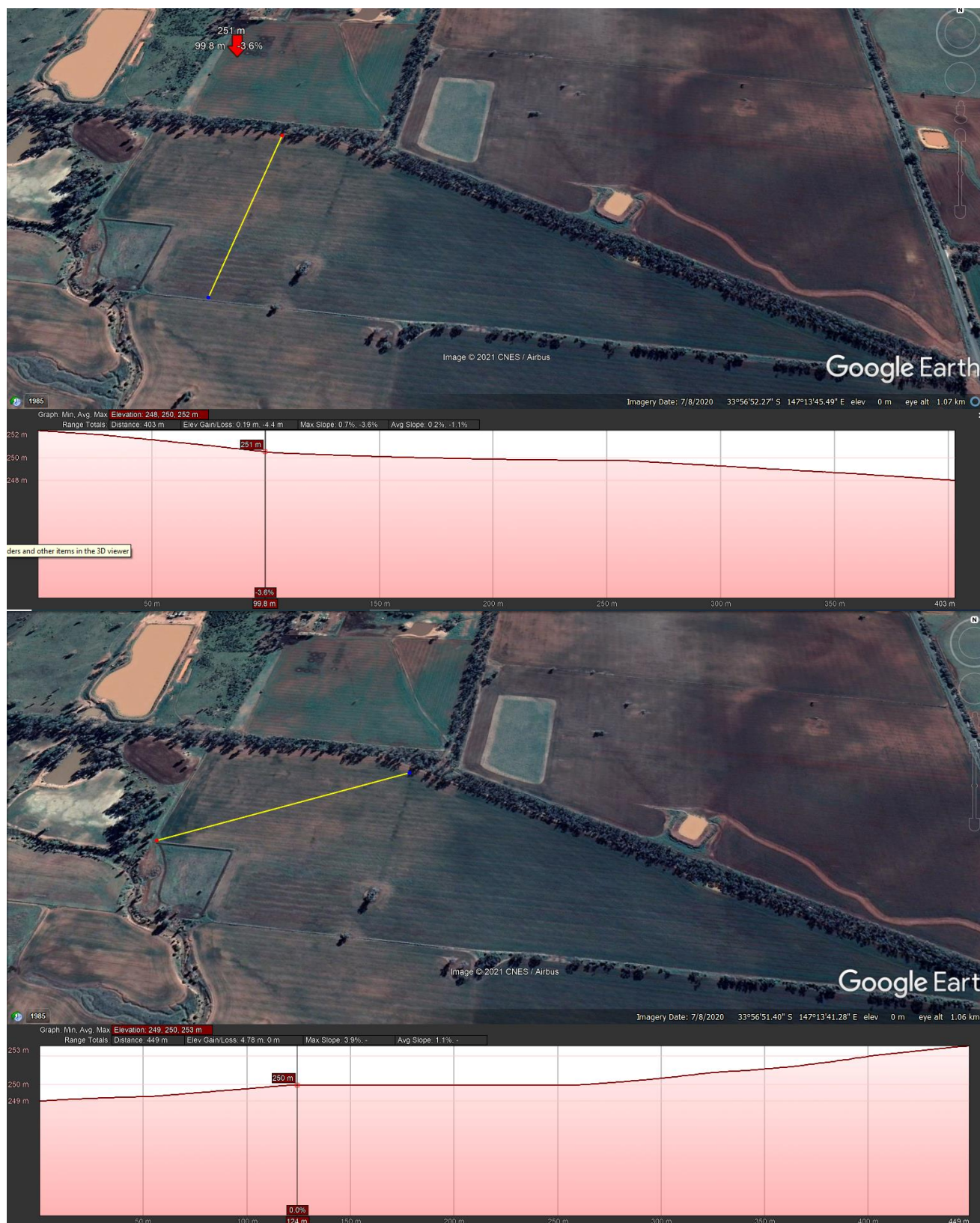
Shire Council local government area (LGA). This site is currently being used for agricultural purposes and the land surrounding this site is also used for agricultural purposes or grazing pastures.

The Project will involve the installation of 12,000 solar modules in 138 rows (each row being approximately 105 m long and 2.2 m wide) running east to west. Each row of solar photovoltaic (PV) modules will rotate to track the sun across the sky from east to west each day. There is approximately 6.25 m spacing between each row. The maximum height of each module is 2.75 m.

The solar farm will also consist of an inverter station. The inverter station incorporates high/medium voltage switchgear and transformers and two 3.4 MW inverters. The inverter station is ground-mounted and incorporated on a 12.19 m skid. Allowance is made for a 2.9 m high battery energy storage facility (BESS) alongside the inverter stations. The mounting system is constructed on piles that are driven into the ground.

During construction there are expected to be 50 personnel on site working from 7 am – 4 pm Monday to Friday. Construction is expected to take approximately three months. Once operational, the site will be unmanned. Maintenance is expected to be carried out quarterly by a crew of two – three people.

Solar panels and related infrastructure will be decommissioned and removed upon cessation of operations. This is likely to occur within two years of the end of the project. The site will be returned to its predevelopment agricultural land use.



