Notes:

1.) Dimensions are subject to final design
2.) Future filter bank space reserved if required

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AMENDED PLANS APPROVED
28 October 2021
DATE
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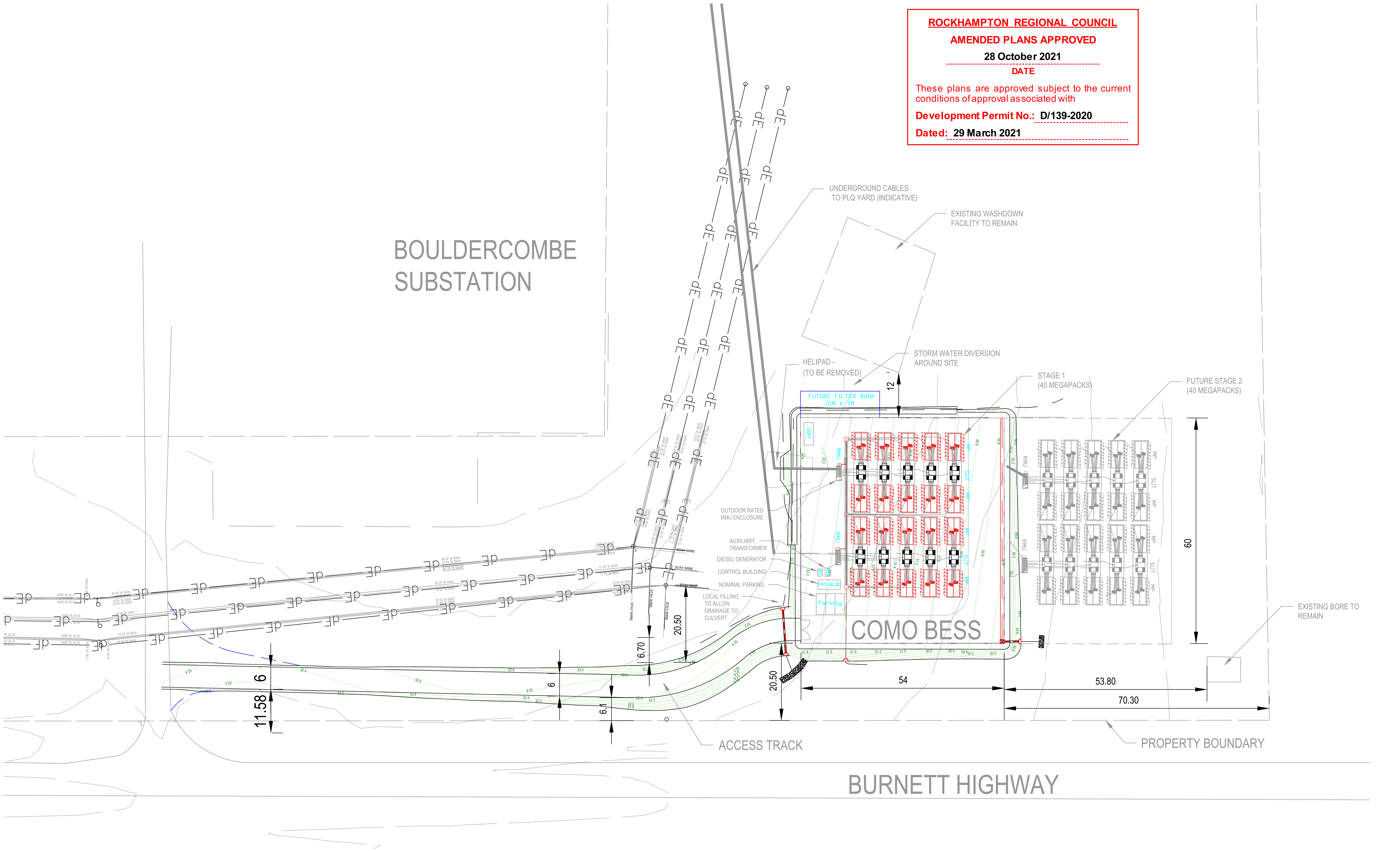

REV	DESCRIPTION	DRAWN	DESIGN	REVIEWED	APPROVED	DATE
–	–	–	–	–	–	–
–	–	–	–	–	–	–
C	FUTURE FILTER BANK & NOTES ADDED	PG	PG	–	J.C.	13/09/21
B	SPARES CONTAINER AND NOTES ADDED	P.G.	P.G.	–	J.C.	28/07/21
A	ISSUED WITH EARLY WORKS DESIGN	P.G.	P.G.	P.B.	J.C.	02/06/21

REVISIONS

CONSOLIDATED POWER PROJECTS
A QUANTA SERVICES COMPANY

REFERENCE DRAWINGS

DRAWING TITLE
COMO
BATTERY ENERGY STORAGE SYSTEM
SITE PLAN

DRAWN	P.G.	02/06/21	PROJECT: COMO BESS — PROJECT No. 11501
DESIGNED	P.G.	02/06/21	DRAWING No. 11501-EL-DR-10100 — SHEET No. — REV C
REVIEWED	J.C.	02/06/21	ISSUED FOR: EARLY WORKS DESIGN
APPROVED	J.C.	–	SCALE AS SHOWN — A1

DIMENSIONS IN MILLILMETRES DO NOT SCALE

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Technical Memorandum

To	Amy Crowley, Wendy Moloney - Genex Power	Page	1
CC			
Subject	Bouldercombe Battery Storage Project (Project Como)		
From	- AECOM		
File/Ref No.	60644664	Date	18-Dec-2020

1.0 Project Overview

The Bouldercombe Battery Project (the Project) is a proposed large-scale battery installation, located on Lot 1 RP610887 and Lot 3 RP611829 in the Rockhampton region (refer Figure 1). The Project is anticipated to be Queensland's first stand-alone, large-scale battery storage development.

The Australian Energy Market Operator (AEMO) 2020 Integrated System Plan (AEMO, 2020) identified that the National Electricity Market (NEM) requires upgrades to transmission infrastructure to cope with the inherently variable nature of distributed and large-scale renewable generation of wind and solar energy. It was identified that new flexible and dispatchable resources, such as large-scale battery storage, would be a key opportunity to respond to the network challenge.

The Project is co-located with Powerlink Queensland's (Powerlink) existing Bouldercombe substation, with a direct connection into Powerlink's 132 kV network. The Project will take electricity from the grid during periods of low demand, and feed back into the grid during periods of high demand, as well as acting to stabilise the grid. The Project will have a storage capacity of up to 100MW, and 200MWh (2 hrs depth).

The Project is proposed to be developed on vacant land within the existing Powerlink site. Due to the scale of the development, a 'material change of use' under the *Planning Act 2016*, assessable under the Rockhampton Regional Council (RRC) Planning Scheme 2015 (Planning Scheme) is triggered.

Review of the Planning Scheme and precedence in Queensland, confirmed that the development would be considered an "Undefined Use". An Undefined Use triggers an "Impact Assessable" development application process, requiring assessment against the intent of the whole Planning Scheme.

The site is accessed from, and has a frontage to, a State Controlled Road (Burnett Highway), owned and operated by Department of Transport and Main Roads (DTMR). This constraint triggers a referral to DTMR for assessment of the Development Application, and conditions may be imposed on the development in relation to access and any potential impacts on the State Controlled Road network.

Therefore, to support the Development Application process, AECOM were engaged in 2020 to undertake the **civil design and flood impact assessment for the project site**. This memorandum documents the scope and findings of these investigations.

