



DECISION NOTICE
AP2023/013

Decision notice

Application details:

Application type	SDA application for reconfiguring a lot (2 into 3 lots) and operational work for native vegetation clearing
Reference #	AP2023/013
Proponent	Cleveland Bay Industrial Park Pty Ltd C/- Milford Planning
Land subject of the SDA application	46 Colinta Road, 63 Heleen Downs Road and 249E Heleen Downs Road, Stuart Part Lot 36 SP341877 Lot 31 on SP341877
State development area	Townsville State Development Area
Decision date	11 September 2024
Currency period	11 September 2028

Decision details:

In accordance with section 84E of the *State Development and Public Works Organisation Act 1971*, the Coordinator-General has decided to **approve with conditions** all of the above SDA application for reconfiguring a lot (2 lots into 3 lots) and operational work for native vegetation clearing.



Gerard Coggan
Coordinator-General

SDA approval – Reconfiguring a lot conditions

Condition 1 - approved plans and documents		Timing
1.1	Carry out the approved development generally in accordance with the approved plans and documents as referenced in Table 1 (including any amendments marked in red), except insofar as modified by any of the conditions of this approval.	<i>To be maintained at all times</i>

Table 1 – approved plans and documents for reconfiguring a lot

Title	Prepared By	Drawing No	Revision	Date
Proposed Reconfiguration Lots 31, 35 and 37 cancelling future Lots 31 and 35	Rowlands Surveys	43811/83	B	19/12/2023
Lot 35 Access Road Wetlands Protection Area	Langtree Consulting	LOT 35 – 100	A	5/07/2023
Stage 4 Access Road Overall Layout Plan	Langtree Consulting	STAGE 4-R-001	E	22/08/2024
Cleveland Bay Industrial Park: Lots 31, 35 & 37 – Flood Impact Assessment	Venant Solutions	N/A	N/A	23/08/2024
Figure 4: Ground-truthed Vegetation	Terra Solutions	N/A	N/A	19/12/2023

Condition 2 – grant easements		Timing
2.1	Register an access easement to allow pedestrian and vehicle access, on-site manoeuvring and connection of services and utilities for benefit of Lot 37 over burdened Lot 35.	<i>To be lodged with the Plan of Subdivision</i>
2.2	Drainage easement(s) must be provided in accordance with Part 9.3.2 Healthy waters code of the Townsville City Plan in favour of council over the stormwater drainage system. An easement is also to be provided over the existing waterway and drainage line forming the discharge waterway through the development parcel of Lot 35.	<i>To be lodged with the Plan of Subdivision</i>
2.3	An easement must be provided in favour of the Coordinator-General for future drainage works to permit the construction of SW_06 Stormwater Relief Channel, as identified in the Townsville State Development Area Infrastructure Plan (May 2018).	<i>To be lodged with the Plan of Subdivision</i>
2.4	Register with the plan of subdivision, any necessary surrender of existing easements and/or leases in connection with the subdivision.	<i>To be lodged with the Plan of Subdivision</i>
2.5	The extent and location of easements, reserves and surrenders required in conditions 2.1, 2.2, 2.3 and 2.4 will, as far as possible, be determined prior to issue of the development permit for Operational Work or upon completion of works if subsequently found necessary.	<i>To be lodged with the Plan of Subdivision</i>

Condition 3 – infrastructure contributions or infrastructure agreement		Timing
3.1	Pay to Townsville City Council any outstanding charges or expenses applied over the subject land, including infrastructure charges.	<i>Prior to submitting the Plan of Subdivision</i>

Condition 4 – offsets		Timing
4.1	Enter into an agreed delivery arrangement to deliver an environmental offset in accordance with the Environmental Offsets Act 2014 to counterbalance the significant residual impacts on the matter/s of state environmental significance being 2,003.4m ² of marine plants.	<i>Prior to commencement of site works</i>

Condition 5 – balance lot		Timing
5.1	Areas within Lot 37 (balance lot) are to be retained as a development free zone (unless otherwise approved or developed by the Coordinator-General). There is to be no permanent development, other than fencing, landscaping, coastal protection works, stormwater drainage outlets and works to access Lot 35 constructed within Lot 37 (unless otherwise approved or developed by the Coordinator-General). <i>Note: No coastal protection works are permitted under this SDA approval; separate approvals should be sought for coastal protection works.</i>	<i>At all times</i>

Condition 6 – inspection		Timing
6.1	Permit the Coordinator-General, or any person authorised by the Coordinator-General, to inspect any aspect of the development.	<i>At all times</i>

Condition 7 – complaints		Timing
7.1	Record all complaints received relating to the development in a register that includes, as a minimum: (a) date and time when complaint was received (b) complainant's details including name and contact information (c) reasons for complaint (d) investigations undertaken and conclusions formed (e) actions taken to resolve this complaint, including the time taken to implement these actions (f) include a notation to the register as to the satisfaction (or dissatisfaction) of the complainant with the outcome.	<i>At all times</i>
7.2	Prepare and provide a response to the complainant within 48 hours of receipt of the complaint.	<i>As indicated</i>
7.3	Provide an up to date copy of the register to the Coordinator-General as part of a request for the approval of the plan of subdivision.	<i>As indicated</i>
7.4	Provide an up to date copy of the register if requested by the Coordinator-General.	<i>As indicated</i>

Condition 8 – services and utilities		Timing
8.1	Provide and maintain a reticulated water supply in the frontage of Lot 31 and Lot 35, and connect to Townsville City Council's infrastructure in accordance with the reconfiguring a lot code and works code of the Townsville City Plan. <i>Note: Townsville City Council does not permit the direct connection of pump systems to water mains for firefighting purposes.</i>	<i>Prior to submitting the Plan of Subdivision</i>
8.2	Provide and maintain a connection for Lot 31 and Lot 35 to Townsville City Council Council's sewer infrastructure. The connection to Townsville City Council's low pressure sewer system shall be at the boundary.	<i>Prior to submitting the Plan of Subdivision</i>

	<i>Note: An end user is to provide privately owned pressure sewer equipment that generally consist of a suitably sized tank with 36-hour storage capacity, a positive displacement or 2-stage centrifugal grinder pump with minimum 1.75L/s flow rate up to approximately 38m head, electrical control/alarms, property discharge lines and boundary kit in accordance with drawings SEQ-PSS-1100-2, SEQ-PSS-1101-1 and SEQ-PSS-1102-1.</i>	
8.3	Provide electricity and telecommunications services for Lot 31 and Lot 35 approved by the relevant authority.	<i>Prior to submitting the Plan of Subdivision</i>
8.4	Existing services for each allotment must be contained within the individual allotments. Any existing water meters must be contained within the individual allotment which they service and at the property road frontage.	<i>Prior to submitting the Plan of Subdivision</i>
8.5	Any relocation and/or alteration to any public utility installation required as a result of any works carried out in connection with this development must be carried out at no cost to Townsville City Council or other public sector entity, except where the terms of a registered easement stipulate otherwise.	<i>Prior to submitting the Plan of Subdivision</i>

Condition 9 – minimum lot levels		Timing
9.1	All industrial allotments and the proposed internal access road must be above the Defined Flood Event (DFE) and/or the defined Storm Tide Event (STE) in accordance with the Townsville City Plan, whichever is greater.	<i>Prior to submitting the Plan of Subdivision</i>

Condition 10 – proposed internal access road		
10.1	The proposed internal access road must generally comply with the plan titled “Stage 4 Access Road Overall Layout Plan” prepared by Langtree Consulting dated 22/08/2024 and referenced in Table 1 to condition 1 of this approval, unless otherwise specified by conditions of this approval.	<i>Prior to submitting the Plan of Subdivision</i>
10.2	Culvert 4 as shown on plan titled “Stage 4 Access Road Overall Layout Plan” prepared by Langtree Consulting dated 22/08/2024 and referenced in Table 1 to condition 1 of this approval, must be redesigned to: (a) align and match the direction of flow and gradient of the floodplain within the local area so as to avoid a skew culvert arrangement (b) generally match adjacent culvert heights in order to limit the potential for blockages and maintain consistency in culvert design criteria for the road access (c) increase cross drainage conveyance for the purposes of reducing culvert flow velocities to be commensurable with adjacent culvert groups (d) maintain non-worsening in discharge conditions and no adverse flood impacts to the southern dam localities and associated existing infrastructure.	<i>Prior to commencement of site works</i>
10.3	Culvert erosion control, including rock size and apron size and length, must be designed in accordance with the Queensland Urban Drainage Manual (current edition). Erosion control measures must also be provided to suitably cater for overtopping of the proposed internal access road by flood flows.	<i>Prior to commencement of site works</i>
10.4	Prepare a revised hydraulic design report by a suitably qualified and experienced Registered Professional Engineer of	<i>Prior to commencement of site works</i>

	Queensland (RPEQ) hydraulic engineer that incorporates conditions 10.1 – 10.3. Submit to the Coordinator-General the revised hydraulic design report.	
10.5	The revised hydraulic design report required by condition 10.4 is to be submitted to: (a) Coordinator-General for endorsement prior to lodging an operational work application (b) Townsville City Council as part of an operational work application.	<i>As indicated</i>

Condition 11 – civil drawings		Timing
11.1	Prepare civil engineering drawings by an RPEQ for the proposed works including both precinct fill earthworks plans as well as road layout plans and corresponding longitudinal profiles that clearly show the following: (a) precinct fill earthwork quantities and levels, including flood levels to demonstrate compliance to the stated hydraulic design criteria and minimum lot level requirements of condition 9.1 (b) road design levels and heights, including design flood levels in order to demonstrate compliance to the stated hydraulic road design criteria and requirement of condition 9.1, including: (i) Road cross section and batter extents and grades (ii) Erosion and scour protection measures proposed for the road embankment and formation (iii) Extent of erosion/scour protection measures proposed for cross drainage structures, including associated details and dimensions (c) Lateral drainage channels proposed upstream and downstream of the road formation, including cross sections, grades and longitudinal profiles. The drawings must not include any earthworks on lands external to the site, including the unformed road easement (unless otherwise approved by Townsville City Council), and Lot 105 SP253485 to the immediate south of the proposed road and fill pad. <i>Note: the stated hydraulic design criteria means that stated in the flood impact assessment referenced in Table 1, Condition 1 of this approval, except where a hydraulic design report has been approved in accordance with condition 10.4 of this approval.</i>	<i>Prior to commencement of site works</i>
11.2	The waterway and drainage line traversing through the site forming the discharge waterway for the existing dam located on Lot 105 SP253485, to the immediate south, must be retained and all proposed earthworks must be setback an appropriate width based on hydraulic design criteria to preserve ongoing conveyance properties of the waterway and to maintain no worsening in erosion and scour conditions of the waterway.	<i>Prior to commencement of site works</i>
11.3	Submit to the Coordinator-General and Townsville City Council RPEQ certified engineering drawings prepared in accordance with conditions 11.1 and 11.2. <i>Note: drawings must reference SDA approval number AP2023/013 and be provided to:</i>	<i>Prior to commencement of site works</i>

	Coordinator-General – sdainfo@coordinatorgeneral.qld.gov.au Townsville City Council – developmentassessment@townsville.qld.gov.au	
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Condition 12 – stormwater drainage and water quality		Timing
12.1	The development is required to achieve non-worsening and no actionable nuisance in terms of stormwater quantity and stormwater quality for the major and minor events as defined by the Townsville City Plan.	<i>At all times</i>
12.2	The development is required to achieve non-worsening and no actionable nuisance to existing infrastructure, including infrastructure located on Lot 105 SP253485 and electrical infrastructure located on Lot 37 (balance lot).	<i>At all times</i>
12.3	Drainage from the development works shall not adversely impact upon adjacent properties. No ponding, concentration or redirection of stormwater shall occur on adjoining land.	<i>At all times</i>
12.4	Provide the discharge of stormwater drainage flows to a legal point of discharge.	<i>At all times</i>
12.5	Untreated stormwater from the works must be diverted or bypassed around the wetland in the Wetland Protection Area.	<i>At all times during the site works phase</i>

Condition 13 – flood emergency access plan		Timing
13.1	Prepare a Flood Emergency Management Plan (FEMP) by a RPEQ that: (a) outlines the management actions to be taken at the site for road access during times of flood, including evacuation of the site prior to a flood inundation event (b) includes provisions and requirements for implementing and reviewing the FEMP. A copy of the FEMP is to be retained on site for use during a flood emergency.	<i>Prior to submitting the Plan of Subdivision and to be maintained</i>
13.2	A copy of the FEMP in accordance with condition 13.1 is to be submitted to the Coordinator-General.	<i>To be lodged with the Plan of Subdivision</i>

Condition 14 – works and stockpiling materials		Timing
14.1	Works are not to compromise the structural integrity of any electrical infrastructure.	<i>At all times</i>
14.2	Spoil must not be stockpiled 10 metres either side of the overhead 110kV conductors on-site.	<i>At all times</i>
14.3	Other than spoil deliberately used for re-profiling to restore bed and banks to natural profiles, spoil from excavation is to be removed and/or stockpiled away from wetlands and waterways.	<i>At all times</i>
14.4	Spoil is not disposed of on tidal lands or within waterways and where required, is managed to prevent acid soil development.	<i>At all times</i>