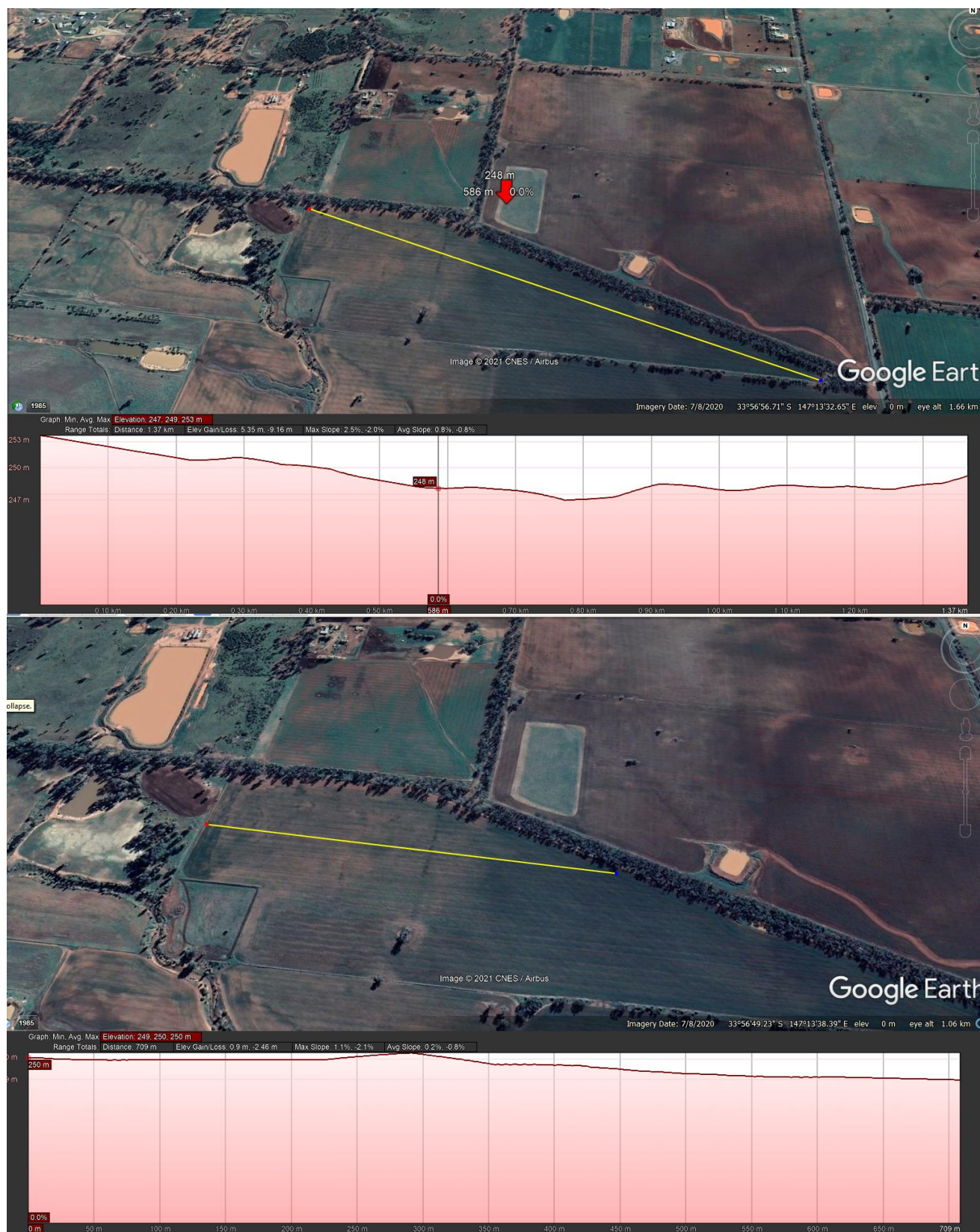


Figure 1: Project area elevation, which is mapped from the red dot to the blue dot.

3.0 LEGISLATIVE CONTEXT

3.1 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act) is an Act to institute an environmental planning system and assessment arrangements for NSW. The development of the Project will require consent under Part 4 of the EP&A Act.

Clause 3.43 makes provision for the preparation of development control plans by relevant authorities. The Bland Shire Development Control Plan has been developed to meet the requirements of this Act, and these development controls will apply to the Project.

3.2 Local Government Act 1993

This Act provides a legal framework for the NSW system of local government. The Floodplain Management Manual (the manual) (NSW Government, 2005) is the approved Section 733 manual for flood prone land. The manual supports the NSW Government's Flood Prone Land Policy in providing for the development of sustainable strategies for the management of floodplains specifically in relation to human occupation. It provides a framework for councils to implement the policy and a process for managing floodplain risk. Section 733 exempts councils from liability in relation to flood prone land, provided they have undertaken assessments substantially in accordance with the latest version of the manual.

3.3 Water Management Act 2000

The Water Management Act 2000 provides for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. Water management principles intended to guide decision making in relation to floodplain management requiring the existing and future risk to human life and property arising from occupation of the floodplain to be minimised. The *Water Management Act 2000* applies to areas of NSW that have a water sharing plan (WSP). Water sharing plans relate to the protection of surface water and alluvial groundwater resources, which are discussed with reference to the Project in the following sections.