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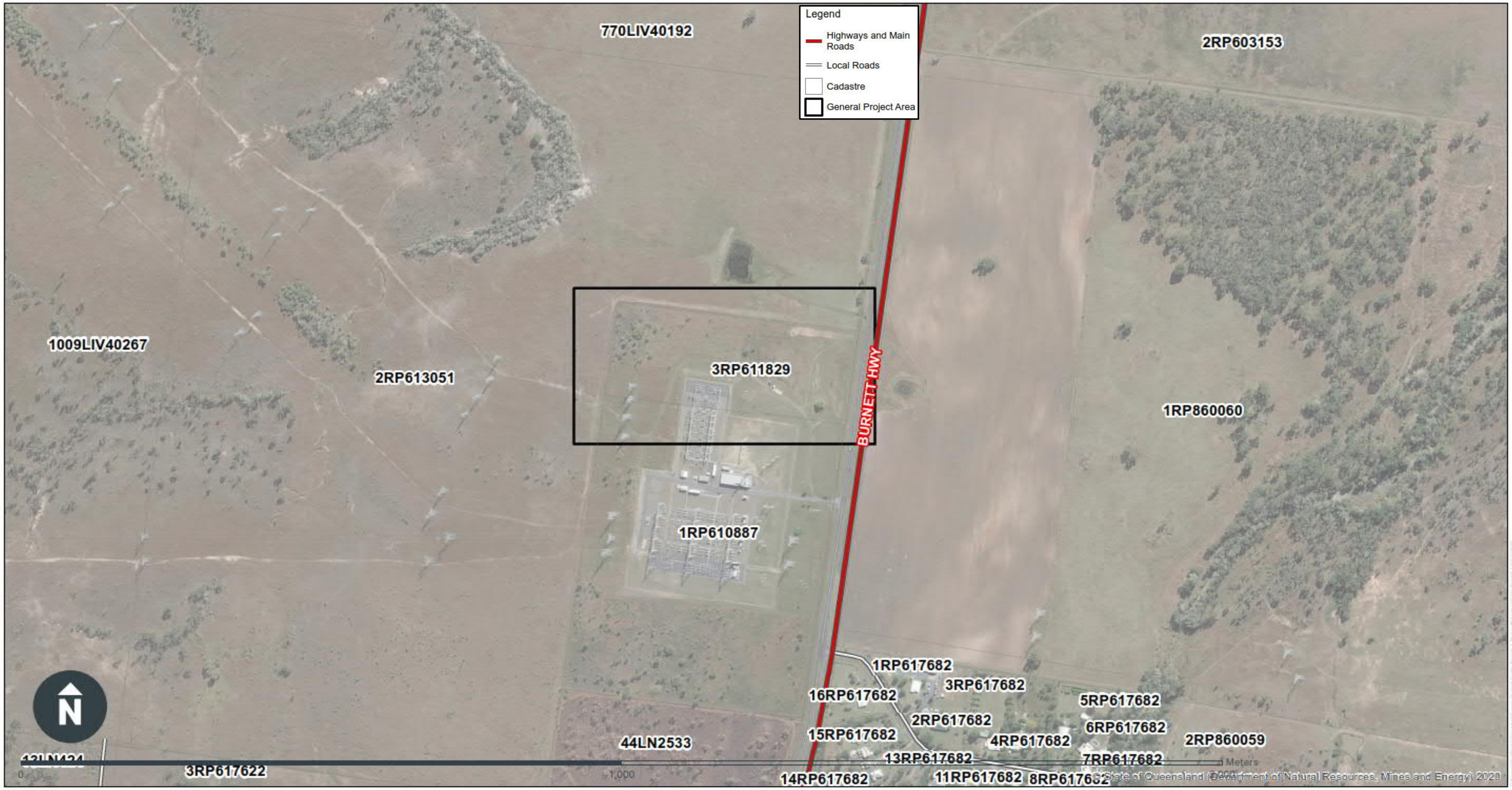

Figure 1 Project Site

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2.0 Civil Design

2.1 Existing Site Conditions

The site topography generally grades down from the south to the north with an approximate slope of between 4%. Ground levels on site range from approximately 55 mAHD to 60 mAHD, with the existing Powerlink Substation located on the highpoint within the site. The site currently consists of undeveloped land with natural grass cover and sparse trees / shrubs.

The following site conditions were also noted during the site visit undertaken with representatives from Powerlink and AECOM on the 16 November 2020:

- **Existing Site Access:** The site is currently accessed via a gravel / unformed track off the Burnett Highway (Lotplan 1RP610887). Currently there are no turning lanes from the highway, with a double gate at the entrance to the site (approximately 8 m – 9 m wide) (refer Figure 2). The property boundary is currently fenced with typical four strand barb wire. Vehicles pass under the existing HV towers as they enter the site (discussed further below).
- **Existing Vehicle Washdown:** Located on Lotplan 3RP611829, there is an existing vehicle washdown facility and dam (refer Figure 3). The dam is currently fenced.
- **Existing Maintenance Helicopter Pad:** Similarly, located on Lotplan 3RP611829, there is an existing maintenance helicopter pad (refer Figure 4).
- **Existing Bore, Pump and Rising Main:** Located within the most north-eastern corner of the Powerlink site is an existing bore, pump and rising main (refer Figure 5). The location of the rising main is unknown and recommended to be confirmed during future design and construction stages.
- **Existing HV Towers:** Running from the south to the north of the Lotplan 1RP610887 (perpendicular to the Burnett Highway), is the existing HV towers (refer Figure 6). The towers head west once crossing the boundary to the Powerlink substation (Lotplan 3RP611829). In addition, the towers cross the existing site access road. The exact location of these shall be confirmed during survey works undertaken during future design stages.
- **Existing LV Ergon Energy Overheads and Poles:** In addition to the HV towers across the site, is a LV overhead and poles running parallel to the Burnett Highway (refer Figure 7). Generally located on the property boundary and running south to north.

Figure 2 Existing Site Access

Figure 3 Existing Vehicle Washdown

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Figure 4 Existing Maintenance Helicopter Pad

Figure 5 Existing Bore, Pump and Rising Main

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Figure 6 Existing HV Towers (adjacent the existing Burnett Hwy access – left and adjacent the proposed battery storage pad – right)

Figure 7 Existing LV Ergon Energy Overheads and Poles (Burnett Hwy shown on the left, looking South)

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2.2 Data / Design Inputs

A site visit was conducted with representatives from Genex, Powerlink and AECOM on the 16 November 2020. The following key points were noted:

- It was agreed that the battery storage pad would be best located towards the eastern frontage of the allotment due to the natural topography (i.e. less earthworks) and lesser length of internal site access road to reach the pad.
- Powerlink noted that the existing washdown facility and helicopter pad could be relocated if needed.

2.3 Design Criteria

The following design criteria were adopted throughout the progression of the design (refer Table 1).

