Torrent Consulting Pty Ltd
PO Box 57
Wallsend NSW 2287

ABN 11 636 418 089

www.torrentconsulting.com.au

Our Ref: DJW: L.T2555.002.docx

27 May 2025
Paul Sun Energy Pty Ltd
c/o Perception Planning
PO Box 107
Clarence Town NSW 2321
Attention: Jordan Long

Dear Jordan

RE: FLOOD IMPACT AND RISK ASSESSMENT FOR PROPOSED SOLAR FARM AT LOT 30 DP1005958, BULAHDELAH NSW

Background

Torrent Consulting was engaged to undertake a Flood Impact and Risk Assessment to assist in the DA process for the proposed solar farm at Lot 30 DP1005958, Bulahdelah, NSW (the Site).

The Site is located to the south-west of Bulahdelah township between the Pacific Highway and the Crawford River, as presented in Figure 1. The local floodplain topography is relatively flat, as presented in Figure 2. The local floodplain surrounding the Site is perched above the broad, low-lying floodplain of the Crawford River to the west, with local catchment flows draining east toward the Myall River. The Crawford River floodplain is around 100-200 m wide and 4-5 m deep, with the Site not impacted by Crawford River catchment flooding unless this floodplain capacity is exceeded, with flows then able to spill eastwards across the local floodplain toward the Myall River.

Whilst not currently adopted, the Draft Bulahdelah Floodplain Risk Management Study and Plan (MHL, 2023) provides a contemporary update to critical flood conditions at Bulahdelah previously adopted from the 2002 Myall River Floodplain Risk Management Study. However, the updated study does not map the critical conditions for the Site, and so a TUFLOW model of the Crawford River and local catchment was developed for this assessment.

Two models were developed to assess both critical flood conditions for a Crawford River catchment event, and for critical flood conditions generated within the local catchment. This information provides a platform to assess the flood risk profile for the proposed development in the context of Council's flood planning controls, and to assess the potential for flood impacts.

Model Development

For this assessment, a TUFLOW hydrological model was developed that covers the Crawford River and local catchment, with a combined catchment area of around 120 km^2, and a separate model covering only the local catchment. The local catchment has an area of around 1.5 km^2, however, channel drainage works within the catchment result in some catchment flows being redirected to the south of the Site. Both catchments were modelled with an outflow boundary at the Pacific Highway crossing of the Myall River.

The models utilised the NSW Spatial Services LiDAR data product, downloaded via the ELVIS Foundation Spatial Data portal to define the local topography. The Crawford River model was constructed using a 20 m

horizontal grid cell resolution, with sub-grid sampling enabled to define model elevations from a 5 m resolution LiDAR Digital Elevation Model (DEM). The local catchment model was constructed using a 5 m horizontal grid cell resolution, defining model elevations from a 5 m resolution LiDAR Digital Elevation Model (DEM).

The LiDAR data was pre-processed using GIS-based terrain analysis techniques to remove sinks within the grid and create a hydrologically corrected DEM. This prevents the initial loss of catchment rainfall to artificial storages.

Land use coverage in the catchments was separated into vegetated and cleared areas using aerial imagery, then assigned a Manning's 'n' roughness within the model of 0.12 and 0.06, respectively. A depth varied Manning's roughness was applied to better represent the influence of the surface roughness under shallow flow conditions, whereby a higher roughness value is applied at shallow flow conditions, tending toward the corresponding assigned Manning's values under deeper flow conditions.

The downstream boundary of both models was configured as a fixed tailwater boundary at a level of 2 m AHD assuming minimal flow in the Myall River.

A more detailed TUFLOW hydraulic model was developed for each catchment. The Crawford River model, as presented in Figure 3, covers the Crawford River floodplain from around 3 km upstream of the Site, and the perched local floodplain, with the model outflow boundary at the Pacific Highway crossing of the Myall River.

The local catchment model, as presented in Figure 3a, was configured as a combined hydrological and hydraulic model, and so covers the entire local catchment. An adjacent tributary catchment to the east and part of the Crawford River floodplain was also incorporated within the local catchment model, with the model outflow boundary at the Pacific Highway crossing of the Myall River.

The Crawford River hydraulic model was constructed using a 16 m grid cell resolution, with sub-grid sampling enabled to define elevations using a 4 m horizontal grid cell resolution LiDAR DEM. The Quadtree functionality of TUFLOW that enables a variable model grid mesh resolution was utilised locally to the Site to reduce the horizontal grid cell resolution to 4 m, with sub-grid sampling enabled to define elevations using a 1 m horizontal grid cell resolution LiDAR DEM. This was considered a suitable resolution for capturing the topographical detail of local flow paths and hydraulic controls within the Site and surrounding floodplain.

The local catchment hydraulic model was constructed using a 4 m grid cell resolution, with sub-grid sampling enabled to define elevations using a 1 m horizontal grid cell resolution LiDAR DEM.

Channel alignments were enforced within both models, with bed levels inferred from low points within the LiDAR DEM. Culverts within the local floodplain were incorporated into the model as 1D elements, dynamically linked to the 2D domain.

For the Crawford River model, inflows were extracted from the hydrological model results. A mainstream inflow was applied upstream of the Site on the Crawford River, while two local inflows were applied as source area boundaries within the model, as shown in Figure 3. This configuration provides a better representation of the Crawford River flows arriving upstream of the Site, that have the potential to spill across the local catchment floodplain, whilst accounting for local catchment flows, and backwater propagation upstream of a floodplain constriction on the Crawford River to the north of the Site.

For the local catchment model, the critical duration was simulated for each storm event, with rainfall applied directly to the model.

The downstream boundaries of the hydraulic models were configured as fixed tailwater boundaries, consistent with the hydrological models, with the addition of a fixed tailwater boundary along the Pacific Highway to account for overtopping at the Crawford River PMF event. Model outlet boundaries were applied at the downstream end of culverts draining across the Pacific Highway.

Manning's 'n' roughness values of 0.12 and 0.06 were applied to the vegetated and cleared areas, respectively. Additional Manning's values of 0.055 and 0.035 were applied the mainstream fluvial and tidal channels, respectively.

The TUFLOW model was used to simulate the catchment rainfall-runoff process, utilising the ensemble storm method outlined in the ARR 2019 guidelines.

Hydrological Modelling

The TUFLOW hydrological models were simulated (using the HPC solver) for a range of design rainfall events for storm durations ranging from one hour to 12 hours for a Crawford River event and from ten minutes to 4.5 hours for a local catchment event. Frequent events were not simulated for the Crawford River as it was predicted that the floodplain would not spill towards the Site until around a 1% AEP event.

The design rainfall depths were sourced from the BoM IFD (Intensity-Frequency-Duration) portal. An Areal Reduction Factor (ARF) was applied to the design point rainfall for the Crawford River catchment, as summarised in Table 1.

Table 1 – Areal Reduction Factor for the Crawford River catchment

Design Event	ARF
1% AEP	0.90
0.5% AEP	0.90
0.2% AEP	0.89

Due to the small size of the local catchment, simulations of the rainfall runoff process were modelled with no ARF applied to the design point rainfall.

Rainfall losses were modelled using the Green-Ampt infiltration method, with a three-layer soil model comprising a 0.1 m deep topsoil, 0.2 m transition zone and a variable depth subsoil layer. The depth of the subsoil layer was derived from the September 2019 CSIRO gridded soil depth mapping dataset.

Soil types for each layer were derived from the September 2022 NSW DPE gridded soil properties mapping dataset, with classification based on the clay, silt, and sand content. The available water holding capacity for each soil type was based on the MEDLI guidelines. Initial Soil Moisture (ISM) was calculated from data sourced from the Australian Water Outlook website published by BoM. The standard Green-Ampt parameters for suction and hydraulic conductivity were adopted.

The ARR 2019 ensemble method involves the simulation of ten rainfall temporal patterns for each design event magnitude and duration, with the average condition of the ten being adopted for design purposes. The TUFLOW model simulations were assessed at the Site to identify the critical storm duration, i.e., that which produces the peak catchment runoff for each design event magnitude.

For the Crawford River catchment, the 9-hour duration was identified as being critical for the 1% AEP, 0.5% AEP, and 0.2% AEP events.

For the local catchment, the 4.5-hour duration was identified as being critical for the 20% AEP event, the 3-hour duration for the 10% AEP and 5% AEP events, while the 2-hour duration was critical for events of a 2% AEP magnitude and rarer.

For the simulation of the PMF (Probable Maximum Flood) condition the Generalised Short Duration Method (GSDM) published by the BOM was adopted. This found the Probable Maximum Precipitation (PMP) for the 3-hour duration to be critical for Crawford River, with a rainfall depth of 510 mm (~170 mm/h intensity). The 90-minute duration was critical for the local catchment, with a rainfall depth of 480 mm (~320 mm/h intensity).

The simulated peak design flood flows for each catchment are summarised in Table 2.

Table 2 – Modelled Peak Design Flood Flows (m^3/s)

Design Event	Crawford River	Tributary Watercourse
20% AEP	-	4
10% AEP	-	6
5% AEP	-	8
2% AEP	-	10
1% AEP	620	12
0.5% AEP	740	15
0.2% AEP	900	18
PMF	4390	83

Design flood flow hydrographs from the hydrological modelling were simulated in the corresponding detailed TUFLOW hydraulic models for the Crawford River and local catchment, to define baseline flood conditions for the purposes of flood risk and impact assessment.

Flood Modelling and Mapping

The results of the hydraulic model simulations show that all critical flood events at the Site up to the 0.2% AEP magnitude are driven by local catchment flooding. Crawford River floodwaters do not spill toward the Site until the 0.2% AEP event; however, the overtopping of the Crawford River floodplain is very shallow for this event and does not result in flows that exceed the 0.2% AEP local catchment runoff at the Site.

For the PMF event, which informs management of risk to life from flooding, critical conditions occur due to Crawford River flows spilling across the Site, significantly exceeding a local catchment PMF event.

Figure 4 shows the extent of the local catchment inundation at the 5% AEP and 1% AEP events, and the PMF extent for a Crawford River flood event. The modelled peak flood depths and peak flood level contours for these conditions are presented in Figure 5, Figure 6, and Figure 7 for additional context.

Figure 8, Figure 9, and Figure 10 present the flood hazard classification at the Site for the local catchment 5% AEP and 1% AEP event, and for the Crawford River PMF event, respectively.

The flood hazards have been determined in accordance with Guideline 7-3 of the Australian Disaster Resilience Handbook 7 Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia (AIDR, 2017). This produces a six-tier hazard classification, based on modelled flood depths, velocities, and velocity-depth product. The hazard classes relate directly to the potential risk posed to people, vehicles, and buildings, as presented in Chart 1.