3.3.1 Surface water sharing plan

The Project site falls under the WSP for the *Lachlan Unregulated River Water Sources 2012*; this WSP covers 23 Lachlan Unregulated River Water Sources, which have been split up into six management zones. Under this WSP, the water source for this Project site is listed under the Western Bland Creek Water source. Given that this plan relates to the licencing and use of water resources under the *Water Management Act 2000*, this WSP is not relevant for the Project as no water extraction is proposed.

3.3.2 Groundwater sharing plan

The relevant groundwater sharing plan for the Project area is the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources Order 2020* under the *Water Management Act 2000*. The site is within the Upper Lachlan Alluvial Groundwater Source. However, as this plan relates to licencing and use of water resources under the *Water Management Act 2000*, it is not relevant for the Project as no water extraction is proposed.

3.4 Bland Local Environmental Plan 2011

The *Bland Local Environmental Plan 2011* (hereby referred to as the Plan) aims to make local environmental planning provisions for land in Bland in accordance with the relevant standard environmental planning instrument. The Plan provides the prohibited and permitted types of development within the local area. Some types of development are also regulated by state environmental planning policies. The regional area includes towns of West Wyalong, Rankins Springs, and Lake Cowal.

The Project site falls on land that can be used for Primary Production (RU1), where the following activities are permitted without the need for consent: environmental protection works, extensive agriculture, home-based childcare, home occupations, and roads. The Plan provides additional provisions for earthworks (Part 6.2) to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. Provisions for essential services require that the consent authority is satisfied that services such as the supply of water, electricity, stormwater drainage or on-site conservation, are available or that adequate arrangements have been made to make them available when required.

In addition, the Plan (Part 5.2) provides specific management requirements for flood planning which applies to land at or below the flood planning level (1 in 100 ARI plus 0.5 m freeboard). It requires that development consent cannot be granted unless the proposed development is compatible with the flood hazard of the land, will not cause significantly adverse impacts to other developments, the environment and the community and incorporates measures to manage risk to life.

There are no existing flood planning maps for this LGA. A review of publicly available information confirms that there are no watercourses on this land parcel and no obvious, large depressions across the lot (Figure 1). Yiddah Creek (non-perennial; undefined stream order) is located approximately 0.2 km to the south-west of the Project site and is the nearest watercourse to this land. The land elevation data suggests that the Project site slopes downwards, towards Yiddah Creek. It is also noted that the surrounding land is used for agricultural or grazing purposes, and no sensitive receptors were identified in proximity to the site. On this basis, it is considered that the flood risk at this site is low.

3.4.1 Bland Shire Development Control Plan 2000

The *Bland Shire Development Control Plan 2012* (DCP) provides guidance for developments and supports the statutory planning controls of the Plan. The guidance provides proponents assistance with criteria to address in development applications, however this relates mostly to housing developments.

Section 9 of the DCP (Primary Production), states that new developments should avoid areas near depressions and watercourses and construction must avoid flood prone land. Access to new developments (i.e. roads) should also avoid flood prone land. There are no flood maps available for this LGA however, there are no mapped watercourses identified within the Project site (SEED, 2021), and Figure 1 does not highlight any obvious depressions in the land parcel.

3.4.2 Bland Shire Council Community Strategic Plan 2027

The *Bland Shire Council Community Strategic Plan 2027* is planned and executed under four key themes with a defined strategic direction:

- Theme 1: Our People, Strategic Direction 1: A strong, healthy, connected, and inclusive community.
- Theme 2: Our Places, Strategic Direction 2: Maintain and improve the Shire's assets and infrastructure.
- Theme 3: Our Leadership, Strategic Direction 3: A well run Council acting as the voice of the community.
- Theme 4: Our Prosperity, Strategic Direction 4: Growing our population and jobs.

The themes do not contain specific flood or water management aspects. However, within the 'Our Places' theme, one objective includes the management of water and sewerage resources. This objective ensures there is adequate water storage and management for future use within the Shire and incorporates the management of stormwater and sewerage. The Project does not require water or sewerage services and therefore there will be minimal disruption to the water storage and management within the Shire.

3.4.3 Bland Shire 2040 Local Strategic Planning Statement

The purpose of the Local Strategic Planning Statement (LSPS) is to outline the Bland Local Government Area's (LGA) economic, social and environmental land use needs over the next 20 years. The LSPS gives effect to the New England North West Regional Plan 2036 (NENWRP), implementing the directions and actions at a local level. It is also informed by other state-wide and regional policies including *Future Transport Plan 2056* and the State Infrastructure Strategy. The LSPS outlines how these plans will result in changes at the local level, such as new or improved transport connections.

The LSPS works with Council's Community Strategic Plan, which has a similar but broader purpose on how Council will work to meet on the community's needs. The LSPS has been derived from the community strategic visioning process that was conducted as part of the Community Strategic Plan.

The LSPS identifies the following actions that council will undertake to ensure that developments are not located in areas identified as high flooding risk:

- Implement the Ungarie Flood Study; and
- Locate developments, including new urban release areas, away from areas of natural hazards and high environmental value.

The Project will be located away from natural hazards and areas of high environmental value.

3.5 State Environmental Planning Policy (Infrastructure) 2007

Division 4 of the *State Environmental Planning Policy (Infrastructure) 2007* relates to 'Electricity generating works or solar energy systems'. The policy relates to the approval process for solar energy systems, and there are specific details required for flood liable land which means land that is susceptible to flooding by the probable maximum flood event. The policy states consultation with the relevant council is required if the proposal will alter flood patterns other than to a minor extent and their response must be taken into consideration.