Condition 15 – construction management plan		Timing
15.1	Prepare and submit to the Coordinator-General a construction management plan (by a suitably qualified person in accordance with current best practise) that includes the following: (a) management of noise and dust generated from the site during and outside construction work hours (b) management of stormwater flows and quality around and through the site without increasing the concentration of total suspended solids or Prescribed Water Contaminants (as	<i>Prior to commencement of site works</i>

	defined in the <i>Environmental Protection Act 1994</i>), causing erosion, creating any ponding and causing any actionable nuisance to upstream or downstream properties (c) management of contaminated soils (if required) including removal, treatment and replacement (d) site remediation plans (e) a monitoring program to identify issues of non-compliance, actions for correcting any non-compliance and who is responsible for undertaking those actions (f) a timetable and process for review of the construction management plan to assess its effectiveness and to implement amendments as required.	
15.2	Undertake all works generally in accordance with the construction management plan which must be current and available on site at all times during the construction period.	<i>At all times during the site works phase</i>
15.3	Water to be used for dust mitigation is to be drawn from sources other than Townsville City Council's reticulated water supply should Level 3 or 4 water restrictions be in effect and / or imposed during the construction of the development	<i>At all times during the site works phase</i>
15.4	Prior to arrival on site, all vehicles and machinery is to be cleaned down in accordance with the Department of Agriculture and Fisheries <i>Queensland Vehicle and machinery checklists Clean-down procedures 2014</i> .	<i>At all times during the site works phase</i>

Condition 16 – soil erosion minimisation and sediment control		Timing
16.1	Soil erosion and sediment control (SESC) plans must be prepared by a suitably qualified professional and submitted to Townsville City Council for approval, with the proposed SESC measures are to be designed in accordance with "Best Practice Erosion and Sediment Control" published by the International Erosion Control Association (Australasian Chapter) (IECA, 2008). The plans must demonstrate that the proposed SESC measures will achieve the erosion and sediment control design objectives specified in Appendix 2, Table A of the State Planning Policy 2017. <i>Note: the erosion sediment control plan must reference SDA approval number AP2023/013 and be provided to:</i> <i>Coordinator-General – sdainfo@coordinatorgeneral.qld.gov.au</i> <i>Townsville City Council – developmentassessment@townsville.qld.gov.au</i>	<i>Prior to the commencement of site works</i>
16.2	Undertake works generally in accordance with the SESC plans prepared in accordance with condition 16.1.	<i>At all times during the site works phase</i>
16.3	Prescribed Water Contaminants (as defined in the <i>Environmental Protection Act 1994</i>) must not be released from the site or to waters within the site, or be likely to be released should rainfall occur, unless all reasonable and practicable measures are taken to prevent or minimise the release and concentration of contamination.	<i>Prior to the commencement of site works and to be maintained during the site works phase</i>

Condition 17 – acid sulfate soils		Timing
17.1	In the event that the works cause disturbance or oxidisation of acid sulfate soil, the affected soil must be treated and thereafter managed (until the affected soil has been neutralised or contained) in accordance with the current <i>Queensland Acid Sulfate Soil Technical Manual: Soil management guidelines, prepared by the</i>	<i>At all times during the site works phase</i>

	<i>Department of Science, Information Technology, Innovation and the Arts, 2014.</i>	
17.2	Certification by an appropriately qualified person, confirming that the affected soil has been neutralised or contained, in accordance with condition 16.1 above is to be provided to palm@des.qld.gov.au or mailed to: <i>Department of Environment, Science and Innovation Permit and Licence Management Implementation and Support Unit GPO Box 2454 Brisbane Qld 4001</i>	<i>At the time the soils have been neutralised or contained.</i>

Condition 18 – wetland protection area		Timing
18.1	Provide a minimum 26-metre-wide buffer for the purpose of wetland protection as shown on plan titled “Stage 4 Access Road Overall Layout Plan” prepared by Langtree Consulting dated 22/08/2024 and referenced in Table 1 to condition 1 of this approval.	<i>Prior to submitting the Plan of Subdivision</i>
18.2	Provide suitable buffer elements within the buffer required by condition 17.1 designed to achieve the purposes set out in the Queensland Wetland Buffer Planning Guidelines 2011.	<i>Prior to submitting the Plan of Subdivision</i>
18.3	Submit to the Office of the Coordinator-General and Department of Environment, Science and Innovation, written evidence from a suitably qualified person that conditions 18.1 and 18.2 have been fulfilled. <i>Note: Evidence must reference SDA approval number AP2023/013 and be provided to:</i> <i>Coordinator-General – sdainfo@coordinatorgeneral.qld.gov.au</i> <i>Department of Environment, Science and Innovation – palm@des.qld.gov.au or Department of Environment and Science Permit and Licence Management GPO Box 2454 Brisbane Qld 4001.</i>	<i>Prior to submitting the Plan of Subdivision</i>

Condition 19 – pest management		Timing
19.1	Prepare a site-based pest management plan in accordance with Department of Agriculture and Fisheries guideline for pest management planning that includes, but is not limited to, the following: (a) a pre-works inspection of the property to locate, map and identify existing pest flora and fauna species (b) training of site personnel in the identification of local pest species likely to occur at the site (c) measures in order to prevent the spread of pests into the wetland protection area (d) appropriate interventions in order to control pest flora and fauna species introduced into the wetland protection area as a result of the development.	<i>Prior to commencement of site works</i>
19.2	Implement the procedures/requirements contained in the site-based pest management plan, prepared in accordance with condition 19.1.	<i>Prior to submitting the Plan of Subdivision</i>

Condition 20 - repair of damage		Timing
20.1	Repair any property fencing, roads, service infrastructure and re-instate existing signage and pavement markings that have been removed or damaged during any works carried out in association with the approved development.	<i>Prior to submitting the Plan of Subdivision</i>

Condition 21 – effect of approval		Timing
21.1	A request for approval of a plan of subdivision for this SDA approval cannot be submitted to the Coordinator-General prior to the completion of Stage 3 outlined in SDA approval APC2023/008 (or subsequent related approvals).	<i>At all times</i>

SDA approval – Operational work for native vegetation clearing conditions

Condition 22 - approved plans and documents		Timing
22.1	Carry out the approved development generally in accordance with the approved plans and documents as referenced in Table 2 (including any amendments marked in red), except insofar as modified by any of the conditions of this approval.	<i>To be maintained at all times</i>

Table 2 – approved plans and documents for operational work for native vegetation clearing

Title	Prepared By	Drawing No	Revision	Date
Figure 4: Ground-truthed Vegetation	Terra Solutions	N/A	N/A	19/12/2023

Condition 23 – clearing		Timing
23.1	The clearing of native vegetation is limited to the extent shown as Development Footprint on plan titled “Figure 4: Ground-truthed Vegetation” prepared by Terra Solutions, dated 19/12/2023.	<i>At all times</i>

Advice

Currency period

This SDA approval is valid until the end of the currency period, four years after the date of approval, unless the approval states a different period. For the SDA approval to remain valid the proponent must have, before the end of the currency period:

- (if the development is reconfiguring a lot) provided the plan of subdivision to the Coordinator-General for approval in accordance with the relevant development scheme; or
- (for all other development) substantially started the development; or
- made an application to the Coordinator-General to extend the currency period.

Other approvals

This approval relates solely to reconfiguring a lot (2 into 3 lots) and Operational work for native vegetation clearing within the Townsville State Development Area. All other approvals and/or permits required under local, state and/or commonwealth legislation must be obtained prior to the commencement of works.

Development permits for Operational works that is the removal, destruction or damage of marine plants must be obtained prior to commencement of works.

Department of Agriculture and Fisheries

Operational work for construction or raising waterway barrier works

Impacts to marine plants associated with the development cannot commence without approval of a development application for *Operational Works that is construction or raising waterway barrier works*.

The proponent must submit an Operational Works application under the *Planning Act 2016* addressing the following information:

- A full response to the relevant parts of the most up to date version of the SDAP *State Code 18: Constructing or raising waterway barrier works in fish habitats*.
- Relevant scaled, referenced and dated plans including:
 - a longitudinal section of the waterway from upstream to downstream showing the existing bed level of the waterway in relation to the proposed waterway barrier works
 - a cross-section of the waterway from bank to bank showing the existing bed and bank levels of the waterway in relation to the proposed waterway barrier works
 - the location of waterways and any tidal land within, and adjacent to, the site including natural bed level, high banks, main channel, low-flow channel and the following where relevant – levels of highest astronomical tide, mean high water spring tide, and low water spring tide
 - registered property boundaries
 - contours of the bed and banks of the waterway at the site and to at least 100 m upstream and downstream of the site

Note – all plans should be able to be read to scale at A3 size
- Written documentation discussing the following:
 - brief overview of the proposed works
 - description of the waterway proposed to be impacted (e.g. condition, size, connectivity, general hydrology) and nature of the impact
 - description of the work method (e.g. timing, equipment to be used)
 - detailed description of how the development has been planned to avoid or minimise

impacts to waterways through considerations such as design, location, setbacks/buffer distances, construction, maintenance

- details of on-site mitigation actions, during and after the development
- extent of any future maintenance works required for the continued safe operation of the proposed structure or facility.

Accepted development requirements

Temporary waterway barrier works required for access are to be constructed in accordance with the Accepted development requirements for operational work that is constructing or raising waterway barrier works or will require development approval under the *Planning Act 2016*.

The construction of an access road and installation of culverts within tidal waterways is assessable development requiring a development approval under the *Planning Act 2016*. Therefore, any marine plant disturbance associated with these waterway barriers cannot be conducted under the Accepted Development Requirements as they are not accepted development.

Advice on waterway determination

Coastal sites that are located on the layer beyond the tidal zone but which, on ground, have tidal features, such as marine plants, marine fauna, salt or brackish water, or tidal ebb and flow, should be treated as tidal waterways.

It is acknowledged that tidal water is likely to be shallow within in the works vicinity. However, this does not preclude the requirement to provide fish passage. Fish passage accounts for all species and all size classes of fish within Queensland waters; it is likely that fingerlings and juvenile fish will move to access the saltmarsh and salt pan areas during times of tidal ingress to forage and seek shelter. Furthermore, the depth of tidal ingress does not preclude the requirement to minimise and mitigate impacts to a tidal waterway. Tidal ingress in these areas enables the dispersal of marine plant seeds which is critical to the production of fisheries resources and fish habitats.

A proponent may seek pre-lodgement advice prior to submitting a development application for operational works that is constructing or raising waterway barrier works under the *Planning Act 2016*.

Townsville City Council

Water restrictions

To manage Townsville's water resources, Townsville City Council regulates water restrictions on a permanent basis. All development undertaken in Townsville must be mindful of the current and projected level of water restrictions that may affect development activities such as landscaping establishment and/or soil erosion and sediment control.

Proponents and developers remain responsible for compliance with any water restrictions as directed by Townsville City Council.

During times of significant water shortage, Townsville City Council may refuse to grant proponents and developers exemptions from water restrictions for the purpose of landscaping works or soil erosion and sediment control activities.

In circumstances where exemptions to water restrictions are no longer issued by Townsville City Council, bonding of soft landscaping works will be permitted to enable the release of compliance certificates. In cases where the soft landscaping is a component of permanent soil erosion and

sediment control (such as an open drain) the use of “bonded fibre matrix” type hydro-mulch products or other suitable soil erosion and sediment control methods can be carried out as alternatives to demonstrate compliance with water restrictions.

The responsibility for compliance with all relevant environmental protection requirements (in particular, sediment and erosion control) remains with the proponent and developer.

Earthworks

Earthworks are not approved as part of this SDA approval. It must be determined if the earthworks are deemed either:

- (a) Accepted development, or
- (b) Accepted development subject to requirements, or
- (c) a Code assessable Operational work development application to be lodged with council for assessment in accordance with relevant code/s and policy direction.

Plans of any earthworks to be associated with the reconfiguring a lot that is deemed to be assessable development in accordance with the Categories of development and assessment - Operational work of the Townsville City Plan must be submitted to council for assessment.

Earthworks must be designed in accordance with Works code of the Townsville City Plan.

Roadworks approval

The proponent is required to obtain from Townsville City Council a Roadworks Approval in accordance with Townsville City Council's Local Laws 4 for the installation of any hoardings, gantries or temporary road closures of the footpath or road prior to the commencement of works. The application is to include the following:

- (a) completed Roadworks approval application form
- (b) prescribed fee, and
- (c) Traffic Management Plan prepared by a suitably qualified traffic professional detailing the traffic management measures put in place to manage all roadworks including pedestrians, cyclists and vehicle in accordance with Townsville City Council's Manual of Uniform Traffic Control Devices Part 3 – Works on Roads.

If the works required closure of part of the road reserve, a temporary Road Closure Permit will be required. This permit allows for a section of road reserve to be close for the purpose of works. The Queensland Police Service is the issuing authority for these permits. An application is to be made to Townsville City Council for a letter of no objection prior to applying to the Queensland Police Service for the permit. The Traffic Management Plan is to be included with the application to Townsville City Council.

As part of the application for a Roadworks Permit, the proponent is required to provide the following detailed plans showing new access driveways and crossovers in accordance with the Townsville City Plan.

Connection to Townsville City Council water supply

A staged specific Water Network Analysis and Water Reticulation Design must be submitted to council with the appropriate application form for connection to Townsville City Council's water supply. Townsville City Council will respond to the application with a quotation for the work and upon payment will schedule the works for connection.