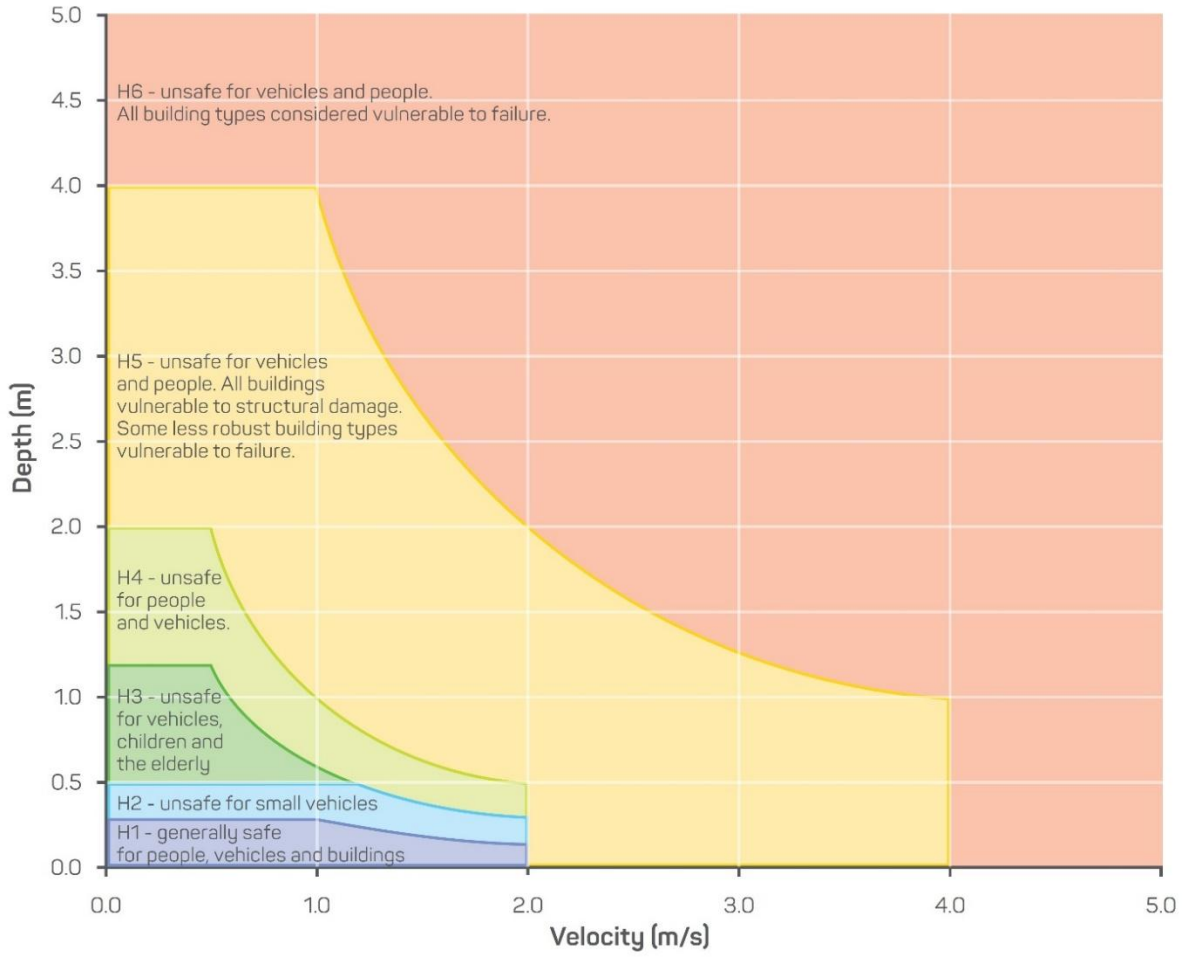


Chart 1 – General Flood Hazard Vulnerability Curves (AIDR, 2017)

Floodplain Risk Management

The principal consideration of good practice floodplain risk management is to ensure compatibility of the proposed development with the flood hazard of the land, including the risk to life and risk to property. Requirements within a Council's LEP (Local Environment Plan) and DCP (Development Control Plan) typically consider the management of flood risk. The DCP is typically more prescriptive and aims to ensure that the overall objectives of the LEP are met. The application of an FPL is the principal flood planning control, particularly for the management of risk to property from flooding.

Mid Coast Council define the FPL as the 1% AEP Flood Level in 2100 plus a 0.5 m freeboard. However, given that the proposed development does not include habitable spaces the FPL is of limited applicability in the context of the proposed development. It is also worth noting that the 0.2% AEP flood level is only around 100 mm higher than a 1% AEP flood level at the Site.

Additional modelling was undertaken to simulate 2100 1% AEP flood conditions, with a 20% rainfall increase applied to represent climate change conditions at the 2100 planning horizon. Figure 11 presents the 2100 peak flood depths and levels, while Figure 12 presents the flood hazard classification for this event. The mapping shows that the storage shed, parking, and equipment area are outside the 2100 1% AEP flood extent, and so raising these areas at least 0.1 m above the existing ground level will readily manage the risk to property presented by these future climate change conditions.

Council's Development Control Plan (DCP) Section 4.2: Flooding provides guidance for the management of development on flood prone land. The following objectives are specified:

- The risk of impacts from flooding on people and assets are avoided or otherwise minimised.
- Development is located in response to the identified flood hazard and designed to accommodate flood conveyance and storage.
- Environmental impacts of development on flood prone land are avoided or otherwise minimised.
- Development on flood prone land does not adversely impact neighbouring properties or visual amenity.
- The potential for financial loss or cost to the community as a result of development on flood prone land is limited.

Development controls are specified in the DCP to meet the planning objectives, and are addressed for the proposed development as follows:

Flood Studies

Applications to subdivide or develop within the Great Lakes LEP 2014 Flood Planning Area may be required to submit a flood study to establish:

- site specific flood planning levels including allowances for sea level rise;
- how any alterations in flood behaviour caused by the development may impact on surrounding properties and;
- the impact of the development on flood conveyance and storage.

The modelling undertaken for this assessment has established the 2100 1% AEP flood conditions, with the recommendation that raising critical infrastructure at least 0.1 m above the existing ground level will readily manage risk to property. Modelled flood depths do not exceed 0.5 m for this condition and so should be compatible with the proposed PV arrays.

The potential impacts of the development on existing flood conditions are addressed in the subsequent flood impact assessment section of this report.

Building Controls

Any building partly or wholly constructed below the 2100 flood planning level, must be certified by a structural engineer to demonstrate that the building and associated structures have been designed to withstand flood forces exerted by the 2100 1% AEP flood.

While the storage shed is likely to be constructed with an FFL below the FPL, which is around 7.95 m AHD at the shed location, it is located outside the 2100 1% AEP extent and will therefore not be subject to hydraulic forces at this event.

New Buildings

(1) New buildings are to be designed and located entirely outside of the 2100 flood planning area wherever possible.

This is not practical for the Site, however, it is recommended that raising the FFL at least 0.1 m above the existing ground level will readily manage risk to property.

(2) In circumstances where construction of a new building at the 2100 1% flood planning level is likely to have an adverse impact on the adjoining property or the visual amenity of the location, a variation may be sought. If supported by Council, the new building may be designed with habitable floor levels above the 2060 1% AEP flood planning level.

The proposed storage shed is outside the 2100 1% AEP flood extent and so does not present an adverse flood risk.

(3) Vehicle access to new buildings is to be designed so that ingress and egress from the site is provided above the 2100 1% AEP flood planning level.

Site access was modelled at 0.2 m above the existing ground level, which will provide a flood immunity of at least the current day 0.2% AEP event and the 1% AEP 2100 flood conditions at the Site.

Fencing

(1) Fences within a floodway are to be of an open style design to minimise impacts on flood conveyance.

There are no highly convective flood flow paths within the Site that would constitute a floodway categorisation. Nevertheless, the security style fencing required to prevent access to the solar farm, has been demonstrated through the flood impact assessment to not result in off-site flood impacts

In addition to the specific requirements of the DCP, the following further addresses the DCP objectives:

- Risk to life is typically managed up to the PMF, with the Site fully inundated at a Crawford River PMF event. However, as the Site is only accessed periodically for maintenance, it is highly improbable that anyone would be at the Site prior to a major flood event occurring, with the extreme conditions preceding a major flood event expected to prevent access to the Site.
- Risk to property will be effectively managed by raising the FFL of the shed and finished surface of the equipment area to at least 0.1 m above the existing ground level.
- Electrical components should be located above the FPL where possible, with an FPL of around 7.95 m AHD suitable for the shed and equipment area, and an FPL of around 7.5 m AHD suitable for the metering unit.
- The peak 2100 1% AEP flood depth within the solar array is around 0.5 m, and so the panels should be located at least this high above the ground surface to prevent inundation at this event.
- The proposed development presents a negligible impact to the environment within a flooding context.
- While the flood impact assessment has identified impacts associated with the proposed development, they are minor and localised, and so there is no tangible risk of the development causing financial loss or cost to the community within a flooding context.

Flood Impact Assessment

A relative flood impact assessment has been undertaken to compare the modelled pre- and post-development flood conditions resulting from the proposed solar farm. The fencing, solar panel array, and the access road were incorporated into the TUFLOW model, and the design flood events were then re-simulated. The results were compared to those of the baseline flood conditions to assess the flood impacts.

The fencing and solar panel array were incorporated as 2D layered flow constrictions to represent the loss of flow conveyance through the structures. A blockage of 50% was applied to represent the security style fencing and potential for debris to accumulate against the fence. A blockage of 3% was applied to the solar array representing the support structures.

There was no detailed design for the proposed access road, and so reasonable assumptions were made to represent the road within the model. The access road was raised above the existing natural surface by 0.2 m, and up to the current day 1% AEP level at the water course crossings. A culvert configuration of two 0.375 m concrete pipes was incorporated at each crossing to facilitate cross drainage.

The modelled impacts to the baseline peak flood depth conditions are presented in Figure 13 and Figure 14 for the 5% AEP and 1% AEP current day events, and Figure 15 for the 1% AEP climate change conditions at the 2100 flood planning horizon. The velocity impacts for these events are presented in Figure 16 to Figure 18, respectively.

The mapping shows that the solar array will have no tangible impact to the existing flood conditions. There will be minor flood level increases upstream of the proposed fencing, however, this does not propagate off-site.

The modelled representation of the access road presents some minor and localised off-site impacts. Flood level increases of up to 20 mm were modelled at a shed location on the neighbouring building upstream (west) of the Site. However, this is a relatively new construction and may have included regrading works that the LiDAR data pre-dates. Also, the modelled increase in flood level is only around 10 mm at the front entrance to the sheds and so it is no considered to be a tangible adverse impact.

Flood level impacts of up to 70 mm were modelled near Booral Road where the access track has been modelled at 0.2 m above the existing ground surface. The extent of impact does not adversely affect any existing development or infrastructure and is likely addressed through detailed civil design for road drainage.

There were no tangible impacts to modelled flood velocities due to the development.

Conclusion

Torrent Consulting was engaged to undertake a Flood Impact and Risk Assessment to assist in the DA process for the proposed solar farm at Lot 30 DP1005958, Bulahdelah, NSW (the Site).

This assessment has included development of a TUFLOW model for the local catchment and the Crawford River catchment to simulate design flood conditions in accordance with the ARR 2019 guidelines, specifically the ensemble method for design flood hydrology.

Modelling shows that part of the solar farm will be located within a local overland flow path through the Site, however, the flood hazard does not exceed H2 within the solar array at the 2100 1% AEP event, presenting a low risk to the proposed infrastructure.

To manage risk to property, it is recommended to raise storage areas at least 0.1 m above the existing ground level which will prevent local runoff inundation up to a 0.2 % AEP event. Sensitive electrical components and other critical infrastructure should be installed as high as possible, preferably above the FPL, which is around 7.95 m AHD at the proposed location of the shed and equipment area, and around 7.5 m AHD at the metering unit.

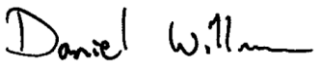
The hazard conditions of a Crawford River PMF event present a potential risk to life, however, the Site will only be periodically accessed for maintenance, with minimal likelihood of anyone being at the Site during an extreme weather event. If severe weather is forecast, access to the Site should be postponed.

A relative flood impact assessment has been undertaken and confirms that the proposed development will have a negligible impact on existing off-site flood conditions. Off-site impacts were modelled due to the proposed raising of the access track. However, the impacts were minor and localised, and an appropriate civil design is expected to readily mitigate these impacts.