The Bland LEP does not have available flooding plan data however, the Project area is at low risk of flooding. Funding from the NSW government was granted in 2019 for the Wyalong and West Wyalong flood study, which remains underway and should be reviewed once completed.

3.6 Protection of the Environment Operations (POEO) Act 1997

The POEO Act aims to protect and restore and enhance the quality of the environment in NSW, while still having regard to ecologically sustainable development.

With relevance to the site, the Act aims to reduce risks to human health and to prevent degradation of the environment by promoting pollution prevention and the reduction in the use of materials and the re-use, recovery or recycling of materials. The Act contains the requirements for the management of water discharges and also the offences that relate to pollution. Section 148 requires that any pollution incidents or those that threaten material harm to the environment must be notified to the relevant authority (e.g., NSW Environment Protection Authority).

3.7 Soil Conservation Act 1938

This Act makes provision for the conservation of soil resources and for the mitigation of erosion. The act allows the Minister for Primary Industries¹ to issue soil conservation notices, declare areas to be sites of erosion hazard, proclaim works in catchment areas and outlines specific regulations regarding the Rural

¹ Except Parts 2A, 3 and 4, and sections 15 and 30A in so far as they relate to Parts 2A, 3 and 4, jointly with the Minister for the Environment

Assistance Act 1989. Of general relevance to this Project is the promotion of sustainable use and prevention of loss of soil resources from a site.

4.0 CATCHMENT AND FLOOD HISTORY

The Project site is located in the Bland Shire Council LGA; the proposed site is located east of the Lachlan River. The Bureau of Meteorology (BOM) stations collect rainfall data for this township and elevated levels correspond with major flooding events experienced by this shire, which date back to 1920. However, there is little publicly available information on the flooding behaviour for this LGA. There is a current flood study underway, which once completed, should be reviewed to confirm that the flood risk of the Project site is low.

There are no watercourses within the Project site. Yiddah Creek runs along the south-west border of the site, approximately 0.2 km away. The land on the property and surrounds is mostly cleared of native vegetation and has historically been used for grazing and other agricultural purposes.

4.1 Wyalong and West Wyalong Flood Study

There are no completed flood studies that cover the Project site however, the Wyalong and West Wyalong Flood Study is underway and aims to:

- Provide a better understanding of the full range of flood behaviour and consequences within the Wyalong/West Wyalong study catchment areas; and
- Use local flood history, available collected flood data, and the development of hydrologic and hydraulic models that are calibrated and verified against historic flood events and extended where appropriate to determine the full range of flood behaviour.

This study was commissioned by Bland Shire Council, with funding assistance administered by the NSW Office of Environment and Heritage (OEH), to define the flood behaviour within these townships. This study is currently in the process of collecting data; reviews of previous studies are being undertaken, along with airborne laser scanning, existing stormwater network, field surveys, and the review of historic flood data. The community is also being consulted to help with the accuracy of the flood study. There are preliminary results from this study (Figure 2) however, the Project site is not within this mapped area. Once this flood study is completed, it is recommended that the Project site is reviewed against these outcomes to confirm that the flood risk is low.

Design Flood Modelling (Preliminary Results)