Connection to Townsville City Council sewer

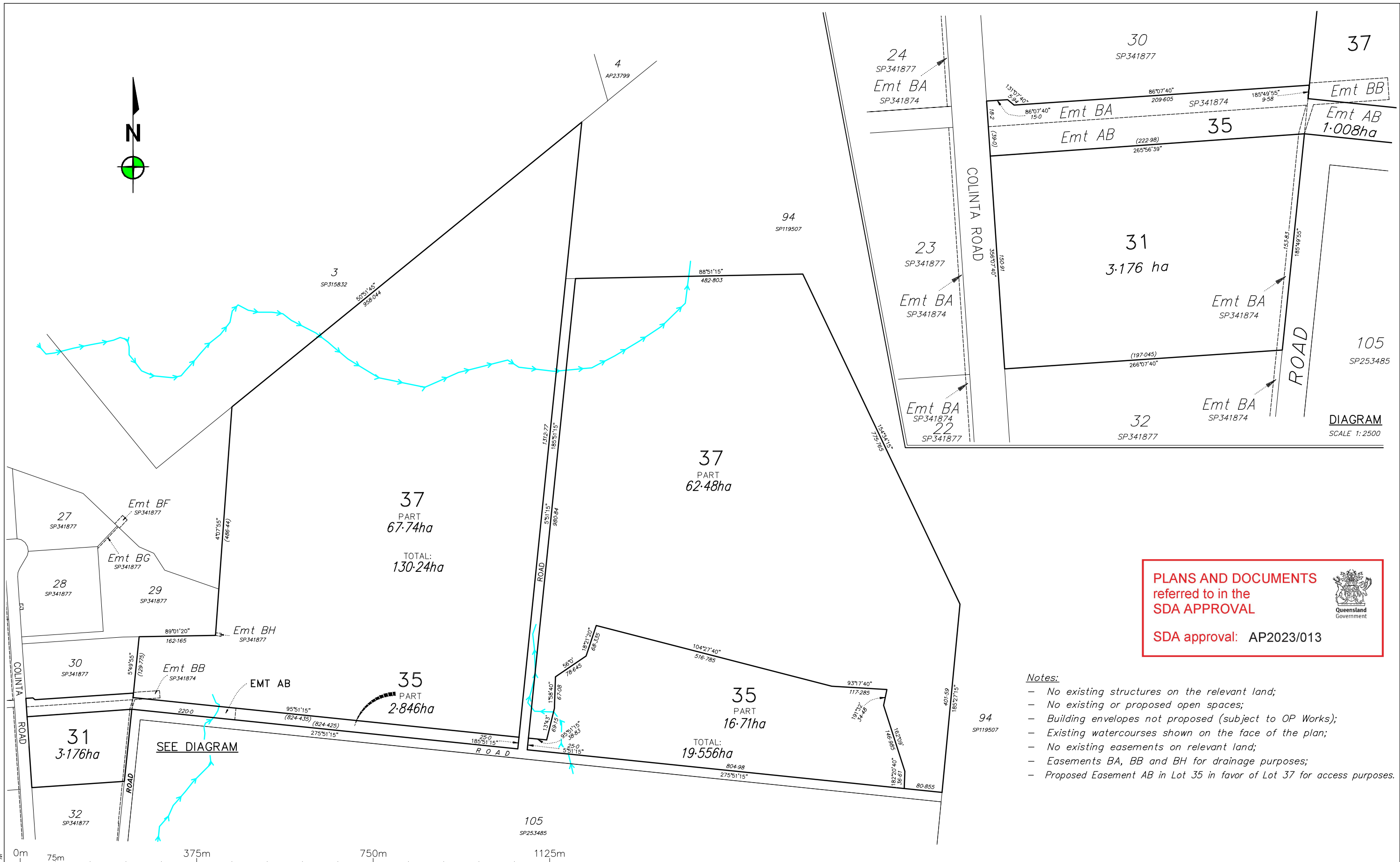
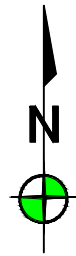
A copy of this SDA approval and the approved sewer reticulation design is to be submitted to Townsville City Council with the appropriate form for connection to Townsville City Council's sewer supply. Townsville City Council will respond to the application with a quotation for the work and upon payment will schedule the works for connection.

Compliance Certificate

Details of all underground electrical services and street lighting must be submitted as part of an application for compliance certificate.

Cultural heritage – duty of care

Where items of archaeological importance are identified during construction of the project, the proponent must comply with its duty of care under the *Aboriginal Cultural Heritage Act 2003* and the Department of Environment and Heritage Protection 2014 guideline: archaeological investigations. All work must cease and the relevant State agency must be notified. Work can resume only after State agency clearance is obtained.



PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL

SDA approval: AP2023/013



- Notes:
- No existing structures on the relevant land;
 - No existing or proposed open spaces;
 - Building envelopes not proposed (subject to OP Works);
 - Existing watercourses shown on the face of the plan;
 - No existing easements on relevant land;
 - Easements BA, BB and BH for drainage purposes;
 - Proposed Easement AB in Lot 35 in favor of Lot 37 for access purposes.

REVISIONS			
REV	BY	DATE	DESCRIPTION
B	BC	19/12/2023	Amendments after registration of St 2
A	RG	21/08/2023	Easement AB added.
O	RG	17/08/2023	Original Issue

NOTES

Property boundaries, areas and dimensions are approximate only and are subject to survey.

ACAD REF F:\43800\43811\Cd90\43811_83B.dwg

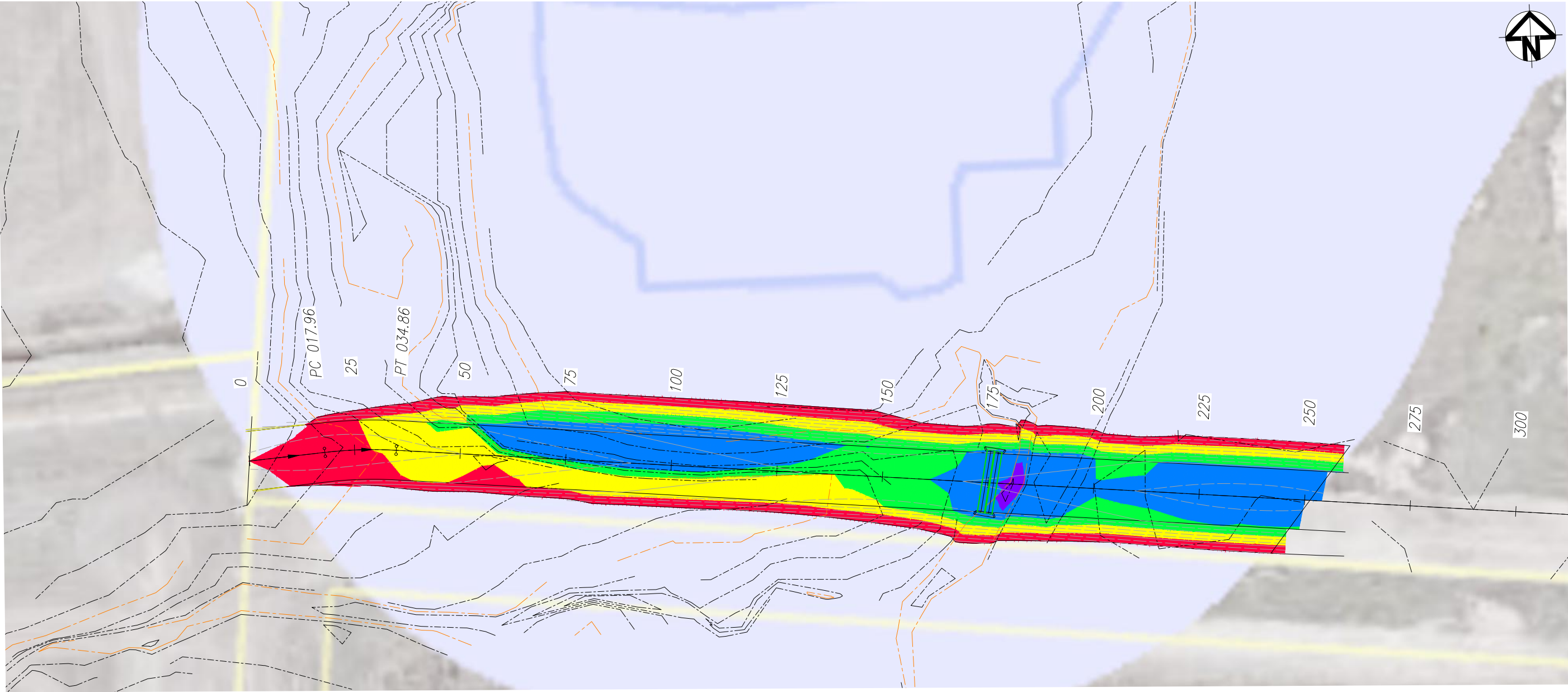


LEVEL DATUM: AHD(Der)
REF BM No: PM53476
REDUCED LEVEL: 7.945
LOCATION: Lot 5 on SP273456

AZIMUTH: MGA°94
SURVEYOR: RSPL
DRAWN: Romy Chebosu
SIGNED BY: Ben Cook



Cleveland Bay Industrial Park Pty Ltd			
Colinta Road, Stuart			
Proposed Reconfiguration Lots 31, 35 and 37 cancelling future Lots 31 and 35			
SCALE 1:7500@A3	PASSED 	DATE 19/12/2023 SHEET 1 OF 1	43811/83 B



ROAD LAYOUT PLAN
SCALE: 1:500

- LEGEND**
- EXISTING CONTOUR MAJOR (1.0m INTERVALS)
 - EXISTING CONTOUR MINOR (0.2m INTERVALS)
 - WETLANDS PROTECTION AREA BUFFER

Surface Analysis: Elevation Ranges					
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m ²)	Volume (m ³)
1		0.000	0.500	1395.9	2671.7
2		0.500	1.000	1536.2	1911.3
3		1.000	1.500	1303.1	1279.4
4		1.500	2.000	1762.0	368.4
5		2.000	2.500	37.6	3.7

0 15 30 60m
SCALE 1:1500 (A1)

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL



SDA approval: AP2023/013

REVISED					HORIZ. DATUM	MGA	CERTIFICATION
					VERT. DATUM	AHD	
					DRG. FILE	DATE	
	No.	BY	DATE	DESCRIPTION	DESIGN	A.REINAUDO	5.07.23
					DRAWN	A.REINAUDO	5.07.23

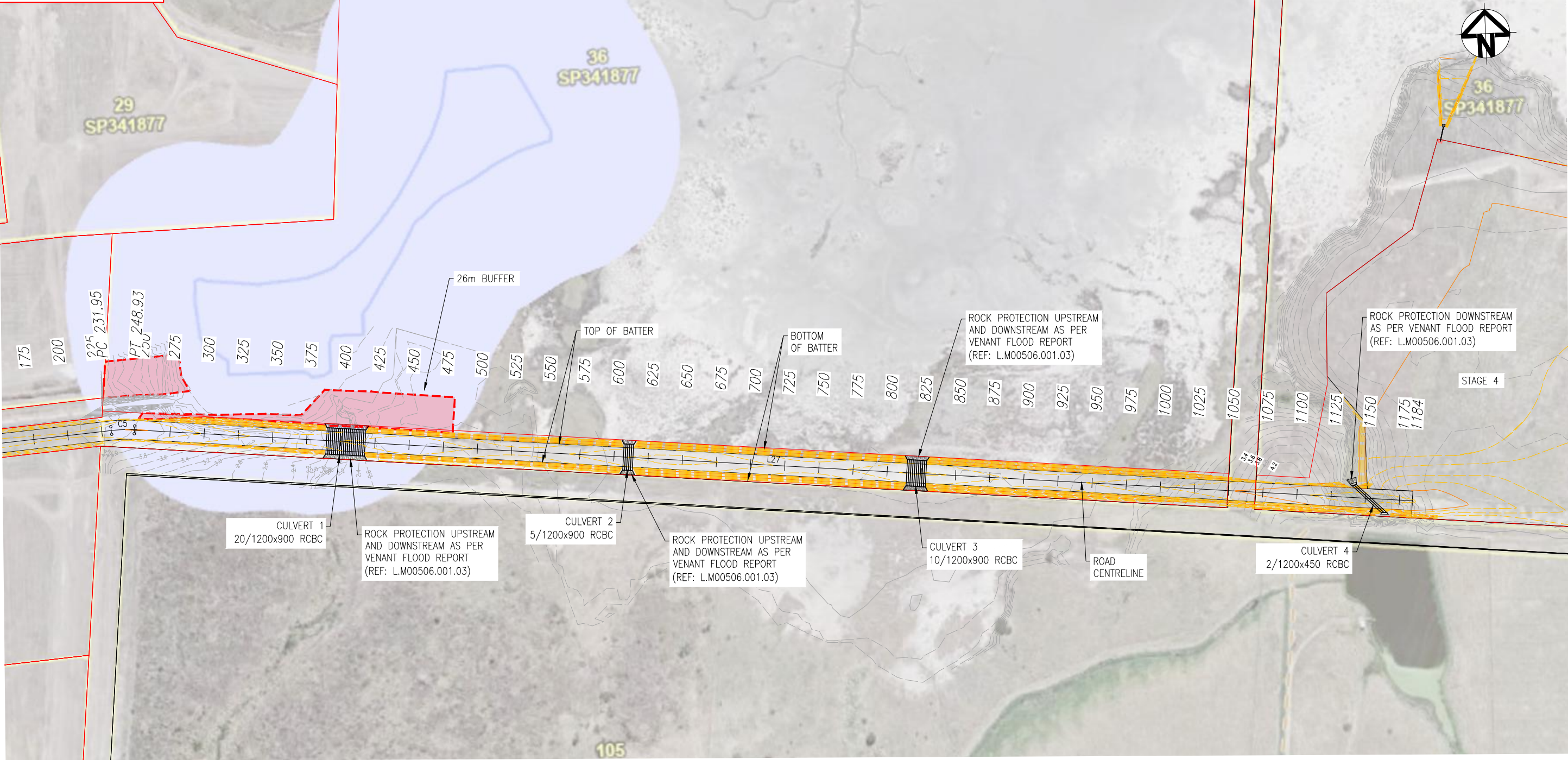


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e brett@langtreeconsulting.com.au

CLEVELAND BAY INDUSTRIAL PARK

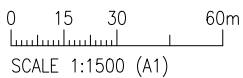
TOWNSVILLE PORT ROAD, STUART
LOT 35 ACCESS ROAD
WETLANDS PROTECTION AREA

SCALE	AS SHOWN				
SHEET	1 OF 1				
REVISION	A				
DRG No.	LOT 35 - 100				



LEGEND

- 4.0 EXISTING MAJOR CONTOUR (1m INTERVALS)
- 3.8 EXISTING MINOR CONTOUR (0.2m INTERVALS)
- WETLAND BUFFER AREA
- WETLANDS OF HIGH ECOLOGICAL SIGNIFICANCE
- 26m BUFFER TO WETLAND



ROAD LAYOUT PLAN
SCALE: 1:1500

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL



SDA approval: AP2023/013

NOTES:

- THE ACCESS ROAD HAS BEEN DESIGNED TO BE ABOVE THE Q100 FLOOD LEVEL.
- CULVERT WILL BE CONSTRUCTED IN ACCORDANCE WITH THE RELEVANT DTMR STANDARDS.