Table 1 Civil Design Criteria

Parameter	Criteria
Topographic Data	In the absence of site survey, the concept design has been undertaken using aerial survey in the form of 2015 LiDAR. Dial Before You Dig data was also obtained, noting that no service locating has been undertaken to date.
Width and Length of Pad	Project requirements: • Stage 1: 50 m x 80 m • Stage 2: 60 m x 90 m
Material (Pad and Access Road)	Gravel surfacing
Existing Washdown Facility and Dam	To remain, minimum offset 2 m from footprint of battery pad
Existing Vegetation within extents of work	To be removed, not of environmental significance
Existing Helipad	To be removed and reinstated if required by Powerlink
Burnett Highway Intersection Location	A new access track is proposed parallel to the front site boundary between the Burnett Highway and the existing High Voltage (HV) overhead infrastructure to minimise the length of interface with Powerlink operations.
Design Vehicle	**Prime mover and long semi-trailer (25 m)** Overall Length = 25 m Overall Width = 3 m Overall Body Height = 4.3 m Min Body Ground Clearance 0.54 m Max Track Width = 3 m Lock-to-lock time = 6s Curb to curb Turning Radius = 15 m A conservative estimate for the adopted design vehicle was made during the Concept Design (25 m Semi-Trailer) however this will be confirmed in the next design phase. Upgrades to the existing intersection would not be required if the design vehicle is reduced.
Minimum Offset from Property Boundary	RRC Planning Scheme Requirements – 6 m minimum offset
Offset from Existing Bore	To remain, currently offset +10 m from the pad footprint

Parameter	Criteria
Horizontal Clearance 11 kV Powerlines	Minimum 5 m from pole stays and electrical entity poles (Ergon Energy and Energex, Electricity Entity Requirements: Working Near Overhead and Underground Electric Lines).
Horizontal Clearance 132 kV Powerlines	Generally, a minimum of 20 m from any tower leg however each application is assessed on a case by case basis (by Powerlink). The toe of the fill pad is 19.1 m from the existing HV tower stays and this has been communicated to Powerlink via the Applicant.
Vertical Clearance 132 kV Powerlines	There must be a minimum of 6.7 m between the trafficable surface and the overhead 132 kV electrical line (Electrical Safety Standards).
Minimum Slope of Pad	0.5% to ensure the pad freely drains to the north to eliminate ponding issues. Discussed further in Section 3.0.
Flood Immunity	0.5% Annual Exceedance Probability (AEP) event adopted as the design event. Discussed further in Section 3.0.
Freeboard	300 mm freeboard adopted, aligns with current industry standards. Discussed further in Section 3.0
Height of Bund Wall (top width) + Freeboard	Approx. 400 mm high (due to the shallow depth of water over the site, including 300 mm freeboard). The bund wall is located largely on the southern side of the pad to protect the cut face, tying into existing / natural surface on the western and eastern side of the pad. Discussed further in Section 3.0.

2.4 Outcomes

Adopting the above criteria, the pad design was progressed to a concept design and design vehicle movements assessed for the adopted design vehicle.

A concept design has been completed to support the Development Application process. For additional information, including type sections and details, reference should be made to the Concept Design Drawings (refer Appendix A).

2.5 Stageability Considerations

As noted by the Applicant, the Project may be constructed in more than one stage. For the purpose of the civil design and flooding assessment, the ultimate built out area has been considered.

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3.0 Flooding Assessment

3.1 Overview

3.1.1 Catchment Characteristics

The Project site located to the north of the Bouldercombe township along the Burnett Highway, has ground surface levels around 55 mAHD to 60 mAHD (refer Figure 8). Two creeks traverse to the east and west of the study area - Gavial Creek and an unnamed tributary of Four Mile Creek, respectively.

Rainfall from the Upper reaches of Bouldercombe Gorge accumulate within the upper reaches of Gavial Creek and tend south, remaining on the eastern side of the project site. On the western side of the catchment, flows accumulate within the upper reaches of the catchment, accumulate and tend south before combining with Four Mile Creek (to the north of the project site). Across the catchment, several farm dams are fed by various tributaries of the two main creek sub-catchments.

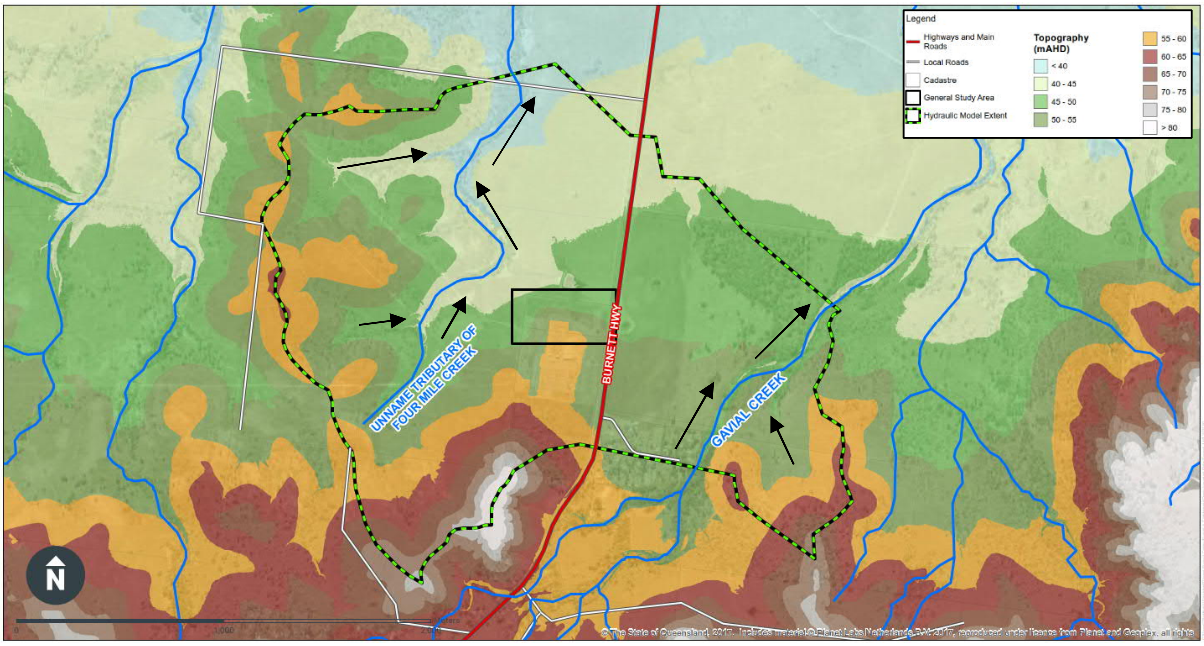

Figure 8 Catchment Overview

3.1.2 Design Criteria

There are two key hydraulic criteria required for the Project:

- The fill pad is to provide 0.5% AEP flood immunity (with provision for freeboard); and
- The Project is not to result in nuisanceable impacts outside of the allotment boundaries.

3.1.3 Limitations and Assumptions

The following limitations apply to the modelling undertaken, for the assessment of flooding impacts:

- Assessment undertaken for catchment / regional flooding only;
- Use of existing XP-RAFTS model (source) for input of flows (from Gavial Gracemere Road Link Planning Study – AECOM, 2012);
- Only major culverts under the Burnett Highway are represented;
- Only an assessment of the 0.5% AEP Event was undertaken;
- Storm durations from 0.5 hours to 9 hours were modelled to determine the critical storm duration;
- Model calibration and validation was not undertaken in the absence of historical data; and,
- Hydrologic and hydraulic modelling is based on methods and data outlined in Australian Rainfall and Runoff (ARR) 1987.

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3.2 Hydrologic Modelling

An existing XP-RAFTS model (built and adopted for the Gavial Gracemere Road Link Assessment) was adopted for the hydrologic assessment for the project site. Reference is made to the Yeppen Floodplain Upgrade Project – Business Case Hydraulic Assessment Report (Preliminary Design) (AECOM, 2012) for further information regarding the XP-RAFTS model.

Shown in Figure 9, the project site (shown as a red circle) is located within sub-catchment 1 which is downstream of sub-catchments 10.2.1, 10.2.2 and 10.2.3. The total flow from these catchments was extracted from the hydrologic model and applied to the hydraulic (TUFLOW) model (refer below for further discussion regarding the hydraulic assessment).

As noted above, the design flood event was the 0.5% AEP event. To generate the inflows hydrographs for the 0.5% AEP event, a factor of 1.14 was applied to the 1% AEP rainfall (Australian Rainfall and Runoff 1987, A Guide to Flood Estimation, Table 8.3.2).