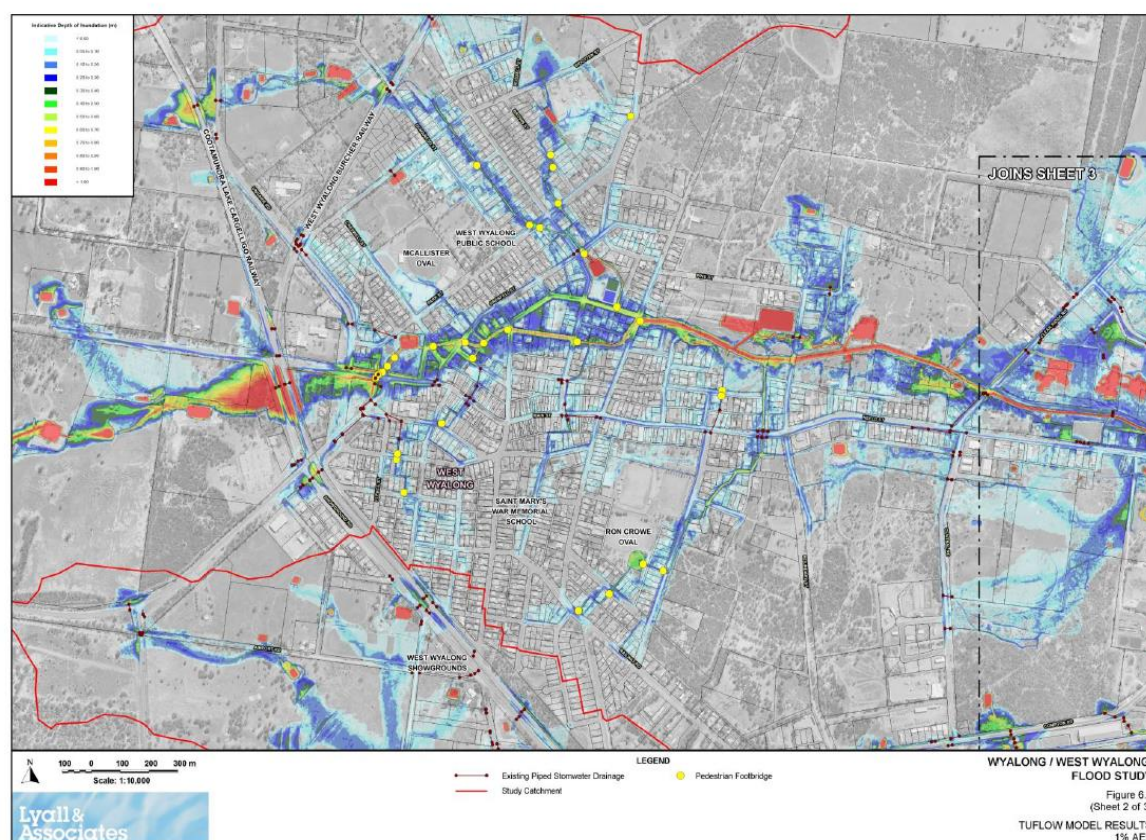


Figure 2: West Wyalong Area – design flood modelling preliminary results (Bland Shire Council, 2021)

5.0 AVAILABLE DATA

Climatic data and water quantity and quality monitoring information is available in the region as outlined in the following sections.

5.1 Rainfall

The Bureau of Meteorology has two stations in and within proximity to West Wyalong; West Wyalong Airport AWS (station 050017) located approximately 7 km north-west of the site and Wyalong Post Office (station 073954) located approximately 4 km north of the site. Table 1 outlines the average annual, maximum annual, maximum daily and maximum monthly rainfall. Average monthly values for the two rainfall stations are in Table 2.

Table 1: Rainfall

Station Number	Station Name	Period of Record	Rainfall (mm)			
			Average Annual	Highest Annual	Maximum Daily	Highest Monthly
050017	West Wyalong Airport AWS	1999 - 2020	445.9	895.6	86.4	103.2
073954	Wyalong Post Office	1895 - 2020	478.2	851.2	140.5	114.8

Table 2: Average Monthly Rainfall

Station Number	Rainfall (mm)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
050017	30.6	48.3	42.7	22.3	30.1	45.6	40.8	36.9	34.7	44.0	44.5	48.7
073954	41.4	39.2	39.8	34.5	38.6	43.4	41.7	38.7	36.7	44.7	36.7	43.7

Flood-producing weather systems across the region include inland troughs, cold fronts, and thunderstorms. Consequently, each rainfall event is a function of the prevailing meteorological conditions. Therefore, the rainfall data from these sites provides useful information about expected seasonal rainfall in the area.

5.2 Streamflow

The three closest government surface water monitoring sites to the Project site have been identified in Table 3. Streamflow records (Table 3) for these sites are available for various locations in the region from the WaterNSW portal.

Table 3: Stream Gauging Stations

Station Number	Station Name	Available/Relevant Data	Approximate distance from Project area
41000282	Mirrool Creek at Barellan	Level and rainfall	111 km south-west
412134	Wattle Creek and Dudauman	Level, discharge, and rainfall	90 km south-east
412172	Jemalong Storage	Level and volume	95 km north

Generally, data from the available stream gauges do not provide specific information on local site flooding but are more useful in the context of assessing major regional flooding events which may impact on site access. Information is publicly available from WaterNSW Real-time data portal and could be incorporated into site management plans.

5.3 Groundwater

The Lachlan catchment is distributed across four geological sequences: Palaeozoic Lachlan Fold Belt the Mesozoic sedimentary rocks, the Cenozoic unconsolidated sediments, and the Cenozoic volcanics. There is no break in sedimentation across the catchment, despite there being variation in geometry. This has resulted in uninterrupted groundwater flow down the valley. The Project area falls within the Lachlan catchment area, which includes the following groundwater sources:

- Belubula alluvium
- Upper Lachlan alluvium
- Lower Lachlan alluvium.

The Project site falls within the Upper Lachlan alluvium management area, which is made up of Cenozoic alluvial sediments. This area extends approximately 13 km to the north-east of Young to Lake Cargelligo. The Upper Lachlan alluvium can be divided into two main aquifers: The Cowra formation; a shallow aquifer system (35 m – 60 m deep) and the Lachlan formation; a deep aquifer system (< 150 m deep).

The quality of groundwater is measured using salinity levels, and groundwater with salinity suitable for a range of productive uses are found in large unconsolidated alluvial systems. The salinity of the Upper Lachlan alluvium ranged from 100 $\mu\text{S}/\text{cm}$ when close to the rivers to greater than 40,000 $\mu\text{S}/\text{cm}$ on the outer limits of the alluvium (seawater is approximately 60,000 $\mu\text{S}/\text{cm}$) (NSW DPI, 2018). The groundwater quality for this alluvium varies between the shallow and deep aquifers however, the quality of aquifers are generally fresh to marginal (Figure 3); the water is suitable for most agricultural purposes.