REVISED	E	A.R	22.08.24	ADDED ROCK PROTECTION	HORIZ. DATUM	MGA	CERTIFICATION
	D	A.R	20.08.24	AMENDED CULVERT SIZES	VERT. DATUM	AHD	
	C	A.R	11.06.24	AMENDED CULVERT 2	DRG. FILE	DATE	
	B	A.R	5.06.24	ADDED 26m BUFFER	DESIGN	A.REINAUDO	COPYRIGHT © These designs and drawings are copyright and are not to be used or reproduced without the written permission of LANGTREE CONSULTING PTY LTD (ACN 29 611 368 024). The contents of this drawing are electronically generated, are confidential and may only be used for the purpose for which they were intended. This is an uncontrolled document issued for information purposes only, unless the checked sections are signed and approved. Figured dimensions take precedence over scale. Do not scale from this drawing.
	A	A.R	15.02.24	FOR DEVELOPMENT APPLICATION	DRAWN	A.REINAUDO	
No.	BY	DATE	DESCRIPTION				



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CLEVELAND BAY INDUSTRIAL PARK

TOWNSVILLE PORT ROAD, STUART
STAGE 4 ACCESS ROAD
OVERALL LAYOUT PLAN

SCALE	AS SHOWN				
SHEET	1 OF 1				
REVISION	A	B	C	D	E
DRG No.	STAGE 4-R-001				

Our Ref: L.M00506.001.03.docx

23 August 2024

Milford Planning
15 Allen Street
South Townsville QLD 4810

Attention: Mr George Milford

Dear George

RE: CLEVELAND BAY INDUSTRIAL PARK: LOTS 31, 35 & 37 – FLOOD IMPACT ASSESSMENT

Venant Solutions has completed a flood impact assessment for the proposed Far Eastern Precinct of the Cleveland Bay Industrial Park (CBIP), comprising of lots 31, 35 and 37 (the Site). The Site is within the Townsville State Development Area (TSDA) and is located approximately 6 km south-east of the Townville Central Business District. The Site is in the Stuart Creek catchment.

Townsville City Council (Council) has undertaken flood modelling and mapping of the catchment which shows that a significant portion of the Site is within the 1% AEP (annual exceedance probability) flood extent. Council previously provided their Lower Stuart MIKE Flood hydraulic model to inform the report Proposed Townsville State Development Area – Flood Management Staging Strategy (Water Technology, 2018). This previous report investigated flooding across the whole of the TSDA, including the Site which is identified as part of Site F2. During the course of preparing the report Water Technology made a number of improvements to Council's model. The model supplied to Venant Solutions by Council for this assessment includes these model improvements. The extent of the MIKE Flood model is shown in Figure 1. Council also supplied the XP-RAFTS hydrological model that forms the basis for the inflows into the MIKE Flood hydraulic model. Some updates to the existing models were made and these are described further below.

Venant Solutions has previously published a report on Western and Eastern Precincts of Cleveland Bay Industrial Park (L.M00260.01 and L.M00260.03.02) which used similar methods. As part of those reports updates were made to the XP-RAFTS hydrological model and hence to the inflows into the MIKE Flood hydraulic model. For this assessment those updates are included and expanded upon.

Venant Solutions previously published two other reports on the Site (L.M00506.001.01 and L.M00506.001.02). This updated report includes additional survey and an updated design compared to the design examined in L.M00506.001.01 and more culverts and a drain compared to the design examined in L.M00506.001.02.

Assessment of floods smaller than the 1% AEP event was not required as the finished level of both the road and Site are above the 1% AEP event and hence the 1% AEP event represents the worst case scenario.

This letter presents the assessment findings and is a response to the draft SDA approval conditions for reconfiguring a lot dated 24 July 2024 in particular conditions 10.1 (b) and 11.1 (b) c. Condition 10.1 (b) vi. states that structure afflux must be independently assessed using a 1-dimensional hydraulic model, this is addressed in the Flood Impact Assessment - Comparison of MIKE Flood and HEC-RAS Structure Afflux of the report.

Existing Conditions XP-RAFTS Model Update

The Sandfly Creek XP-RAFTS hydrological model was updated to represent the area around the Site in more detail. Sub-catchment SF-4.10, SF-5.00 and SF-6.00 were split as shown in Figure 2. All three sub-catchments were split along the northern edge of the proposed development. Table 1 shows the area and fraction impervious of the supplied sub-catchments while Table 2 shows the area and fraction impervious of the updated sub-catchments. As local inflows from the XP-RAFTS model are used as inflow into the hydraulic model the schematisation of the links does not impact the hydraulic model.

Table 1 Supplied Existing Case XP-RAFTS Sub-Catchments

Sub-catchment	Area (ha)	Fraction Impervious
SF-4.10	59.6	0%
SF-5.00	70.7	0%
SF-6.00	33.8	0%

Table 2 Updated Existing Case XP-RAFTS Sub-Catchments

Sub-catchment	Area (ha)	Fraction Impervious
SF-4.10_N	50.8	0%
SF-4.10_S	8.7	0%
SF-5.00_N	65.8	0%
SF-5.00_S	4.9	0%
SF-6.00_E	30.6	0%
SF-6.00_W	3.2	0%

Existing Conditions MIKE Flood Model Update

The locations of the point source flows into the hydraulic model were updated to correspond with the alterations to the XP-RAFTS sub-catchments. The supplied and additional point source locations are shown in Figure 3. The updated point source locations for SF-4.10_S, SF-5.00_S and SF-6.00_W have been placed on the downstream edges of the sub-catchments in preparation for the proposed development to be added to the model. The point sources for SF-4.10_N, SF-5.00_N and SF-6.00_E are located at roughly the centre of the sub-catchments and have not been moved from the location of the SF-4.10, SF-5.00 and SF-6.00 point sources.

The ground levels over the Site and in the location of the proposed road were updated with survey (*SURVEY TIN.dwg*) provided by Milford Planning.

The ground levels of the dam near the south-west corner of the Site and the drain leading to them in the existing case model were updated using ground level survey provided by Milford Planning (*43811_84_PRELIM 231106 (1).pdf*).

The MIKE Flood model was then run to establish flood levels and extents across the Site under existing conditions (the undeveloped scenario used as the base case the cumulative assessment) in the 1% AEP event. The flood depth mapping and flood height contours for the 1% AEP event are presented in Figure 4. The extent of the proposed fill and access road are also shown on this figure. It is evident that a large portion of the Site is within the 1% AEP flood extent under existing conditions, however this area is at the edge of the floodplain and should therefore have a minimal impact on flood levels. The access road runs through a deeper section of the floodplain.

Figure 5 shows the change in 1% AEP flood level in the existing case between the MIKE Flood model used in L.M00260.03.02 and the updated model. The lemon shade represents areas where there is no change in flood level within a ± 10 mm tolerance. The green shades represent areas where there would be reductions in flood level in accordance with the magnitude shown in the legend, and the orange/red shades represent areas where the flood level would be increased. The pink shade identifies areas that would currently be inundated but would be flood free with the development in place (was wet now dry) and the blue shade shows the reverse (was dry now wet). The model update has not resulted in changes in flood level more broadly across the floodplain but there are small increases in flood level or flood extent locally around the new inflow locations at SF-5.00_S and SF-6.00_W. There are also decreases in flood level to the south of the proposed road and over the Site. This is due to the modifications to the topography to represent the drain leading to the dam and the new survey over the Site respectively.

Proposed Conditions XP-RAFTS Model Update

As no onsite detention is planned for the Site the hydrological modelling was adjusted to account for the increased impervious area on the Site. It was assumed that the entire Site was impervious area for the purposes of hydrological modelling. The proposed case fraction impervious of the sub-catchments that have changed between existing and proposed cases are shown in Table 3.

Table 3 Updated Proposed Case XP-RAFTS Sub-Catchments

Sub-catchment	Area (ha)	Fraction Impervious
SF-4.10_N	50.8	0%
SF-4.10_S	8.7	100%
SF-5.00_N	65.8	0%
SF-5.00_S	4.9	100%
SF-6.00_E	30.6	0%
SF-6.00_W	3.2	100%

Proposed Conditions MIKE Flood Model Update

The changes made to the proposed case MIKE Flood model are listed below and are shown in Figure 6:

- Road and Site fill included in the model. Proposed case TIN was supplied by Langtree Consulting (*Lot 35 TIN_19.08.24.dwg*). The TIN includes the channels as described below.
- Four sets of culverts under the road included in the model. The locations can be seen in Figure 6 and the details are shown in Table 4.
- To the east of Culvert 1 and south of the proposed road a channel at 2.6 m AHD is cut into the road batter to convey flow to the east.
 - As the channel is approximately 2 m wide the roughness value of the channel was multiplied by 5 to approximate the conveyance of a 2 m wide drain using a 10 m grid.
- Culvert 4 has a channel cut into the fill to the south of the road to convey the flow.
 - As the channel is approximately 2 m wide the roughness value of the channel was multiplied by 5 to approximate the conveyance of a 2 m wide drain using a 10 m grid.

Table 4 Proposed Culvert Details

Culvert	Configuration	Upstream Invert (m AHD)	Downstream Invert (m AHD)
Culvert 1	20/1200 × 900 RCBC	1.90	1.90
Culvert 2	5/1200 × 900 RCBC	1.90	1.90
Culvert 3	10/1200 × 900 RCBC	1.63	1.63
Culvert 4	2/1200 × 450 RCBC	2.40	2.40

Blockage

As per QUDM Table 10.4.1 (IPWEA 2017) the design blockage factor for culverts with an inlet height of less than 3 m is 20%. As such all proposed culverts have had a 20% blockage applied.

Flood Impact Assessment

The proposed changes are assessed both independently of the other developments taking place as part of CBIP (the independent assessment) against the scenario with CBIP East and West developed and cumulatively with the other developments taking place as part of CBIP (the cumulative assessment) against the undeveloped scenario.

Mapping is presented as follows:

- Figure 7: Peak Flood Depth and Level – 1% AEP
- Figure 8: Peak Flood Velocity – 1% AEP

Independent Assessment

Mapping is presented as follows:

- Figure 9: Independent Change in Peak Flood Level – 1% AEP
- Figure 10: Independent Change in Peak Flood Velocity – 1% AEP

Figure 9 shows the changes in flood level caused by this development alone. There are significant increases in flood level upstream (south) of the proposed road which are due to the blockage of flow to the north by the road. These increases are of a maximum of 180 mm outside the road corridor. The increases in flood level are largely confined to the low ground to the immediate south of the proposed road. Increases of more than 10 mm extend for approximately 150 m south of the road. The increases in flood level are away from any buildings and mainly occur in low lying undeveloped land that would not otherwise be developable. As such the increases in flood level will not increase flood damages or affect the use and enjoyment of the and hence do not constitute an actionable nuisance.

Figure 10 shows that the proposed development has a small effect on flood velocities. This is mainly reductions in velocity due to the retarding effects of the proposed road but there are localised increases in velocity including at the culvert outlets. Downstream of Culvert 1 there are increases in flood velocity of up to 0.6 m/s, leading to a maximum absolute velocity of 1.3 m/s (absolute velocities are shown in Figure 8). Downstream of Culvert 2 there are increases of up to 0.9 m/s, leading to a maximum absolute flood velocity of 1.2 m/s. Downstream of Culvert 3 there are increases in flood velocity of up to 1.0 m/s leading to a maximum flood absolute velocity of 1.2 m/s. Downstream of Culvert 4 there are reductions in flood velocity and the maximum absolute velocity is 0.3 m/s. Velocities in the order of 1.3 m/s are unlikely to cause scouring given that the area downstream of the culverts are generally vegetated with grasses and low scrub. As such the increases in flood velocity do not constitute an actionable nuisance.

Cumulative Assessment

Mapping is presented as follows:

- Figure 11: Cumulative Change in Peak Flood Level – 1% AEP
- Figure 12: Cumulative Change in Peak Flood Velocity – 1% AEP

Figure 11 is similar to Figure 9 except that the increases in flood level caused by the rest of the CBIP East, to the south-west of the proposed road are evident. Also evident are areas no longer inundated and areas with reductions in flood level further west. The increases in flood level are a maximum of 200 mm outside the road corridor with the exception of one model cell that is approximately half inside and half outside the road corridor where the increase in flood level is 201 mm. As with the increases in flood level shown in the independent case, the increases in flood level from the cumulative assessment are away from any buildings, will not alter the use or enjoyment of the land and hence does not constitute an actionable nuisance.

Figure 12 is similar to Figure 10 with differences caused by the same factors that caused the changes between Figure 9 and Figure 11 and similarly does not constitute an actionable nuisance.