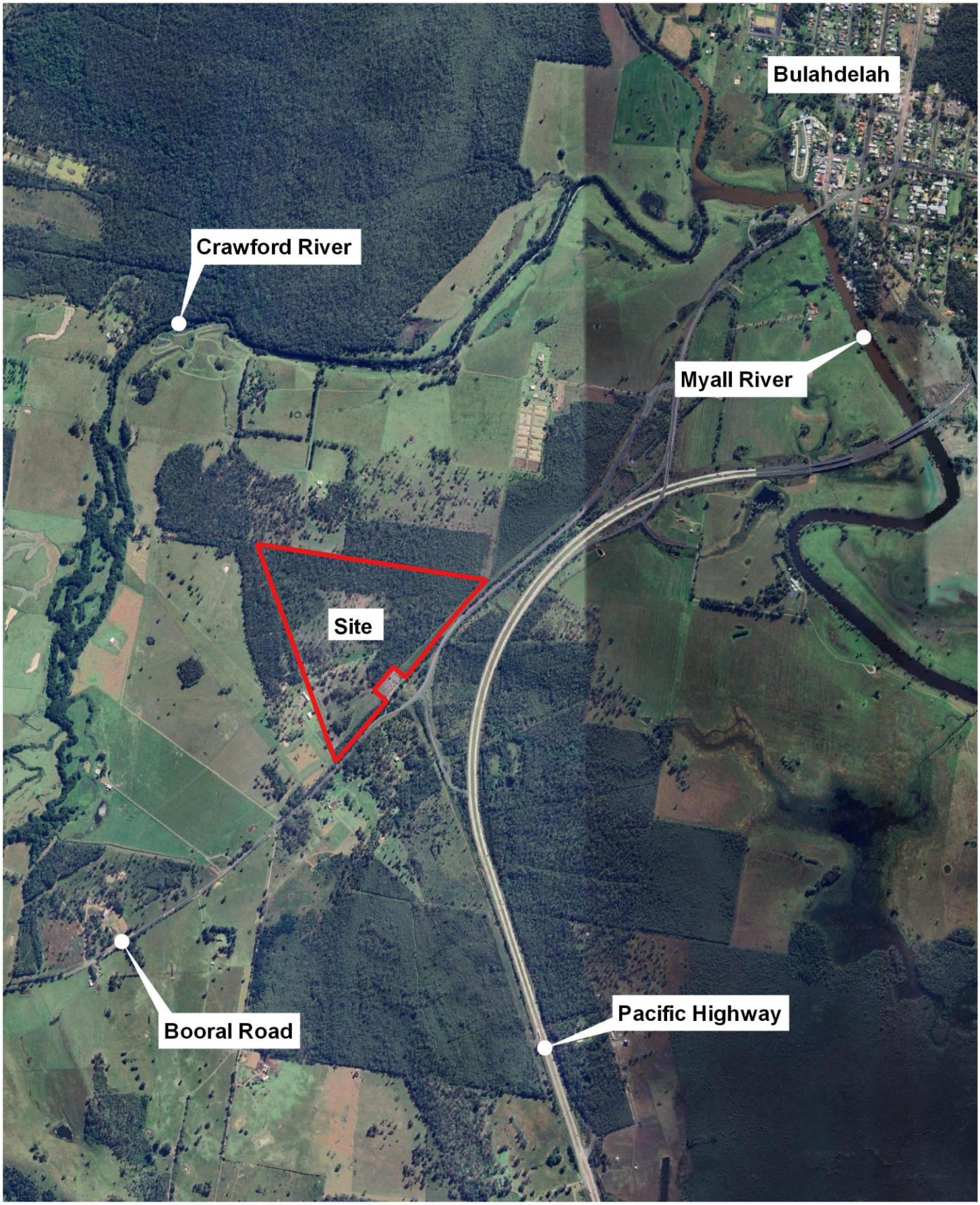
We trust that this report meets your requirements. For further information or clarification please contact the undersigned.

Yours faithfully

Torrent Consulting



Dan Williams
Director



Title:

Study Locality

0 0.5 1 km

approx. scale

Figure: 1

Revision: A

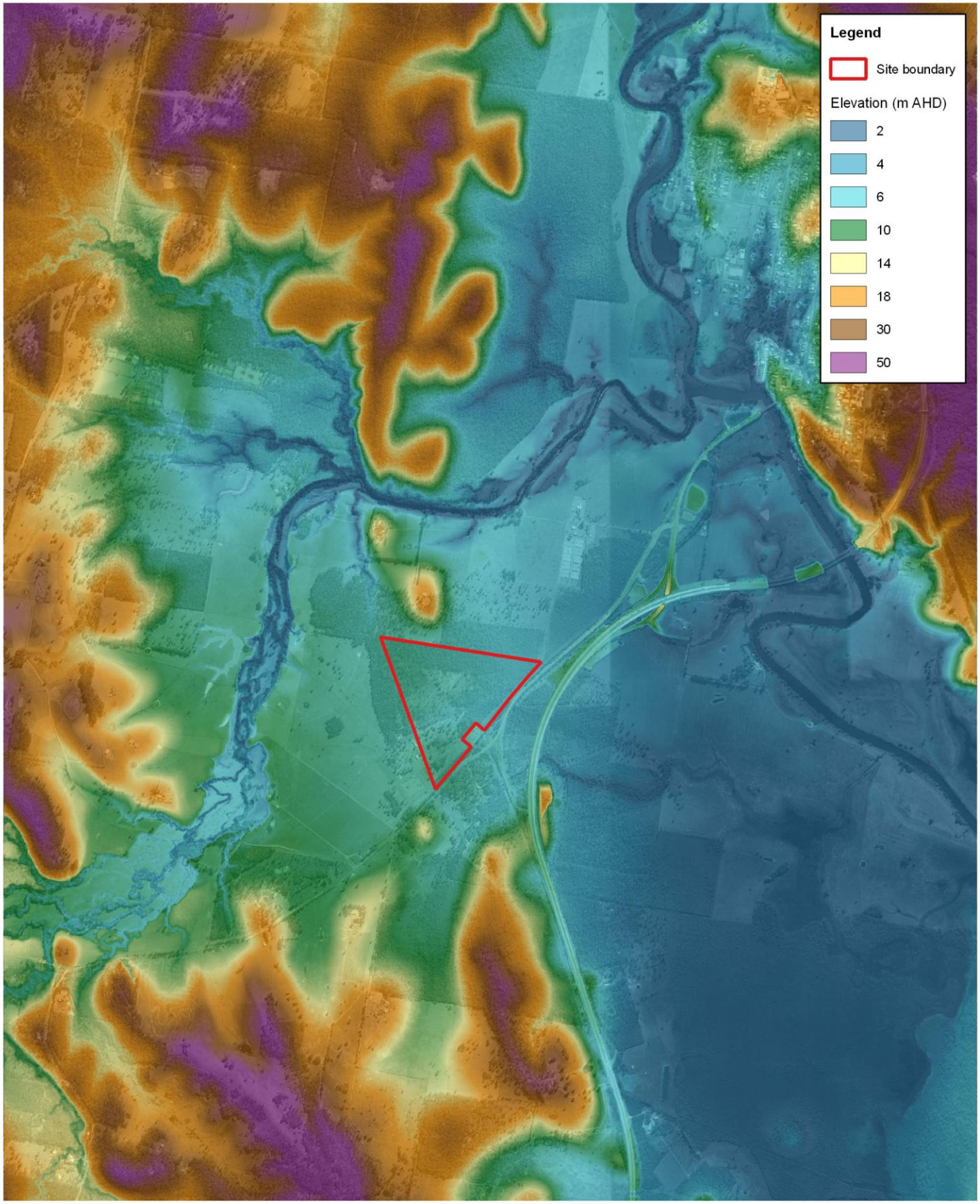
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING

www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_001_250519_Locality.qgz



Title:

Local Catchment Topography

0 0.8 1.6 km

approx. scale

Figure: 2

Revision: A

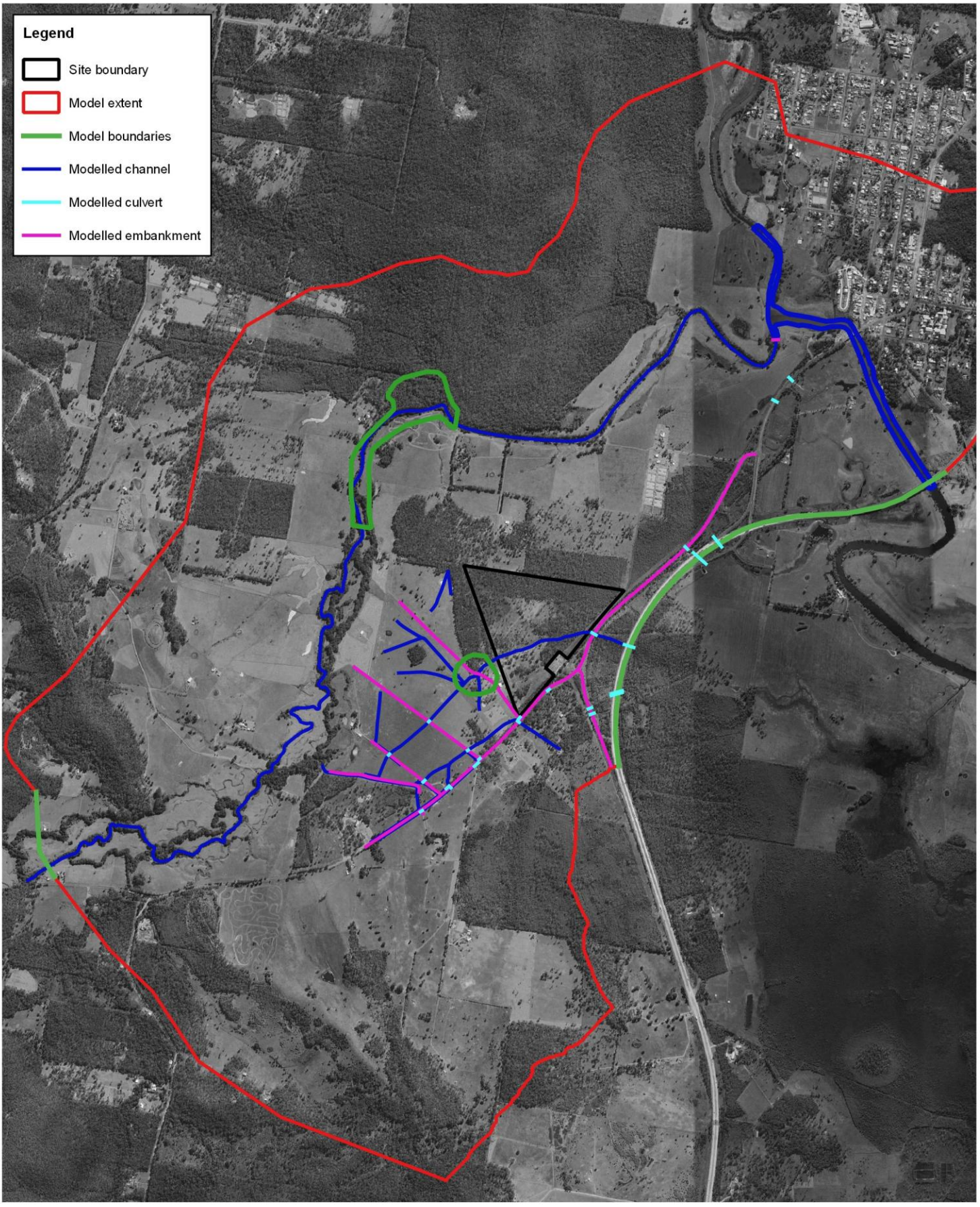
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING

www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_002_250519_Topography.qgz



Title:

Crawford River TUFLOW Model Components

0 0.8 1.6 km

approx. scale

Figure: 3

Revision: A

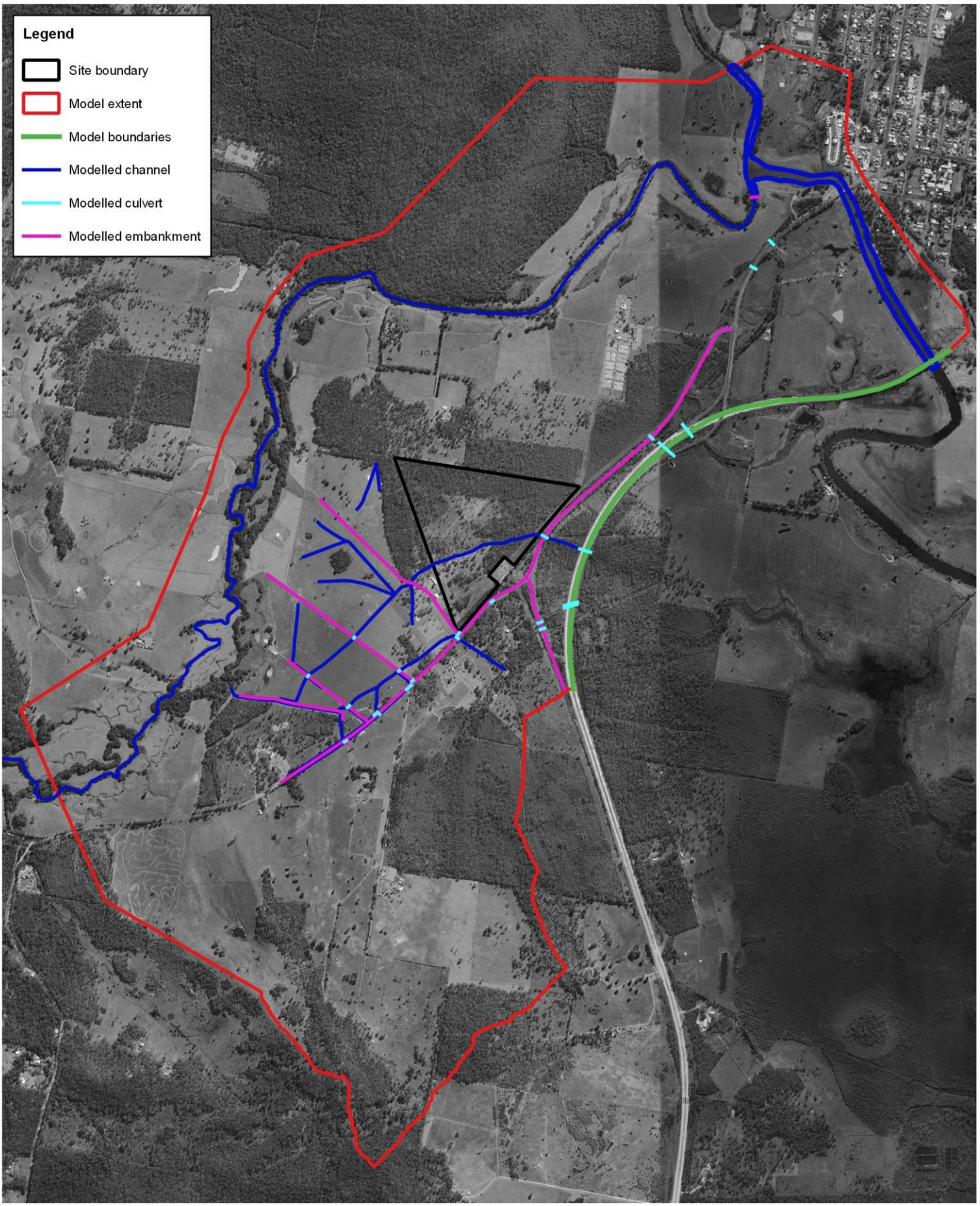
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING

www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_003_250519_TUFLOW.qgz



Title:

Local Catchment TUFLOW Model Components

0 0.7 1.4 km

approx. scale

Figure: 3a

Revision: A

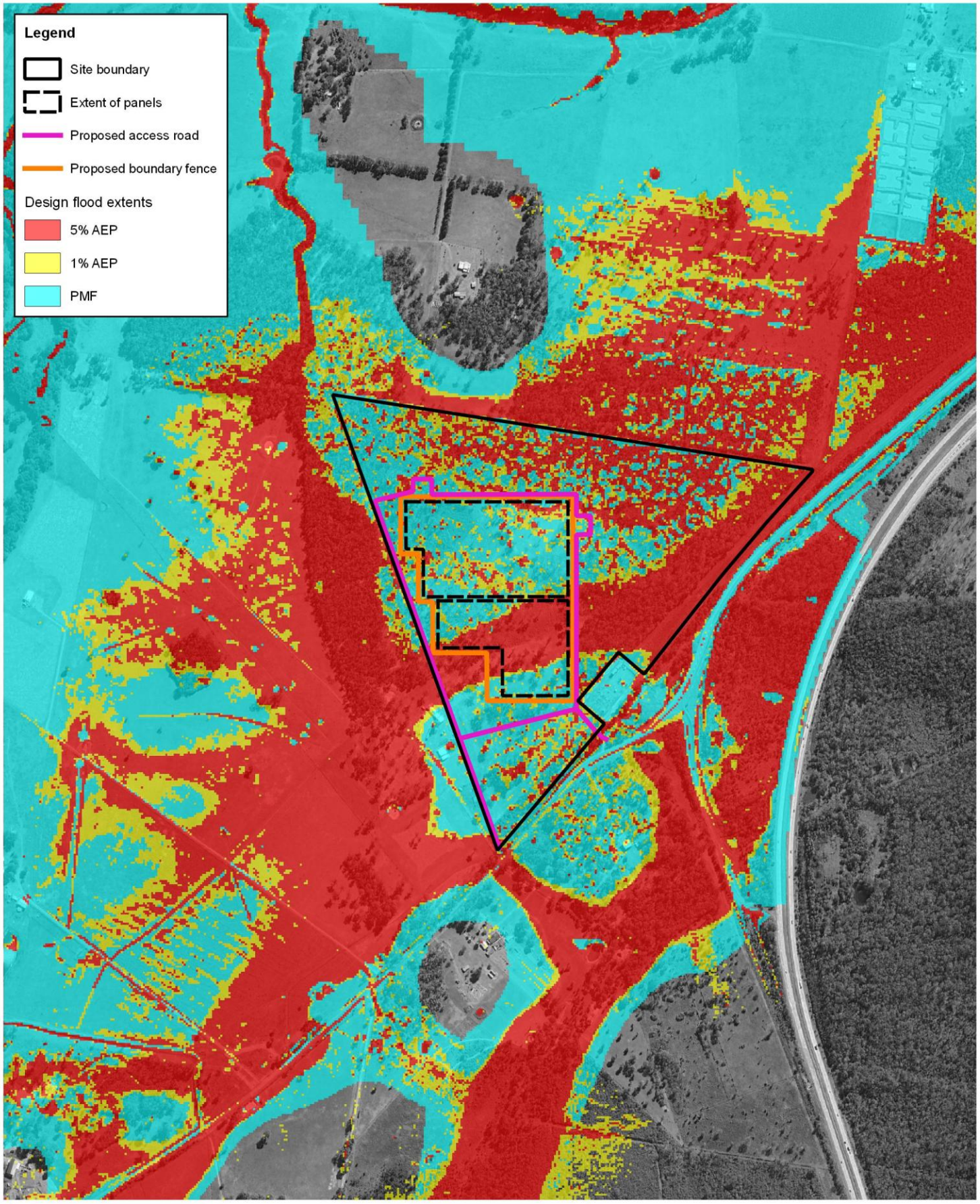
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING

www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_003_250519_TUFLOW_local.qgz



Title:

Modelled Flood Extents

0 200 400 m

approx. scale

Figure: 4

Revision: A

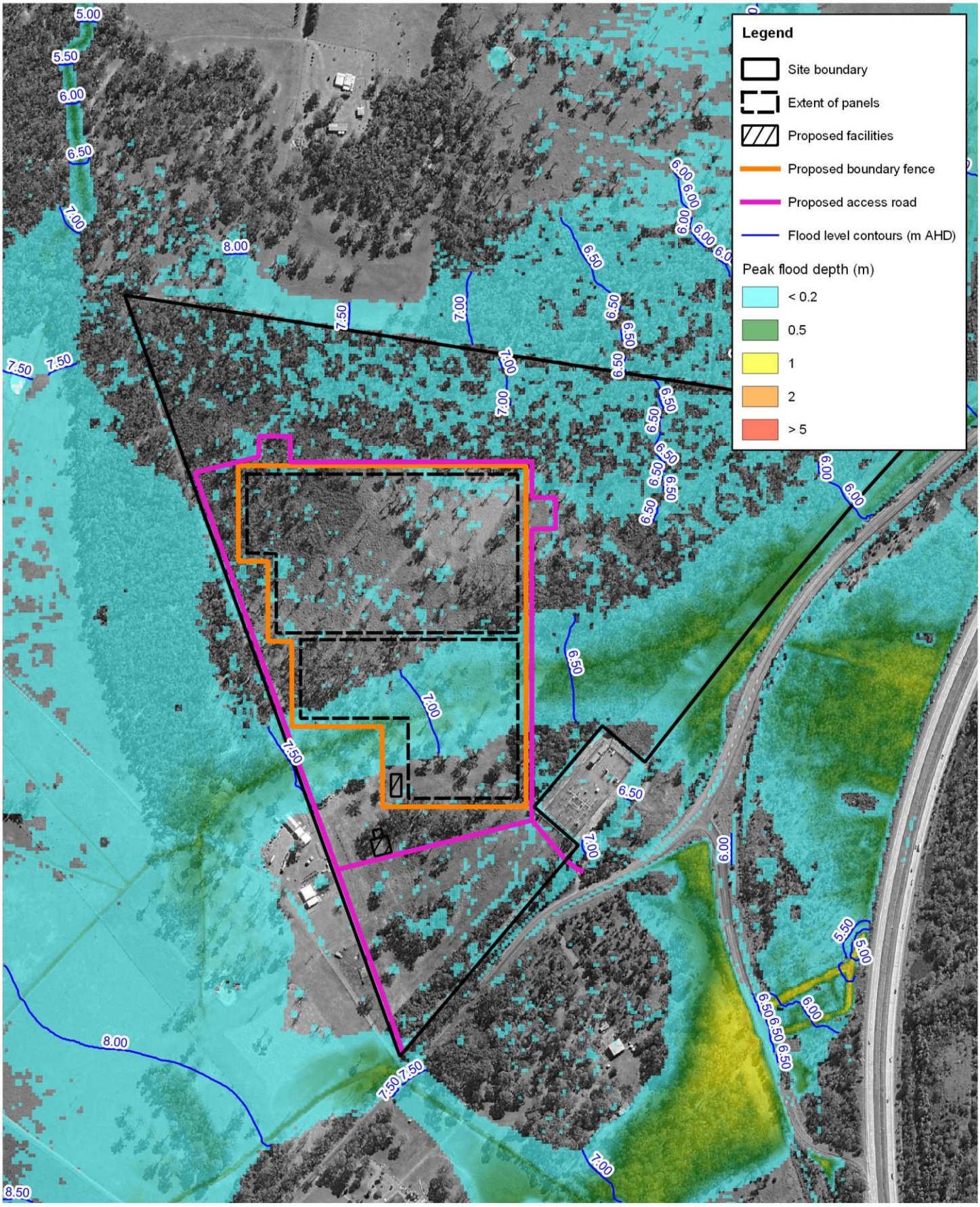
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING

www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_004_250519_Flood_Extents.qgz



Title:

Modelled 5% AEP Flood Depths and Levels
Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 5

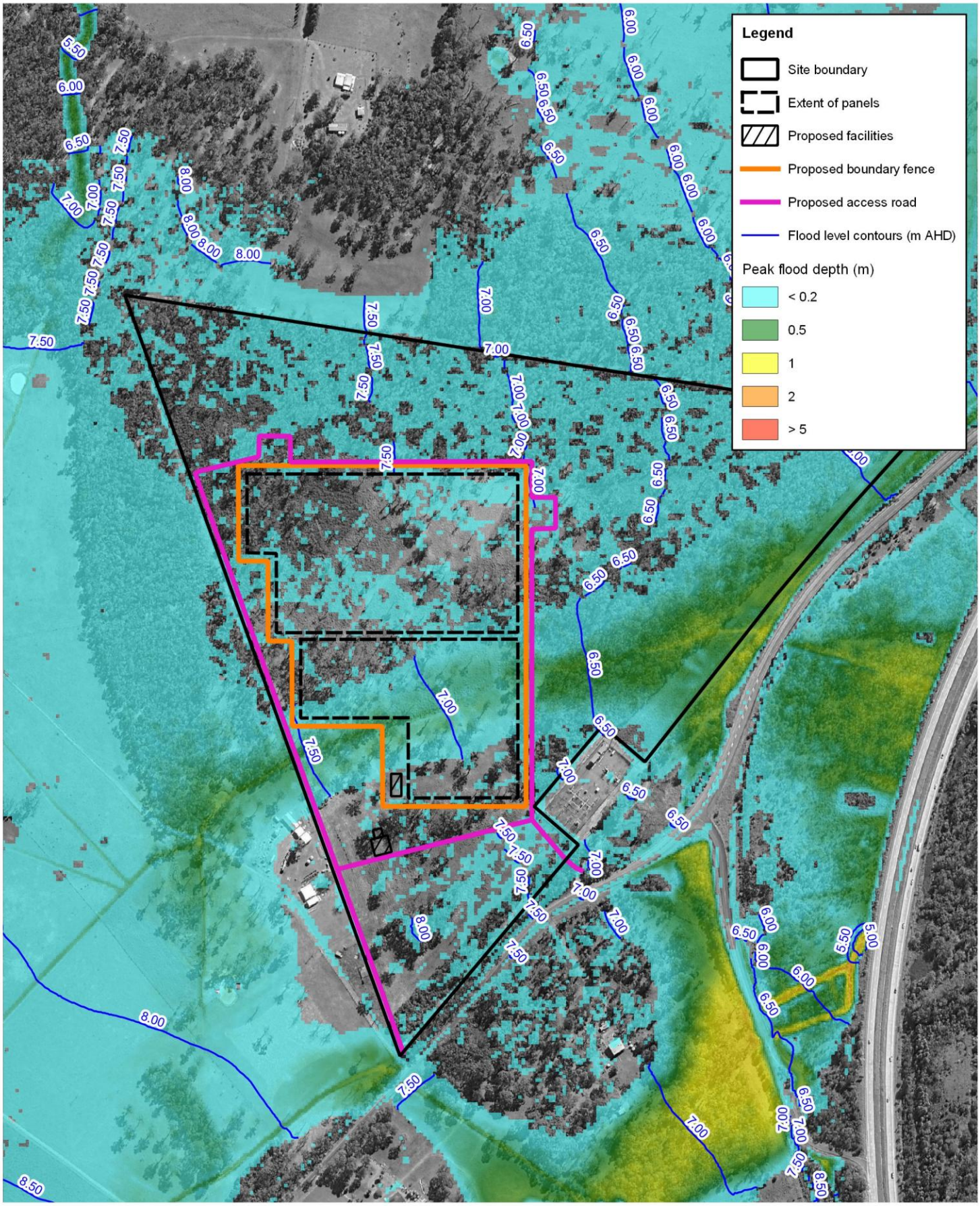
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_005_250519_20y_levels.qgz