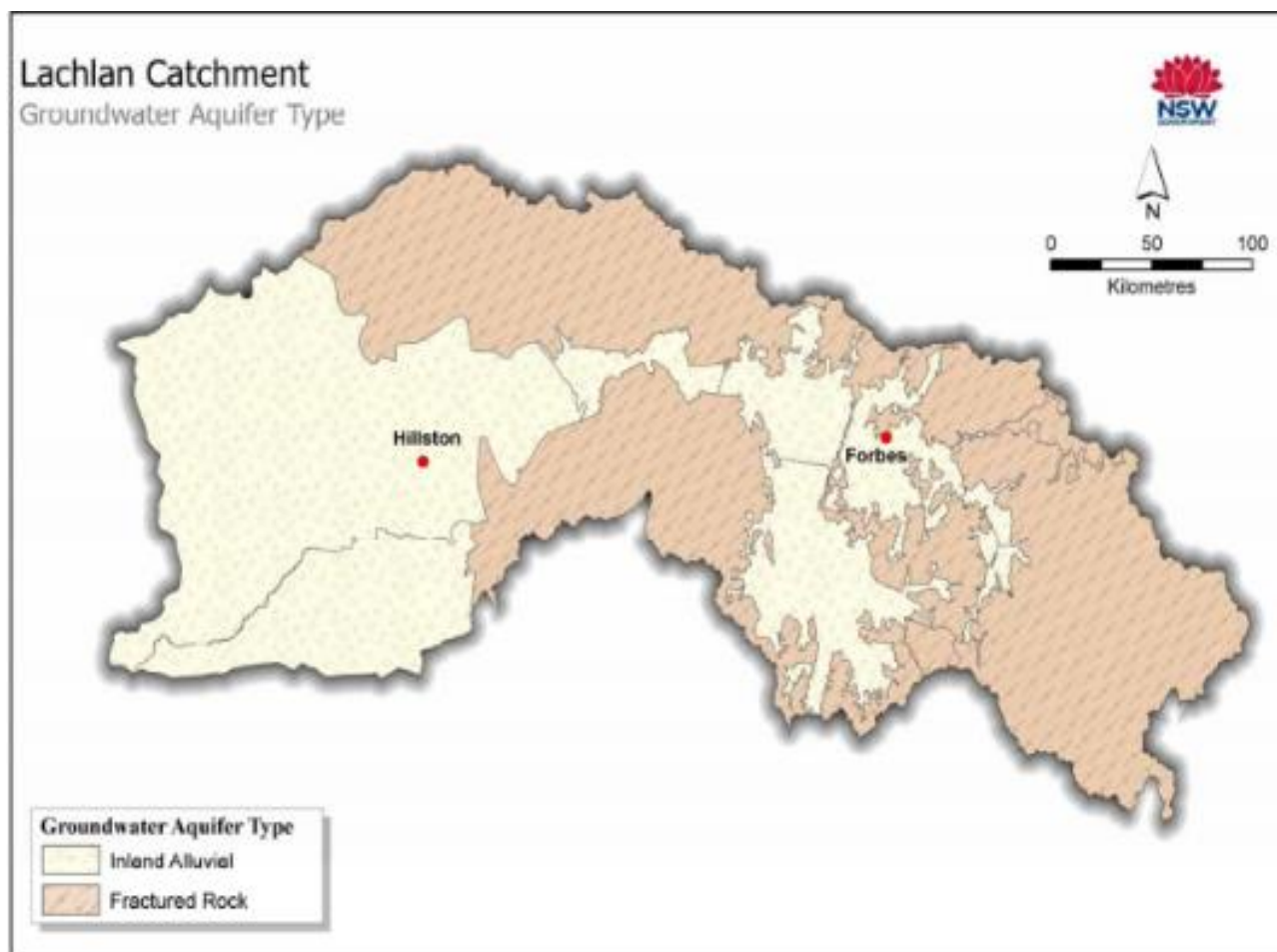


Figure 3: Lachlan Catchment Groundwater Aquifer Type (NSW Office of Water, 2011)

WaterNSW monitors groundwater level, pressure and quality through its network of groundwater observation bores across NSW. Monitoring bores are designed to monitor a specific aquifer for water level and water quality. The nearest bore screened within the Lachlan Catchment Groundwater Source is GW059716 located approximately 500 m west of the Project site. There are no data currently available for this bore.

The nearest real time groundwater monitoring site on the Water NSW database (WaterNSW, 2021) is located approximately 45 km north of the Project site at Forbes at Marsen West Pipe Two (Site no. GW036597.1.2). The levels recorded on 26 July 2021 indicated that the bore level below MP was 38.249 m and the ground water level 171.561 m AHD (Figure 4).