Within the XP-RAFTS model, site specific design rainfall intensities, or Intensity Frequency Duration (IFD) data, was determined using the design rainfall isopleths from Volume 2 of Australian Rainfall and Runoff (AR&R, 2001). The IFD input data set was obtained for the catchment (150.5333 E, 23.3667 S) and are shown in Table 2. Further discussion regarding IFD data used within the hydraulic model is included within Section 3.3.3

Table 2 Adopted IFD Parameters (XP-RAFTS)

Parameter Value	Parameter Value
1 hour, 2 year intensity (mm/hr)	44.9
12 hour, 2 year intensity (mm/hr)	8.93
72 hour, 2 year intensity (mm/hr)	2.63
1 hour, 50 year intensity (mm/hr)	85
12 hour, 50 year intensity (mm/hr)	17.94
72 hour, 50 year intensity (mm/hr)	6.10
Average Regional Skewness	0.22
Geographic Factor, F2	4.22
Geographic Factor, F50	17.7

Standard techniques from ARR 1987 were used to determine rainfall intensities up to the 12-hour duration for a range of magnitudes including the 1% AEP event. For the purpose of this assessment, the 1% AEP data and the adopted 0.5% AEP calculated IFD data is shown in Table 3.

Table 3 Intensity Frequency Duration Data (XP-RAFTS)

Duration (hr)	Intensity (mm/hr)	
	1% AEP	0.5% AEP
0.5	136.5	155.6
0.75	116.1	132.4
1	100.0	114.0
2	65.0	74.1
3	51.0	58.1
6	32.9	37.5
9	25.5	29.1
12	21.3	24.3

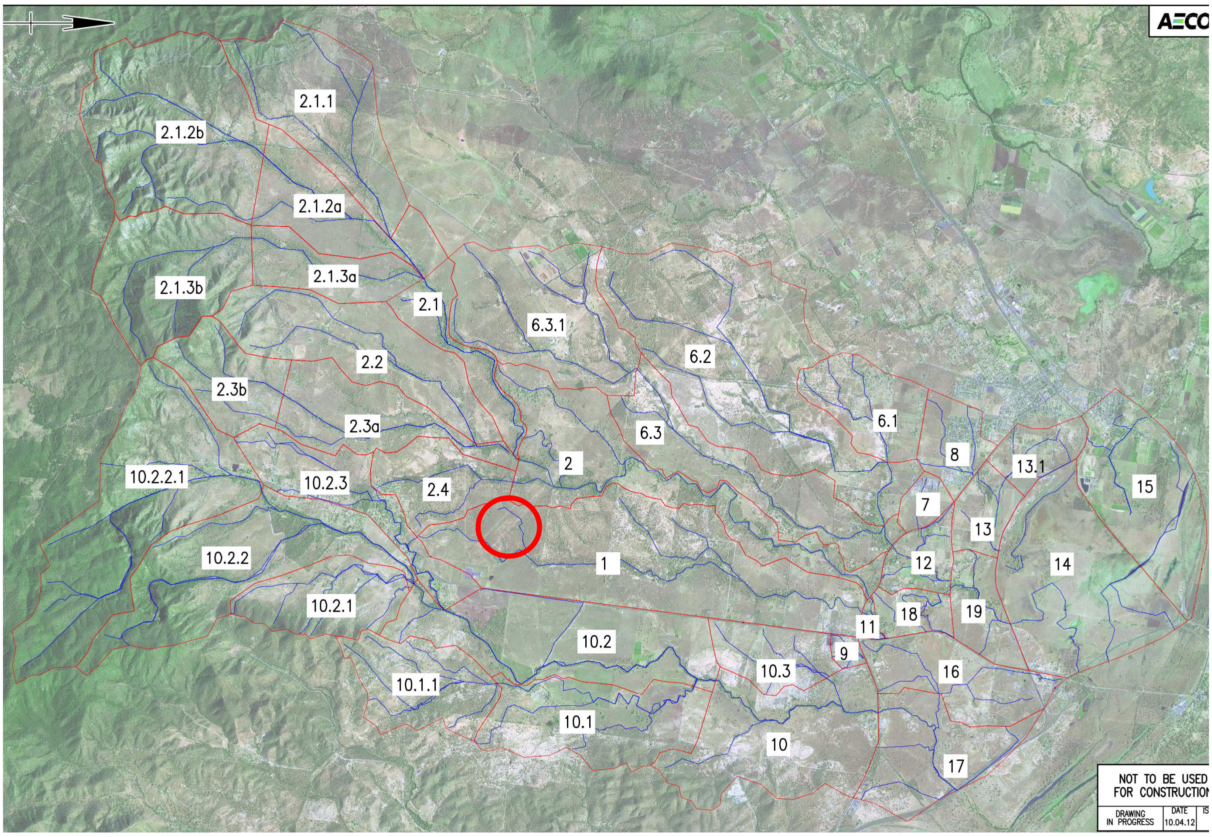

Figure 9 XP-RAFTS Catchments (AECOM, 2012)

3.3 Hydraulic Modelling

3.3.1 Overview

Hydraulic modelling was undertaken using the TUFLOW software platform. The modelling approach adopted is TUFLOW HPC (GPU). Details associated with the model development can be found in the sections below, with an overview of the model and parameters provided in Table 4.

Table 4 Hydraulic Model Overview

Parameter	
Completion Date	December 2020
AEP's Assessed	0.5% AEP Event
Durations Assessed	0.5, 0.75, 1, 2, 3, 4.5, 6 and 9 hour (A 'Max:Max' analysis was undertaken, whereby results from all storm durations were compared and the maximum flood levels extracted at each cell within the model domain).
Hydrologic Modelling Approach	Direct Rainfall (refer Section 3.3.3) and Inflows (refer Section 3.3.2)
Hydraulic Model Software	TUFLOW HPC (GPU) Version 2020-01-AB-iSP-w64
Grid Size	2 m
DEM (year flown)	1 m LiDAR (2015) (Sourced from ELVIS – Elevation and Depth – Foundation Spatial Data, https://elevation.fsdf.org.au/)
Roughness	Spatially varying values
Eddy viscosity	SMAGORINSKY (default)

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Parameter	
Model Calibration and Validation	Nil
Model boundaries	Inflow and Outflow Boundary Conditions (refer Section 3.3.2)
Timesteps	2.5 seconds in the 2D domain; and 1.0 second in the 1D domain
Wetting and drying depths	Cell centre 0.0002 m (default)
Cut-off Depth	75 mm

3.3.2 Catchment Delineation, Inflow and Outflow Locations

Sourced from ELVIS, 1 m LIDAR data, captured in 2015 was used to delineate the catchment boundary (refer Figure 10). As the XP-RAFTS model was built in 2012 using the available data at the time, the recent 2015 ELVIS data was used as the most accurate reflection of the existing topography.

The inflow boundary condition was represented as discharge versus time (Q v T) inflow type. The flow from the hydrologic model was applied at the upstream boundary of the TUFLOW model, as shown in Figure 10.

The downstream boundaries for the model were digitised as shown in Figure 10. A downstream boundary condition representing a water level (head) versus flow (Q) (H v Q) was applied.