Title:

Modelled 1% AEP Flood Depths and Levels
Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 6

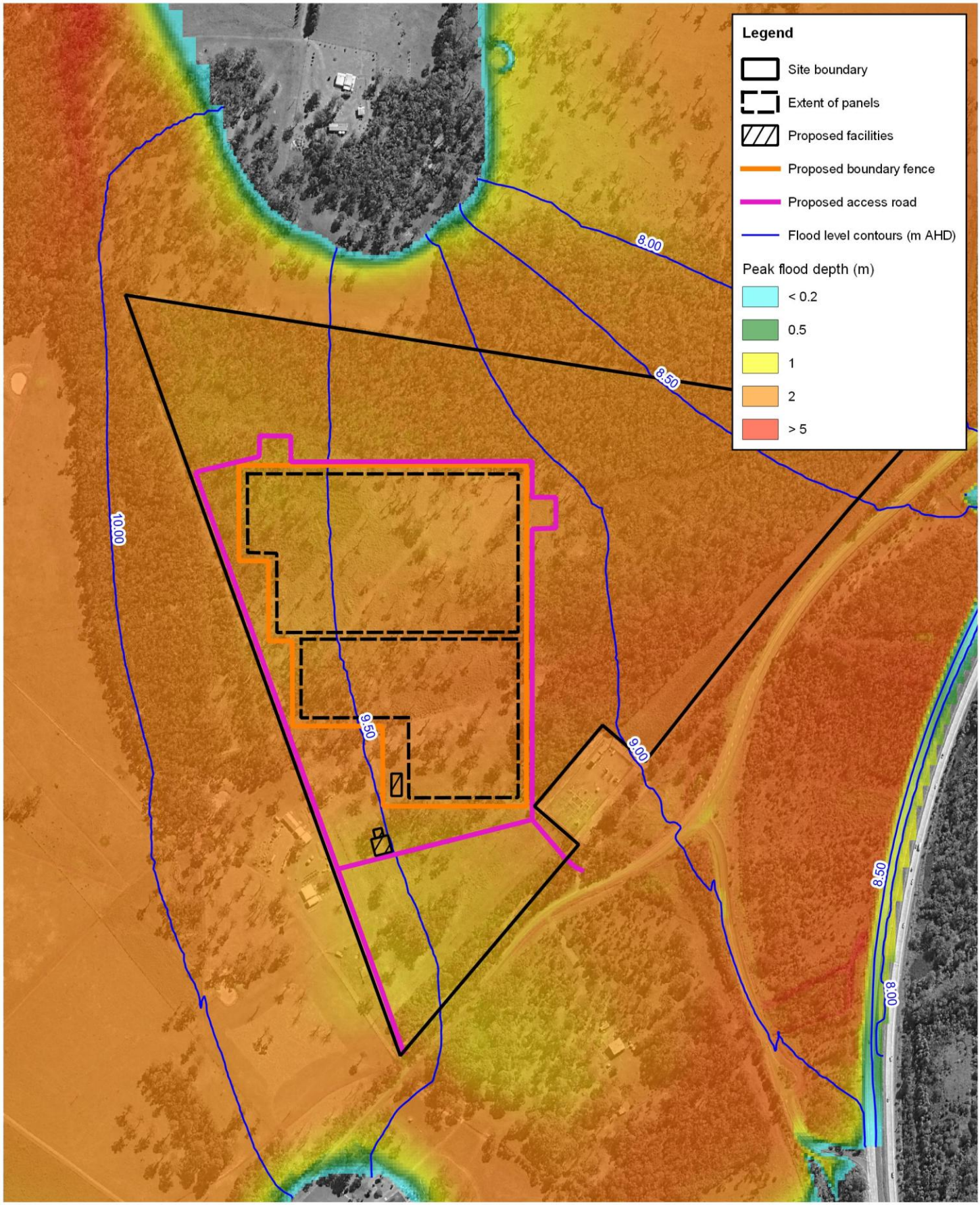
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_006_250519_100y_levels.qgz



Title:

Modelled PMF Flood Depths and Levels
Crawford River Conditions

0 100 200 m

approx. scale

Figure: 7

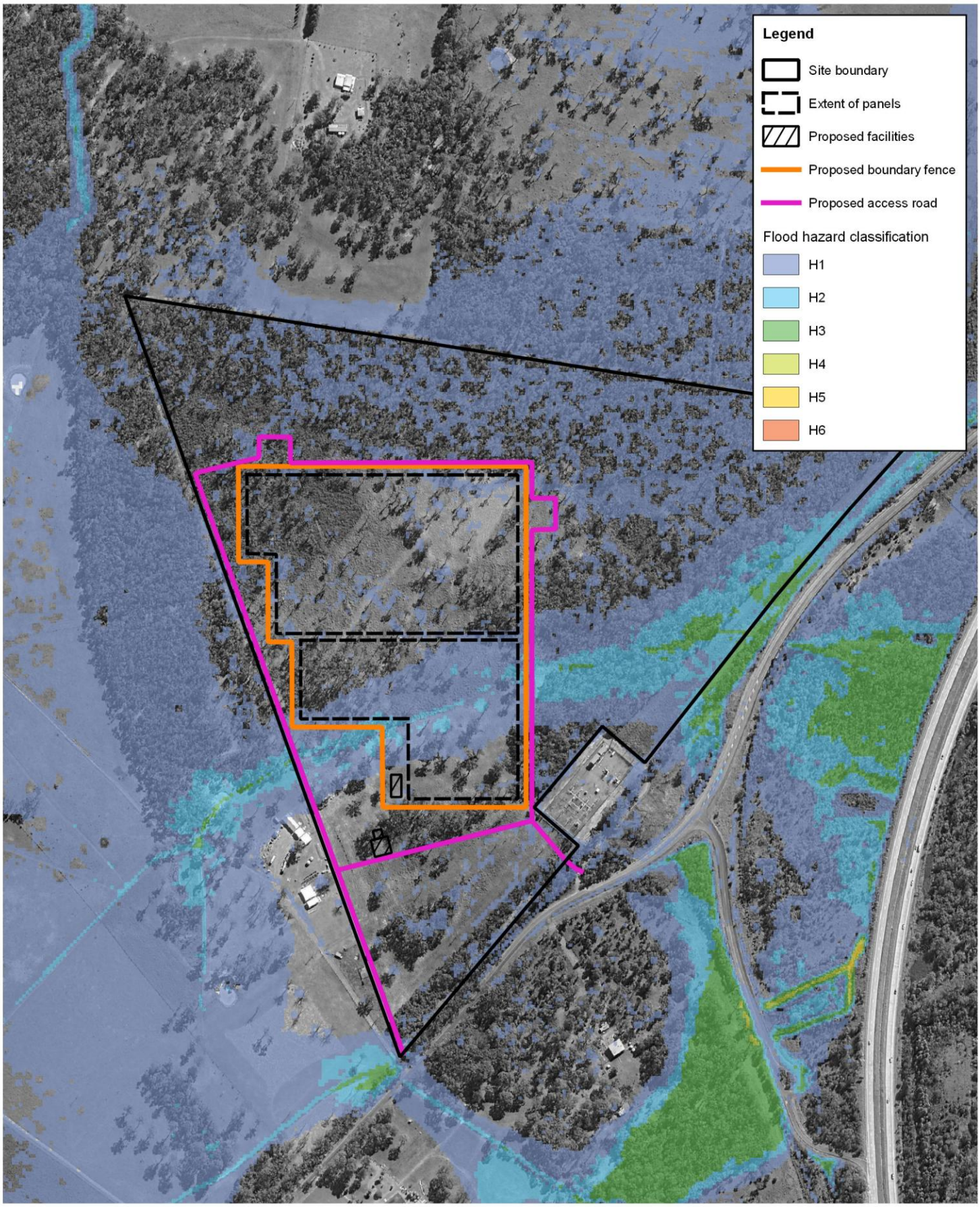
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_007_250519_PMF_levels.qgz



Title:

Modelled 5% AEP Flood Hazard Classification Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 8

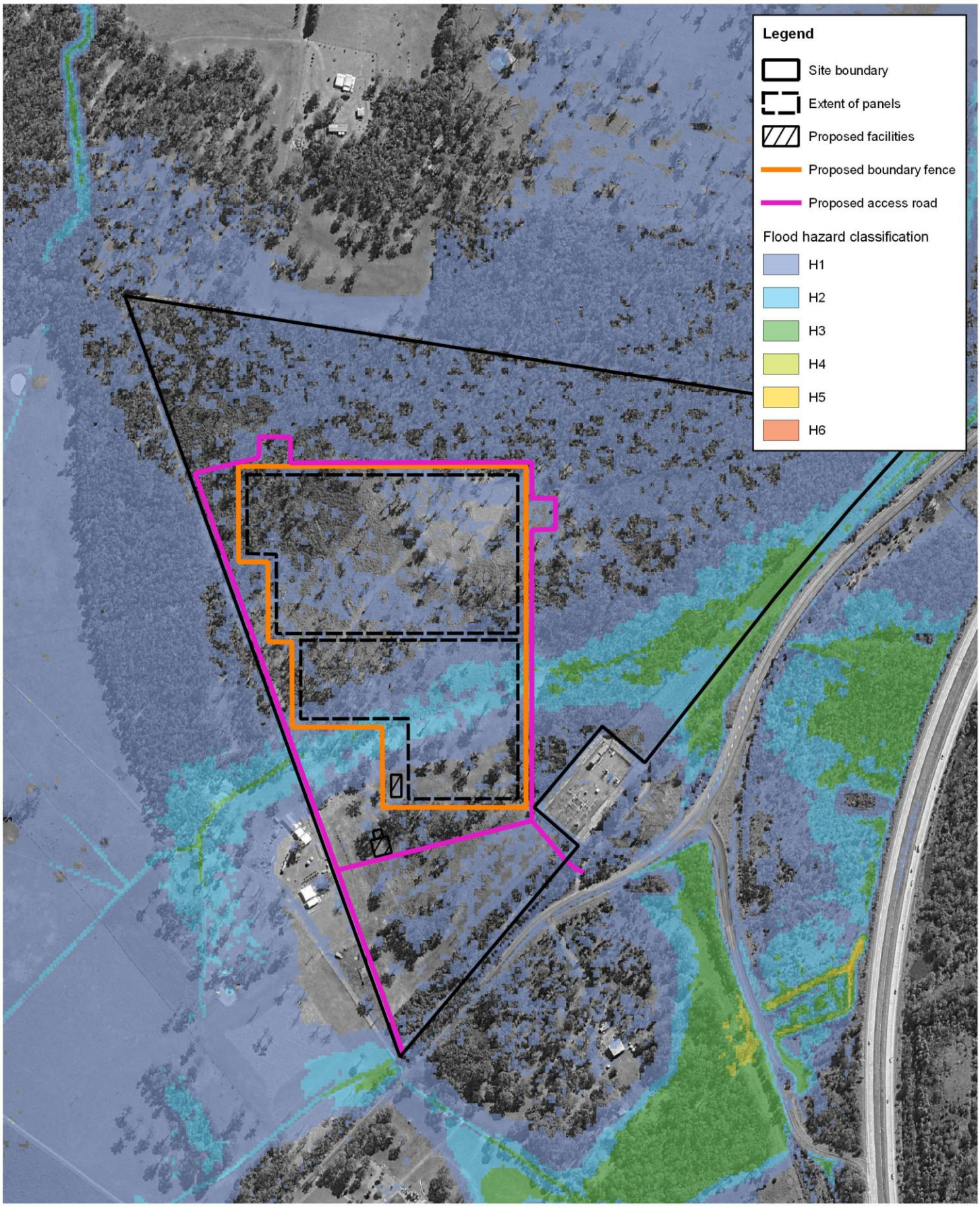
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_008_250519_20y_hazard.qgz



