Appendix I – Engineering Services Report

Building Services Report

Fairmont Resort

71-85 Port Douglas Road

Port Douglas, QLD 4877

Prepared For:
Chidodo Corporation
Pure Projects

Prepared By:
Building Services Engineers

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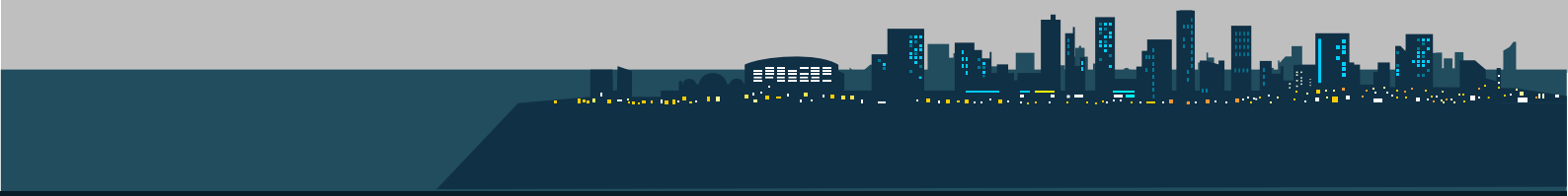

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Contents

1. Executive Summary

This report has been commissioned by Chiodo Corporation to support the Development Application for the proposed Fairmont Resort development at 71-85 Port Douglas Road, Port Douglas.

This report addresses the following engineering aspects at the concept design level:

- Water Supply
- Sewerage Infrastructure
- Electricity and Telecommunications
- Gas
- Codes.

2. Introduction

2.1. Purpose

This Building Services Engineering Report has been prepared to support the Development Application for the proposed Fairmont Resort development at 71-85 Port Douglas Road, Port Douglas.

2.2. Project Description

The proposed development involves the construction of a new Fairmont Resort. The resort includes the following key elements;

- Porte Cochere and Entrance
- Basement Carpark and Service Areas
- Lower Ground, Ground Level 1 to 3
- Roof Top

The Fairmont Resort will include spaces such as:

- Short Term Accommodation (253 accommodation rooms)
- 7 off Food and Drink Outlets, plus 2 off flexi on demand pop-up food specialities
- Function facility
- Ancillary uses including basement car parking, reception, office, gymnasium and outdoor recreational facilities

The resort will be serviced by new infrastructure connected to existing services located along Port Douglas Road. New dedicated site services for electrical, communications, sewerage, potable water and fire services shall be installed to service the proposed development.

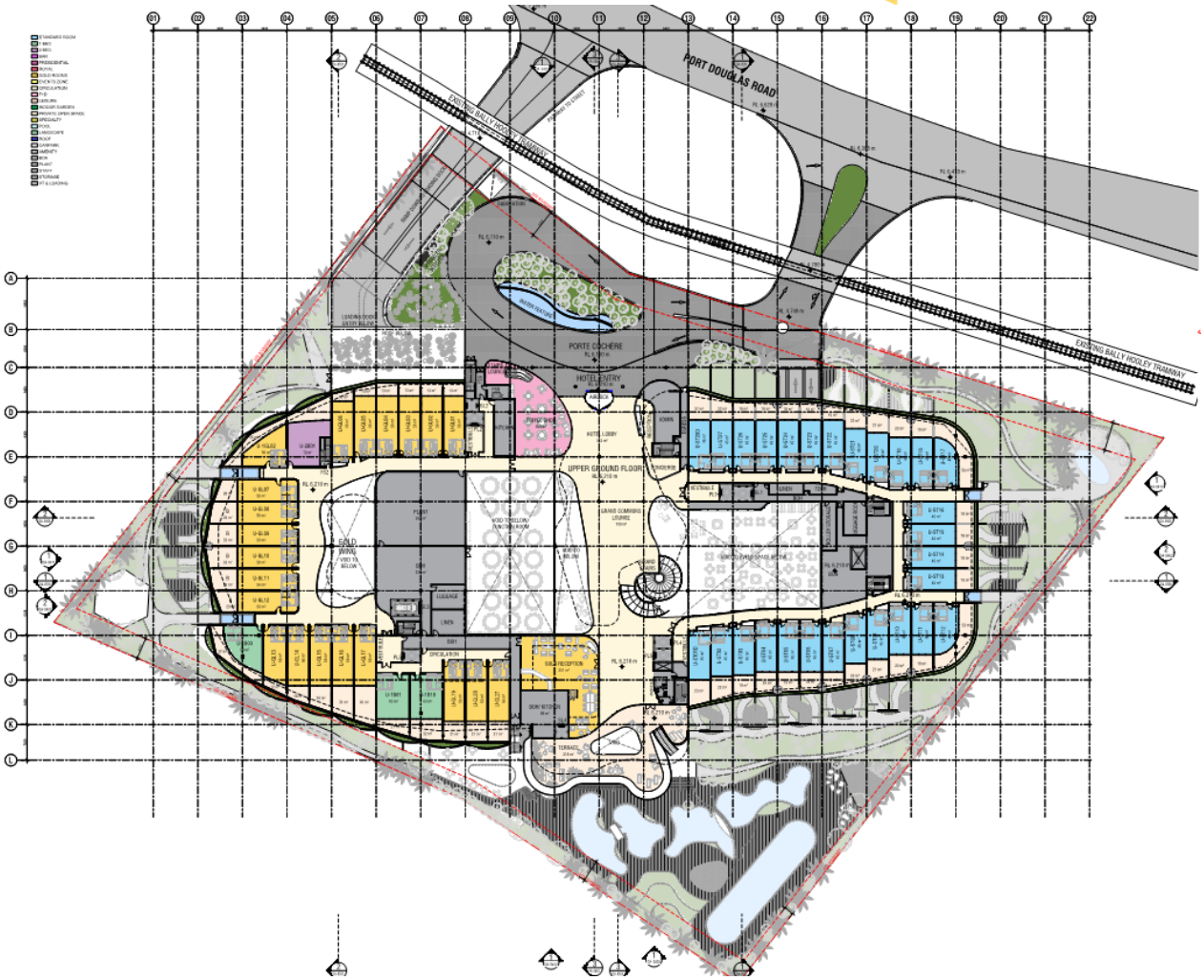

Figure 1 – Proposed Development

3. Site Characteristics

3.1. Site Situation

The site is located at 71-85 Port Douglas Road, Port Douglas and is described at Lot 1 on SP 150468

The site fronts Port Douglas Road to East, with connection to Mirage Country Club golf course to the West and Oaks Resort to the South.

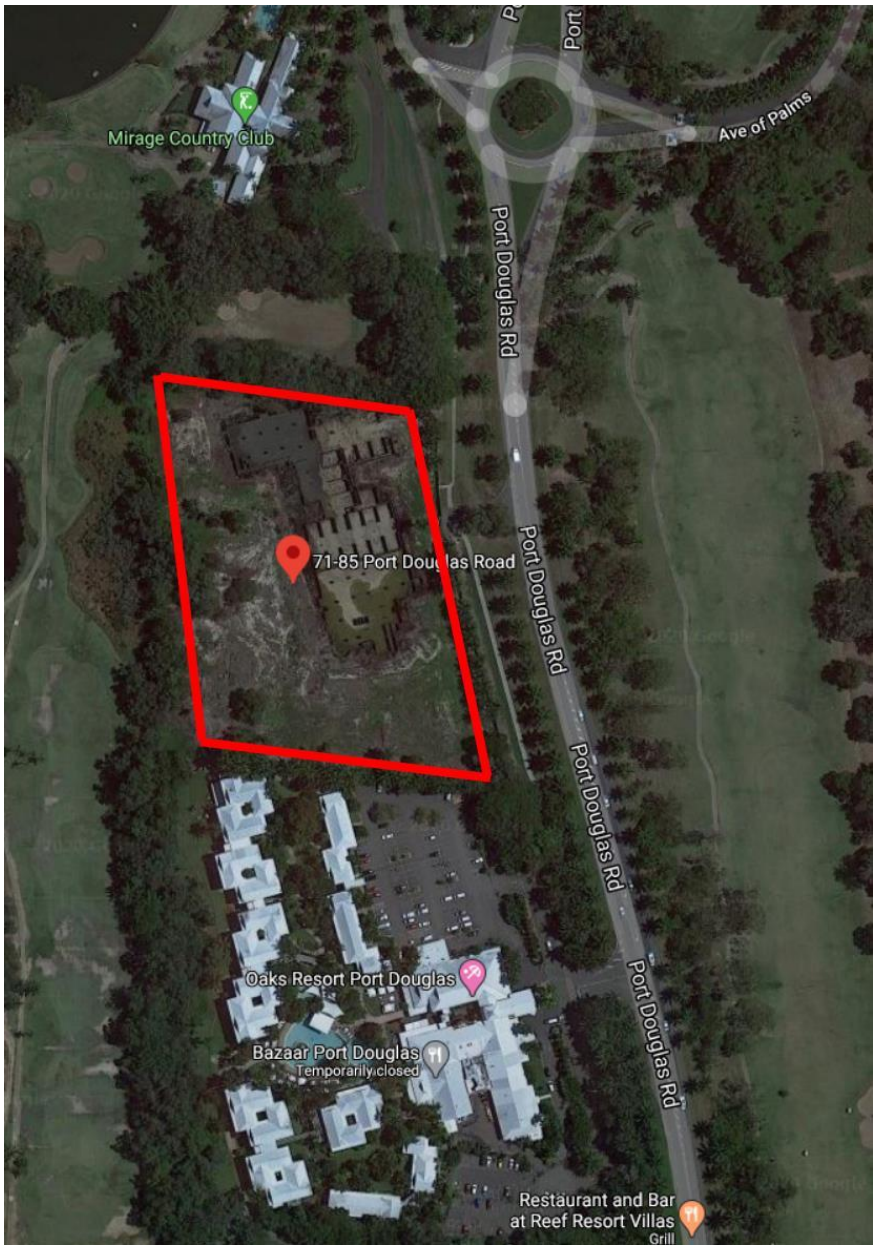

Figure 2 – Site Location

3.2. Site Data

Site data has been obtained from the following sources:

- Douglas Shire Council
- Satellite Imagery
- Relevant Reports
- Existing Plans
- Dial before You Dig (DBYD)

3.3. Stormwater

The stormwater related engineering aspects of the proposed development are addressed in the Stormwater Management Plan undertaken by Northrop and lodged in a separate report.

The buildings stormwater shall be collected and directed to the lawful point of discharge.

3.4. Water Supply

Inspection of the Douglas Shire Council, Port Douglas and Mowbray Water Network water mapping shows the following services:

- Existing 300mm Diameter Asbestos Cement water main is located adjacent to the property boundary
- Existing 450mm Diameter DICL water main is located adjacent to the above water main.

The proposed development will require the following connections to the existing water mains. The final connection will be subject to review of existing for and pressure in each main as well as advice from Douglas Shire Council technical officers, it is proposed that the new connections are made to the existing 450mm DICL main. The new connection will be to the North of the property, along the new service access road.

The required connections are:

- 1 off 100dia potable water supply
- 2 off 150mm fire services connections.

New connections and meter assemblies will be installed on site to suit Douglas shire council requirements.

It is noted that an existing 100mm diameter connection exists, this connection will be disconnected and removed to allow for the proposed entry to the site.

As part of the development a combined fire hydrant and sprinkler system is required to meet National Construction Code. Subject to the flow and pressures of the existing water mains, it is envisaged that hydrant and sprinkler pumps as well as storage tanks will be required. The flow and demand for the site is estimated at this stage to be as listed below:

- Potable Water – 15 - 18 l/s
- Fire Service – 32 - 36 l/s

We highlight that he above are estimates only at this stage of the project.

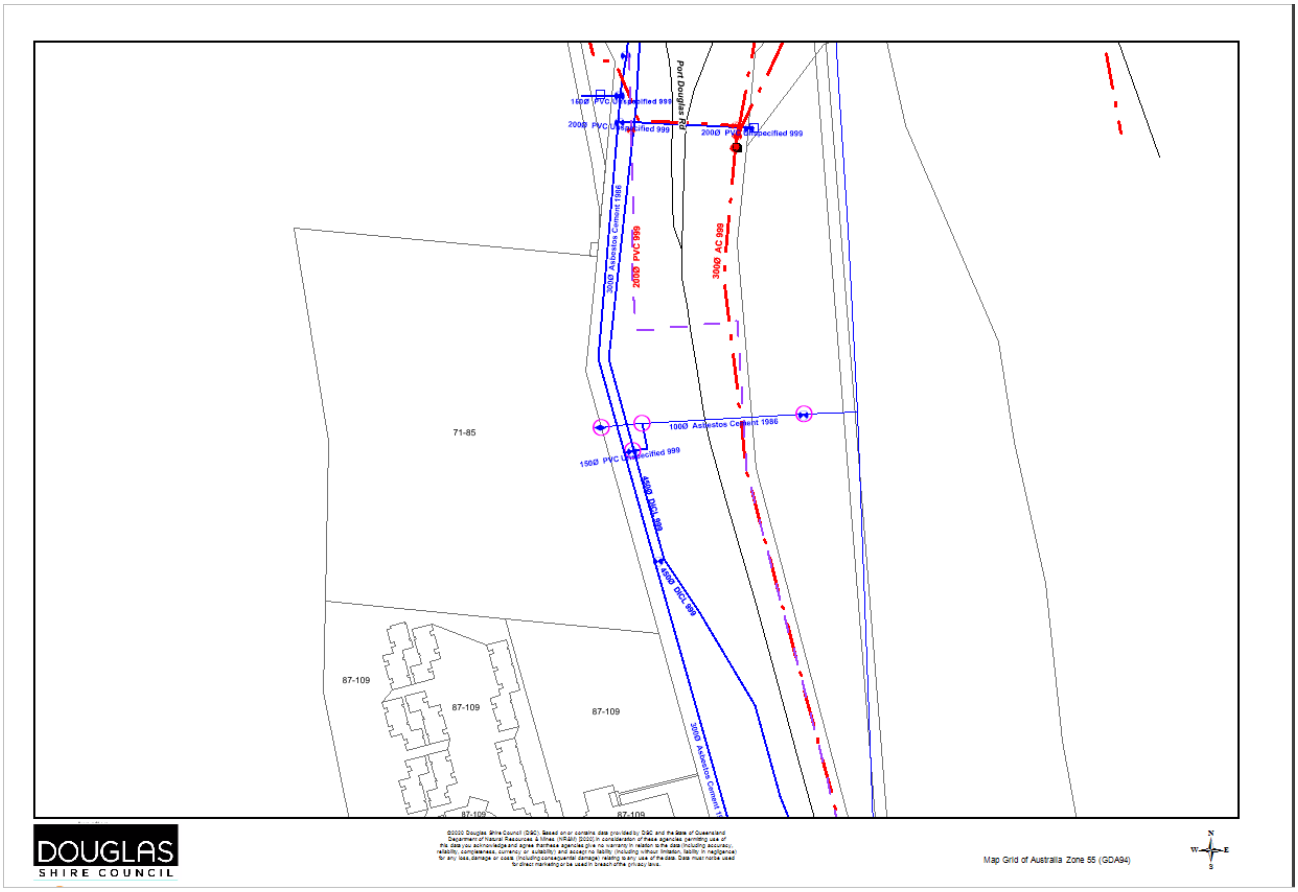

Figure 3 – Extract of Douglas Shire Council Mapping – Blue Indicates Water Services

3.5. Sewer

Inspection of the Douglas Shire Council, Port Douglas and Mowbray Water Network water mapping shows the following services:

- Existing 300mm dia rising main is located on the opposite side of Port Douglas Road. (in **RED** below)

There is no current sewer connection for this site.