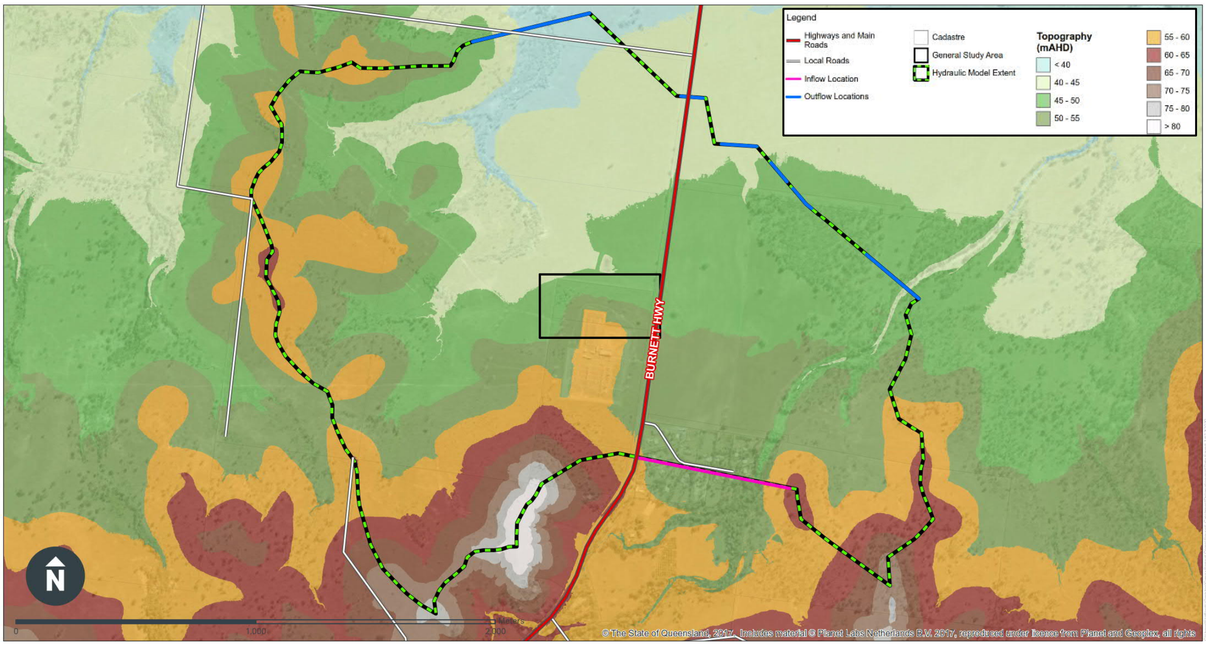

Figure 10 Catchment Delineation, Inflow and Outflow Locations

3.3.3 Design Rainfall Applied to the 2D model domain

Design rainfall data was sourced from the BoM online IFD tool. IFD parameters required to determine rainfalls for events were sourced using a single set of parameters, derived at the location (150.4876 E, 23.5351 S).

Standard techniques from ARR 1987 were used to determine rainfall intensities up to the 12-hour duration for the 1% AEP event. Given that the design flood event was the 0.5% AEP event, to generate the design rainfall for the 0.5% AEP event, a factor of 1.14 was applied to the 1% AEP rainfall (Australian Rainfall and Runoff 1987, A Guide to Flood Estimation, Table 8.3.2).

3.3.4 1D Model Network

The 1D model network is based on the site visit undertaken (November 2020). Two box culverts 1200 mm wide by 450 mm high were located under the Burnett Highway directly south-east of the proposed site. These were included in the hydraulic model.

3.3.5 Roughness

The hydraulic roughness represents the different types of land use and ground cover that exist within the model extent and thus the variation in flow resistance across the model. Hydraulic roughness has been represented in the model with a Manning's 'n' value. The roughness categories have been adopted from similar TUFLOW models. Roughness values for each land use category adopted in the model also included depth varying roughness.

Table 5 Hydraulic Roughness

Category	Adopted Roughness
Open Space – Minimal Vegetation	0.1
Open Space – Moderate Vegetation	0.1
Sealed Road / Car Park / Pavement	0.02
Residential (Lower Density)	0.08

3.4 Hydraulic Modelling Outcomes

3.4.1 Critical Duration

Utilising the range of durations modelled in TUFLOW, it was determined that the critical duration for the site was the 60-minute event. However, for the purposed of this assessment, the maximum depth for all durations was calculated and adopted.

3.4.2 Existing Conditions (Baseline)

Following the development of the model, the existing conditions were assessed in TUFLOW. This shows that the proposed site is not subject to regional flooding during a 0.5% AEP event (refer Figure 11).

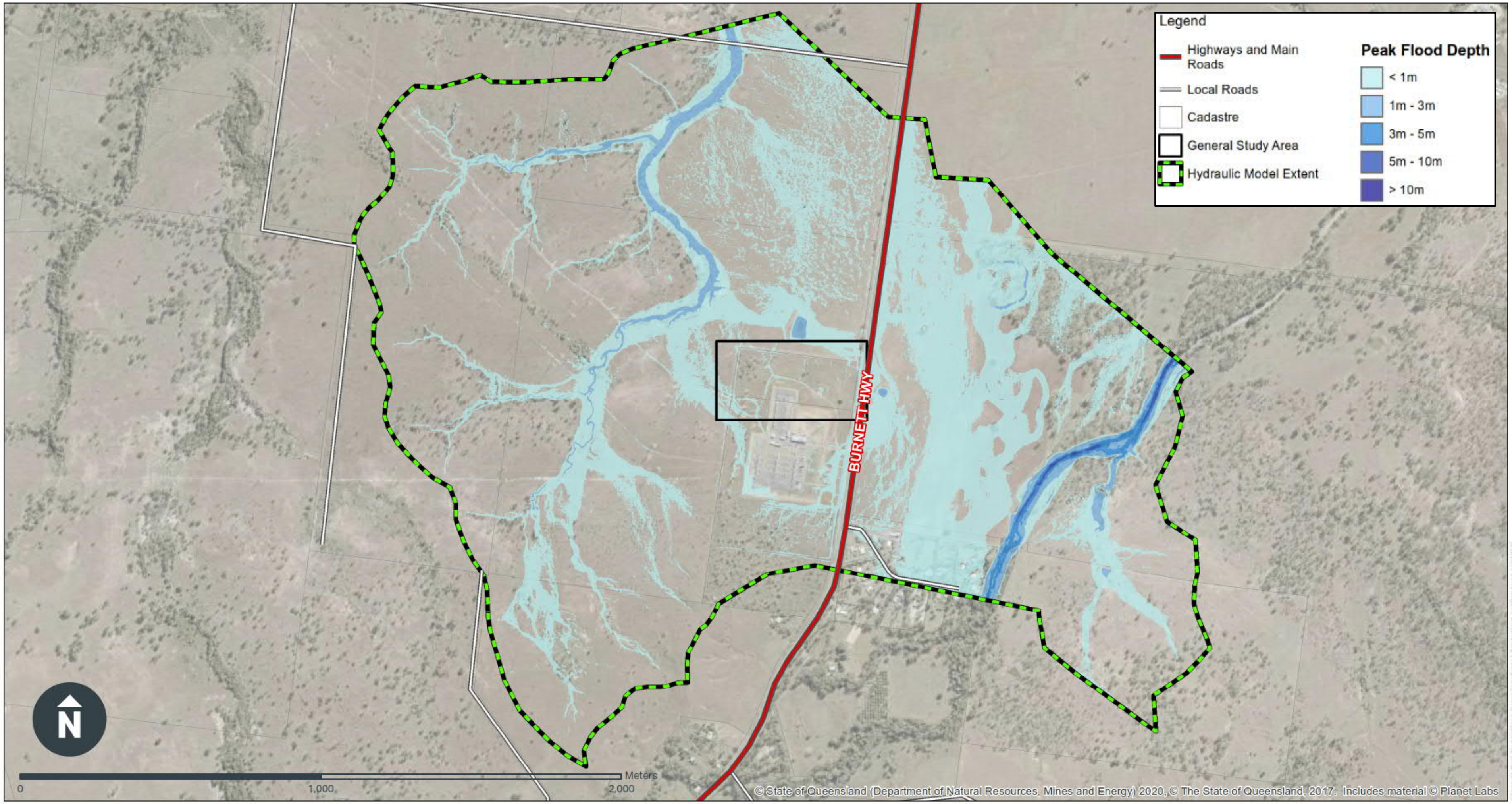

Figure 11 **Baseline: Peak Flood Depth (0.5% AEP Max:Max Event)**

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3.4.3 Post Construction Conditions (Developed Case)

The proposed civil works were incorporated into the TUFLOW model and the 0.5% AEP flood event was simulated to determine if there was any impact on external flooding due to the proposed works.