Title:

Modelled 1% AEP Flood Hazard Classification Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 9

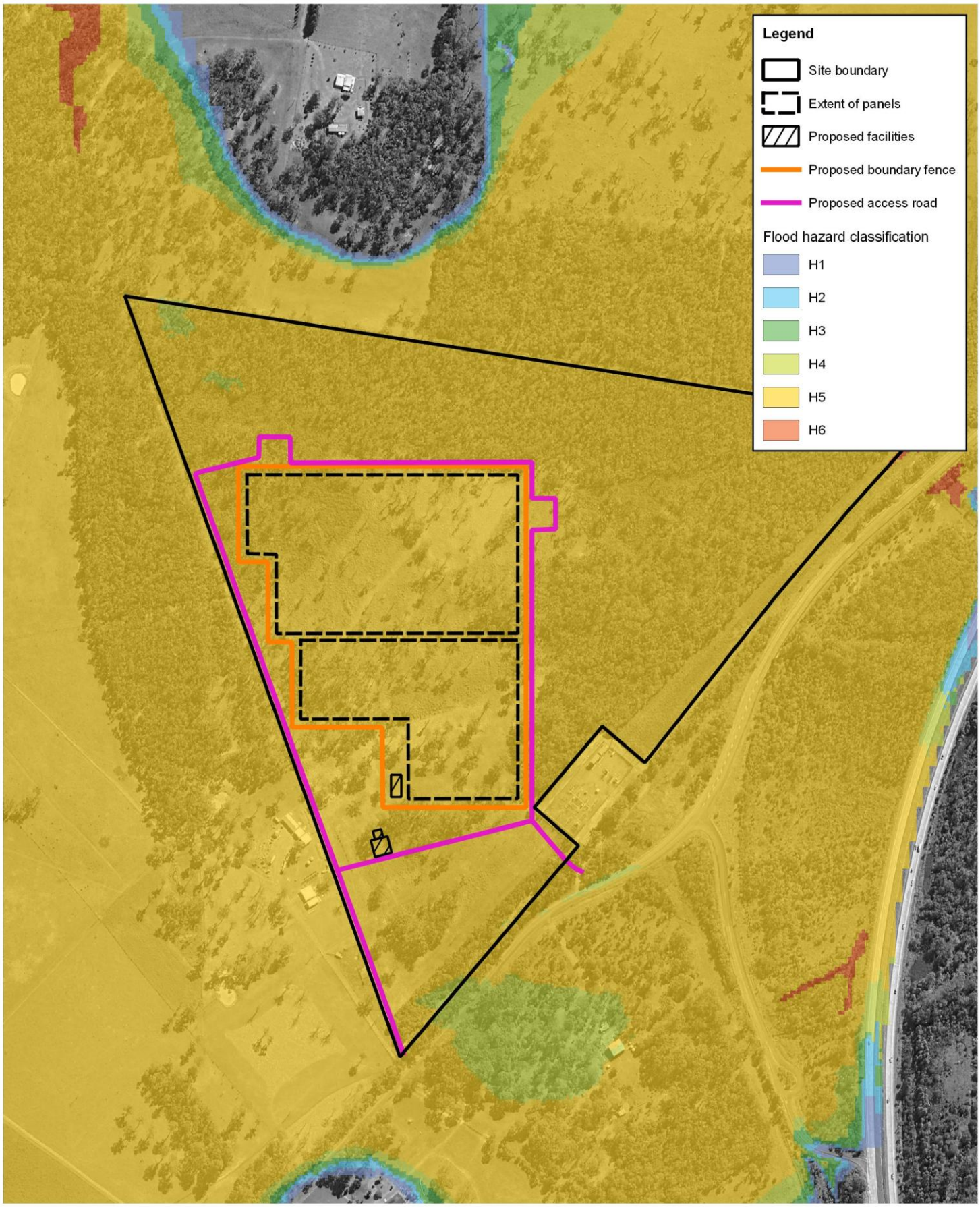
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_009_250519_100y_hazard.qgz



Title:

Modelled PMF Flood Hazard Classification
Crawford River Conditions

0 100 200 m

approx. scale

Figure: 10

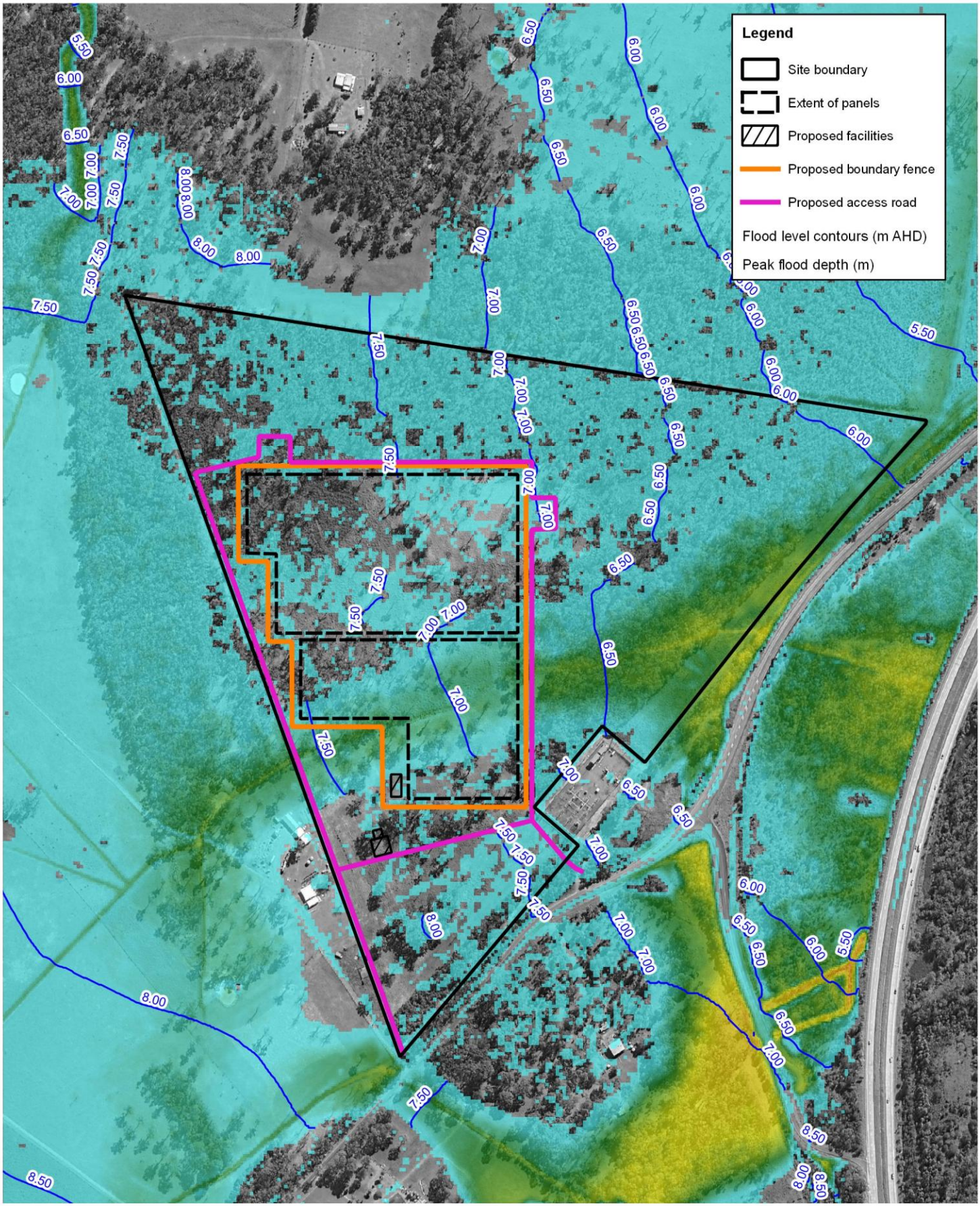
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_010_250519_PMF_hazard.qgz



Title:

Modelled 1% AEP Flood Depths and Levels
Local Catchment Climate Change Conditions

0 100 200 m

approx. scale

Figure: 11

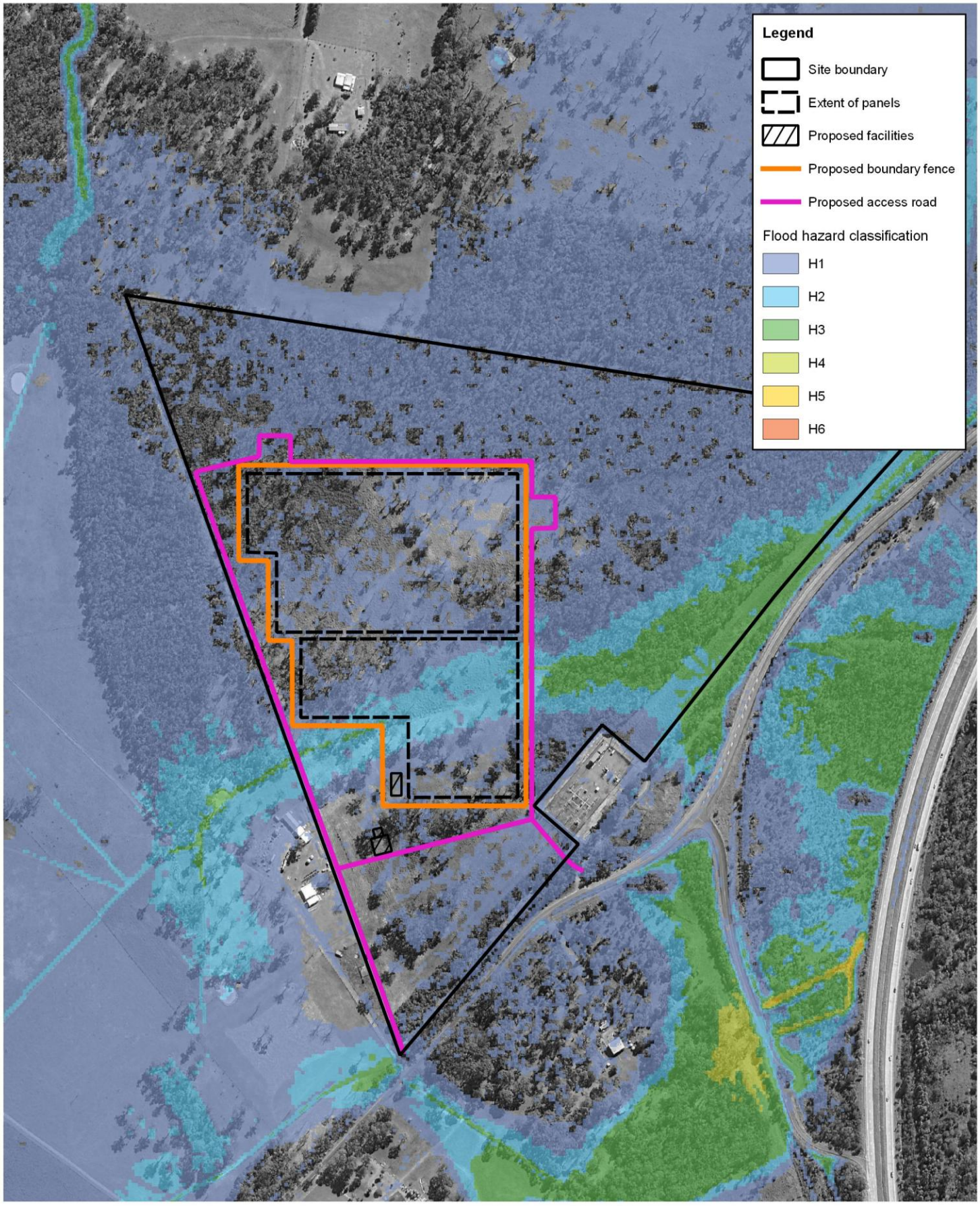
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_011_250519_100y_2100_levels.qgz