For the purposes of the development a new sewer pumps station will be required to be installed for the development. This pump station will then connect to the existing rising main on Port Douglas Road.

The depth of this existing rising main is unknow at this stage, however, as a new pump station is to be installed for the development, details around acceptable pressures and connection details will be worked through with the technical officers of the Douglas Shire Council as part of the detailed design phase.

The sewer discharge is subject to the available capacity of the 300mm rising main. The estimated discharge at this stage is as listed below:

- Sewer – 20 - 25 l/s (Peak)

We highlight that the flow rate from the site to the existing main will be capped by the infrastructure available, and the site pump station capacity will be increased to ensure an acceptable constant sewer discharge.

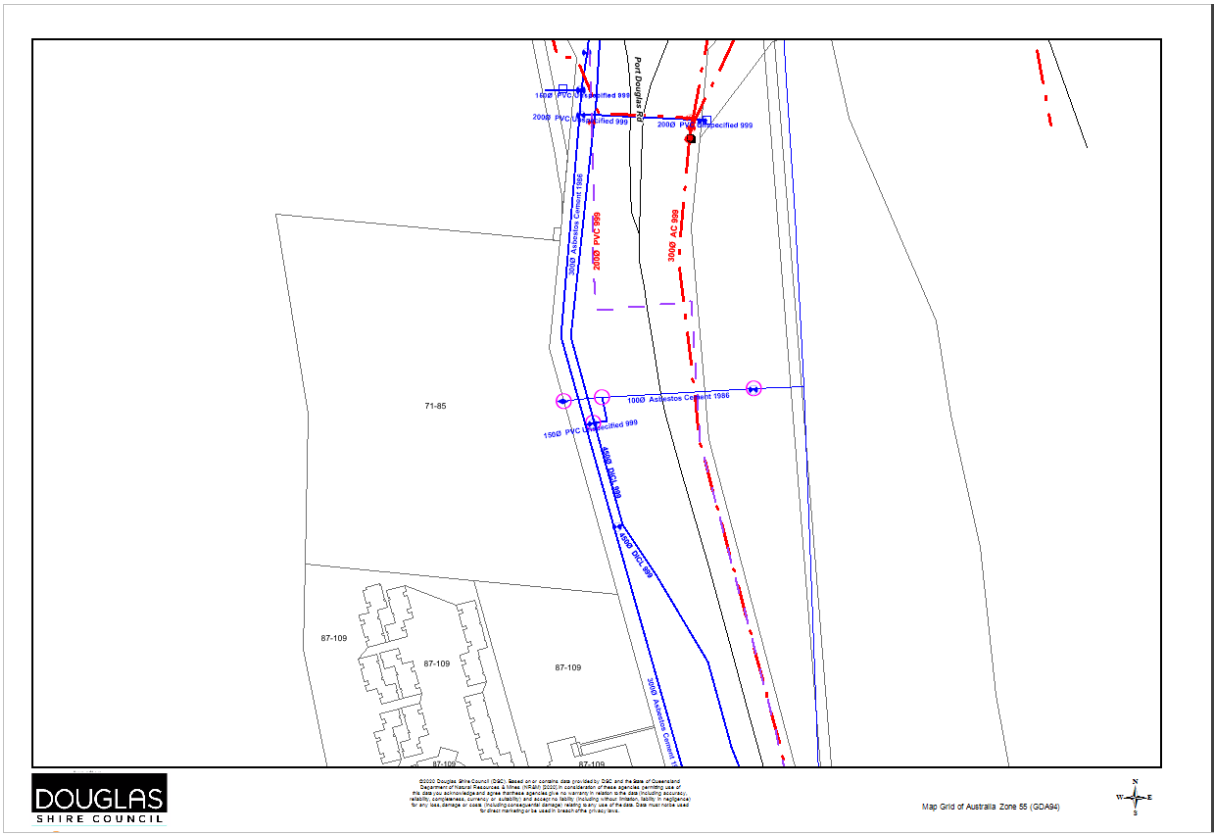

Figure 4 – Extract of Douglas Shire Council Mapping – Red Indicates Rising Main Sewer Services

3.6. Trade Waste

The existing site is not provided with any trade waste facilities.

As part of the development, new food and beverage facilities will be installed. As required by Queensland Urban Utilities and the Douglas Shire Council, new trade waste facilities will be installed on site.

While the final food and beverage offering and kitchen design is yet to be finalised, we anticipate that 3 off 6,000 ltr trade waste grease arrestors will be installed / required for the site. Each of these trade waste arrestors will be installed to suit the requirements of NCC, Queensland Urban Utilities and the Douglas Shire Council.

Each trade waste arrestor will be provided with remote suction facility at the loading dock for routine maintenance.

3.7. Gas

The existing site is not supplied with any gas services.

As part of our investigations, and in speaking with APA, there is a 110mm MDPE (Medium Pressure – 110 kPa) LPG main that is located on the east side of Port Douglas Road.

As gas is required to service the development, it is proposed that a new connection to the existing gas main is undertaken to provide a new service to the site. The size and capacity of the connection to the gas main will be further developed as part of the detailed design phase of the project with the relevant stakeholders.

The plan below details the existing main (shown in **pink** below) as supplied by the DBYD inquiry.

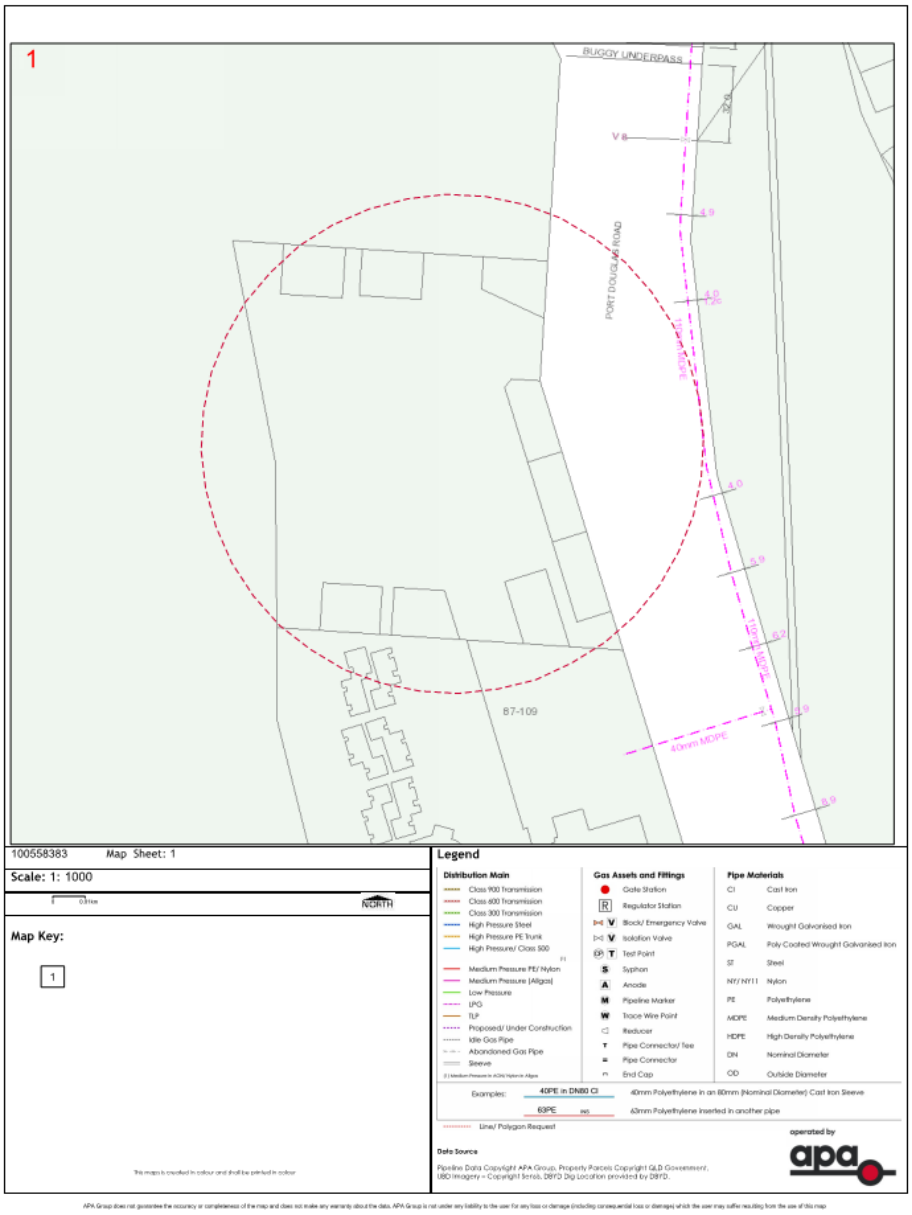

Figure 5 – Extract of APA Network – Pink Indicates existing main Services

3.8. Electricity

There is existing high voltage 22kV cabling that reticulates on the east side of Port Douglas Road. There is an existing pad mount transformer that is located near the property boundary; however, it is not confirmed at this stage if this transformer serves the adjacent Mirage Country Club.

There is currently no service for this site.

For the new development new electrical transformer will be required connected to the existing high voltage Ergon network, discussions and liaison with Ergon are ongoing for the site agreement.

The Plan below details the existing 22kV high voltage underground infrastructure (shown in blue below) as supplied by the DBYD inquiry.

Figure 6 – Extract of Ergon Network – Blue Indicates existing High Voltage Services

3.9. Telecommunications

Inspection of the available information, there is both Telstra and NBN infrastructure located on the West side of Port Douglas Road.

From the DBYD information and existing conduit and service is installed to approximately 40m to the existing property. As part of the new development this existing services will be removed and replaced with a new leadin to suit the proposed entry and loading service roads.

Discussion with both Telstra and NBN will occur for the provision of telecommunications and fibre to the site.

The Plan below details the existing NBN underground infrastructure (shown in Green below) as supplied by the DBYD inquiry.

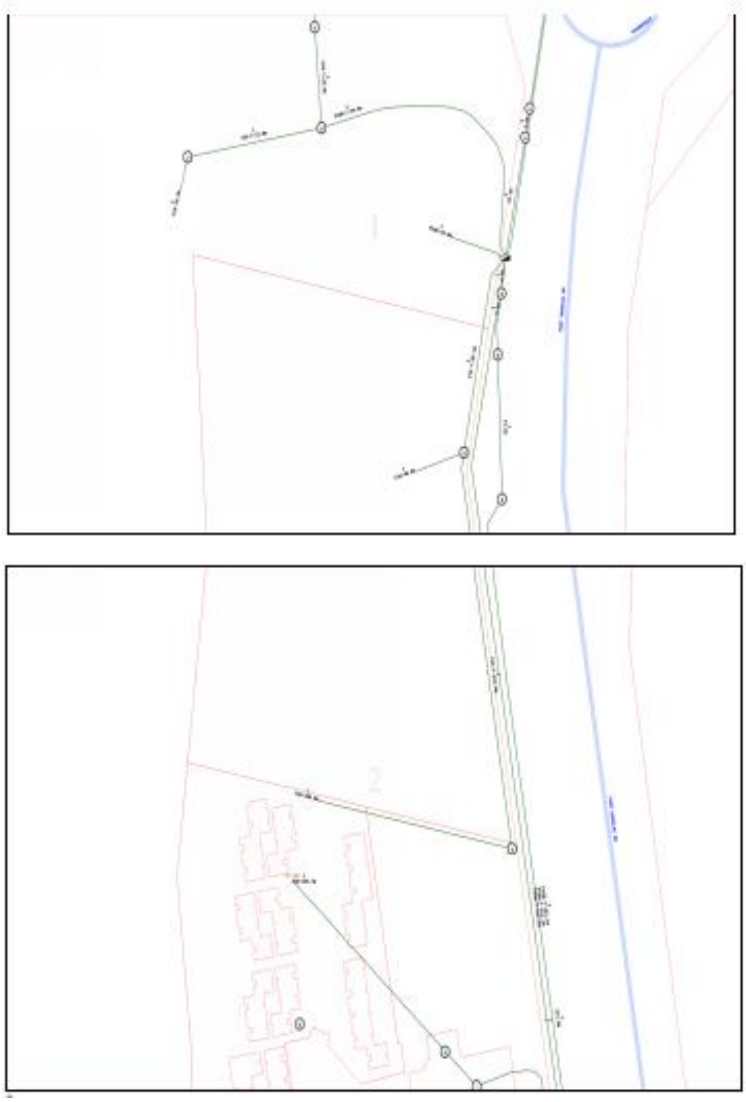

Figure 7 – Extract of NBN Network – Green Indicates existing conduit network

4. Conclusion

This Building Services Report demonstrates that under the proposed plans the site will be adequately serviced for water and sewer by the proposed connections to existing Douglas Shire Council infrastructure mains. Electricity and telecommunication services will be provided to the site with new connections undertaken in accordance with the requirements of the relevant authorities.

In summary:

- New water connection shall be made to the existing infrastructure located along Port Douglas Road upon confirmation on existing flow and pressures within the existing 450mm DICL water main.
- A new Sewer connection from a dedicated sewer pump station on the property shall be made to the existing 300mm rising main to service the development.
- Electrical connection shall be made to the existing high voltage network located along Port Douglas Road with a new transformer located on site in accordance with the authority's requirement.
- Telecommunications connection shall be made to the existing Telstra and NBN network located along Port Douglas Road in accordance with the authority's requirement.

5. Limitations of Report

Building Services Engineers have prepared this report for the proposed Fairmont Resort development at 71-85 Port Douglas Road, Port Douglas in accordance with the available information, plans and reports provided.

This report is not meant to representative of the detailed design, it identifies the existing network infrastructure and requirements of the development. Additional detailed design and liaison with Douglas Shire Council and relevant authorities will be undertaken to ensure that the proposed development meets the requirements of the National Construction Code.