Figure 12 shows the flood depths for the developed case, with Figure 13 showing the difference in water levels due to the development. The model results show that there are not predicted to be any off-site changes to flood levels in the 0.5% AEP event due to the Project.

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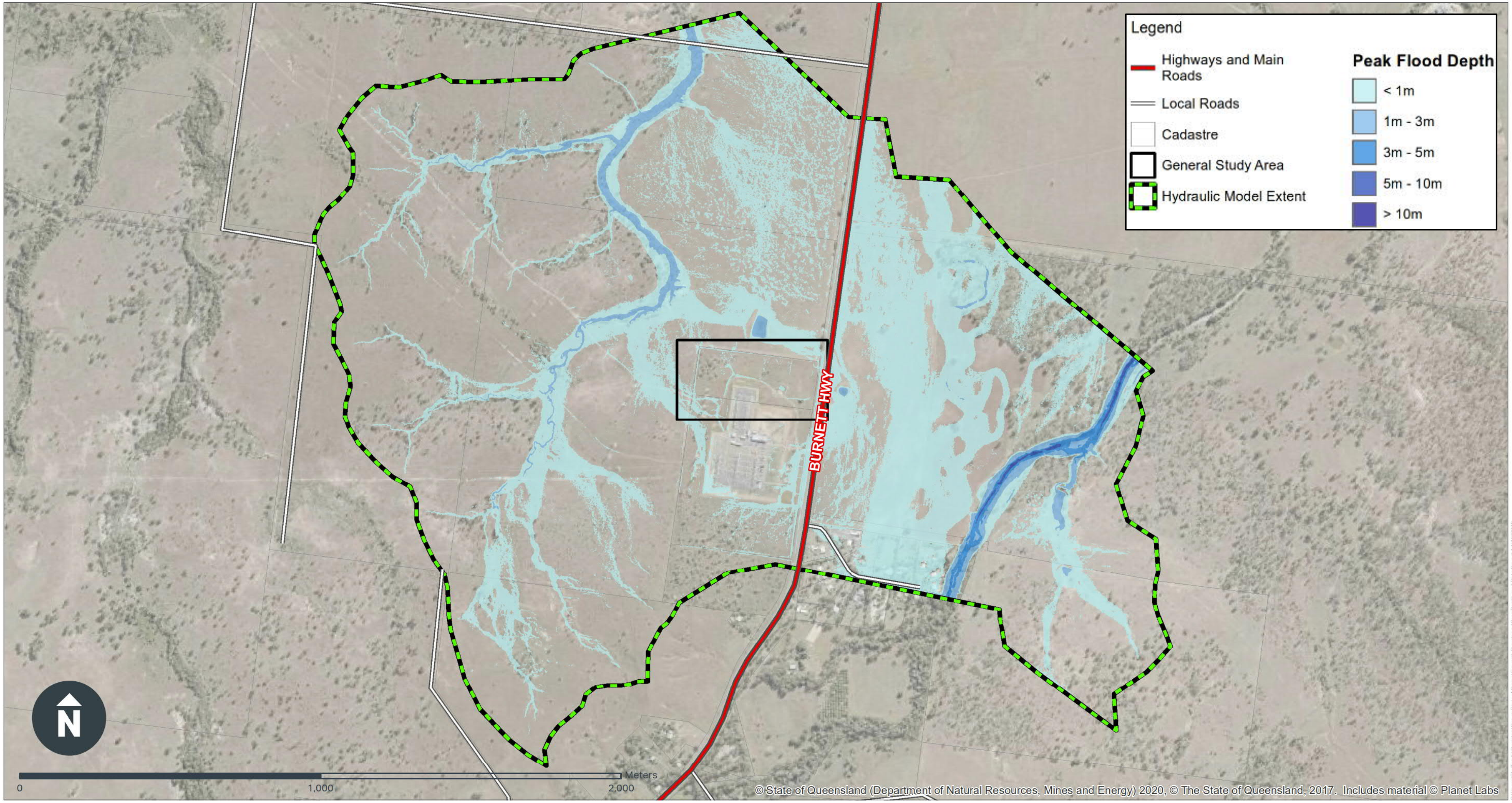

Figure 12 Developed Case: Peak Flood Depth (0.5% AEP Max:Max Event)

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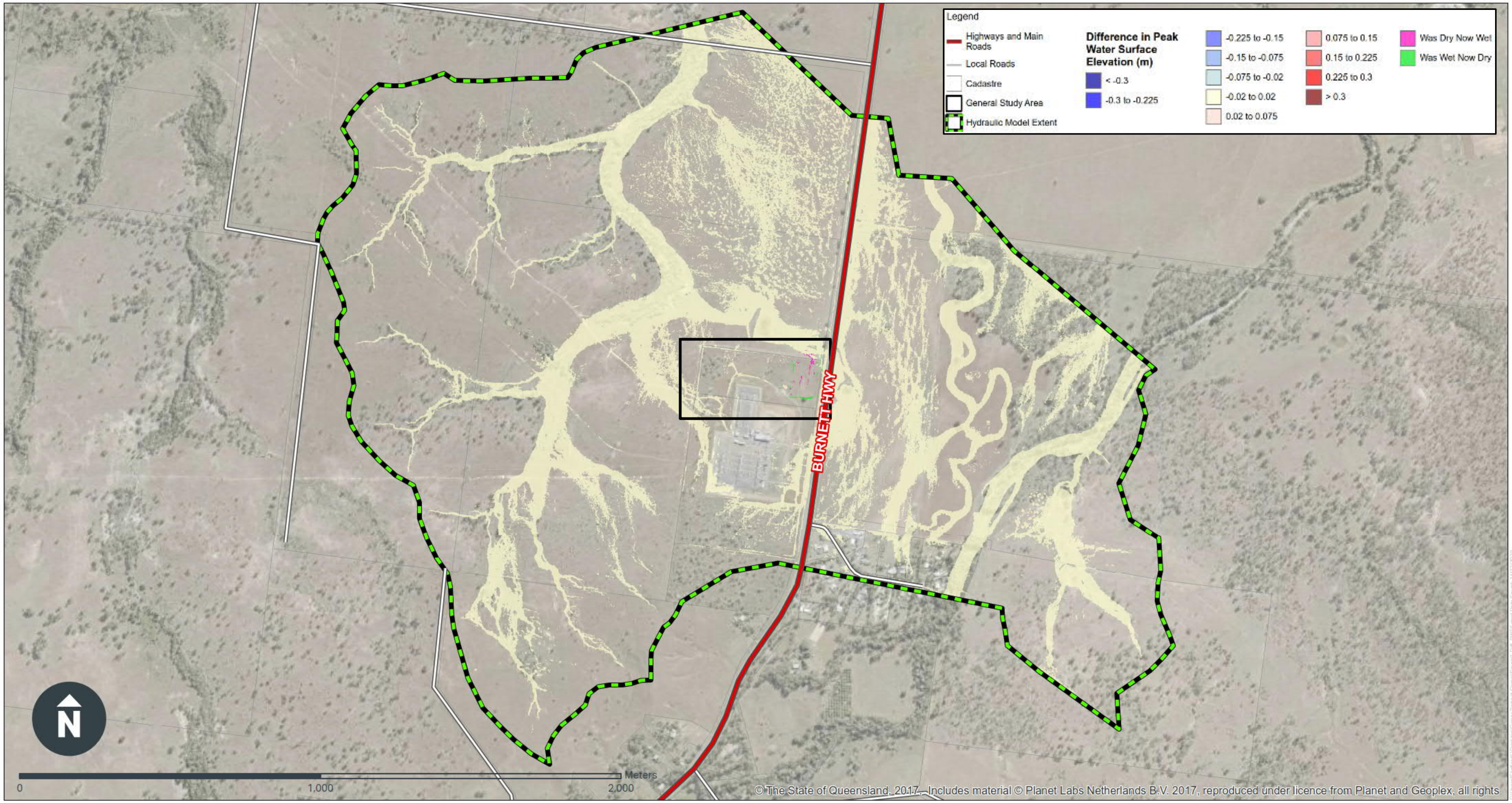