Title:

Modelled 1% AEP Flood Hazard Classification Local Catchment Climate Change Conditions

0 100 200 m

approx. scale

Figure: 12

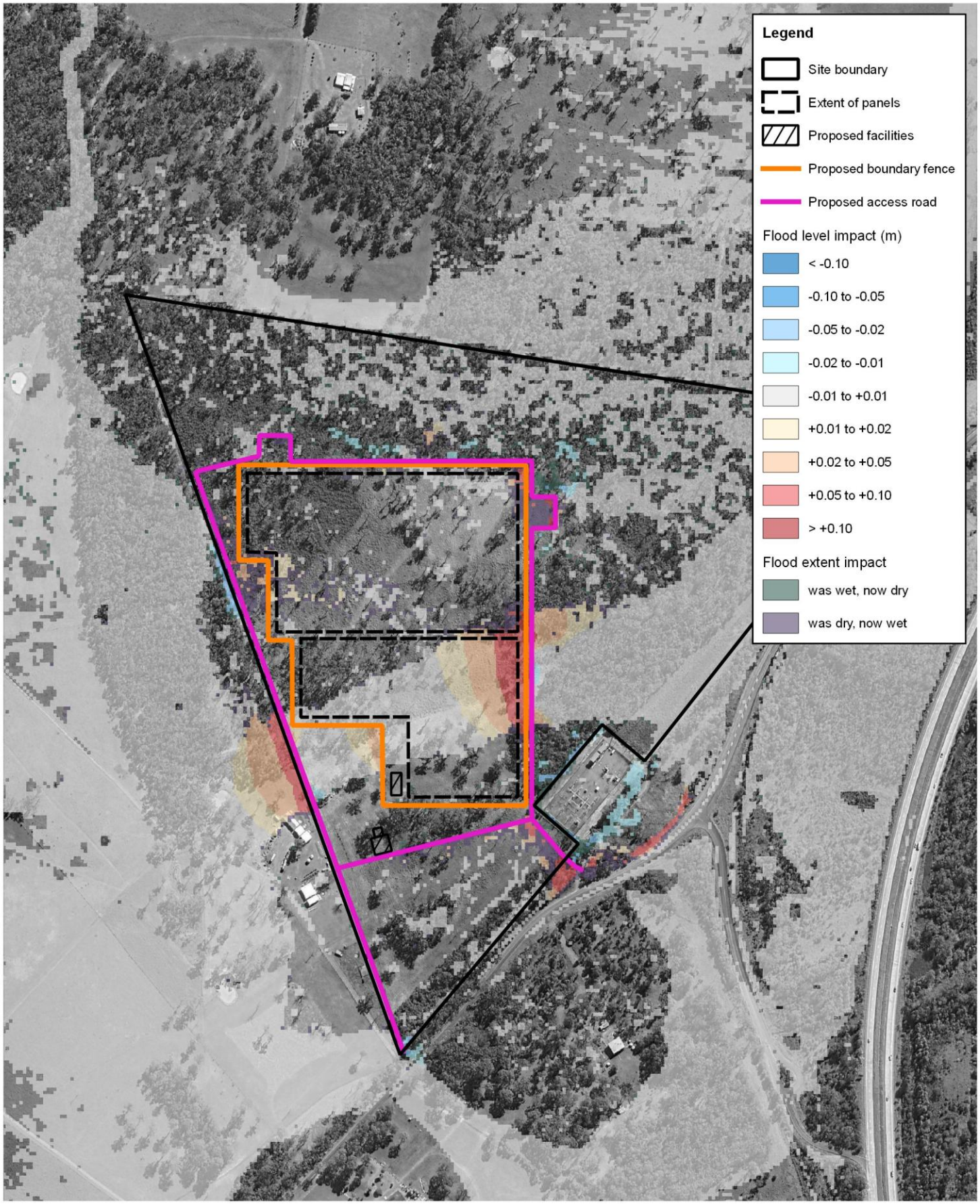
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_012_250519_100y_2100_hazard .qgz



Title:

Modelled 5% AEP Peak Flood Level Impact Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 13

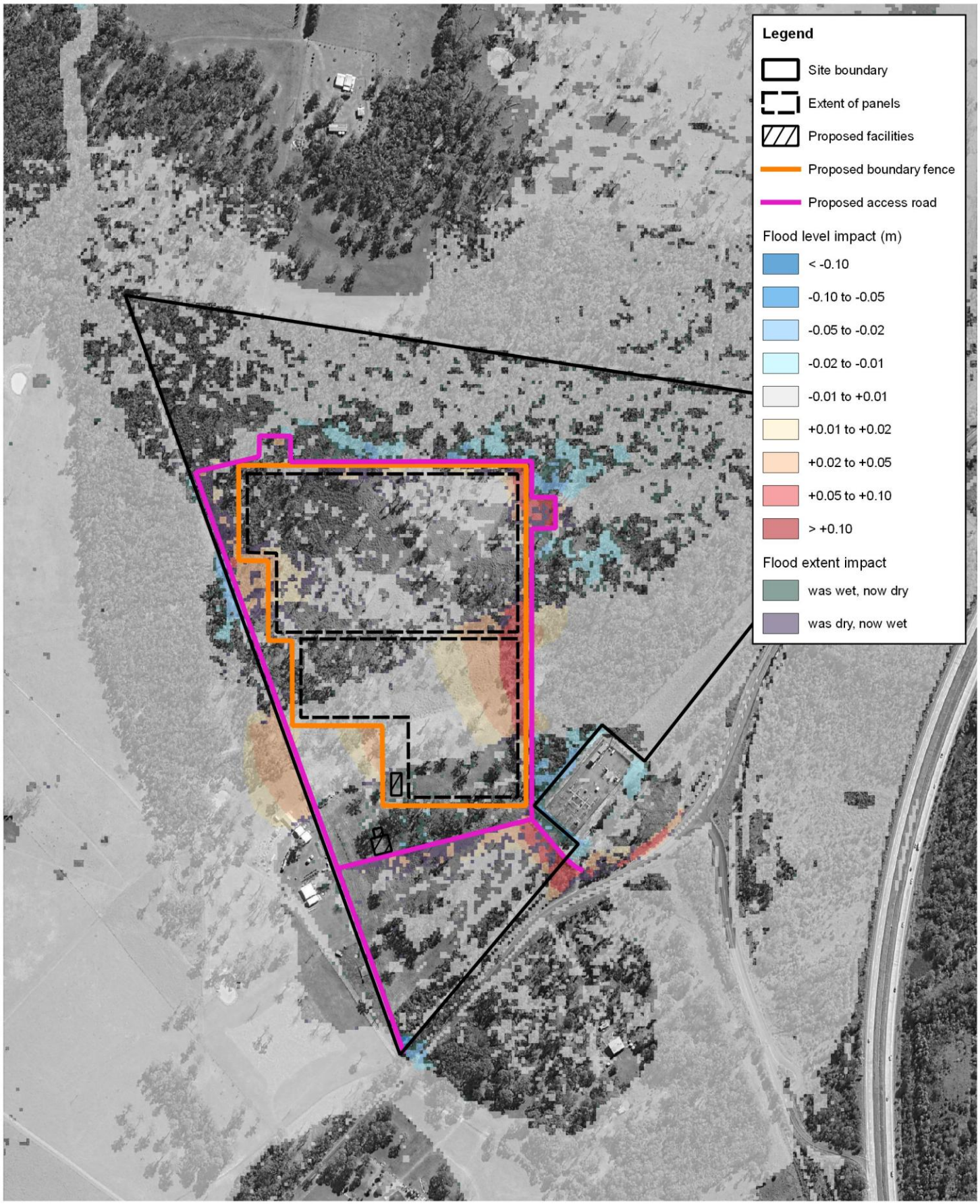
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_013_250519_20y_d_impact.qgz



Title:

Modelled 1% AEP Peak Flood Level Impact
Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 14

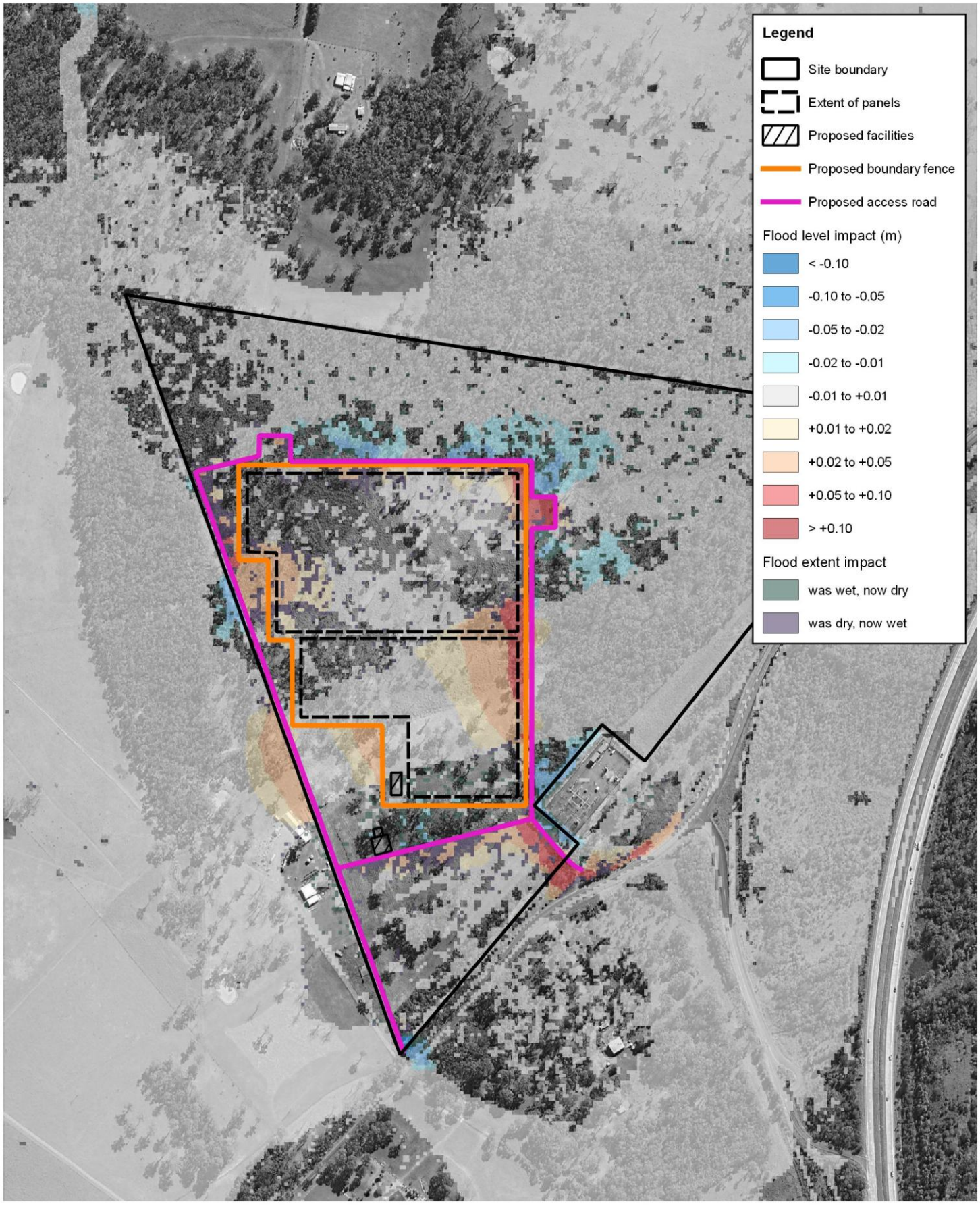
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_014_250519_100y_d_impact.qgz