Immunity of Road

For the purposes of this assessment the Queensland Urban Drainage Manual definitions of immunity and trafficability have been adopted:

- Immunity: No inundation on the traffic lane;
- Trafficability (IPWEA 2017, Table 7.4.5):
 - Where there is a risk to life (e.g. a causeway): depth $\leq$ 200 mm, depth x velocity 0.30 m²/s

It can be seen in Figure 7 that the road is not inundated or overtopped in the 1% AEP event. Both lanes are immune in the 1% AEP flood.

Comparison of MIKE Flood and HEC-RAS Structure Afflux

Each culvert was modelled in HEC-RAS using the same set up as used in MIKE Flood. HEC-RAS was run in steady state with the flow rate at the time of the peak flood level through each culvert and the corresponding downstream water level used as boundary conditions. MIKE applies an adjustment to the entrance and exit loss coefficients based on the culvert velocity and the upstream approach and downstream departure velocities. The adjusted losses at the peak of the flood were applied in the HEC-RAS model. The upstream water levels in for both models are shown in Table 5. A very good match is achieved at all culverts.

Table 5 Proposed Culvert Peak Flow and Velocity in the 1% AEP Event

Culvert	MIKE Flood Upstream Water Level (m AHD)	HEC-RAS Upstream Depth (m AHD)
Culvert 1	3.12	3.15
Culvert 2	2.68	2.68
Culvert 3	2.69	2.70
Culvert 4	5.00	5.01

Culvert Velocity

Table 6 shows the peak culvert flow and culvert velocities. Note that these velocity values are greater than those shown in Figure 8. The culvert velocity is the peak velocity inside the barrel of the culvert whereas the velocities shown in Figure 8 are the velocities downstream of the culvert. The velocities downstream of the culvert are averaged over a 10 m grid cell and represent the velocity of the flow after the flow has expanded and slowed on leaving the culvert.

The culvert velocities as shown in Table 6 should be used for sizing scour protection as these values are the worst-case velocity values immediately downstream of the culvert.

Table 6 Proposed Culvert Peak Flow and Velocity in the 1% AEP Event

Culvert	Peak Flow (m ³ /s)	Peak Velocity (m/s)
Culvert 1	37.0	2.1
Culvert 2	4.6	2.1
Culvert 3	13.6	2.4
Culvert 4	3.8	4.4

It can be seen that peak velocity through the culverts is high and scour protection or energy dissipation will be required. Table 7 shows recommended minimum rock size and rock pad length for energy dissipation. Calculations are done according to Figure 3.17 in Austroads (2023). Based on Austroads (2023) Table 3.1 grass has an allowable velocity of 2.5 m/s at the culvert outlet, therefore scour is unlikely to occur at the culvert outlets of Culverts 1, 2 and 3.

Due to the model grid size of 10 m compared to the size of the energy dissipation aprons the culvert, aprons have been represented in the MIKE model without rock energy dissipation.

Table 7 Recommended Minimum Energy Dissipation Rock and Apron Sizing

Culvert	Minimum Rock d ₅₀ (mm)	Minimum Rock Apron Length (m)
Culvert 1	200	2.7
Culvert 2	200	2.7
Culvert 3	200	2.7
Culvert 4	400	3.6 ¹

¹ Figure 3.17 of Austroads (2023) gives a minimum rock apron length of 1.80 m. Section 3.13 of Austroads (2023) states that for multi-pipe outlets where there is a risk of scour the length of the apron should be doubled. The doubled length is included in Table 6.

Summary

An assessment of the potential impact of filling for the proposed Far Eastern Precinct of Cleveland Bay Industrial Park has been undertaken using Council's MIKE Flood model. The assessment found that the proposed road and Site upgrade causes flood levels to increase by less than 200 mm in the properties to the south of the road in the independent assessment. These increases in flood level are away from any buildings and mainly occur in low lying undeveloped land that would not otherwise be developable.

Please do not hesitate to contact the undersigned should you have any questions.

Yours sincerely,



Richard Gale
Senior Engineer



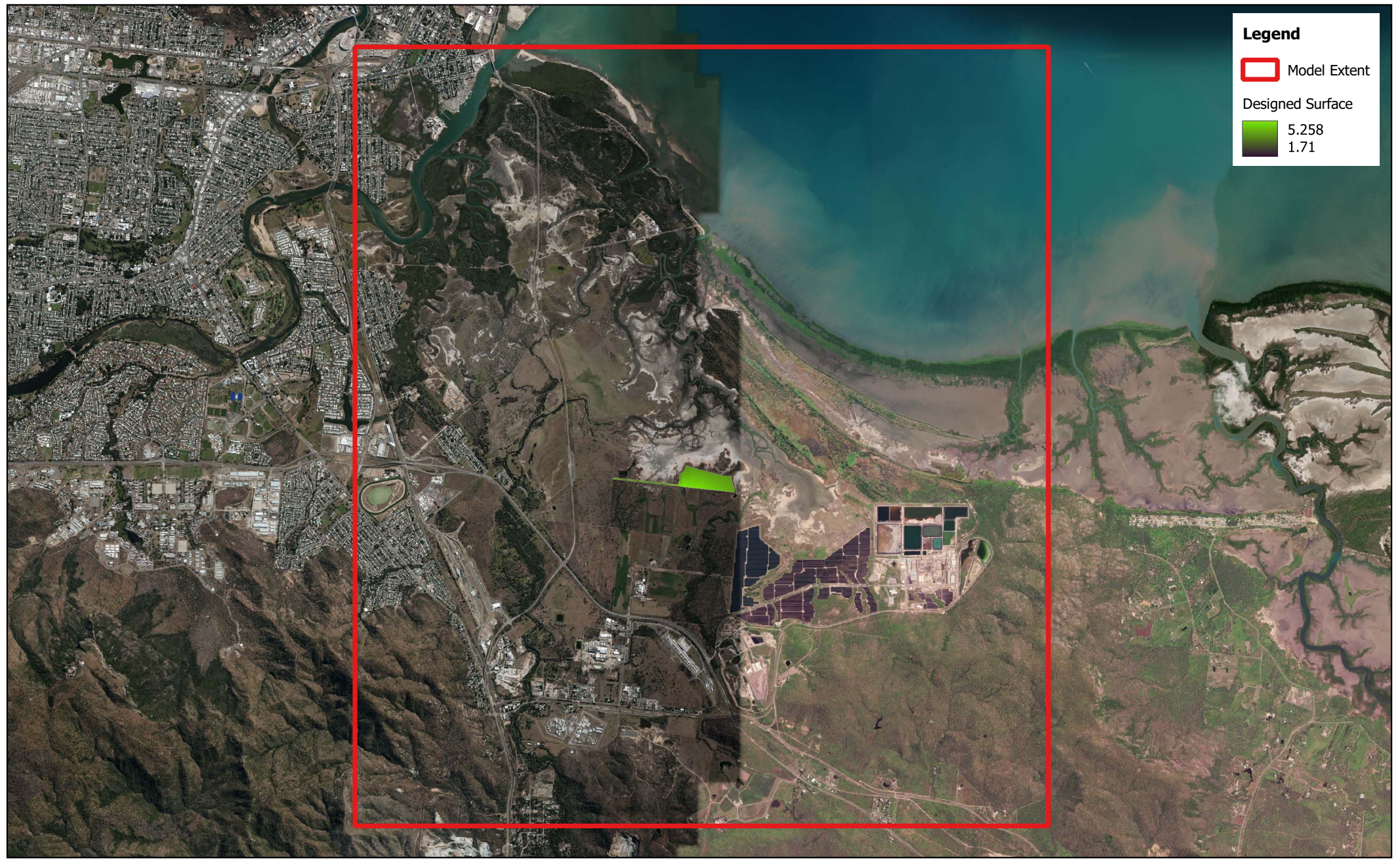
Dr Mark Jempson (RPEQ: 11111)
Director

References

Austroads (2023), Guide to Road Design Part 5B: Drainage – Open Channels, Culverts and Floodway Crossings, Austroads, Sydney, Australia, 2023.

Institute of Public Works Engineering Australia (IPWEA) (2017), Queensland Urban Drainage Manual (QUDM), Queensland Government, Australia, 2017.

Water Technology (2018), Proposed Townsville State Development Area – Flood Management Staging Strategy, Australia, 2018.



Legend

 Model Extent

Designed Surface

 5.258

 1.71

Title: **Townsville SDA - CBIP Far East**
Model Extent

Figure:
1

Rev:
A



This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.

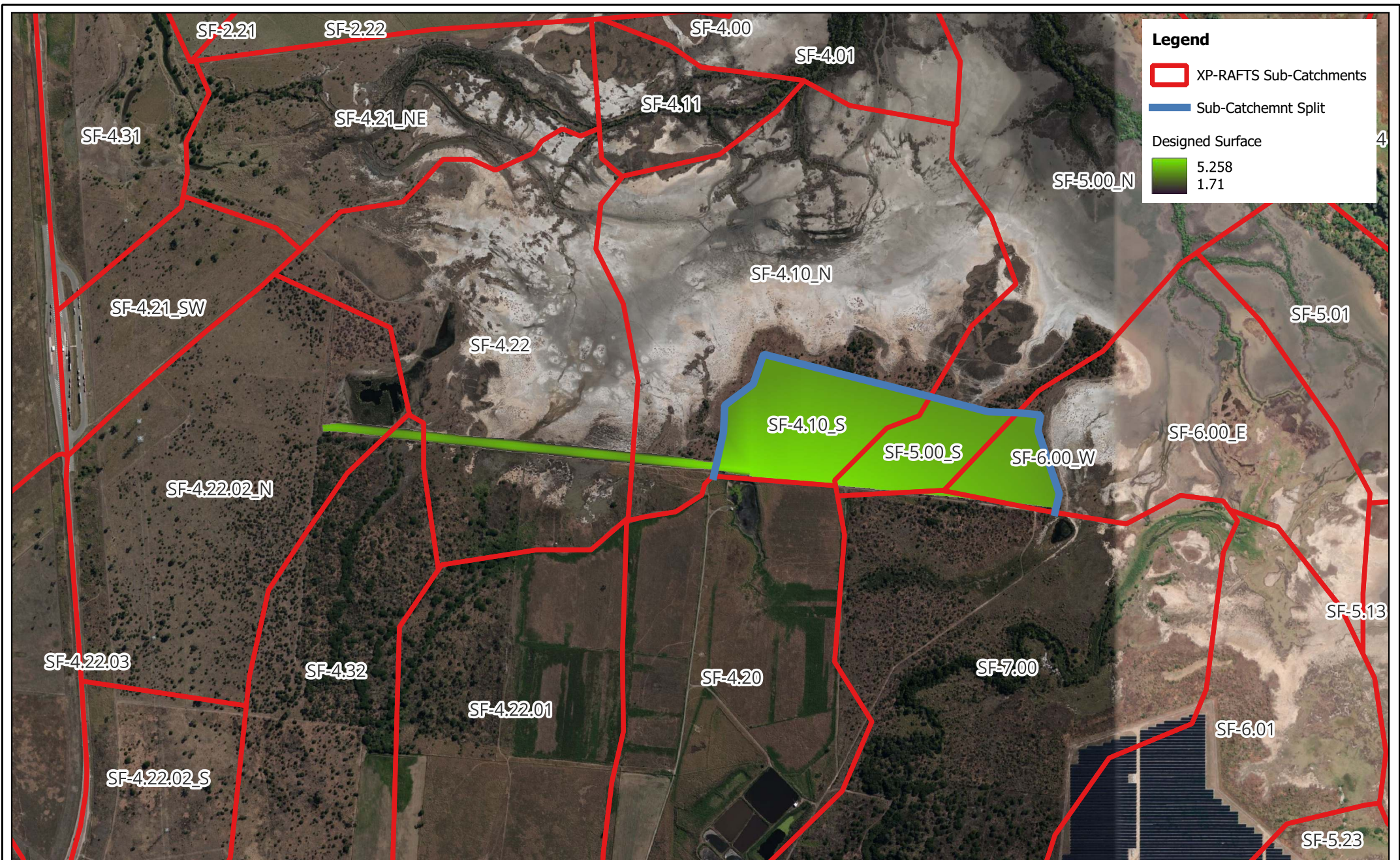


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By: RG

Apr 2024

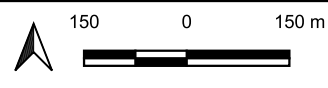
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Title: Townsville SDA - CBIP Far East
XP-RAFTS Sub-Catchment Split