Appendix J – Flooding Catchment & Storm Tide Study

71-85 Port Douglas Road, Port Douglas, QLD Catchment Flooding & Storm Tide Study

Reference: R.B24360.001.01.Flood Study & Storm Tide Assessment.docx
Date: August 2020
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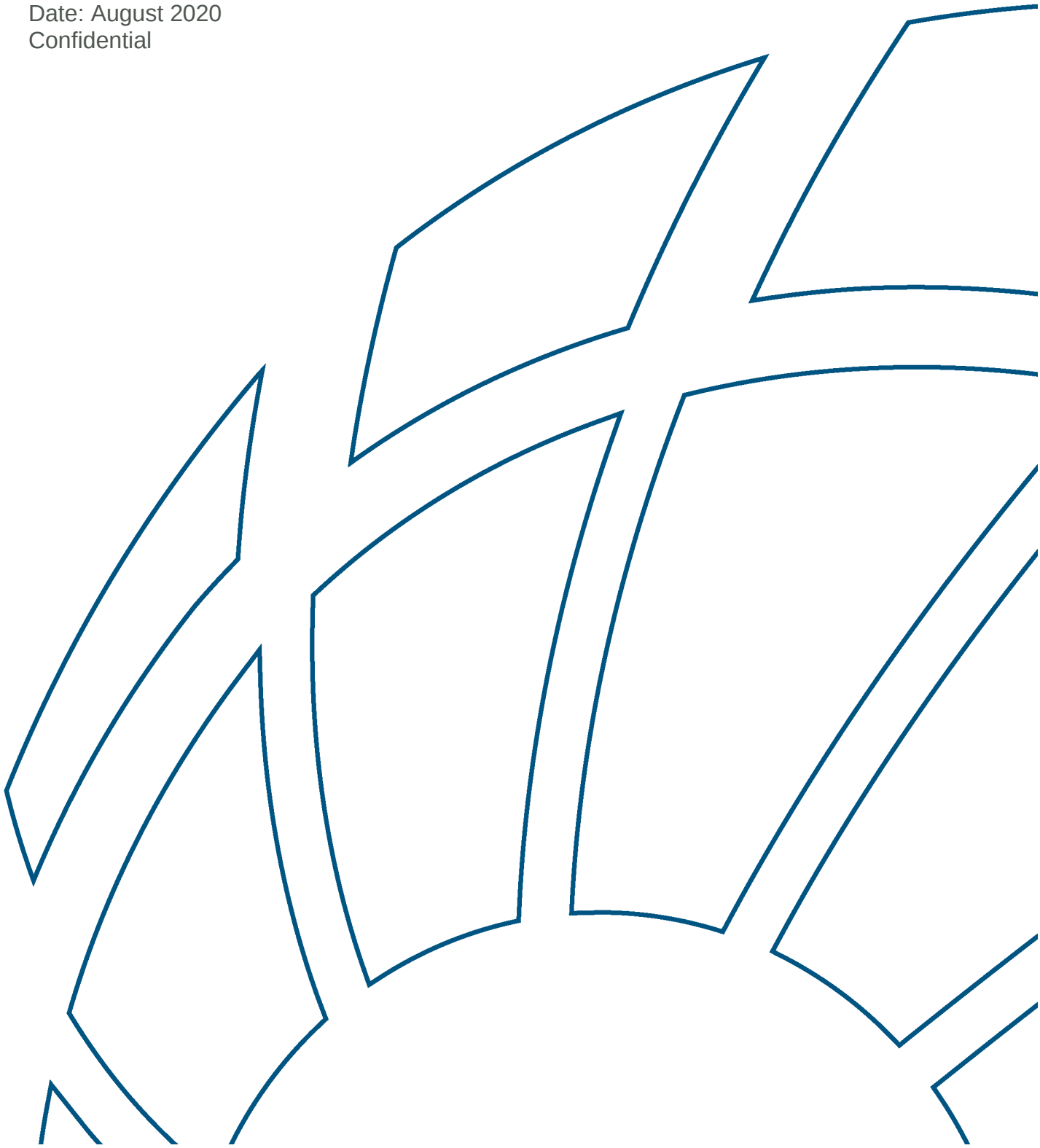

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Title:	71-85 Port Douglas Road, Port Douglas, QLD Catchment Flooding & Storm Tide Study
Project Manager:	Matthew Barnes
Author:	Netsanet Shiferaw & Matthew Barnes
Client:	Chiodo Corporation Operations Pty Ltd
Client Contact:	David McDonald (Pure Projects)
Client Reference:	

Synopsis: This report details the development of hydrologic & two dimensional (2D) hydraulic models of Creek & local catchments, and assessment of storm tide to derive the 1% Annual Exceedance Probability (AEP) Defined Flood Level pertinent specifically for the proposed development site.

REVISION/CHECKING HISTORY

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1	31st August 2020				

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Destination	Revision										
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Chiodo Corporation Operations Pty Ltd	PDF	PDF									
BMT File	PDF	PDF									
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Executive Summary

BMT Commercial Australia Pty Ltd completed a flood study and site-based assessment of storm tide with respect to the proposed development site located at 71-85 Port Douglas Road, Port Douglas, QLD. The main aim of the study was to derive the 1% Annual Exceedance Probability (AEP) design Defined Flood Level (DFL) pertinent specifically for the proposed development site. The study was conducted in accordance with latest edition of the *Australian Rainfall & Runoff* (ARR2019) design flow estimation guideline.

The DFL estimates were derived based on a combination of regional catchment flow and storm tide tailwater level. Whilst the ARR2019 guideline requires the consideration of the 1% AEP flow with the same AEP (1% AEP in this case) storm tide, the assessment contained herein conservatively adopted the 1% AEP storm tide plus sea level rise for the 2070 and 2100 climate change predictions for consistency with Douglas Shire Council requirements.

A local flood assessment was undertaken to ensure that the level derived from the local flooding event was not higher than the regional flood levels. A sensitivity analysis was also conducted based on a range of Manning's 'n' values for main flow paths. The analysis showed that the DFL estimates were not very sensitive to the adopted roughness values.

Based on the flood model results, the 1% AEP DFL estimates for the proposed development site are:

- 2.70m AHD for the 2100 storm tide combination;
- 2.46m AHD for the 2070 storm tide combination; and
- 2.45m AHD for the local flooding event.

In accordance with the Douglas Shire Planning Scheme, Flood and Storm Tide hazard overlay code, the proposed development floor level must provide flood immunity to the 1% AEP DFL plus a freeboard allowance of 300 mm. The recommended minimum finished floor levels are therefore:

- Development design life of 80-years (i.e. to the year 2100): 3.00 mAHD
- Development deign life of 50-years (i.e. to the year 2070): 2.76 mAHD.

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1 Introduction

1.1 Background

Development approval was previously issued by former Douglas Shire Council (DSC) to construct a resort style development on 71-85 Port Douglas Road, Port Douglas, QLD. The approval included conditions in relation to finished floor levels based on the *Cairns Region Storm Tide Inundation Study* (BMT WBM 2013). In the absence of a site-based assessment, a minimum finished floor level of 3.2 mAHD for immunity from storm tide was required.

Recent correspondence from DSC (email on 17 March 2020 to Erin Campbell, GHD) also indicated that there is no available local catchment flood model covering the site and there is some uncertainty in relation to the finished floor levels for immunity from regional and local catchment flooding. In this case, DSC adopts default minimum finished floor level of 3.4 mAHD.

BMT Commercial Australia Pty Ltd has been engaged by Chiodo Corporation Operations Pty Ltd to undertake a flood study and provide site-based storm tide advice to inform the assessment of minimum finished floor levels for the proposed development site.

1.2 Objectives of the Study & Report Structure

General features of the subject site relevant to the flood assessments are described in Section 2. Outputs from the *Cairns Region Storm Tide Inundation Study* (BMT WBM 2013) are included in Section 3 and a site-based interpretation of this previous regional scale assessment is provided.

The study involves the development of a hydrologic model and a 2D hydraulic model in accordance with latest edition of the *Australian Rainfall & Runoff* (ARR2019) design flow estimation guideline, with the aim of deriving the 1% Annual Exceedance Probability (AEP) design Defined Flood Level (DFL) and provided minimum finished floor levels for the proposed development site. Sections 3 and 5 provide the details of the hydrologic and hydraulic modelling, incorporating outcomes of the site-based storm tide assessment presented in Section 3.

DSC flood immunity requirements and recommendations with respect to minimum finished floor levels are provided in Sections 6 and 7. The assessment and recommendations consider two potential planning horizons:

- Development design life of 80-years (i.e. to the year 2100)
- Development deign life of 50-years (i.e. to the year 2070).

Based on current state government recommendations for planning purposes in Queensland, appropriate sea level rise allowances in 2100 and 2070 are 0.8 m and 0.5 m respectively. These assumptions have been incorporated to the assessments described in this report.

2 Site Description

The subject site is located on the western side of Port Douglas Road between the Mirage Country Club and Oaks Resort (Refer to Figure 2-1). The Real description of the property is Lot1SP150468 and the site has an area of approximately 2.1 hectares.

The subject site is perched on high grounds, with most of the site consisting of ground elevations above 3.5m AHD compared to the Creek floodplain level of about 1.0m AHD. The potential exposure to storm tide conditions is either from the open coast approximately 500m east of the site or via Dickson Inlet to north.

Figure 2-1 Locality Map

3 Storm Tide Assessment

3.1 Background

DSC adopts the findings of the *Cairns Regional Storm Tide Inundation Study* (BMT WBM 2013) when providing guidance on minimum requirements for fill and floor levels for areas potentially exposed to coastal processes. Specifically, 1% AEP storm tide level in the year 2100 has been adopted by DSC. This design water level definition includes a 0.8 m allowance for sea level rise.

BMT WBM (2013) report tropical cyclone generated design water levels at 195 unique locations within the DSC local government area. The design water level definitions are as follows:

- The 'storm tide' level which includes the influence of the tide plus surge associated with the tropical cyclone climate.
- The 'storm tide including wave effects' which includes the additional contribution that wave processes can have on the water level (wave setup and runup).

The 'storm tide' level is applicable in areas not directly exposed to waves. This includes tidal extent of rivers and creeks and coastal floodplain more than 200 m inland from the coastline.

The 'storm tide including wave effects' level is applicable to areas directly exposed to breaking waves. This is generally limited to open coast beaches where wave setup and wave runup processes occur.

A subset of output points from BMT WBM (2013) is shown in Figure 3-1 indicating that location '246' is the closest representative reporting location to the proposed development site. Table 3-1 provides a summary of outputs from location 246 for the 1% AEP in 2100.

Table 3-1 Summary of Outputs from Location 246 (BMT WBM 2013)

TC Generated Parameters: 1 in 100 (1% AEP) in 2100	Location 246
Significant Wave Height (m)	2.84
Wave Peak Period (s)	7.07
Tide plus Surge (mAHD)	2.73
Tide plus Surge plus Wave Effects (mAHD)	3.90

Storm tide conditions may also reach the development site via Dickson Inlet and Packers Creek. The 1% AEP storm tide conditions at the entrance to Dickson Inlet are used to inform the hydraulic model tailwater condition for the flood assessments described in Section 5. This location corresponds to point '254' in Figure 3-1 where the 1% AEP storm tide (tide plus surge) in 2100 is estimated to be 2.63 mAHD.

As a conservative approach, the slightly higher values at point 246 and referenced in Table 3-1 have been adopted for the independent site-based assessment of storm tide described below. For informing the hydraulic model tailwater condition (refer Section 5), the values at point 254 and referenced in Table 3-2 have been used.

Table 3-2 Summary of Outputs from Location 254 (BMT WBM 2013)

TC Generated Parameters: 1 in 100 (1% AEP) in 2100	Location 246
Significant Wave Height (m)	3.18
Wave Peak Period (s)	7.07
Tide plus Surge (mAHD)	2.63
Tide plus Surge plus Wave Effects (mAHD)	3.97

3.1.1 Wave Effects

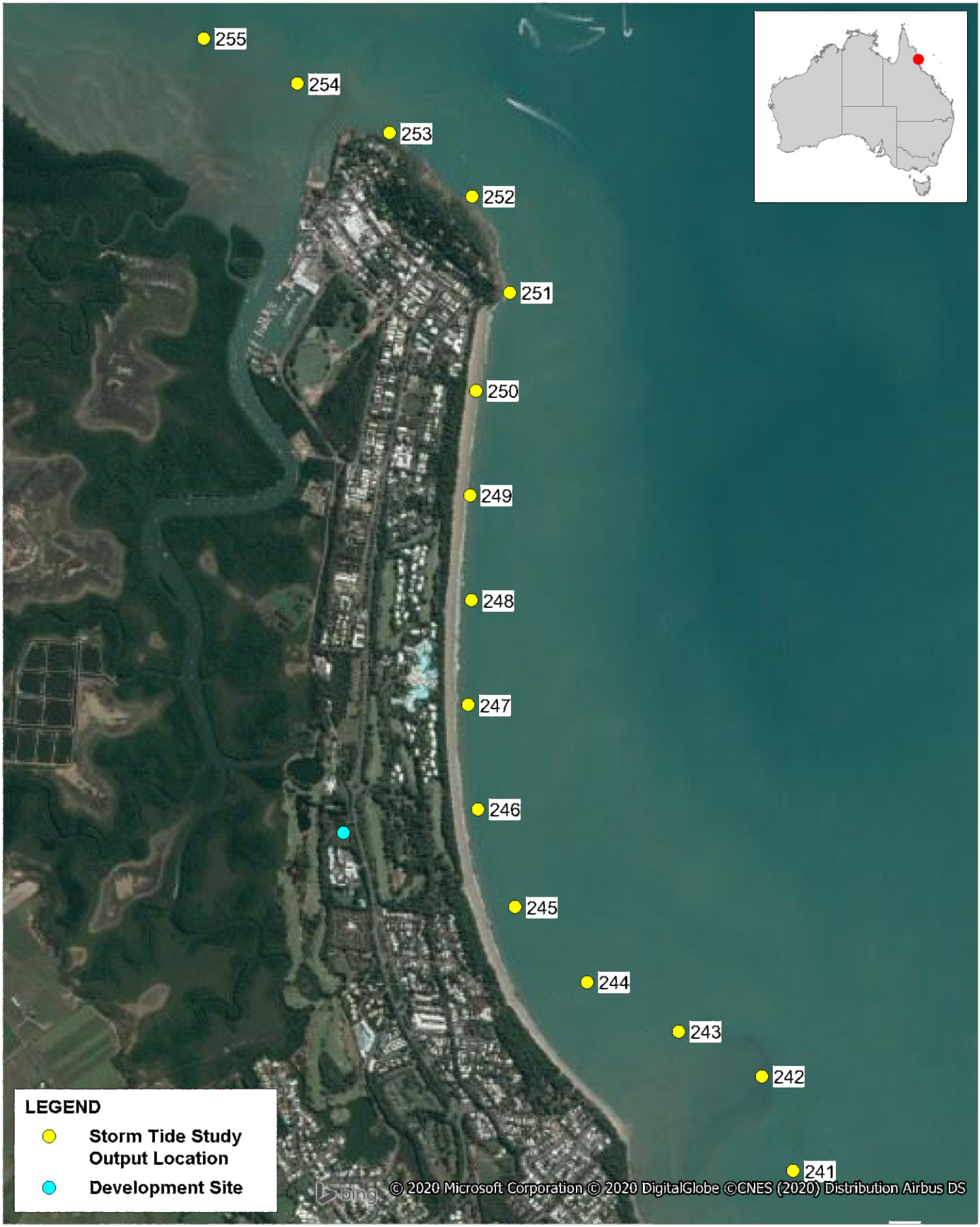
Wave effects diminish with the distance from the coastline due to topography and resistance from vegetation. For the BMT WBM (2013) study, in the absence of site-specific investigations, wave effect penetration was conservatively assumed to reach 200 m from the shoreline, with a linear reduction in wave effects with distance from the shoreline. Beyond 200 m the effects of waves on the extreme water level is assumed negligible. Most of the subject site is greater than 500 m landward of the open coast shoreline and therefore not exposed to the influence of waves. In this scenario, the 'tide plus surge' level applies. The influence of waves on the storm tide level is therefore not considered further in this study.