Title:

Modelled 1% AEP Peak Flood Level Impact Local Catchment Climate Change Conditions

0 100 200 m

approx. scale

Figure: 15

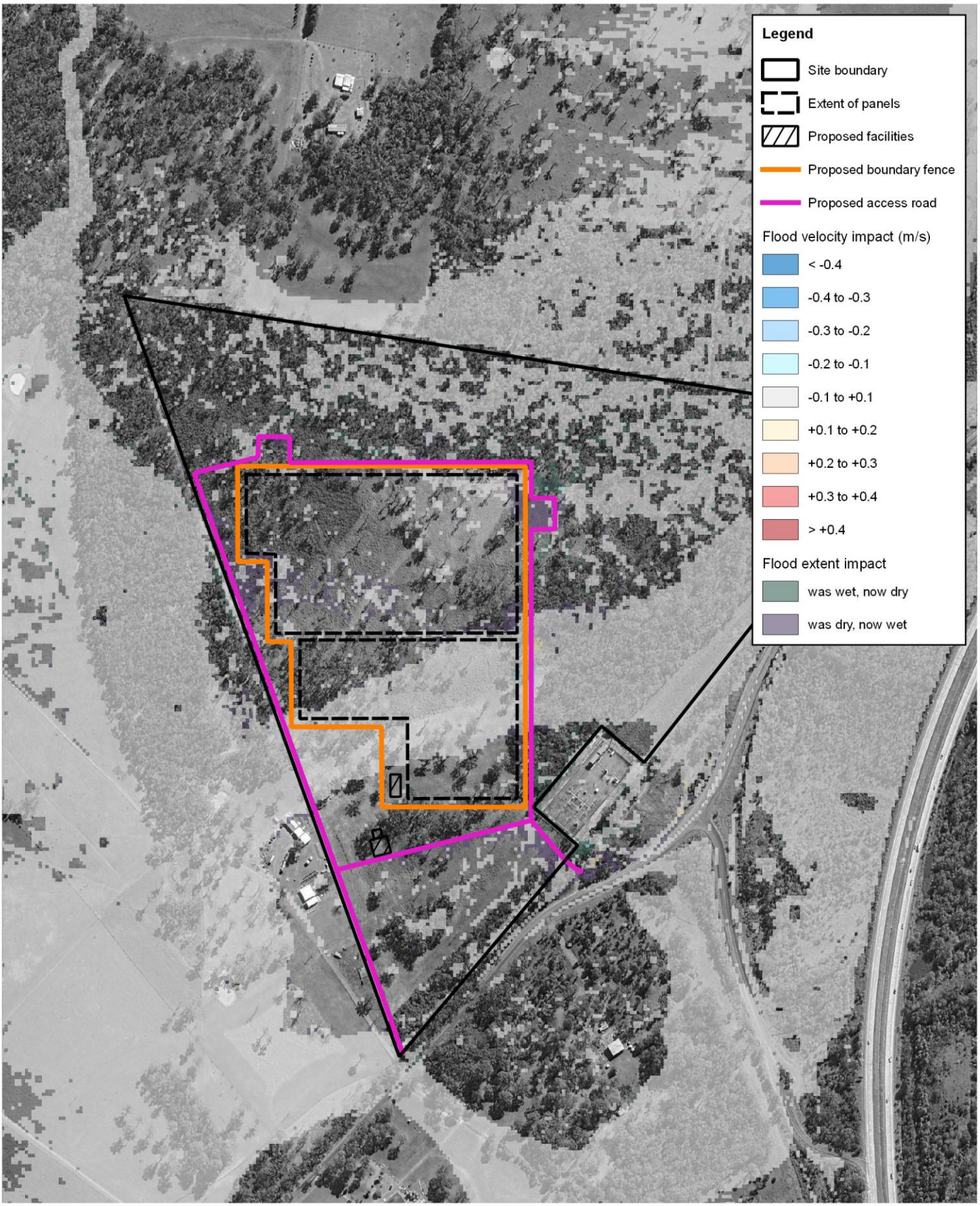
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_015_250519_100y_2100_d_impact.qgz



Title:

Modelled 5% AEP Peak Flood Velocity Impact Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 16

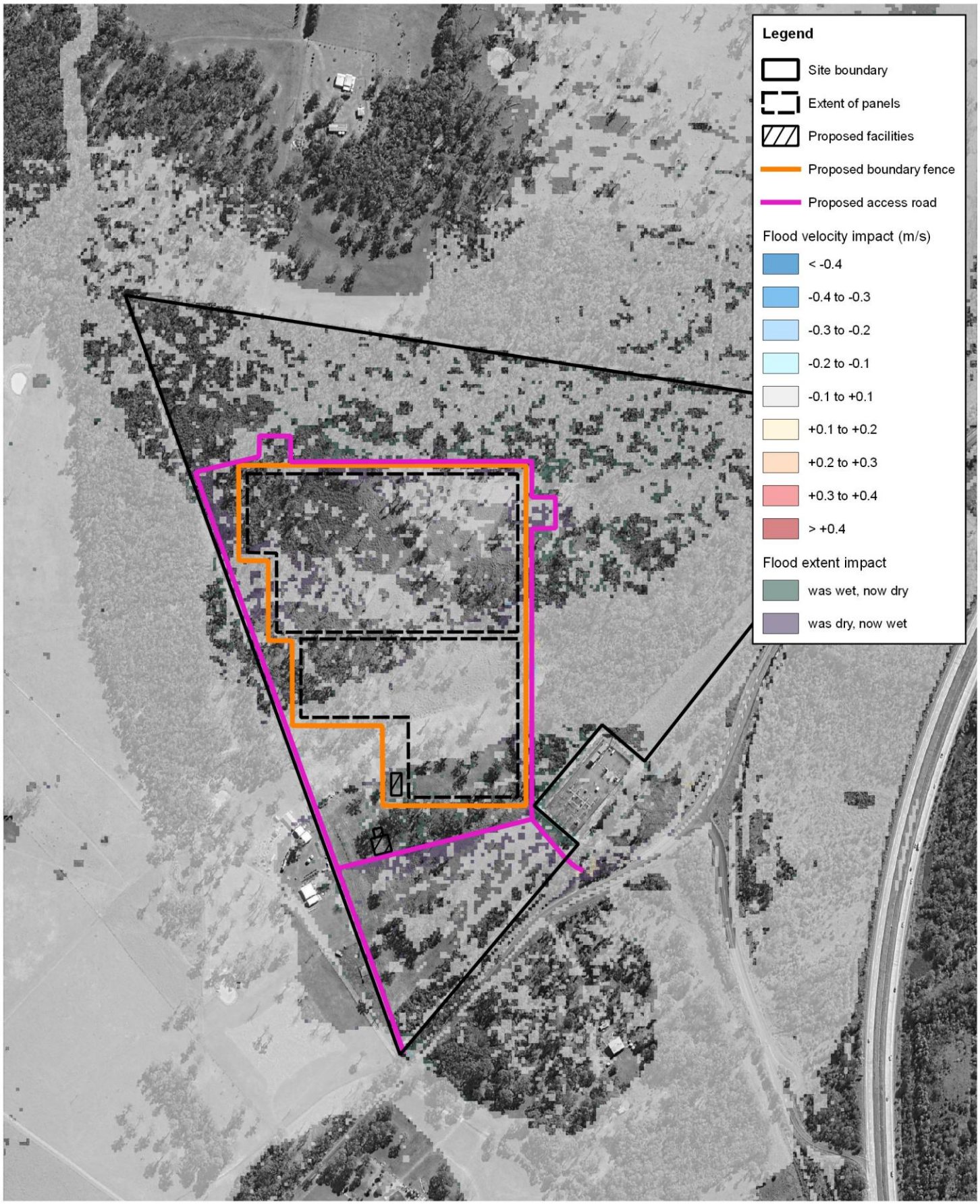
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_016_250519_20y_v_impact.qgz



Title:

Modelled 1% AEP Peak Flood Velocity Impact Local Catchment Conditions

0 100 200 m

approx. scale

Figure: 17

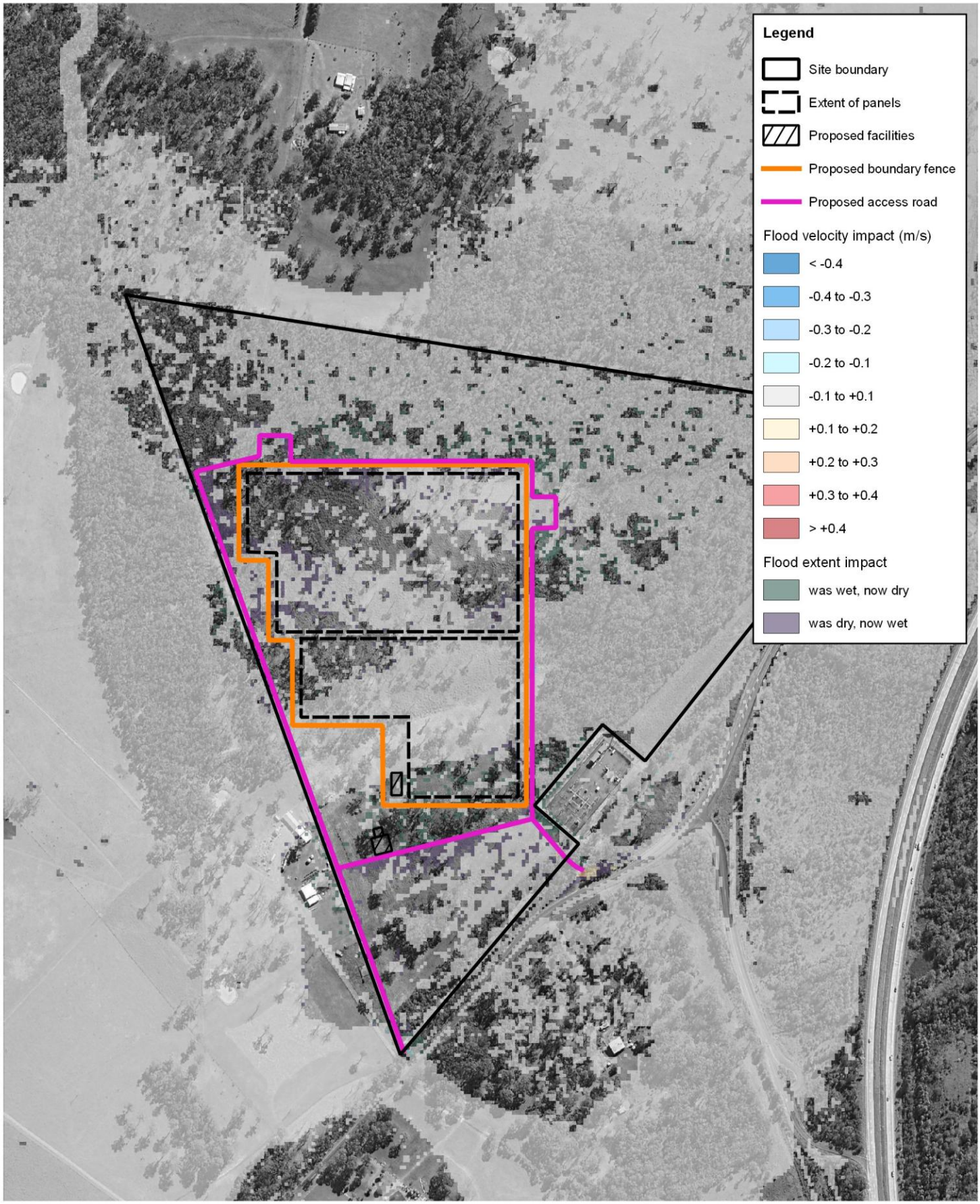
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_017_250519_100y_v_impact.qgz



Title:

Modelled 1% AEP Peak Flood Velocity Impact Local Catchment Climate Change Conditions

0 100 200 m

approx. scale

Figure: 18

Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2555_Buladelah_Solar\GIS\T2555_018_250519_100y_2100_v_impact.qgz