Figure:
2

Rev:
A



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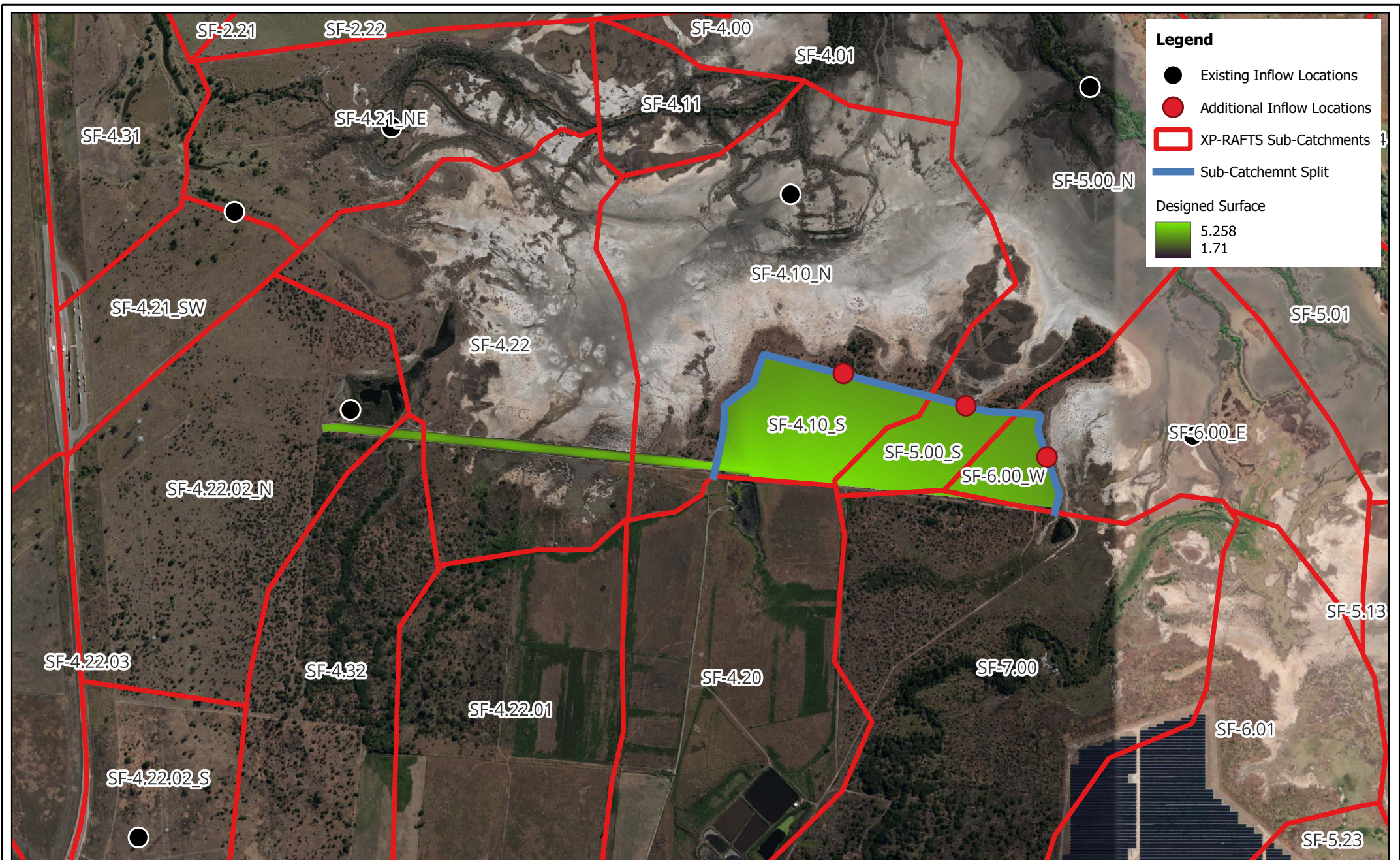


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By: RG

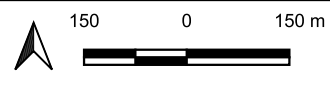
Apr 2024



Title: Townsville SDA - CBIP Far East
MIKE Flood Revised Inflow Locations

Figure:
3

Rev:
A



This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.

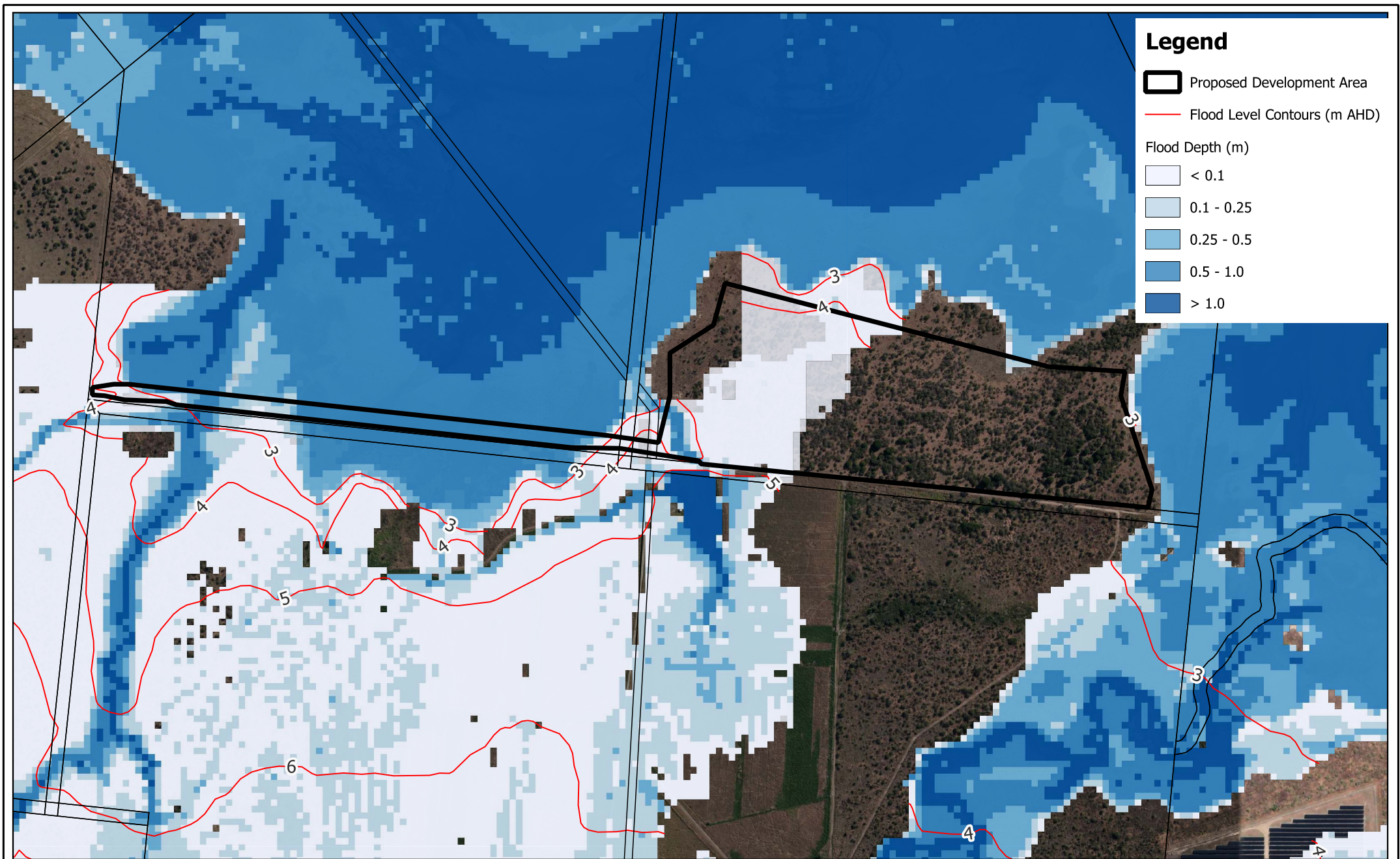


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By: RG

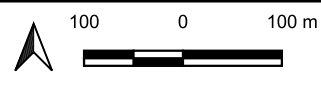
Apr 2024



Title: **Townsville SDA - CBIP Far East**
Existing Peak Flood Depth and Level - 1% AEP

Figure:
4

Rev:
A

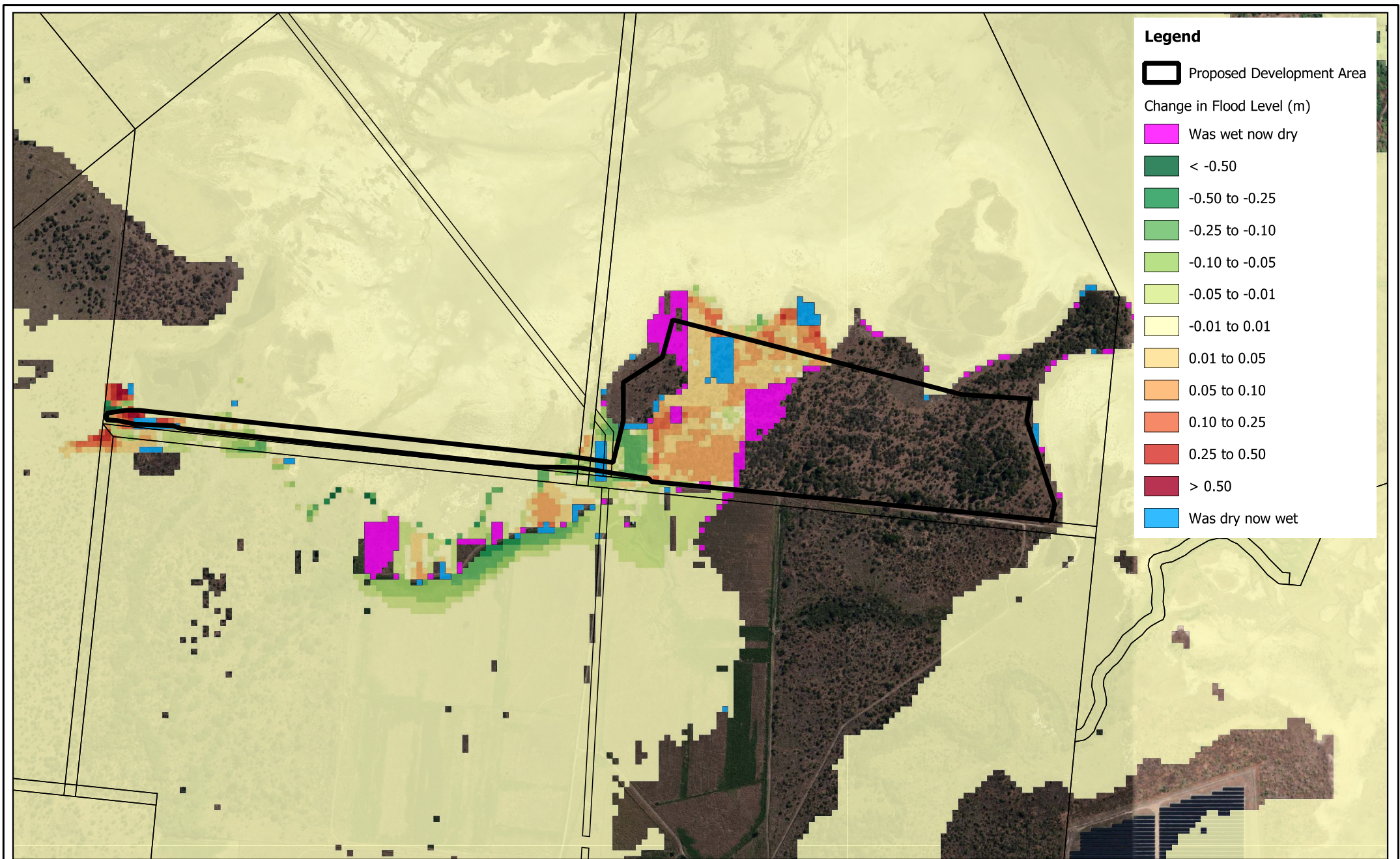


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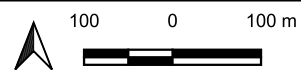
By: TL Jun 2024



Title: Townsville SDA - CBIP Far East
Change in Peak Flood Level - 1% AEP

Figure:
5

Rev:
A



This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.