3.2 Independent Storm Tide Levels at the Subject Site

The BMT WBM (2013) study did not assess storm tide in the year 2070. Based on current state government recommendations for planning purposes, an appropriate sea level rise allowance in 2070 is 0.5 m. Design storm tide levels (not including freeboard) for the site and 2100 and 2070 planning horizons are therefore:

- Development design life of 80-years (i.e. to the year 2100): 2.7 mAHD (i.e. the 'tide plus surge' level taken from Table 3-1)
- Development deign life of 50-years (i.e. to the year 2070): 2.4 mAHD (i.e. based on the 'tide plus surge' level taken from Table 3-1 with a reduced sea level rise allowance).

These levels and the outputs from BMT WBM (2013) are considered further as part of the joint probability assessments of catchment flooding and storm tide presented in Section 5.



Title:

Subset of Storm Tide Study Output Points (BMT WBM 2013)

Figure: 3-1

Rev: A

N

0 0.5 1km

Approx. Scale

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4 Hydrologic Analysis

A hydrologic analysis was conducted to derive design inflow hydrographs for use in the hydraulic analysis. The analysis methodology was based on the latest edition of ARR2019 guideline. A hydrologic model of the Packers Creek catchment (adjacent to the subject site) established using the Watershed Bound Network Model (WBNM). The model was validated against the probabilistic Rational Method and the Regional Flood Frequency Estimation (RFFE) method.

The details of the hydrologic analysis are presented in the following sections.

4.1 WBNM Model Setup

The model requires several input parameters to derive design inflow hydrographs. These are detailed in the following sections.

4.1.1 Catchment Delineation and Properties

The delineation of the Packers Creek catchment was carried out based on a 5m grid LiDAR digital terrain model (DTM) sourced from the ELVIS online database. The delineation was completed using a combination of the QGIS Watershed Analysis automated tool and manual adjustment as required.

The overall drainage area was delineated into several sub-catchments to allow for derivation of inflow hydrographs at multiple points of interest. The catchment plan is shown in Figure 4-1. The catchment properties are presented in Table 4-1.

Table 4-1 Sub-Catchment Properties

Sub-Catchment	Area (ha)	Fraction Impervious (%)	Sub-Catchment	Area (ha)	Fraction Impervious (%)
A	408.4	0	K	37.3	0
B	143.5	0	L	7.3	50
C	162.8	0	M	6.2	40
D	85.8	0	N	337.7	0
E	78.4	60	O	117.4	0
F	72.6	50	P	34.6	0
G	21.5	40	Q	27.8	0
H	19.3	35	R	101.3	0
I	32.7	0	S	138.5	25
J	61.2	0	-	-	-

4.1.2 Rainfall Intensity and Temporal Patterns

Site specific intensity frequency duration (IFD) and temporal patterns were derived from the ARR Data Hub based on Latitude of -16.5316 and Longitude of 145.4503.

It is noted that despite the catchment area being greater than 1 km^2 (threshold for application of areal reduction factor), the no areal reduction factor (ARF) was applied to the IFD to provide a more conservative rainfall depth estimate.

4.1.3 Rainfall Loss Rates

The following global rainfall losses were obtained from the ARR Data Hub:

- Storm initial loss (SIL) of 67 mm and continuing loss (CL) of 3.5 mm for pervious surface.
- IL of 0mm and CL of 1 mm for impervious area; and
- Pre-burst rainfall depth varying per storm durations.

Based on the ARR guideline, the design burst initial loss is calculated as the SIL (67 mm) minus the median pre-burst rainfall depth. Based on the supplied SIL and pre-burst rainfall depths, the design IL was calculated to be zero for the durations greater than 60 minutes. For the durations less or equal to 60 minutes, the ARR method calculated an IL of 57 mm. For the local hydrologic analysis however an IL of 0 mm was conservatively adopted for these durations as well.

4.1.4 Global Lag Parameter

The lag parameter is used for the conversion of rainfall to runoff on pervious and impervious surfaces, as well as flood routing in streams. The WBNM user guide recommends a Lag Parameter value between 1.3 and 1.8. For the analysis different values were tested as part of the model validation. For the final analysis, a value of 1.3 was adopted to obtain a close agreement with the validation method.

Legend

- Creek Flow path
- Site Boundary
- Catchment Flow Direction
- Sub-Catchment Boundary

Title:
Catchment Layout

Drawing: **4-1**

Rev: **A**

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

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4.2 WBNM Output

The 1% AEP peak flows at the outlets of sub-catchments 'I' and 'S' were derived from the model for the purpose of model validation. The peak flows, critical durations and adopted temporal patterns are summarised in Table 4-2. It is noted that the critical duration and temporal patterns were selected based on the median value.

Table 4-2 1% AEP WBNM Peak Flows at Outlets of Sub-Catchments I and S

Outlet	Area (ha)	Critical Duration (min)	Adopted Temporal Pattern	Peak Flow (m^3/s)
Sub-catchment 'I'	1,025	180	8781	168.6
Sub-catchment 'S'	1,894	180	8795	289.8

4.3 Model Validation

The model was validated at the outlet of sub-catchments 'I' and 'S' by comparing the 1% AEP peak flows derived from the model against the Rational Method and RFFE model. The validation process is detailed in the following sections.

4.3.1 Rational Method

For the Rational Method, the time of concentration (TC) was calculated using the Friend's Equation (Chart 4.6) and Stream Velocity method in accordance with the Queensland Urban Drainage Manual (QUDM). The calculations of the TC and peak flows are presented in Table 4-3 and Table 4-4. The results show that the Rational Method estimates were found to be generally consistent with those of the WBNM model.

Table 4-3 Rational Method Time of Concentration Calculations

Parameters	Length (m)	Average Slope (%)	Assumed Velocity (m/s)	Travel Time (min)
Sheet Flow	50	10	n/a	15
Reach 1	2,500	13	1.5	27.8
Reach 2	2,300	5	0.9	42.6
Reach 3	2,225	0-1.5	0.7	53.6
Sub-catchment 'I' Outlet TC (min)				138.9
Reach 4	3,830	0-1.5	0.7	91.2
Sub-catchment 'S' Outlet TC (min)				230.1

Table 4-4 Rational Method 1% AEP Peak Flow Calculations

Outlet	Area (ha)	Fraction Impervious (%)	I_{10y1hr} (mm/hr)	C_{10}	C_{100}	TC (min)	I_{100} (mm/hr)	Peak Flow (m^3/s)
Sub-catchment 'I'	1,025	10	83.7	0.7	0.84	138.9	80.5	193
Sub-catchment 'S'	1,894	10	83.7	0.7	0.84	230.1	64.2	284

4.3.2 RFFE

The RFFE method was used to calculate peak flow estimates at the two validation points using the ARR Data Hub on-line program. Figure 4-2 and Figure 4-3 show the RFFE model layouts for the selected validation points. Table 4-5 presents the 1% AEP peak flow estimates. These estimates were found to be very different from those of both the WBNM and Rational methods.

It is noted that the RFFE method estimates the flow for a given catchment based on statistical correlation of the catchment with the nearest regional catchment flow gauges. Its accuracy is thus dependent on the quantity and distance of the flow gauges used to drive the flow. It is also noted that as the method does not implement non-linear runoff routing techniques like most industry standard hydrologic models, the estimation does not take into consideration distinctive hydrologic/hydraulic characteristics of a given catchment such as the presence of a significant flood storage that can have a significant effect on the flow estimation.

As the study area consists of steep slopes in the upper catchment and very flat slopes in the lower part of the floodplain where there is a significant flood storage, the RFFE method is not considered to provide accurate flow estimation.

Hence, given the consistency between the Rational Method and WBNM estimates, the former was adopted as the preferred validation method.

Table 4-5 RFFE 1% AEP Peak Flow Estimates

Outlet	Area (km^2)	5% Confidence Limit (m^3/s)	95% Confidence Limit (m^3/s)	Expected Quantiles (m^3/s)
Sub-catchment 'I'	10.25	130	1,230	402
Sub-catchment 'S'	18.94	186	1,750	572

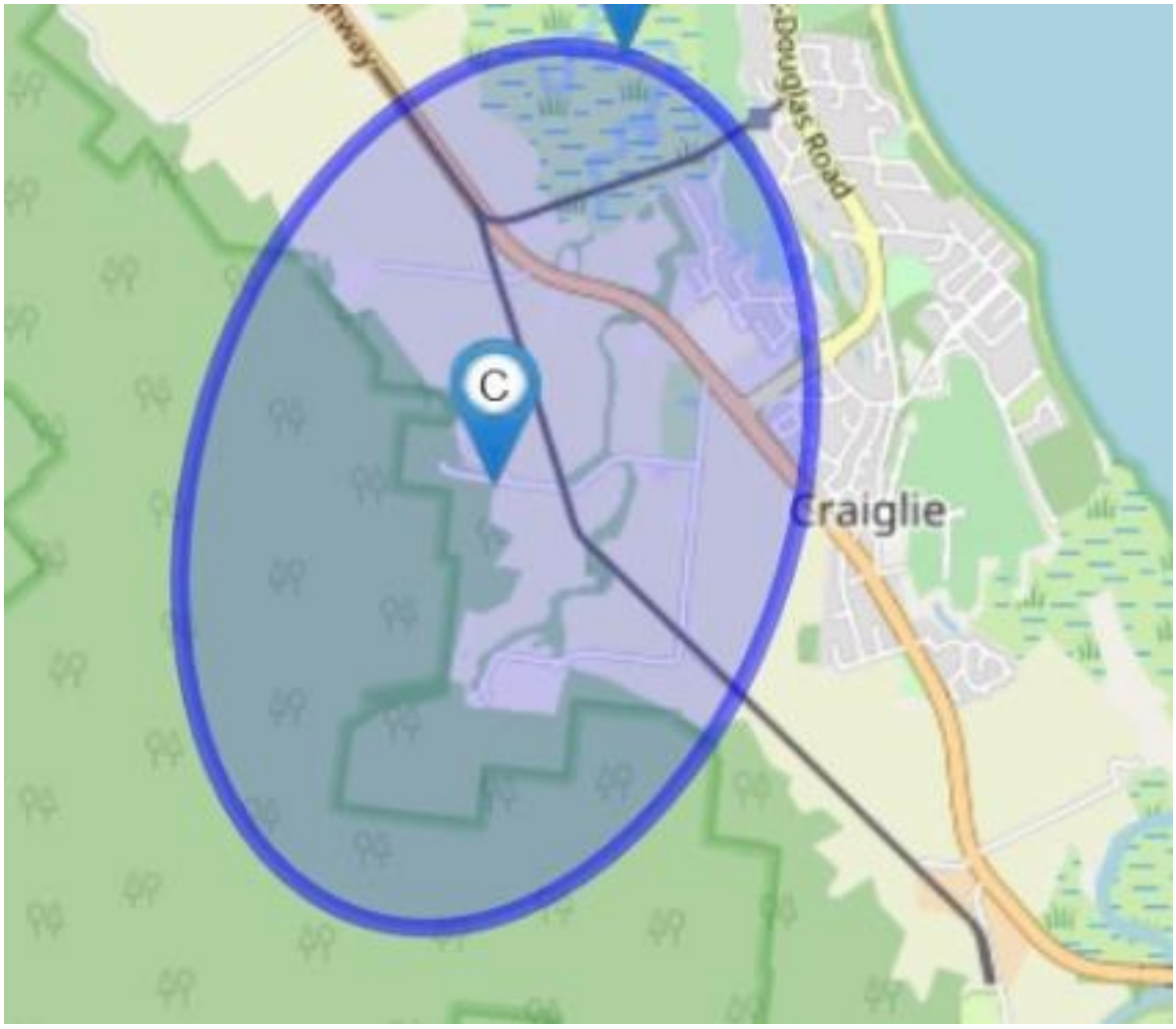


Figure 4-2 RFFE Layout of Sub-Catchment 'I' Outlet

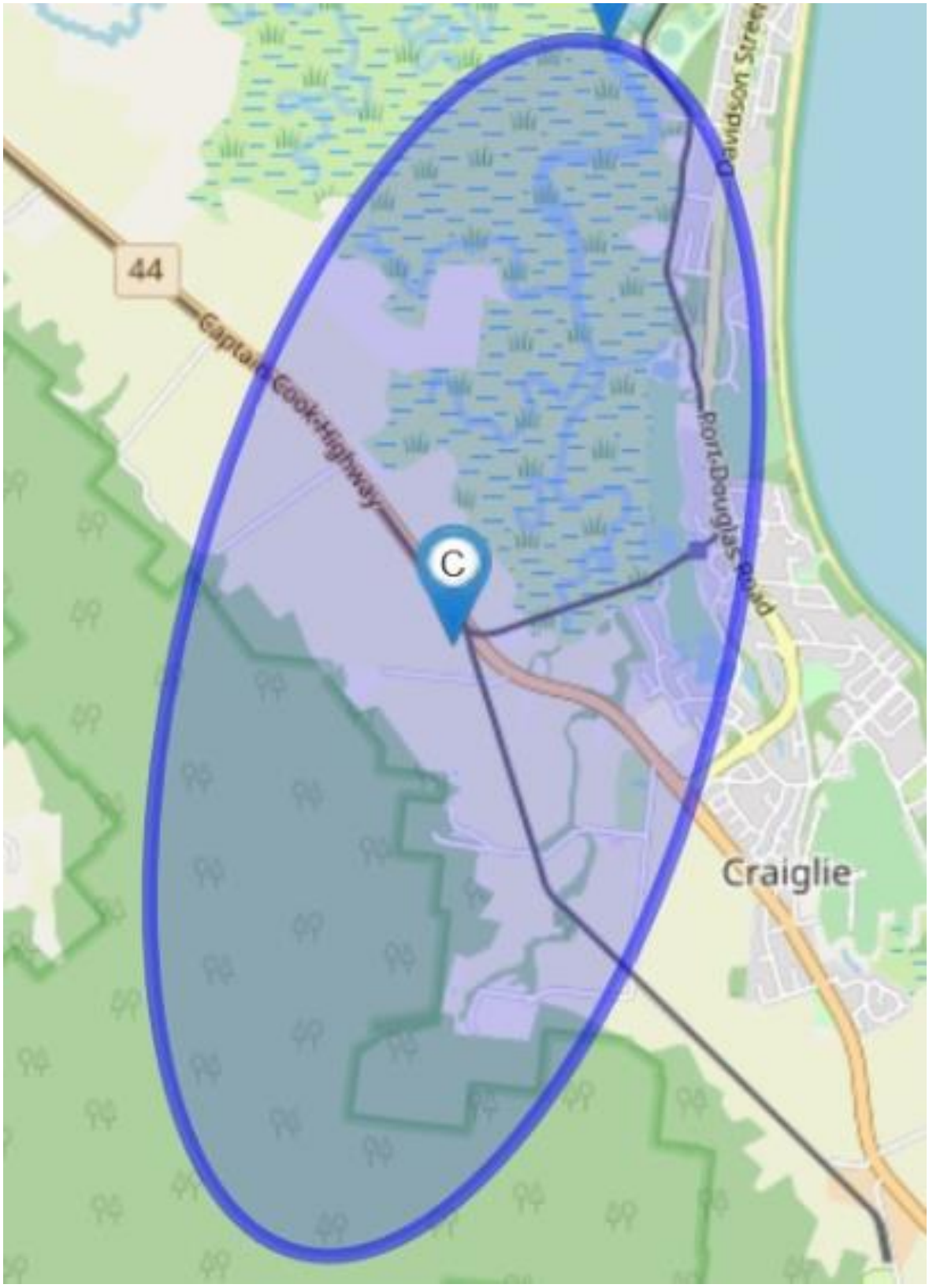


Figure 4-3 RFFE Layout of Sub-Catchment 'S' Outlet

5 Hydraulic Analysis

A combined 1D/2D unsteady flow model of the study area was established using the TUFLOW software package (Version 2018-03-AC-iSP). TUFLOW is a leading industry standard hydraulic modelling package suited for coastal, riverine, and overland flow flood modelling. For the analysis, the latest Highly Parallelised Compute (HPC) TUFLOW engine was utilised to capitalise on the fast runtime. The two models were developed, namely Creek & local catchment flood models, as detailed in the following sections.