Figure 13 Developed Case minus Baseline: Difference in Peak Water Surface Elevation (0.5% AEP Max:Max Event)

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4.0 Concept Stormwater Management Plan

4.1 Overview

In addition to the progression of the civil design and flooding assessment, AECOM has prepared a concept stormwater management plan (SMP) to support the Development Approval for RRC.

The scope of works for this SMP includes:

- Assessment of the impacts of the development on flooding (as documented in Section 3.0);
- Concept mitigation measures to minimise impacts on local flooding;
- Assessment of the impacts of the proposed development on stormwater quality;
- Appropriate stormwater treatment measures to meet RRC guidelines; and,
- Determination of the effectiveness of stormwater treatment measures.

4.2 Rockhampton Regional Council Planning Scheme

The RRC Planning Scheme (2015), Schedule 6 Planning Scheme Policies, Section 18 Stormwater Management Planning Scheme Policy is to be considered when assessing applications identified by the works code and stormwater management code. The purpose of the planning scheme policy is to provide guidance in relation to the provision of stormwater infrastructure for development in order to ensure stormwater infrastructure design and construction satisfies RRC's Desired Standard of Service (DOS) requirements and environmental and safety expectations.

The stormwater drainage system must:

1. Prevent or minimise adverse social, environmental, and flooding impacts on waterways, overland flow paths and the constructed drainage network;
2. Ensure that the design of channel works and other stormwater management measures is integrated with natural catchment features and maximises the use of natural channel design principles where possible;
3. Achieve acceptable levels of stormwater run-off quality by applying water sensitive urban design principles as part of catchment based total water cycle management approach; and,
4. Seek to maintain the catchment hydrograph as close as possible to natural conditions to reduce adverse impacts associated with the reduction of time to peak flows and increased flow volume.

Given the requirement for developments to comply with the DOS, environmental and safety expectations, as discussed above, the following assessment of the pre- and post-construction stormwater drainage was undertaken.

It is a requirement of the RRC development guidelines that a development does not cause any adverse impacts on stormwater runoff quantity or quality. To ensure the proposed development meets this requirement, a conceptual SMP has been developed, to improve or minimise impacts on stormwater quantity and quality.

Further details of the SMP are discussed below.

4.3 Site Based Stormwater Management Plan

The site topography generally grades down from the south to the north with an approximate slope of between 4%. Ground levels on site range from approximately 55 mAHD to 60 mAHD. The site currently consists of undeveloped land with natural grass cover and sparse trees / shrubs.

As no geotechnical information is available at this early stage of project development, the soil characteristics for the site are unknown. It is likely that geotechnical investigations will be carried out during detail design phase. The SMP may change once the results of these investigations are available.

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4.3.1 Existing Site Drainage

In large magnitude flood events, surface runoff flows from south to north on either side of the Burnett Highway and does not encroach on the project site. Flows cross the Highway from east to west through two 1200 mm x 450 mm RCBCs, once the capacity of a small farm dam on the eastern side of the highway is exceeded. The RCBC's outlet to the south of the proposed site and flow travels towards a second agricultural dam before combining with runoff from the unnamed tributary of Four Mile Creek.

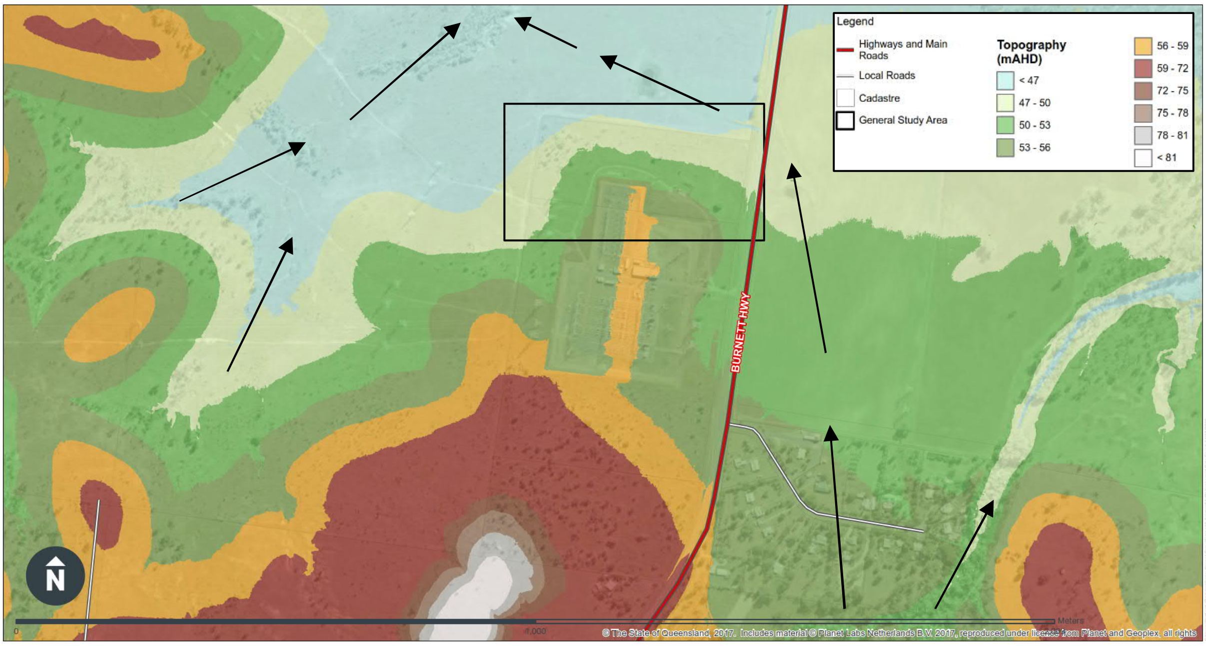

Figure 14 Existing Site Drainage

4.3.2 Proposed Site Drainage

The proposed site drainage, as shown in the Concept Design Drawings (refer Appendix A) largely remains similar to the existing site drainage where possible (refer Figure 15). The following key points are noted:

- **Pad Slope:** As noted in Section 2.3, to discharge overland flow from the pad itself, a 0.5% slope has been adopted to direct sheet flow north in a similar direction to existing (i.e. combines with the existing flow path north of the site which tends east to west from the culvert under the Burnett Highway).
- **Earth Bund:** As noted in Section 2.3, to manage overland flow from the small localised sub-catchment south of the pad, a 400 mm high grassed earth bund is to be constructed to direct flow around the pad to the south of the site in a similar direction to existing (i.e. combines with the existing flow path north of the site which tends east to west from the culvert under the Burnett Highway). The earth bund is to be connected into the access track with a 450 x 375 RCBC culvert to direct flows underneath the existing access track to the north east. The culvert sizing adopted during Concept Design is indicative and is recommended to be confirmed during Detailed Design.
- **Burnett Highway Drainage:** No changes to the existing cross drainage and longitudinal drainage is required due to the development.
- **Site Access:** As noted in Section 2.3, a new access track will be constructed from the existing access to the battery storage pad. Runoff from the small localised sub-catchment to the west of the new access road will be collected via a nominal table drain and conveyed from south to north to the new 450 x 375 RCBC.
- **Potential for Contaminated Runoff:** For the purpose of the concept design, it was assumed that no contaminated runoff will be created due to the development, however this is recommended to be confirmed during future design phases.