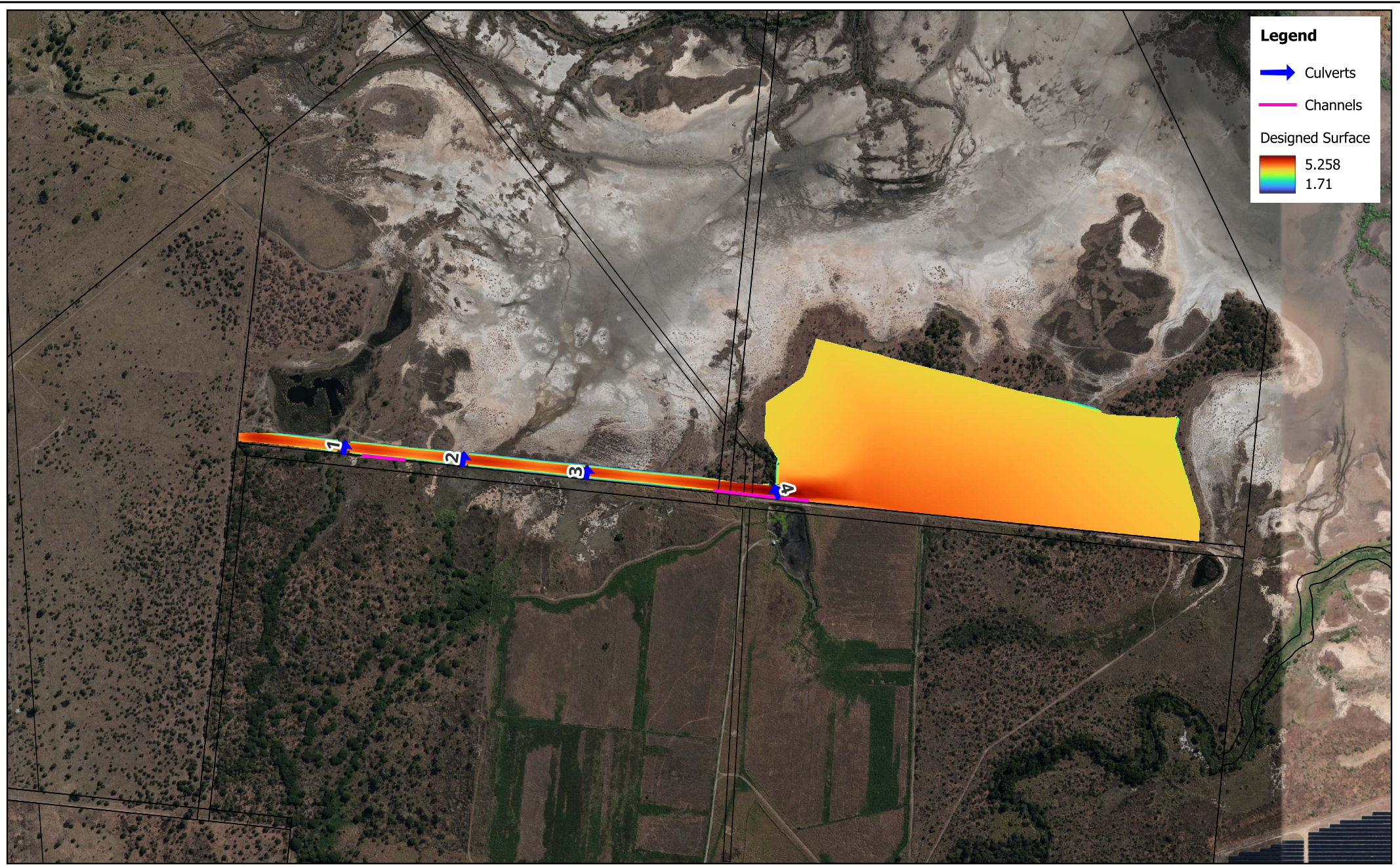


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By: TL

Jun 2024



Legend

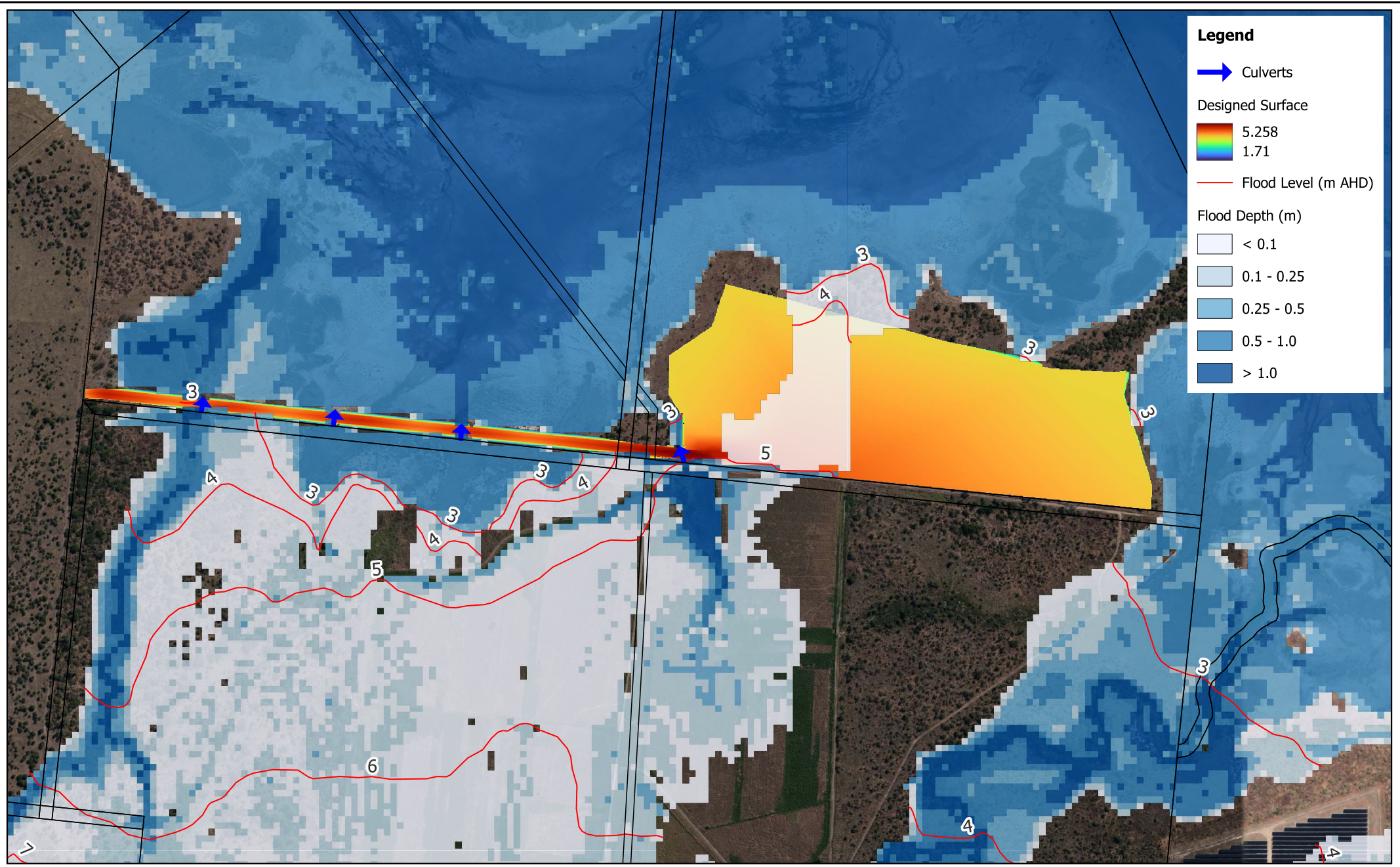
→ Culverts

Channels

Designed Surface

5.258

1.71



Legend

 Culverts

Designed Surface

 5.258
1.71

 Flood Level (m AHD)

Flood Depth (m)

 < 0.1

 0.1 - 0.25

 0.25 - 0.5

 0.5 - 1.0

 > 1.0

Title: Townsville SDA - CBIP Far East - Proposed
Peak Flood Depth and Level - 1% AEP

Figure: 7
Rev: A

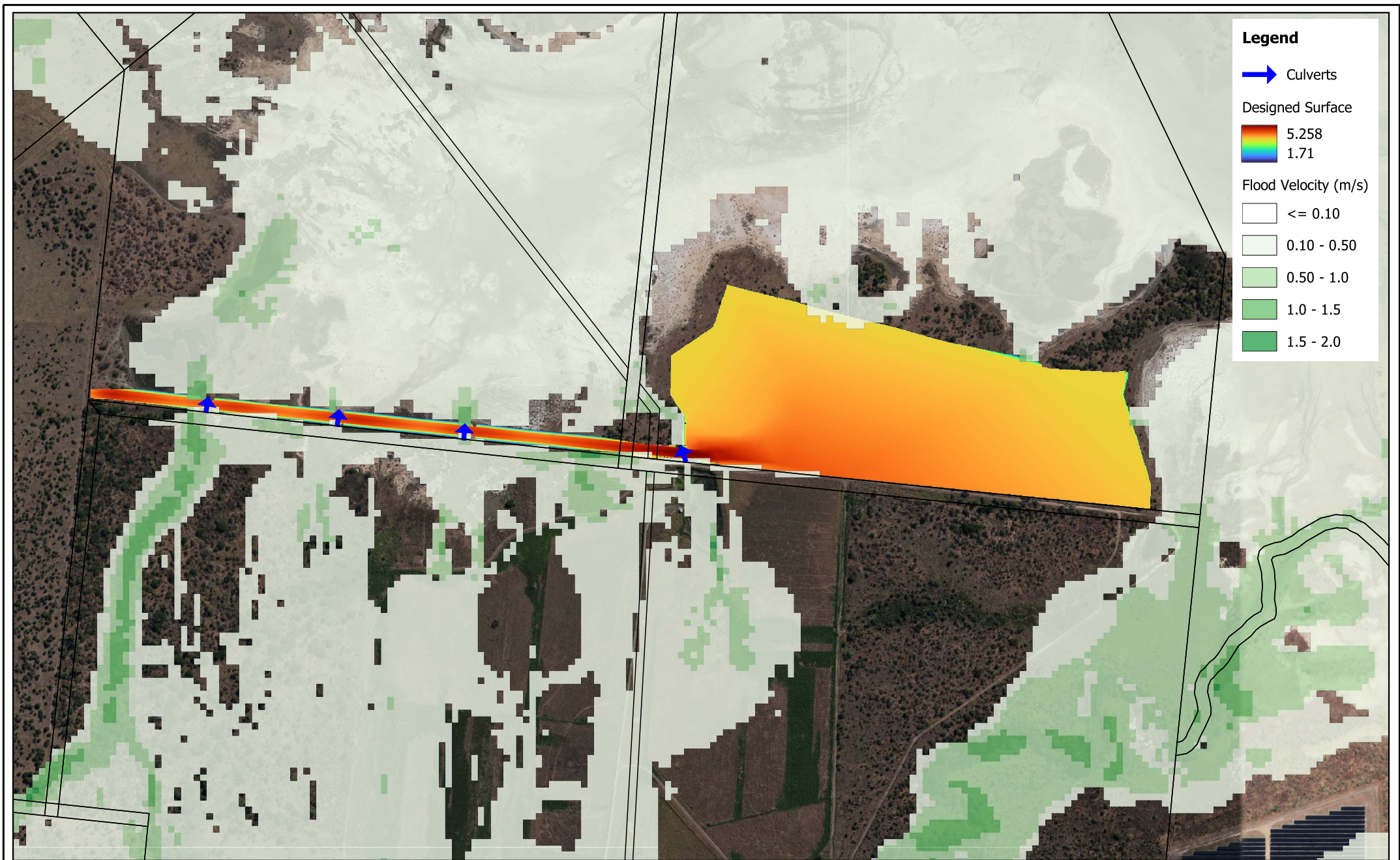
This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.

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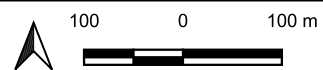
By: TL Aug 2024



Title: Townsville SDA - CBIP Far East - Proposed
Peak Flood Velocity - 1% AEP

Figure:
8

Rev:
A



This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.

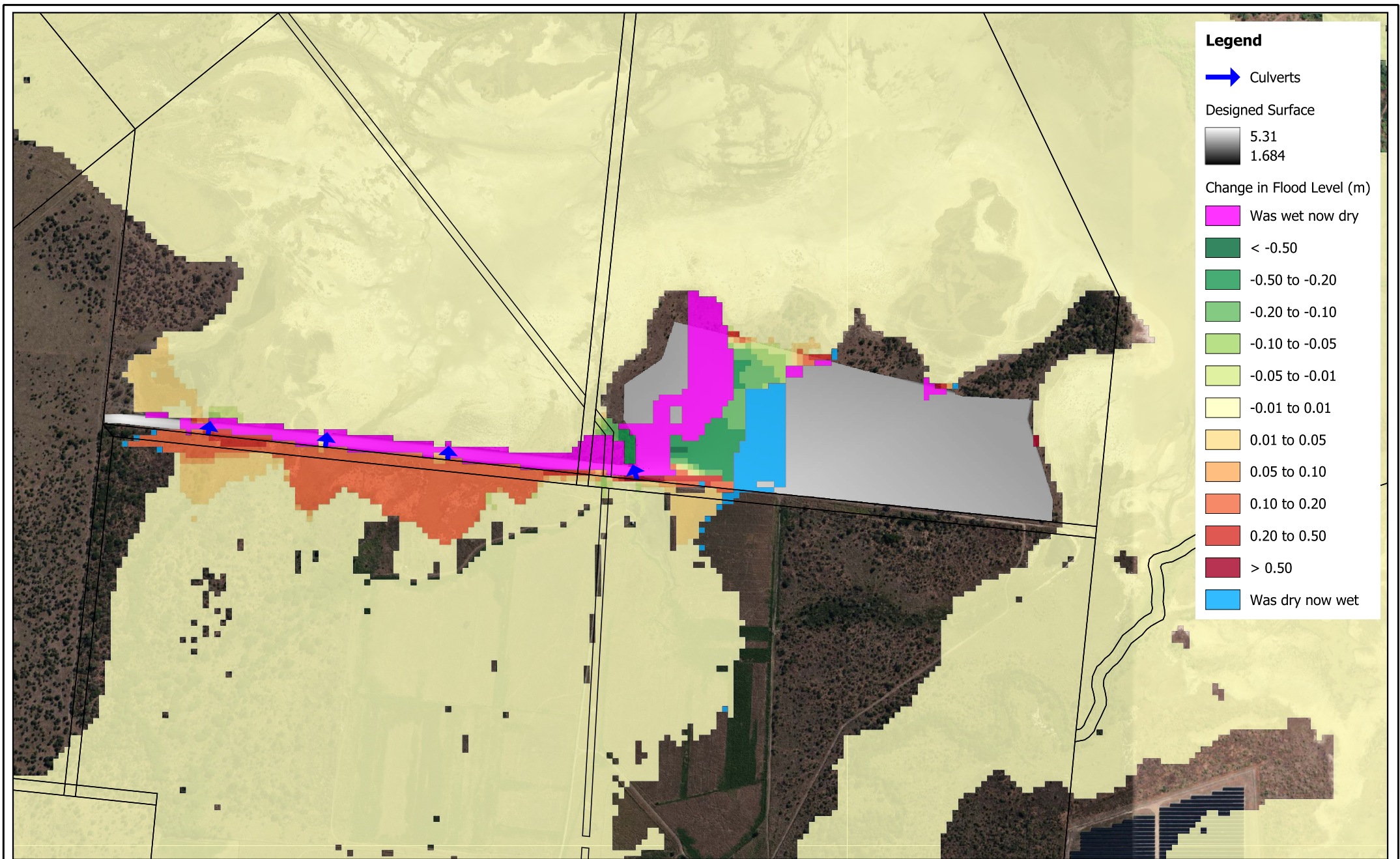


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By: TL

Aug 2024

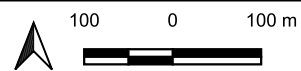
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Title: Townsville SDA - CBIP Far East
Independent Change in Peak Flood Level - 1% AEP

Figure:
9

Rev:
A



This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.