5.1 Creek Catchment Model

The Creek catchment model was established to assess a combination of catchment flooding and storm tide across the floodplain. The key components of the model are detailed below.

5.1.1 2D Model Extent and Grid Size

The Creek flood model starts just downstream of Captain Cook-Highway, extending downstream to the Port Douglas Yacht Club near the Port Douglas Crocs AFL ground.

A 10-metre grid size was adopted to achieve a reasonable balance between the requirements of model run time and topographic resolution. The TUFLOW model layout is shown in Figure 5-1.

5.1.2 Manning's n

The Manning's n values adopted within the study area are listed below:

- 0.025 for the water bodies and the mainstream path (Packers Creek);
- 0.1 for densely vegetated areas around the subject site; and
- 0.05 for the remainder of the wider floodplain.

5.1.3 Inflow Hydrographs

The design hydrographs derived from the WBNM model were adopted. For the initial run, several storm durations with full ensemble storms (ten temporal patterns per duration) to identify the final critical durations and temporal patterns based on the hydraulic analysis. The storm durations range from 180min to 1440min.

5.1.4 Downstream Boundary Conditions

The BMT WBM (2013) study includes a reporting point at the entrance of Dickson Inlet that is the most appropriate point for the downstream boundary (also refer Section 3). This study focused on storm tide conditions associated with tropical cyclone activity. As part of a separate study for the Department of Transport and Main Roads (TMR), BMT and Systems Engineering Australia (SEA) has also recently examined the role that 'non-cyclonic' weather systems have on the extreme water level statistic throughout the region. General findings from this recent work have also been considered when establishing a representative downstream boundary condition for the present-day (2020) scenario.

Consideration was given to the ARR2019 Chapter 5 of Book 6 in relation to joint probability of catchment and storm tide flooding. The ARR2019 guideline requires the consideration of a combination of the 1% AEP flow and the 1% AEP storm tide level. The hydraulic analysis detailed herein also incorporates sea level rise allowances for the 2070 and 2100 planning horizons. Table 5-1 presents the 1% AEP storm tide levels at the entrance of Dickson Inlet for the various scenarios.

Table 5-1 Joint Probability Model Scenarios

Scenario	Downstream Tailwater Level (m AHD)	Sea Level Rise allowance (m)	Source
1% AEP Flow with 1% AEP coastal water level (tide plus surge) in 2020	2.08	NA	BMT (2019), unpublished non-cyclonic analysis
1% AEP Flow with 1% AEP coastal water level (tide plus surge) in 2070	2.33	0.5	BMT WBM (2013)*
1% AEP Flow with 1% AEP coastal water level (tide plus surge) in 2100	2.63	0.8	BMT WBM (2013)

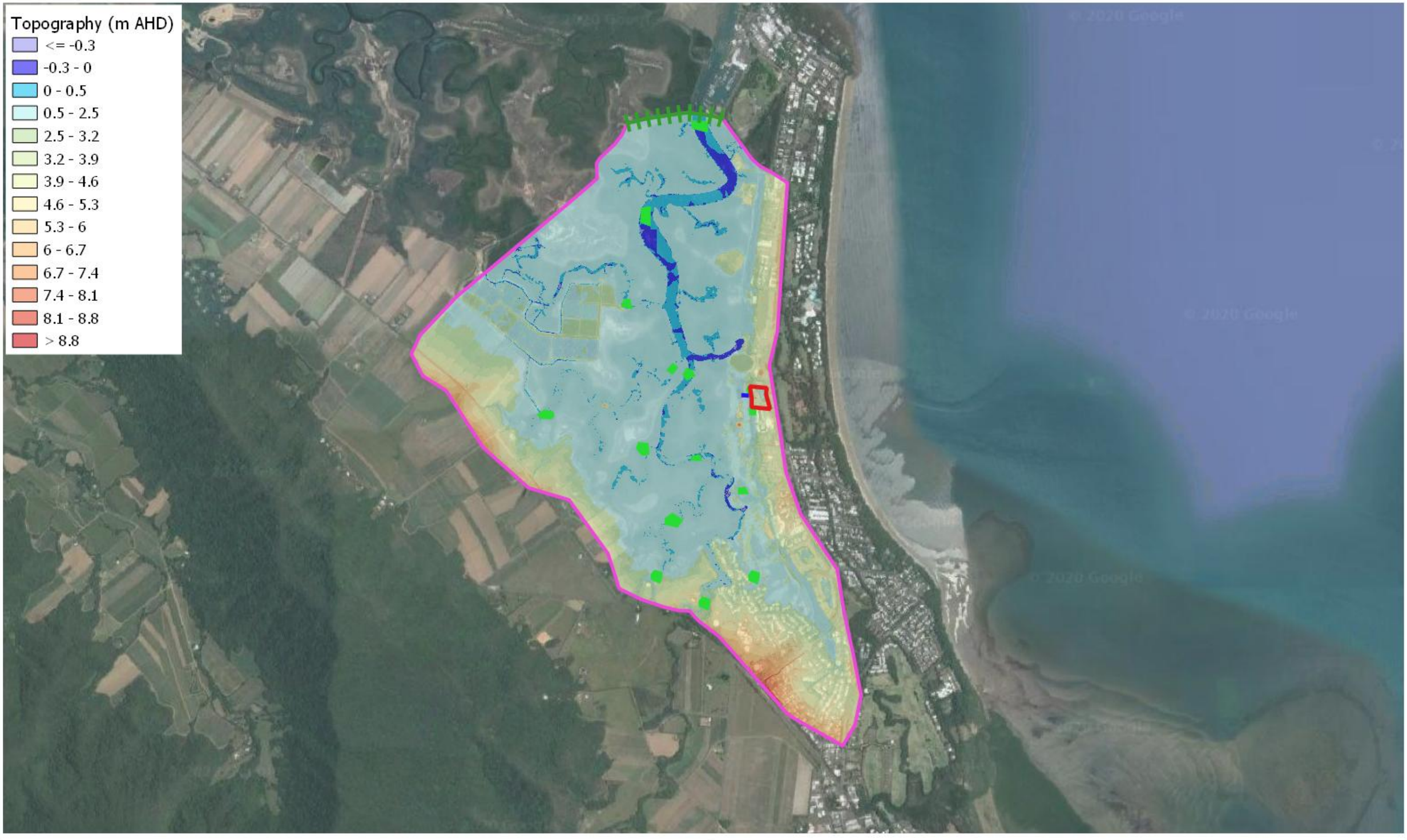
*based on the 1% AEP in 2100 result with a reduced 0.5 m sea level rise allowance

5.1.5 Initial Water Level

An initial water level of 0.91 mAHD was applied in the model at the start of the simulation. This level represents the Mean High-Water Springs (MHWS) level for the current climate scenario published by Maritime Safety Queensland.

5.1.6 1D Structure

There is an existing culvert at the south western corner of the site boundary that conveys the local runoff into the Golf Course Lagoon. The size of this structure was estimated based on measurement of the headwall based on an aerial photo. The modelled structure is 2.4m x 0.6m RCBC.



Legend

- 2d_bc_TWL
- Site Boundary
- 2d_code_ModelExtent
- 1d_nwk_EXG_Culvert
- 2d_sa_Inflows

Title:

Packers Creek TUFLOW Model Layout

Drawing: 5-1

Rev: A

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

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5.2 Local Catchment Model

A detailed TUFLOW model was established to assess flooding resulting from short duration intense storms over the local site catchment that is perched on high grounds. The local catchment drains in a westerly direction with the highest section of the catchment defined by Port Douglas Road.

5.2.1 2D Model Extent and Grid Size

The local model covers the subject site and the immediate surroundings that are perched on high grounds. A 2-metre grid size was adopted to provide a more detailed topographic resolution of the terrain. The model extent is shown in Figure 5-2.

5.2.2 Inflow Hydrographs

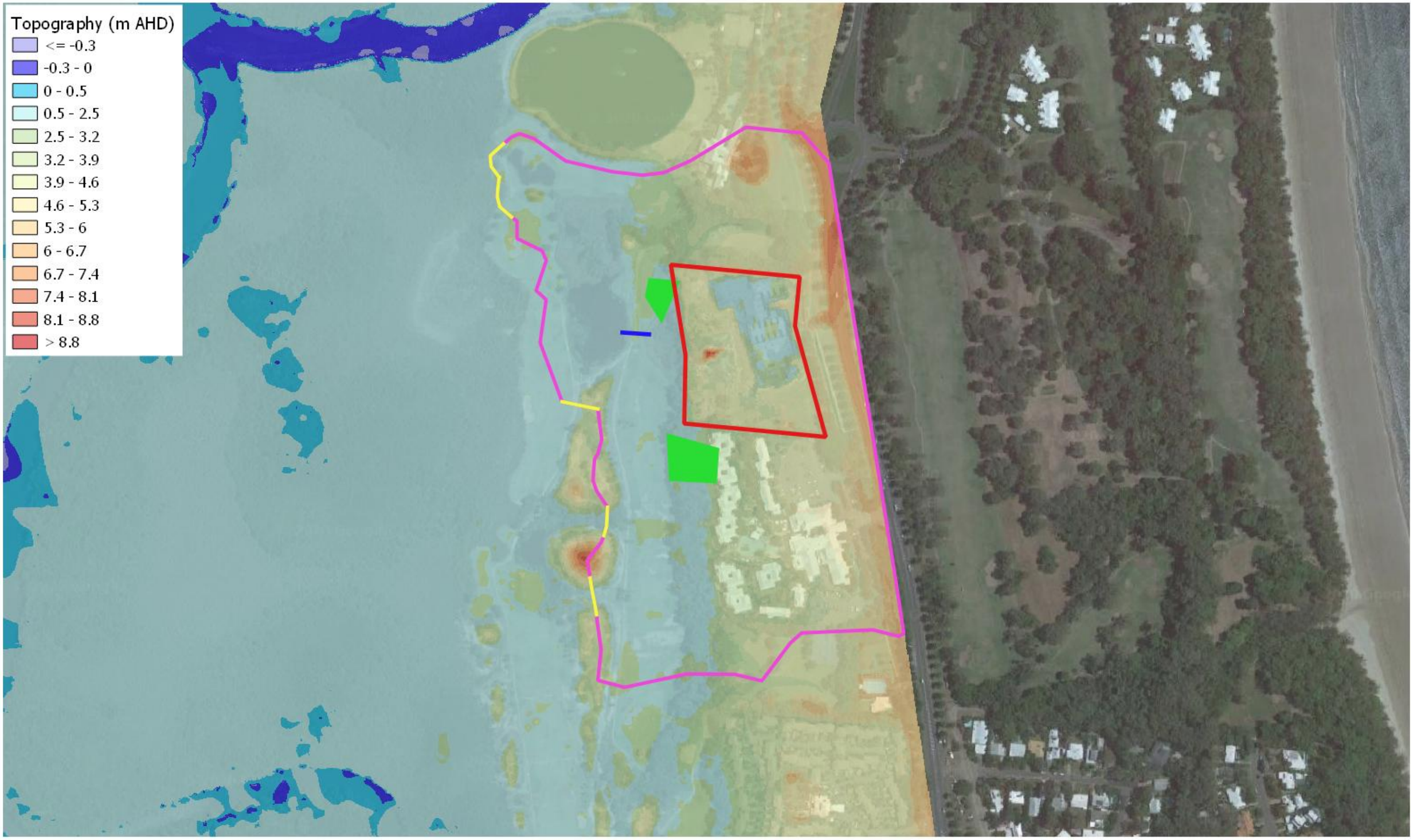
The design hydrographs derived from the WBNM model were adopted. For the initial run, several storm durations with full ensemble storms (ten temporal patterns per duration) to identify the final critical durations and temporal patterns based on the hydraulic analysis. The storm durations range from 25 min to 180 min.

5.2.3 Downstream Boundary Conditions

The downstream boundary conditions were defined based on the Normal Depth slope of 0.01 m/m.

5.2.4 Initial Water Level

An initial water level of 1.88 mAHD was applied in the Lagoon. This level represents the crest level of spillway of the Golf Course Lagoon.



Legend

- 2d_bc_TWL_local
- Site Boundary
- 2d_code_ModelExtent_local
- 1d_nwk_EXG_Culvert
- 2d_sa_Inflows_Local

Title:

Local Catchment TUFLOW Model Layout

Drawing: 5-2

Rev: A

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5.3 Model Results

The median flood level was adopted as the DFL in accordance with the ARR2019 guideline. The results are presented in Table 5-2 and Table 5-3. Appendix A contains flood level mapping for both the Creek and Local catchment models.

Table 5-2 Creek Flood Model 1% AEP Defined Flood Level Estimates

Joint Probability	Tailwater Level (m AHD)	DFL (m AHD)	Critical Duration (min)	Median Temporal Pattern
1% AEP Flow with 1% AEP Storm Tide 2070	2.33	2.46	360	8762
1% AEP Flow with 1% AEP Storm Tide 2100	2.63	2.70	180	8781

Table 5-3 Local Catchment 1% AEP Defined Flood Level Estimate

DFL (m AHD)	Critical Duration (min)	Median Temporal Pattern
2.45	90	8630

5.4 Sensitivity Analysis

A sensitivity analysis was undertaken based on a range Manning's n values (lower and higher than the design case of 0.025) for the main flow paths to check the sensitivity of the peak flood level estimation. For the analysis, the 1% AEP flow and the 2100 storm tide combination were adopted, using the critical duration of 180min and median temporal pattern of 8781. The sensitivity case flood level estimates are presented in Table 5-4. It is noted that for the design case, the model predicted a flood level estimate of 2.70m AHD. These indicate that the flood level estimation is not very sensitive to the Manning's n value adopted.

Table 5-4 Sensitivity Case Flood Level Estimates

Scenario	Flood Level (m AHD)
Manning's n 0.020	2.71
Manning's n 0.035	2.69
Manning's n 0.050	2.68

6 Flood Immunity Requirements

6.1 Douglas Shire Planning Scheme

To identify the flood immunity requirements pertinent to the proposed development, a review of the Douglas Shire Planning Scheme, Flood and Storm Tide hazard overlay code was conducted. Table 8.2.4.3.b of the code specifies that a development floor level within the flood and storm tide overlay maps is to be designed to provide immunity to the following defined flood events plus a freeboard of 300 mm:

- 1% AEP for the development; and
- 0.5% AEP for a substation if required.