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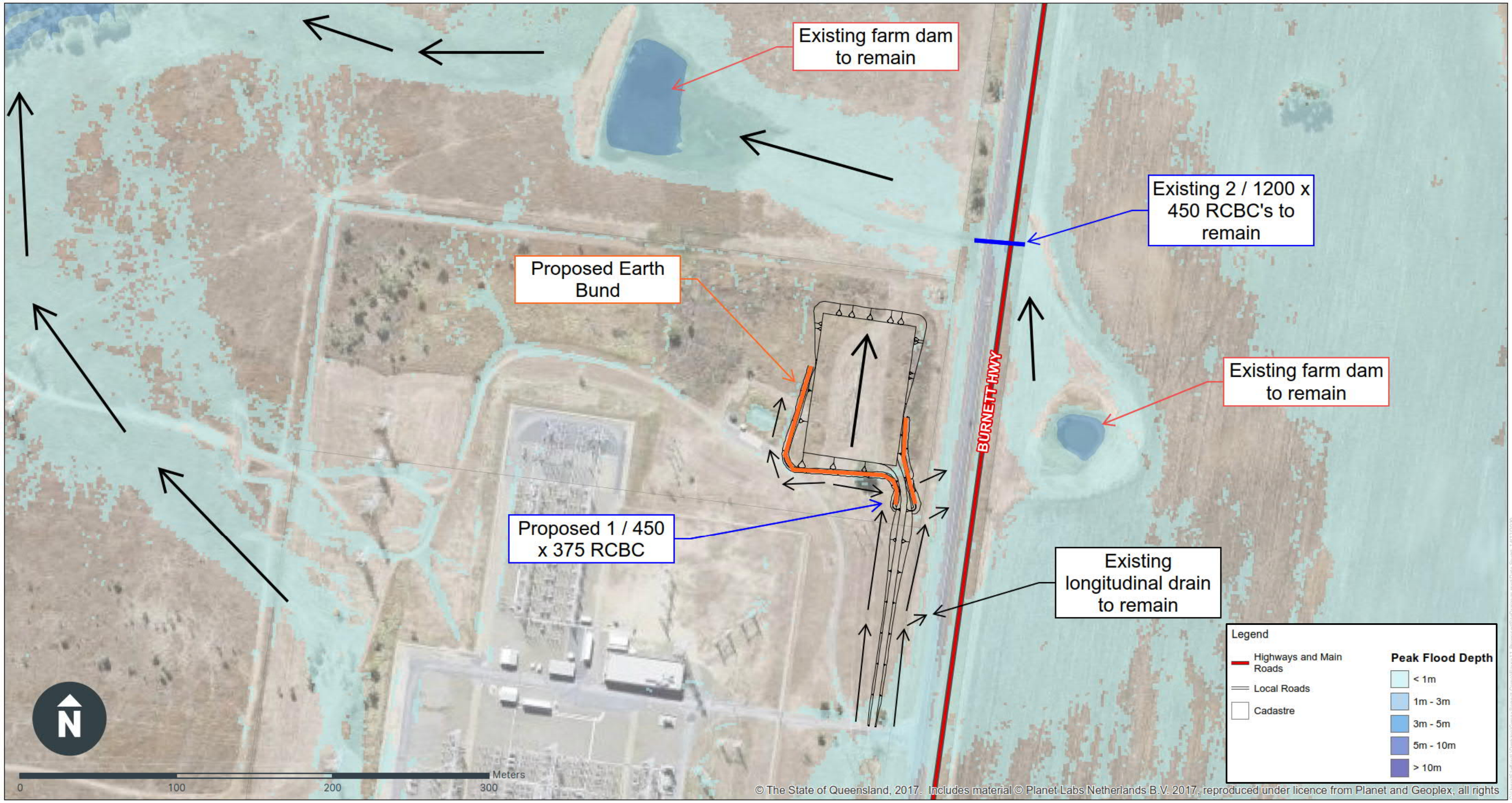

Figure 15 Proposed Site Drainage (0.5% AEP Regional Catchment Flood Extent shown)

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4.3.3 Erosion and Sediment Control

The design of erosion and sediment control measures shall be undertaken during detail design in accordance with *Soil Erosion and Sediment Control: Engineering Guidelines for Queensland Construction Sites* (IEAUST, 1996) the International Erosion Control Association (IECA) Australasia Guidelines.

4.4 Stormwater Quantity Assessment

As discussed within Section 3.0, a hydrologic and hydraulic assessment was undertaken for the proposed design. Whereby the assessment of the pre- and post-conditions was undertaken for the local catchment flooding. Refer Section 3.0 for further discussion regarding the outcomes of the hydraulic assessment. It is noted that no mitigation works were required to offset changes to external catchment runoff.

5.0 Stormwater Quality Assessment

It is noted that a Stormwater Quality Assessment has not been undertaken at this stage. It is therefore recommended that a MUSIC model is developed and used to assess the effectiveness of stormwater quality measures in the next design phase.

6.0 Conclusions and Recommendations

6.1 Conclusions

Throughout this assessment, the initial design for the Project was progressed to a high-level concept design, noting that the Project is currently expected to be constructed across stages. A high-level hydraulic and stormwater assessment was undertaken in addition to the progression of the civil design for the Project. Given that the design is a high-level assessment, several recommendations have been made to be carried over to future design and construction stages (refer below).

6.2 Recommendations

The following recommendations were made during the concept design assessment:

- A conservative estimate for the adopted design vehicle was made during the Concept Design (25m semi-trailer) however this will need to be confirmed.
- Further consideration for works (including potential gate and access widening) is required to be undertaken during future design phases, once the design vehicle is confirmed.
- A MUSIC model is to be developed and used to assess the effectiveness of stormwater quality measures. It is expected that the proposed grassed diversion bunds and open swales will be effective in managing stormwater quality objectives.

7.0 References

AECOM, 2012, Yeppen Floodplain Upgrade Project – Business Case Hydraulic Assessment Report (Preliminary Design)

Australian Rainfall and Runoff 1987, A Guide to Flood Estimation

ELVIS – Elevation and Depth – Foundation Spatial Data, https://elevation.fsdf.org.au/

Ergon Energy and Energex, Electricity Entity Requirements: Working Near Overhead and Underground Electric Lines

Rockhampton Regional Council Planning Scheme, 2015, Schedule 6 Planning Scheme Policies, Section 18 Stormwater Management Planning Scheme Policy

Soil Erosion and Sediment Control: Engineering Guidelines for Queensland Construction Sites (IEAUST, 1996) the International Erosion Control Association (IECA) Australasia Guidelines

8.0 Closing Remarks

Please feel free to contact the undersigned with any queries.

Ben McMaster, Associate Director

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Appendix A – Concept Design Drawings

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NOT FOR CONSTRUCTION

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This drawing is confidential and shall only be used for the purposes of this project.

REVISIONS

No.	BY	DATE	DESCRIPTION	APPD

Scale

SCALE A 0 10 20 30 40 50m — 1 : 2000 (A3) 1 : 1000 (A1)

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE AECOM QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED		CHECKED	
DRAWN		CHECKED	
APPROVED	*	DATE	

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CAD REF: 60644664-1000-04-GA.dwt
Last Modified: Tue, 15 Dec 2020 11:34 am

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