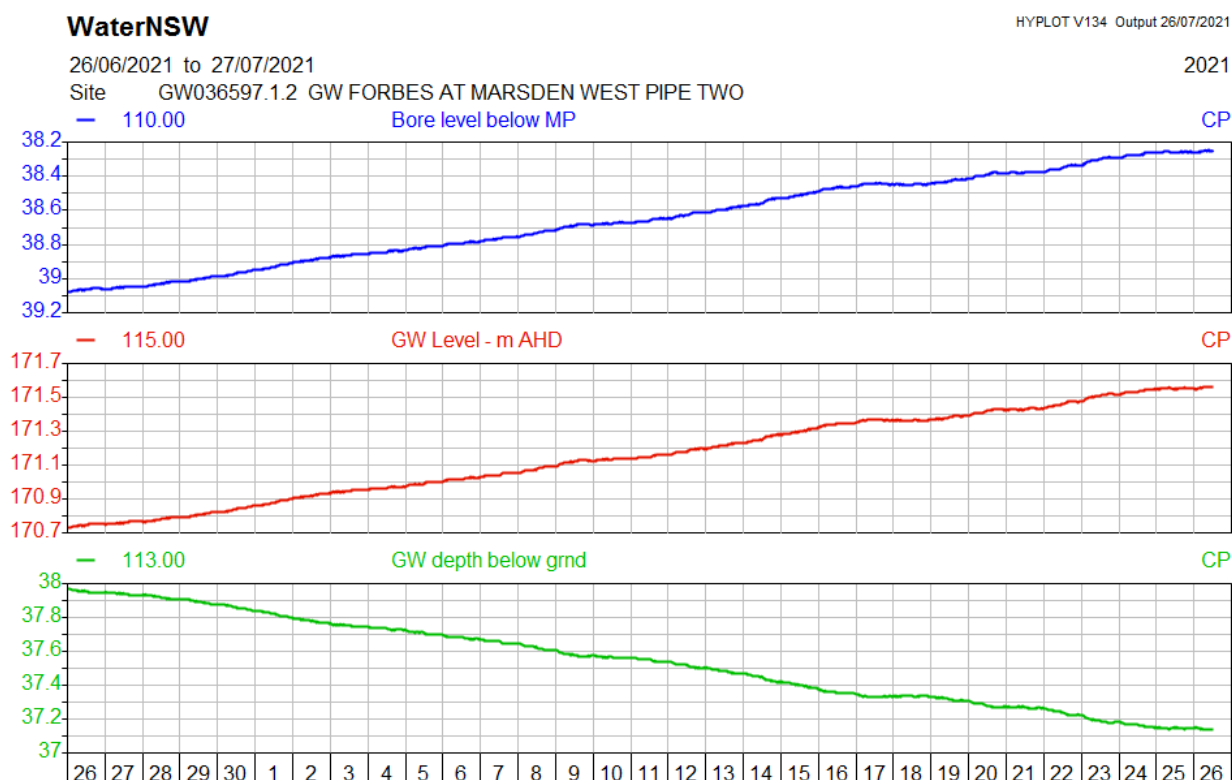


Figure 4: Forbes at Marsden West Pipe Two (GW036597.1.2) groundwater levels (levels recorded on 26 July 2021).

6.0 POTENTIAL IMPACTS

The Bland LEP does not have available flood mapping data for this site however, from elevation data and land use mapping it is considered that this site is at low risk from flooding. There are no watercourses present on the Project site and the land slopes down towards the nearest watercourse, Yiddah Creek. No sensitive receptors were identified in proximity to the Project area.

Furthermore, this site is not located within any mapped areas that may be sensitive to groundwater impacts as prescribed by the LEP. Accordingly, proposed on-site activity is not expected to materially contribute to any regional groundwater issues particularly those associated with nearby irrigation districts. Proposed trenching would be to a maximum 1,200 mm deep and piling would extend to a maximum depth of 3.5 m, which is expected to be above the local groundwater level.

Based on the current available information, potential adverse surface water-related impacts to the site include:

- Site accessibility and inundation
- Managing downstream sedimentation.

As there will be no extraction of groundwater or interference with the groundwater table during Project activities, potential for groundwater impacts have not been considered further.

6.1 Flooding

Although there are currently no available flood planning maps for this site, it is considered that the Project area is at low risk from flooding. However, heavy rainfall during storm events (or flash flooding) may cause disruption during construction activities or for material suppliers.

The Project has the potential to alter existing water quality conditions of runoff leaving the site. The impervious area of solar facilities is typically only marginally increased owing to associated hardstand and building areas. However, the panels may impact the nature of vegetation/grass coverage on the site, which has the potential to increase surface runoff and peak discharge. Increased flow concentration off the panels also has the potential to erode soil at the base of solar panels (Cook & McCuen, 2013).

Furthermore, as the site has been historically used for cropping there is very little natural ground cover vegetation.

The Project site occurs on soils that are characterised as grey sodosols (SEED, 2021). Sodosols are texture-contrast soils with impermeable subsoils due to the concentration of sodium. These soils are slowly permeable and poorly drained, run on is moderate and runoff is low. Generally, sodosols have a low-nutrient status and are very vulnerable to erosion and dryland salinity when vegetation is removed (Office of Environment and Heritage, 2017). There is the potential that site runoff will contain sediments and increase turbidity or other water quality parameters in downstream waterways.

7.0 PROPOSED MITIGATION MEASURES

7.1 Site accessibility and inundation

The site accessibility and potential for inundation issues may be managed in the Project's risk management register(s) owing to the regional nature of the events and the potential to impact whole of site works. There should be procedures in place to halt construction during heavy rainfall to reduce impacts to the Project construction and also to increase sedimentation downstream.

7.2 Downstream sedimentation

Impacts associated with erosion and sedimentation resulting from construction activities can be minimised by undertaking works in accordance with provisions of the NSW government's best practice sediment and erosion control series *Managing Urban Stormwater: Soils and Construction* (DECC, 2008).

Proposed mitigation measures associated with managing downstream actionable nuisance (sedimentation) are outlined in Table 4.