7 Conclusions

BMT has completed a flood study to derive the 1% AEP DFL and has considered the outcomes of the BMT WBM (2013) storm tide study as they relate to the subject site.

The DFL estimates were derived based on a combination of regional catchment flow and storm tide tailwater level. Whilst the ARR2019 guideline requires the consideration of the 1% AEP flow with the 1% AEP storm tide for the present-climate scenarios, the modelling also conservatively included sea level rise allowances to provide results for the 2070 and 2100 planning horizons.

A local flood modelling assessment was undertaken to ensure that the level derived from this flooding event is not higher than the regional flood levels. A sensitivity analysis was also conducted based on a range of Manning's n values for main flow paths. The analysis showed that the DFL estimates were not overly sensitive to the adopted roughness values.

Based on the flood model results and consideration of storm tide, the DFL estimates for the proposed development site are:

- 2.70 mAHD for the 2100 storm tide combination;
- 2.46 mAHD for the 2070 storm tide combination; and
- 2.45 mAHD for the local flooding event.

In accordance with the Douglas Shire Planning Scheme, Flood and Storm Tide hazard overlay code, the proposed development floor level is to be designed to provide flood immunity to the 1% AEP defined flood and storm tide event plus a freeboard allowance of 300 mm. The recommended minimum finished floor levels are therefore:

- Development design life of 80-years (i.e. to the year 2100): 3.00 mAHD
- Development deign life of 50-years (i.e. to the year 2070): 2.76 mAHD.

Appendix A Flood Level Mapping

Legend

Site Boundary

Title:

1% AEP Flow with 1% Storm Tide 2100 - Creek Flooding

Drawing: A-1

Rev: A

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Legend

Site Boundary

Title:

1% AEP Flow with 1% Storm Tide 2070 - Creek Flooding

Drawing: A-2

Rev: A

0 70 140 m

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Legend

Site Boundary

Title:

1% AEP Design Flow - Local Flooding

Drawing: A-3

Rev: A

0 70 140 m

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Our dedication to developing innovative approaches and solutions enhances our ability to meet our client's most challenging needs.

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Appendix K – Civil Engineering Report

NORTHROP

CIVIL ENGINEERING REPORT

Fairmont Hotels and Resort Port Douglas

71-85 Port Douglas Road, Port Douglas QLD 4877

PREPARED FOR
Chiodo Corporation Operations Pty Ltd
704/434 St. Kilda Road
Melbourne VIC 3004

Tel: (03) 9078 8784

Ref: SY200372-CR01
Rev: 1
Date: 31.08.20

Civil Engineering Report: Civil Engineering Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
31.08.20	1	For Development Application	A. Rivett	S. McClelland

Northrop Consulting Engineers Pty Ltd

ACN 064 775 088 | ABN 81 094 433 100

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Table of Contents

1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged to prepare the Civil Engineering design and documentation in support of a Development Application submission to Douglas Shire Council for the proposed Fairmont Hotels development at 71-85 Port Douglas Road, Port Douglas QLD 4877.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Flooding Consideration/Building Levels;
- Site Grading and Bulk Earthworks;
- Roadworks and Pavements; and
- Stormwater Management.

1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

1. Development Application Civil Drawings prepared by Northrop:
    - 200372-DA-C01.01: Cover Sheet, Drawing List and Locality Plan
    - 200372-DA-C01.11: Civil Specification Notes
    - 200372-DA-C01.21: General Arrangement Plan
    - 200372-DA-C02.01: Concept Sediment and Erosion Management Control Plan
    - 200372-DA-C02.11: Sediment Erosion Management Control Details
    - 200372-DA-C03.01: Earthworks Cut Fill Plan
    - 200372-DA-C03.11: Earthworks Cut Fill Sections
    - 200372-DA-C04.01: Siteworks and Stormwater Management Plan Sheet 01
    - 200372-DA-C04.02: Siteworks and Stormwater Management Plan Sheet 02
    - 200372-DA-C04.03: Siteworks and Stormwater Management Plan Sheet 03
    - 200372-DA-C04.04: Siteworks and Stormwater Management Plan Sheet 04
    - 200372-DA-C04.11: Driveway Longitudinal Sections
    - 200372-DA-C08.01: Concept Catchment Plan
2. Development Application Architectural Documentation prepared by Buchan Group;
3. Catchment Flooding and Storm Tide Study by BMT (ref: R.B24360.001);
4. Douglas Shire Council's Infrastructure Works Code;
5. Far North Queensland Development Manual; and
6. Queensland Urban Drainage Manual Version 4

1.3 The Development

1.3.1 Existing Site

The site is located within the town of Port Douglas in the Douglas Shire Council (Council) Local Government Area (LGA) approximately 2km south of the village centre.

The proposed Fairmont Hotels and Resort Port Douglas is located at 71-85 Port Douglas Road, Port Douglas and is formally known as Lot 1 in SP 150468. The site is approximately 2.1 hectares, bound by Mirage Country Club to the west and north, the Bally Hooley Tramway and Port Douglas Road to the east, and Oaks Resort to the South (refer Figure 1).

Figure 1 – Site location

The existing site is elevated above the adjacent floodplain with most of the site at elevations above 3.5 mAHD compared to floodplain levels of around 1.0 mAHD. The site generally grades to the west to a lagoon located within the adjacent golf course. An existing Ø600 pipe drains the external Port Douglas Road catchment though the site to the lagoon. The golf course is located within the Packers Creek floodplain, draining to the Coral Sea at Dickson Inlet located to the north of the site.

Current site access is provided by an access road from Port Douglas Road. The basement of an abandoned building project occupies approximately one third of the existing site.

1.3.2 Proposed Development

The proposed development is a multi-storey five-star resort with open space around the building incorporating active and passive leisure areas such as pools and a barbecue area. The building consists of a basement carpark, five storeys, and a rooftop leisure area.

Site access is proposed via two access roads from Port Douglas Road, one to access the reception and basement carpark, and the other to access the proposed loading dock. The existing access from Port Douglas Road is not utilised by the development and is to be removed.

A perspective view of the proposed development is shown in Figure 2.

Figure 2 – Perspective of proposed development
Source: Buchan Group

Refer to the architectural drawings prepared by Buchan Group in support of the Development Application for full details of the development.

2. Flooding and Building Levels

2.1 Flooding

A catchment flooding and storm tide study was undertaken by BMT (ref: R.B24360.001) to establish the 1% Annual Exceedance Probability (AEP) Defined Flood Level (DFL) for the development site. From this study the 1% AEP DFL estimates are:

- 2.70 mAHD for the 2100 storm tide combination;
- 2.46 mAHD for the 2070 storm tide combination; and
- 2.45 mAHD for the local flooding event.

The flood extents for the 1% AEP regional (2100 storm tide combination) and local flooding events determined by BMT are presented in Figures 3 and 4.

Figure 3 – 1% AEP regional (2100 storm tide combination) flood extents

Source: BMT

Figure 4 – 1% AEP local flood extents
Source: BMT

2.2 Building Immunity Requirements

In accordance with Council's *Flood and Storm Tide Overlay Code*, the proposed floor level must provide immunity to the 1% AEP DFL plus 300mm freeboard. The adopted lower ground finished floor level of 3.01 mAHD provides 301mm freeboard to the 2100 storm tide combination.

3. Site Grading and Bulk Earthworks

3.1 Site Grading

The adopted lower ground floor level of 3.01 mAHD sits approximately 1-1.5m lower than the adjoining property to the south and generally 1-2m lower than the adjoining property to the north. Retaining walls, to be designed during the detailed design stage, are proposed along the boundary line to account for the level difference. During the detailed design phase, it is proposed to further investigate how the height of retaining walls may be reduced through landscaping treatments between the building and boundaries.

Grading of the site generally directs runoff away from the building towards the stormwater network proposed along the northern and southern boundaries (refer Section 5). Refer civil engineering drawings C04.01-C04.04 for details of concept site grading.

3.2 Bulk Earthworks

With the lowering over most of the site and the excavation of the proposed basement there is an excess of material to be exported from site. Preliminary earthworks volumes are as follows:

- Total Cut: 45,270 m^3
- Total Fill: 5,645 m^3
- Excess material (export): 39,625 m^3

The above indicative volumes are based on the following assumptions:

- Existing surface stripped 150mm over whole site; and
- Finished surface (including basement) set 300mm below finished surface level over whole site.

Indicative areas of cut (red) and fill (green) are shown in Figure 5. Refer civil engineering drawings C03.01 and C03.11 for additional information.

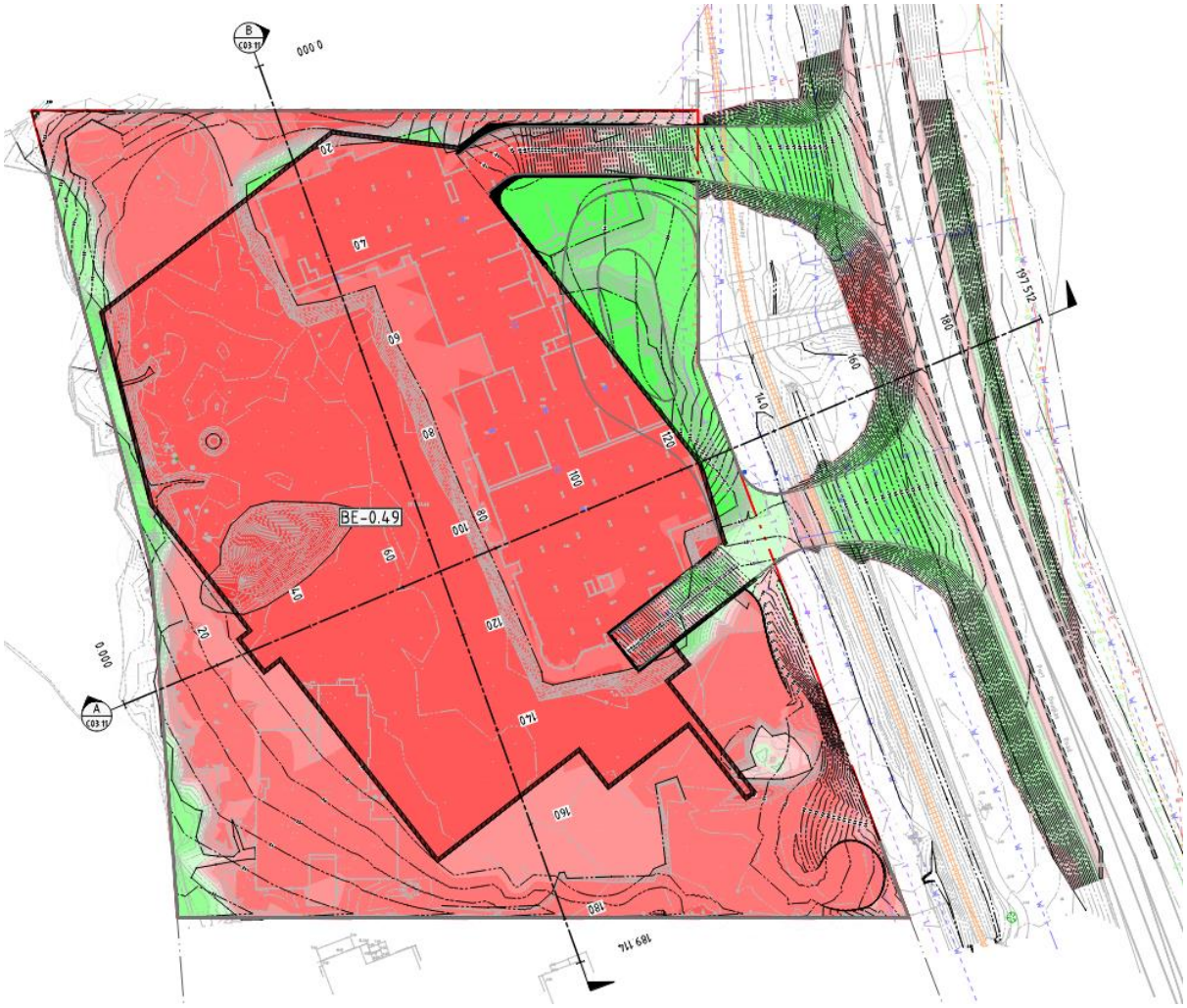

Figure 5 – Indicative areas of cut (red) and fill (green)

A more detailed assessment of the required earthworks volumes will be undertaken during the detailed design phase.

4. Roadworks

Two new property accesses are proposed from Port Douglas Road into the development. The concept design of the new accesses is presented on the civil engineering drawings, with additional design to be undertaken in accordance with Department of Transport and Main Roads (TMR) requirements during the detailed design phase.

The proposed roadworks generally consists of:

- Provision of northbound left-in slip lane to the main site entry with shared bicycle lane;
- Provision of southbound right turn lane into the main site entry;
- Road widening to the western and eastern shoulders to facilitate the additional turn lanes;
- Construction of two new property access roads;
- Removal of the existing disused property access; and
- Adjustment works to the existing shared path, tramway and table drain west of Port Douglas Road as required.

Refer civil engineering drawings C04.02 and C04.04 for additional details of the proposed property accesses and road widening.

4.1 Pavements

Road pavement design will be undertaken during the detailed design phase in accordance with normal engineering practice and TMR requirements where applicable.

4.2 Parking

All onsite parking is located within the basement carpark and is outside the scope of the civil engineering works.

5. Stormwater Management

5.1 Existing Drainage

The site falls generally from east to west towards the golf course located to the rear of the development. A lagoon located within the golf course site immediately west of the property boundary is the receiving waters for the existing runoff and the proposed point of discharge for the development.

An external catchment of approximately 1.72 hectares to the east of the site drains to an existing headwall in the road reserve near the south eastern corner of the site. A Ø600 pipe conveys the runoff from the external catchment through the site to the golf course.

The existing drainage regime is illustrated in Figure 6.