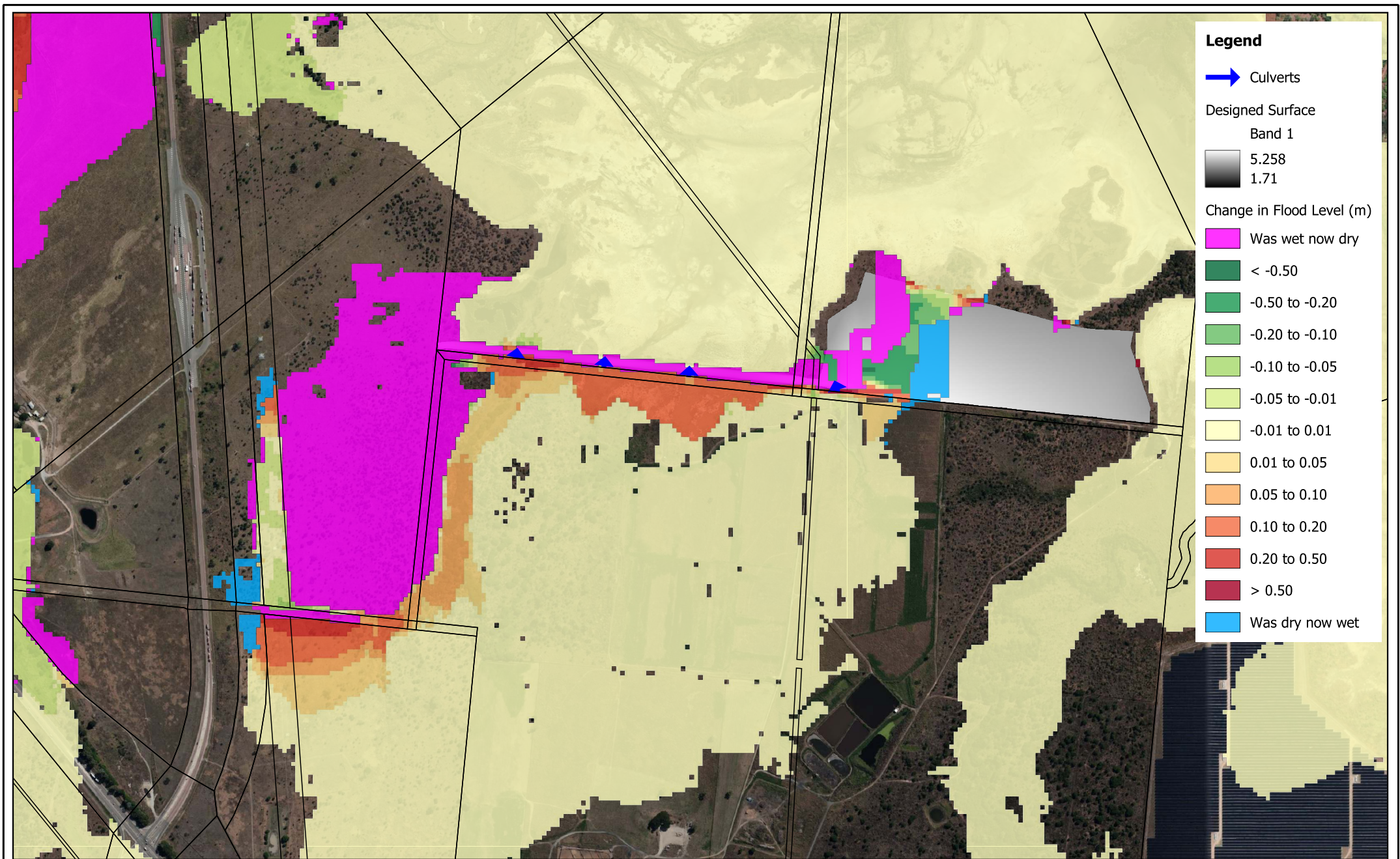
www.VenantSolutions.com.au

Filename: S:\Projects\M00506.RG.CBIPFarEast\GIS\Drawings\L.M00506.001.03\Fig9_Dif_LowerStuart_b2015_VS_d255_VS_d205_100y_h_Max.qgz

By: TL

Aug 2024

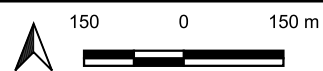




Title: Townsville SDA - CBIP Far East
Cumulative Change in Peak Flood Level - 1% AEP

Figure:
11

Rev:
A



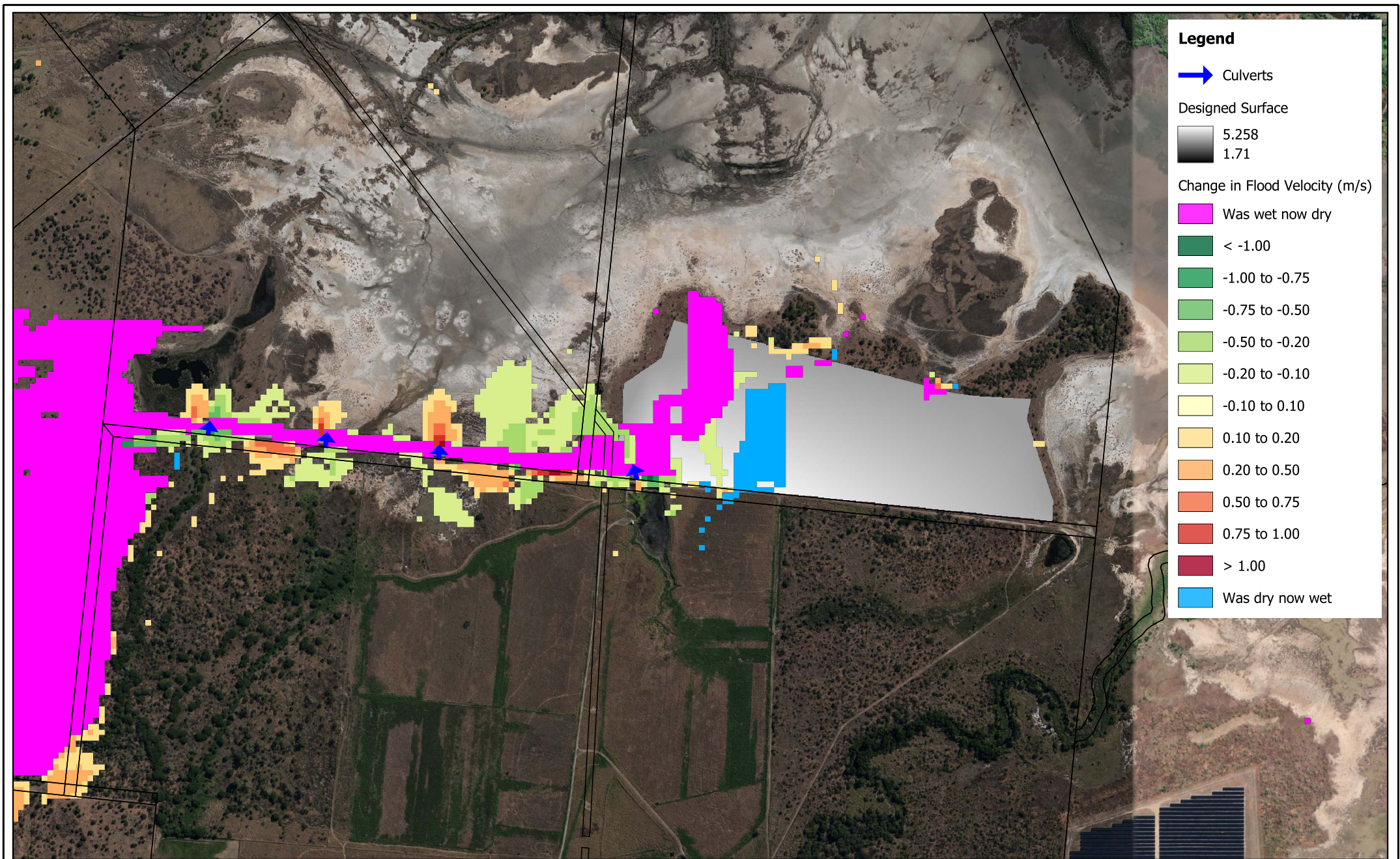
This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.



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Filename: S:\Projects\M00506.RG.CBIPFarEast\GIS\Drawings\L.M00506.001.03\Fig11_Dif_LowerStuart_b2015_VS_d255_VS_e023_100y_h_Max.qgz

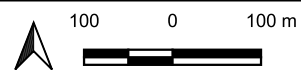
By: TL Aug 2024



Title: Townsville SDA - CBIP Far East
Cumulative Change in Peak Flood Velocity - 1% AEP

Figure:
12

Rev:
A



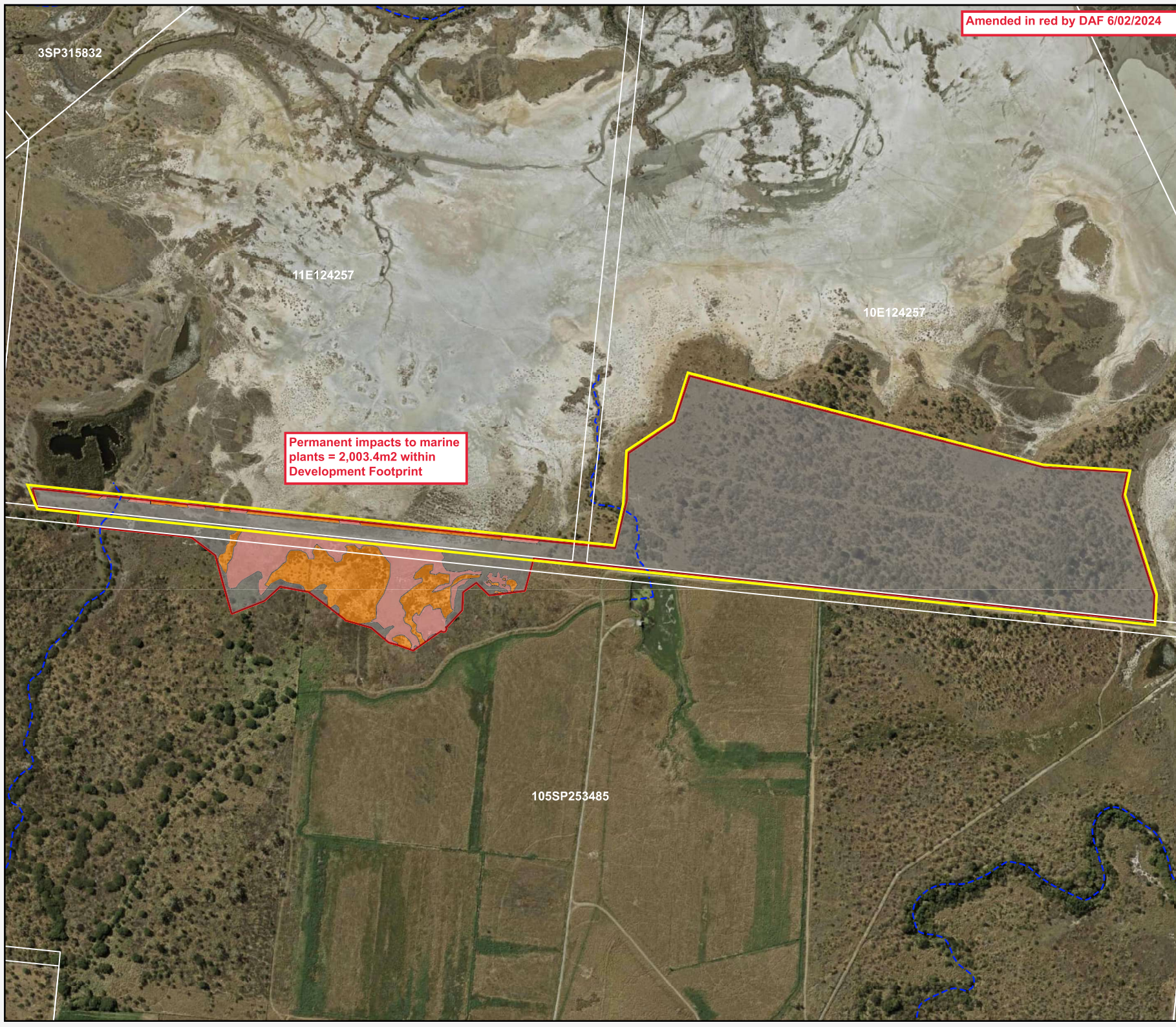
This mapping product is based on techniques and data in accordance with the study scope. Users should consider the mapping in the context of the report. No two floods are the same and care should be taken in the use and interpretation of the results presented.



Filename: S:\Projects\M00506.RG.CBIPFarEast\GIS\Drawings\L.M00506.001.03\Fig12_Dif_LowerStuart_b2015_VS_d255_VS_e023_100y_V_Max.qgz

By: TL Aug 2024

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Terra
SOLUTIONS

FIGURE 4: GROUND-TRUTHED
VEGETATION

0 75 150 225 m
1:4,879

LEGEND:

- Survey Area
- Lot Parcel
- VM Act Watercourses
- Ground-truthed REs
 - 11.1.1 (1.80 ha)
 - 11.1.2 (1.85 ha)
 - Non-remnant (19.75 ha)
- Development Footprint

PLANS AND DOCUMENTS
referred to in the
SDA APPROVAL



SDA approval: AP2023/013

CLIENT: CLEVELAND BAY INDUSTRIAL PARK PTY LTD
DATE: 19/12/2023
AUTHOR: Anton
COORDINATE SYSTEM: GDA2020 / MGA zone 55

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