Table 4: Proposed Mitigation Measures

Stage	Measure	Activities/Approach
Design	Site drainage and water quality controls	Design basis ■ Undertake hydrological assessment of the site's catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff. ■ Determine sediment management targets and drainage control standards in accordance with <i>Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book)</i> (DECC, 2008). ■ Develop a site erosion and sediment control plan in accordance with the Blue Book. ■ Develop site drainage design incorporating detention basins and sedimentation management structures where relevant. ■ Permanent site drainage should coincide with temporary arrangements where possible.

Stage	Measure	Activities/Approach
Construction and/or Demolition	Site drainage and water quality controls	General site works: ■ Catch drains to be located downslope of any proposed road works. ■ Install location-appropriate sediment fences or other applicable control measures depending on whether the feature is upstream or downstream of a disturbed part of the site or will need to be trafficable. ■ All stormwater collection points need to have appropriate sedimentation and erosion controls. ■ Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness. ■ Vibration grids or wash bays at all construction exits. ■ Level spreaders at locations where concentrated flow is discharged offsite to ensure sheet flow like conditions are maintained. ■ Flat land erosion control options include erosion control blankets, gravelling, mulching, soil binder, turfing and revegetation.
Construction and/or Demolition	Stormwater point source control	In the event of concrete works: ■ Do not undertake works if chance of heavy rain. ■ Store rinsate² water, if applicable, separately to other water on site and dispose of offsite as appropriate. ■ Block on site drains in the area of the works and remove any contaminated runoff. In the event that dewatering practices are required: ■ Pump hose intakes for withdrawing water from excavations will be elevated to minimise sediment pumping and directed to a containment area for settling prior to discharge. ■ Limit direct discharge off site (consistent with the design requirements for sediment pond discharge). ■ Stormwater collected on site should be reused where possible. Controls should be inspected and maintained on a regular basis. All water released from sediment basins should be clear or disposed off site by vehicle.

² A dilute solution of chemical resulting from washing the container and equipment with water, as defined by NSW EPA accessed 20 December 2018
<https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/authorised-officers/glossary#r>

Stage	Measure	Activities/Approach
		■ Material and waste storage areas should be designed and operated to minimise interaction with surface waters. ■ Vehicle washdown areas should be located away from water courses.

8.0 REFERENCES

Bland Local Environmental Plan 2011

Bland Shire Development Control Plan 2012

Bland Shire Community Strategic Plan 2027

Bland Shire 2040 Local Strategic Planning Statement

Bland Shire Council (2021) *Wyalong & West Wyalong Flood Study, Preliminary Results*, Lyall & Associates, NSW. <https://www.blandshire.nsw.gov.au/Environment/Wyalong-West-Wyalong-Flood-Study>

Bureau of Meteorology (2020). *Australian Data Archive for Meteorology - online database*. Commonwealth of Australia. Available from: <http://www.bom.gov.au/climate/data/>. Accessed 20 July 2021

Cook, L. M., McCuen, R. H. (2013) Hydrologic response of solar farms, *Journal of Hydrologic Engineering*, v 18, n 5, p 536-541

DECC (2008) *Managing Urban Stormwater: Soils and Construction Vol 2A*

Department of Water and Energy, 2009. *Lachlan Unregulated River Water Sources 2012*. NSW Government, Sydney, NSW.

International Erosion Control Association (2008) *Best Practice Erosion and Sedimentation Control Guidelines*

Local Government Act 1993 (NSW) s.733 (Austl.).

NPWS (2003) *Bioregions of New South Wales: Simpson-Strzelecki Dunefields*.

NSW Government, 2005. *Floodplain Development Manual – the management of flood liable land*. NSW Government, Department of Infrastructure, Planning and Natural Resources.

NSW Officer of Water, 2011. *Water resources and management overview: Lachlan catchment*. NSW Office of Water, Sydney.

Office of Environment and Heritage (2017) *Great Soil Group (GSG) Soil Type map of NSW*, NSW Office of Environment and Heritage, Sydney.

State Environmental Planning Policy (Infrastructure) (2007) (NSW) s.15 (Austl.).

Water Management Act 2000 (NSW) s.5 (Austl.).

WaterNSW (2019) *Real-time Water Data*, online database, State of New South Wales through WaterNSW, viewed 26 July 2021, <https://realtimedata.waternsw.com.au/>

Signature Page

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APPENDIX A

Important Information Relating to this Report

The document ("Report") to which this page is attached and which this page forms a part of, has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

This Report constitutes or is part of services ("Services") provided by Golder to its client ("Client") under and subject to a contract between Golder and its Client ("Contract"). The contents of this page are not intended to and do not alter Golder's obligations (including any limits on those obligations) to its Client under the Contract.

This Report is provided for use solely by Golder's Client and persons acting on the Client's behalf, such as its professional advisers. Golder is responsible only to its Client for this Report. Golder has no responsibility to any other person who relies or makes decisions based upon this Report or who makes any other use of this Report. Golder accepts no responsibility for any loss or damage suffered by any person other than its Client as a result of any reliance upon any part of this Report, decisions made based upon this Report or any other use of it.

This Report has been prepared in the context of the circumstances and purposes referred to in, or derived from, the Contract and Golder accepts no responsibility for use of the Report, in whole or in part, in any other context or circumstance or for any other purpose.

The scope of Golder's Services and the period of time they relate to are determined by the Contract and are subject to restrictions and limitations set out in the Contract. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by Golder in regards to it.

At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification



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