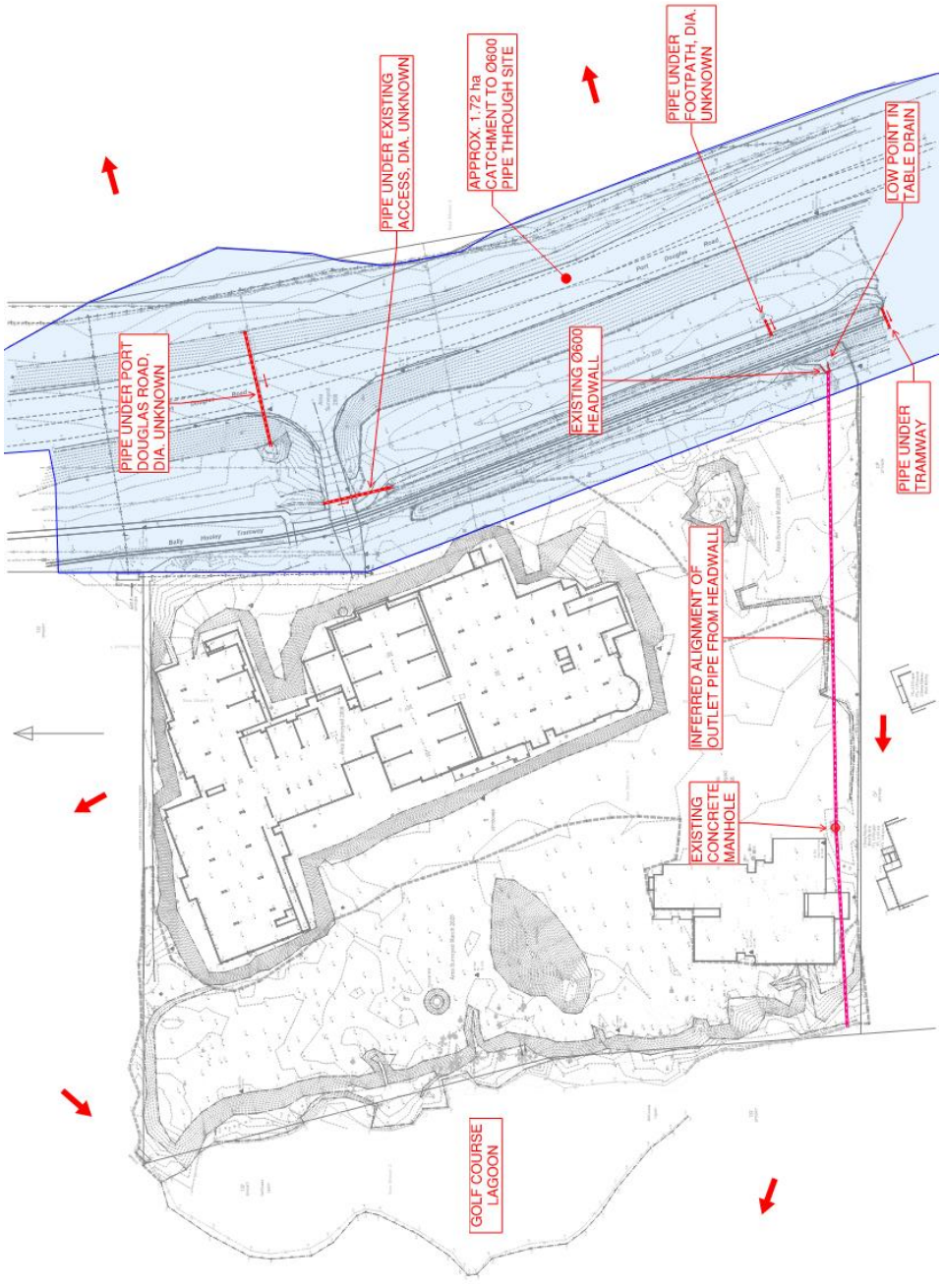

Figure 6 – Existing drainage regime

5.2 Proposed Drainage

The vertical and horizontal alignment of the existing Ø600 pipe running along the southern boundary is not compatible with the proposed site layout and levels. Furthermore, the pipe does not have capacity to convey 1% AEP flows to the lagoon. In order to convey external flows through the site to the golf course it is proposed to provide the following:

- Local regrading of the table drain to a low point adjacent to the property boundary;
- An 1800x900 grated inlet pit (subject to confirmation at detailed design stage) located in the low point of the table drain to capture 1% AEP flows;
- A 1200x600 reinforced concrete box culvert (RCBC) along the southern boundary of the site to convey 1% AEP flows to the lagoon.

It is proposed to connect internal site drainage to the culvert up to the capacity of the system, with the remaining site area connected to a second conduit along the northern boundary of the site.

The proposed drainage regime is illustrated in Figure 7 and indicative catchments in Figure 8.

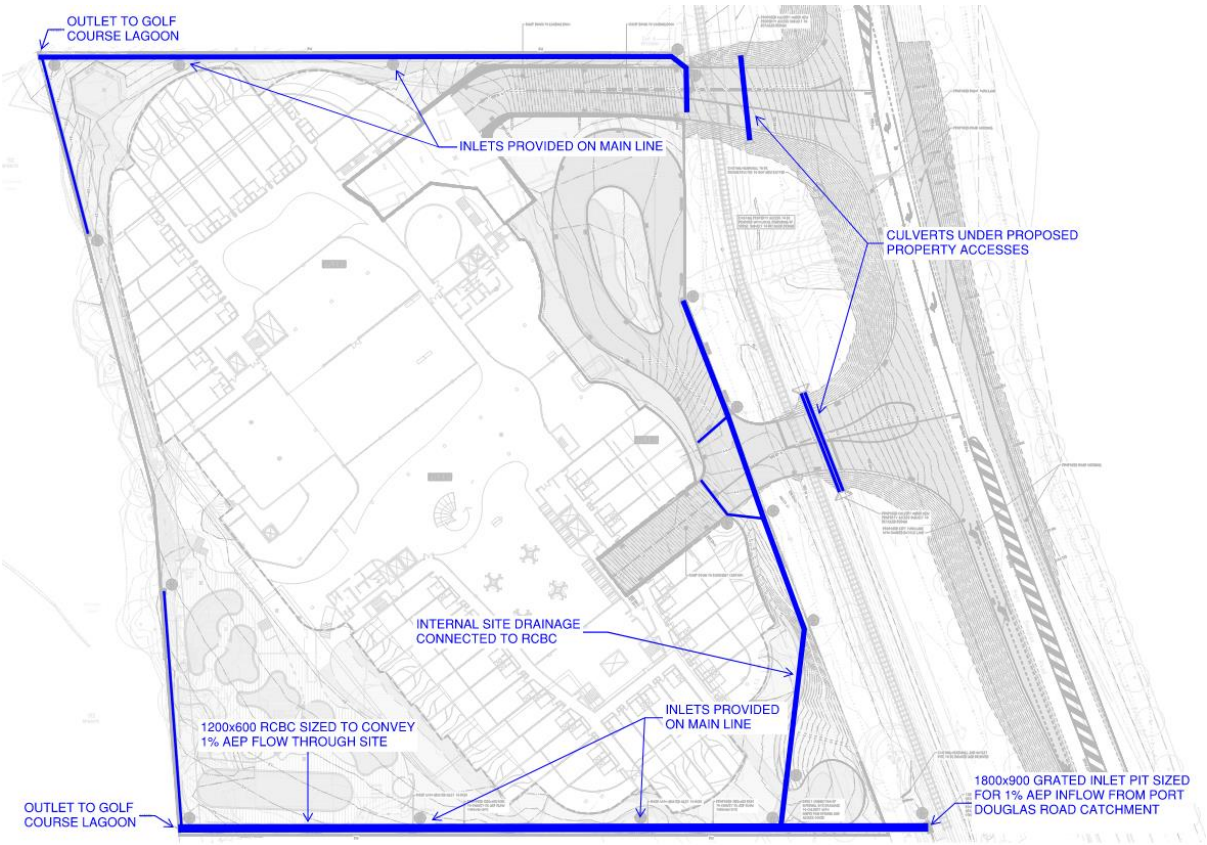

Figure 7 – Proposed drainage regime

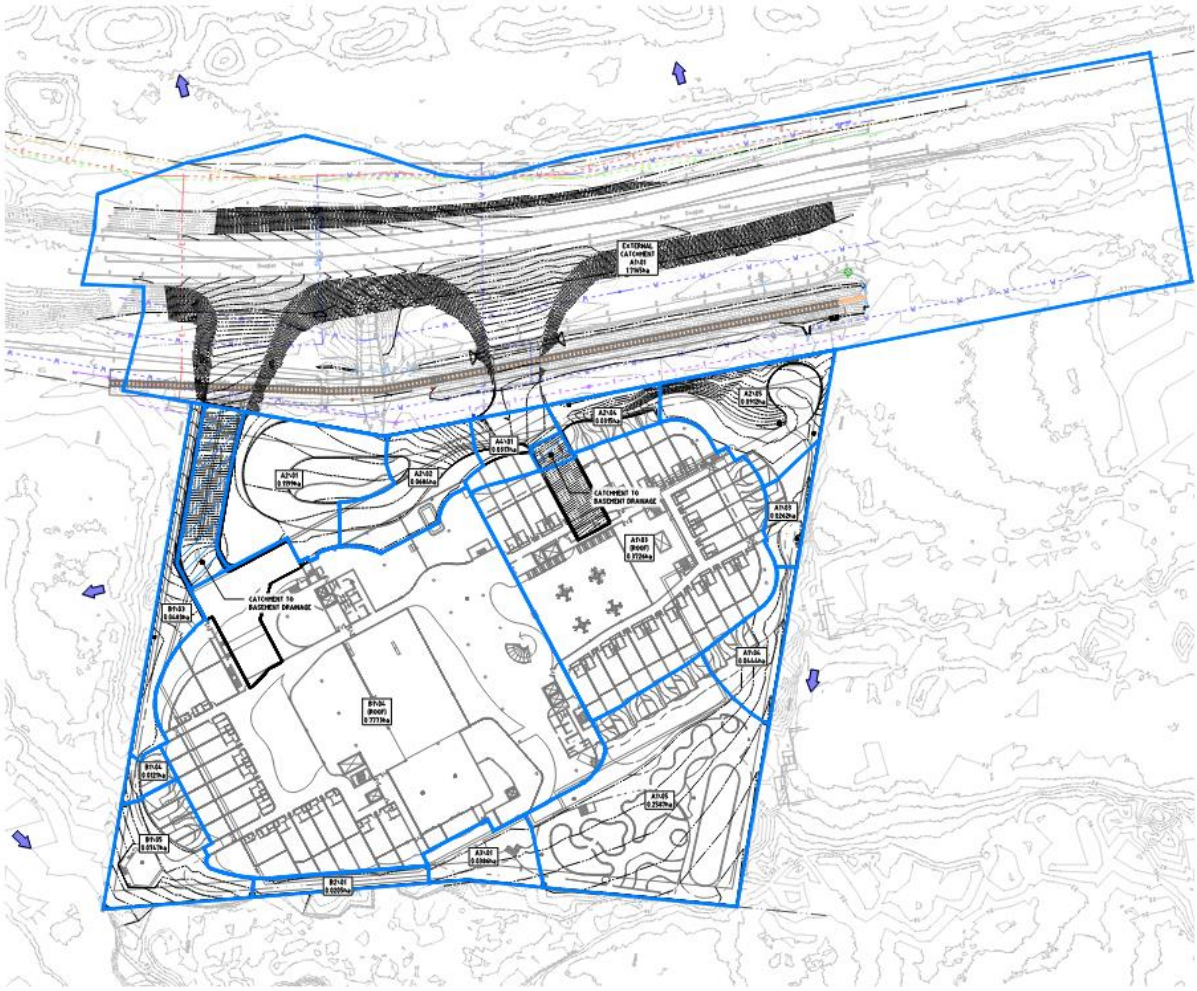

Figure 8 – Indicative catchment plan

Refer to civil engineering drawings C04.01-C04.04 for additional information on the proposed drainage regime and drawing C08.01 for the concept catchment plan.

5.2.1 Drainage Design

Preliminary drainage design has been undertaken in DRAINS software using ILSAX hydrology with ARR 2019 rainfall and procedures to size the RCBC and inlet pit conveying external flows through the site. At the detailed design stage, the same methodology is proposed to design all internal site drainage. Internal site drainage will be designed for the 1% AEP event with overland flow paths provided for severe storms in excess of 1% AEP.

The design will be undertaken in accordance with the Far North Queensland Regional Development Manual, the Queensland Urban Drainage Manual, and Council's requirements.

6. Conclusion

The proposed development at 71-85 Port Douglas Road, Port Douglas consists of a multi-storey resort building with surrounding open space. The floor level for the lower ground floor has been set to 3.01 mAHD, providing 301mm freeboard to the 1% AEP 2100 storm tide combination.

The adopted floor level sits in the order of 1-2m below the adjoining properties to the north and south, with retaining walls proposed to facilitate the level difference. The walls will be designed at the detailed design stage with landscaping solutions to be investigated to reduce the height and extent of walls as much as possible. Bulk excavation of the site will require around 40,000 m^3 of soil to be exported from the site, to be confirmed at the detailed design stage.

Two new property accesses are proposed from Port Douglas Road, with the existing access to be removed. Widening of Port Douglas Road is required to provide left- and right-turn lanes into the main site access.

A 1200x600 RCBC is proposed to replace the existing Ø600 pipe along the southern boundary of the site to convey 1% AEP flows from Port Douglas Road to the golf course lagoon. Internal site drainage is proposed to connect to the culvert, up to the capacity of the system, with the remaining site area connecting to a second outlet located in the north eastern corner. Design of the internal drainage system will be undertaken at the detailed design stage using ILSAX hydrology and ARR 2019 rainfall and procedures in the DRAINS software. The design will be undertaken in accordance with the Far North Queensland Regional Development Manual, the Queensland Urban Drainage Manual, and Council's requirements.

In summary, this report and the accompanying civil engineering drawings determine that:

- Access to the site is available via two new property accesses constructed from Port Douglas Road;
- The required flood immunity is provided to the lower ground floor through the provision of 301mm freeboard to the 1% AEP flood level (2100 storm tide combinate); and
- A drainage regime has been identified and can be designed at the detailed design stage to meet the relevant requirements.

We trust the information provided is sufficient to support the development application. If you have any queries, please feel free to contact the undersigned to discuss.

Yours faithfully,

Andrew Rivett
Civil Engineer (BE Civil, Hons1)
Northrop Consulting Engineers Pty Ltd

FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS

CIVIL ENGINEERING PACKAGE
DEVELOPMENT APPLICATION

SOURCE : GOOGLE.COM.AU (©2019)

LOCALITY PLAN

DRAWING SCHEDULE	
DRG No.	DRAWING TITLE
200372-DA-C01.01	COVER SHEET, LOCALITY PLAN AND DRAWING LIST
200372-DA-C01.11	CIVIL SPECIFICATION NOTES
200372-DA-C01.21	GENERAL ARRANGEMENT PLAN
200372-DA-C02.01	CONCEPT SEDIMENT EROSION MANAGEMENT CONTROL PLAN
200372-DA-C02.11	SEDIMENT EROSION MANAGEMENT CONTROL DETAILS
200372-DA-C03.01	EARTHWORKS CUT FILL PLAN
200372-DA-C03.11	EARTHWORKS CUT FILL SECTIONS
200372-DA-C04.01	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 01
200372-DA-C04.02	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 02
200372-DA-C04.03	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 03
200372-DA-C04.04	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 04
200372-DA-C04.11	DRIVEWAY LONGITUDINAL SECTIONS
200372-DA-C08.01	CONCEPT CATCHMENT PLAN

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT

CHODO corporation

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK.
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PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE
COVER SHEET, DRAWING LIST AND LOCALITY PLAN

JOB NUMBER
200372

DRAWING NUMBER
200372-DA-C01.01

REVISION
01

Plotted By: ANDREW RIVETT Found: \\nw-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\0-Drawings\0-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C01.01.dwg
Date: 07.08.2020 12:15 PM

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH DOUGLAS SHIRE COUNCIL DEVELOPMENT GUIDELINES .THE AFOREMENTIONED GUIDELINES INCLUSIVE OF ALL SPECIFICATIONS TAKE PRECEDENCE OVER NOTES PROVIDED BELOW.

ACCESS AND SAFETY

1. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING TRAFFIC CONTROL.
2. THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS FOR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY. WORK IS NOT TO COMMENCE ON SITE PRIOR TO APPROVAL OF TRAFFIC MANAGEMENT SCHEME.
3. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES ACCESS TO BUILDINGS ADJACENT THE WORKS IS NOT DISRUPTED.
4. WHERE NECESSARY THE CONTRACTOR SHALL PROVIDE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS THROUGH OR BY THE SITE.
5. THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS REQUIREMENTS.

TREE PROTECTION

1. REFER TO LANDSCAPE / ARCHITECTS PLAN FOR TREES TO BE RETAINED AND PROTECTED.
2. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY;
   - 2.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE.
   - 2.2. ENSURING THAT NOTHING IS NAILED TO ANY PART OF THE TREE.
   - 2.3. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY. COUNCILS AND/OR INDEPENDENT ARBORISTS TO BE CONSULTED WHERE TREE ROOTS ARE TO BE REMOVED AND/OR CUT.

SEDIMENT AND SOIL EROSION

1. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS DESIGN, OTHER REGULATORY AUTHORITY REQUIREMENTS AND MAKE GOOD PAYMENT OF ALL FEES.
2. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
3. THE SITE SUPERINTENDENT SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.
4. THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
5. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE;
   - 5.1. CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF SHAKE DOWN / WASH PAD.
   - 5.2. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
   - 5.3. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS.
6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS.
8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
9. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO COUNCILS STORMWATER SYSTEM . ENSURE WHOLE SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

EXISTING SERVICES

1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.
2. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS AREA TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
3. THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF THE PROPOSED WORKS. ANY AND ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AT THE CONTRACTORS EXPENSE.
4. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS.
5. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT.
6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED AND MAINTAINED.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF THE PROGRAM FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY.
8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

EARTHWORKS

1. AT THE COMMENCEMENT OF FILLING OPERATIONS FOR BULK EARTHWORKS A GEOTECHNICAL ENGINEER IS TO VISIT THE SITE & CONFIRM THE SUITABILITY OF THE METHODOLOGY OF ACHIEVING THE REQUIRED COMPACTION REQUIREMENTS.
2. STRIP TOPSOIL, VEGETABLE MATTER AND RUBBLE TO EXPOSE NATURALLY OCCURRING MATERIAL AND STOCKPILE ON SITE AS DIRECTED BY THE SUPERINTENDENT.
3. WHERE FILLING IS REQUIRED TO ACHIEVE DESIGN SUBGRADE, PROOF ROLL EXPOSED NATURAL SURFACE WITH A MINIMUM OF TEN PASSES OF A VIBRATING ROLLER (MINIMUM STATIC WEIGHT OF 10 TONNES) IN THE PRESENCE OF THE SUPERINTENDENT.
4. THE CONTRACTOR IS TO ALLOW FOR A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO PROVIDE ADVICE AND CERTIFICATION OF ANY WORKS ASSOCIATED WITH TREATING OR MANAGING UNSUITABLE GROUND CONDITIONS THROUGHOUT THE CONTRACT (e.g. STABILITY OF EXCAVATIONS, POOR SUBGRADE, etc).
5. ALL SOFT, WET OR UNSUITABLE MATERIAL IS TO BE REMOVED AS DIRECTED BY THE SUPERINTENDENT AND REPLACED WITH APPROVED MATERIAL SATISFYING THE REQUIREMENTS BELOW.
6. PROVIDE CERTIFICATES VERIFYING THE QUALITY OF IMPORTED MATERIAL FOR THE SUPERINTENDENTS APPROVAL.
7. ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 200mm THICK LAYERS (LOOSE) AND COMPACTED AT OPTIMUM MOISTURE CONTENT (+ OR - 2%) TO ACHIEVE A DRY DENSITY DETERMINED IN ACCORDANCE WITH AS1289.2.1.1, AS1289.5.7.1 AND AS1289.5.8.8 OF NOT LESS THAN THE FOLLOWING STANDARD MINIMUM DRY DENSITY;

LOCATION	COMPACTION REQUIREMENT
LANDSCAPED AREAS	98% SMDD
ROADS	100% SMDD (IN ACCORDANCE WITH COUNCIL SPECIFICATIONS)
PAVED AREAS	100% SMDD (IN ACCORDANCE WITH COUNCIL SPECIFICATIONS)

8. TESTING OF THE SUBGRADE FOR BUILDINGS SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY.
9. ALLOW THE FOLLOWING COMPACTION TESTING BY N.A.T.A. REGISTERED LABORATORY FOR PLATFORMS AND FILL LAYERS IN ACCORDANCE WITH THE LATEST VERSION OF AS3798. (MINIMUM 3 TESTS PER LAYER) OR 1 TEST PER MATERIAL TYPE PER 2500sq.m OR 1 TEST.
10. WHERE TEST RESULTS ARE BELOW THE SPECIFIED COMPACTION, RECOMPACT AND RETEST UNTIL SPECIFIED COMPACTION STANDARDS ARE ACHIEVED, OTHERWISE SUBGRADE REPLACEMENT IS REQUIRED IF COMPACTION STANDARDS ARE NOT ACHIEVED.
11. ALLOW FOR EXCAVATION IN ALL MATERIALS AS FOUND U.N.O. NO ADDITIONAL PAYMENTS WILL BE MADE FOR EXCAVATION IN WET OR HARD GROUND.
12. WHERE THERE IS INSUFFICIENT EXCAVATED MATERIAL SUITABLE FOR FILLING OR SUBGRADE REPLACEMENT, THE CONTRACTOR IS TO ALLOW TO IMPORT FILL. IMPORTED FILL SHALL COMPLY WITH THE FOLLOWING;
   - 12.1. BE OF VIRGIN EXCAVATED NATURAL MATERIAL OR
   - 12.2. CONTRACTOR TO PROVIDE EVIDENCE IMPORT IS SUITABLE USE
   - 12.3. PLASTICITY INDEX BETWEEN 2-15% AND CBR > 8
   - 12.4. FREE FROM ORGANIC AND PERISHABLE MATTER
   - 12.5. MAXIMUM SIZE 50mm, PASSING 75 MICRON SIEVE (<25%)

EARTHWORKS (cont)

13. THE CONTRACTOR SHALL PROGRAM THE EARTHWORKS OPERATION SO THAT THE WORKING AREAS ARE ADEQUATELY DRAINED DURING THE PERIOD OF CONSTRUCTION. THE SURFACE SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS, ROLLERS MARKS AND SIMILAR WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM THE CONTRACTOR NOT OBSERVING THESE REQUIREMENTS SHALL BE RECTIFIED AT THEIR COST.
14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE AND MAINTAIN THE INTEGRITY OF ALL SERVICES, CONDUITS AND PIPES DURING CONSTRUCTION, SPECIFICALLY DURING THE BACKFILLING AND COMPACTION PROCEDURE. ANY AND ALL DAMAGE TO NEW OR EXISTING SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST.
15. TESTING OF THE SUBGRADE SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY AT THE CONTRACTORS EXPENSE.

DEEP EXCAVATIONS

16. PRIOR TO THE COMMENCEMENT OF EXCAVATION WORKS GREATER THAN 1.5m IN DEPTH, THE CONTRACTOR SHALL OBTAIN THE SERVICES OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO DETERMINE THE STABILITY OF A NATURAL MATERIAL AND BENCHING REQUIREMENTS.
17. THE CONTRACTOR MUST PROVIDE THE SUPERINTENDENT AND OR THE DESIGN ENGINEER WITH A COPY OF THE GEOTECHNICAL ENGINEERS REPORT.
18. THE CONTRACTOR IS TO PROVIDE SAFETY BARRIERS / FENCING IN ACCORDANCE WITH OH&S AND REGULATORY AUTHORITY REQUIREMENTS.

SERVICE TRENCHES

19. SAWCUT EXISTING SURFACES PRIOR TO EXCAVATION. BACKFILL ALL TRENCHES UNDER EXISTING ROADS, PAVEMENTS AND PATHS WITH STABILISED SAND 5% CEMENT OR DGS40 MATERIAL (5% CEMENT) COMPACTED IN 200mm THICK LAYERS TO 98% MMDD TO UNDERSIDE OF PAVEMENT.
20. BACKFILL ALL TRENCHES NOT UNDER ROADS, PAVEMENTS, PATHS AND BUILDINGS WITH APPROVED EXCAVATED OR IMPORTED MATERIAL COMPACTED TO 95% SMDD.

SITEWORKS

1. ALL WORKS TO BE IN ACCORDANCE WITH RELEVANT LOCAL COUNCIL / REGULATORY AUTHORITIES REQUIREMENTS, ALL SPECIFICATIONS AND AUSTRALIAN STANDARDS. CONFLICTS BETWEEN SAID DOCUMENTS SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION.
2. THE CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES DURING CONSTRUCTION IN ACCORDANCE WITH ALL REGULATORY AUTHORITIES, INCLUSIVE OF LOCAL COUNCIL REGULATIONS AND REQUIREMENTS.
3. THE CONTRACTOR IS TO OBTAIN ALL AUTHORITY APPROVALS AS REQUIRED PRIOR TO COMMENCEMENT OF WORKS.
4. RESTORE ALL PAVED, COVERED, GRASSED AND LANDSCAPED AREAS TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT ON COMPLETION OF WORKS. WHERE PLANTING OF NEW GRASS IS NECESSARY REFER TO LANDSCAPE ARCHITECT AND / OR ARCHITECT DOCUMENTATION.
5. ON COMPLETION OF ANY TRENCHING WORKS, ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL, GRASSED AREAS AND ROAD PAVEMENTS.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF WORKS.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING LEVELS ONSITE PRIOR TO LODGMENT OF TENDER AND ONSITE WORKS. THE PRICE AS TENDERED SHALL BE INCLUSIVE OF ALL WORKS SHOWN ON THE TENDER PROJECT DRAWINGS. ADDITIONAL PAYMENTS FOR WORKS SHOWN ON THE TENDER PROJECT DRAWINGS WILL NOT BE APPROVED.
8. DO NOT OBTAIN DIMENSIONS BY SCALING DRAWINGS.
9. IN CASE OF DOUBT OR DISCREPANCY REFER TO SUPERINTENDENT FOR CLARIFICATION OR CONFIRMATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
10. WHERE NEW WORKS ABUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED. MAKE SMOOTH TRANSITION TO EXISTING FEATURES AND MAKE GOOD WHERE JOINED.
11. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
12. ALL CIVIL ENGINEERING DESIGN HAS BEEN DOCUMENTED UNDER THE ASSUMPTION THAT ALL NECESSARY SITE CONTAMINATION REMEDIATION WORKS HAVE BEEN SATISFACTORILY COMPLETED (IF APPLICABLE) AND THAT THE SITE IS NOT AFFECTED BY ANY SOIL STRATA OR GROUNDWATER TABLE CONTAMINATION.

STORMWATER DRAINAGE

1. ALL PIPES SHALL BE CLASS 2 RUBBER-RING JOINTED RCP U.N.O. WHERE uPVC PIPES HAVE BEEN SPECIFIED, THE FOLLOWING CLASS PIPEWORK IS TO BE ADOPTED U.N.O. Ø100mm OR LESS TO BE CLASS 'SN10' AND ABOVE Ø100mm TO BE CLASS 'SN8'.
2. uPVC STORMWATER LINES PASSING UNDER FLOOR SLABS TO BE CONCRETE ENCASED.
3. FRC PIPES EQUAL TO THAT OF THE STEEL REINFORCED CONCRETE PIPE CLASS SPECIFIED ON THE DRAWINGS MAY BE USED SUBJECT TO APPROVAL FROM THE SUPERINTENDENT.
4. ALL PIPE ARE TO BE LAID AT 1.0% MIN GRADE U.N.O.
5. COVERS
   - 5.1. USE HOT DIPPED GALVANISED COVERS AND GRATES COMPLYING WITH RELEVANT COUNCIL AND AUSTRALIAN STANDARDS.
   - 5.2. ALL COVERS AND GRATES TO BE POSITION IN A FRAME AND MANUFACTURED AS A UNIT.
   - 5.3. ALL COVERS AND GRATES TO BE FITTING WITH POSITIVE COVER LIFTING KEYS
   - 5.4. OBTAIN SUPERINTENDENTS APPROVAL FOR THE USE OF CAST IRON SOLID COVERS AND GRATES. CAST IRON SOLID COVERS (IF APPROVED) TO CONSIST OF CROSS-WEBBED, CELLULAR CONSTRUCTION WITH THE RIBS UPPERMOST TO ALLOW INFILLING WITH CONCRETE. INSTALL POSITIVE COVER LIFTING KEYS AND PLASTIC PLUGS.
   - 5.5. UNLESS DETAILED OR SPECIFIED OTHERWISE, COVERS AND GRATES TO BE CLASS 'D' IN VEHICULAR PAVEMENTS AND CLASS 'B' ELSEWHERE.
   - 5.6. ALL GRATED TRENCH DRAINS SHOULD BE 'CLASS D' CAST IRON WITHIN VEHICULAR PAVEMENTS AND CLASS 'B' HEEL SAFE WITHIN PEDESTRIAN PAVEMENTS.
6. ALL PIPE BENDS, JUNCTIONS, ETC ARE TO BE PROVIDED USING PURPOSE MADE FITTINGS OR STORMWATER PITS.
7. ALL CONNECTIONS TO EXISTING DRAINAGE STRUCTURES SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
8. STORMWATER PIPEWORK TO FINISH FLUSH WITH INTERNAL PIT WALLS AND MUST NOT PROTRUDE. CONNECTION TO BE NEATLY RENDER AND MADE NEAT.
9. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
10. U.N.O. MATERIAL USED FOR BEDDING OF PIPES SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED AND FREE OF ORGANIC AND CLAY MATERIAL.
11. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN 50mm CONCRETE BED (OR 75mm THICK BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK.
12. BEDDING SHALL BE U.N.O TYPE HS2 UNDER ROADS AND H2 UNDER GENERAL AREAS IN ACCORDANCE WITH CURRENT RELEVANT INDUSTRY STANDARDS AND GUIDELINES.
13. THE CONTRACTOR SHALL ENSURE AND PROTECT THE INTEGRITY OF ALL STORMWATER PIPES DURING CONSTRUCTION. ANY AND ALL DAMAGE TO THESE PIPES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AND AT NO EXTRA COST.
14. NOTE THAT THE PIT COVER LEVEL NOMINATED IN GUTTERS ARE TO THE INVERT OF THE GUTTER WHICH ARE 40mm LOWER THAN THE PAVEMENT LEVEL AT LIP OF GUTTER. REFER KERB DETAILS FOR CONFIRMATION.

SUBSOIL DRAINAGE

15. Ø100mm SUBSOIL DRAINAGE LINES WITH NON-WOVEN GEOTEXTILE FILTER SOCK SURROUND SHALL BE CONNECTED TO A STORMWATER DRAINAGE PIT (AT MIN 1% LONGITUDINAL GRADE) AND PROVIDED IN THE FOLLOWING LOCATIONS;
   - 15.1. THE HIGH SIDE OF PROPOSED TRAFFICKED PAVEMENT AREAS.
   - 15.2. ALL PLANTER AND TREE BEDS PROPOSED ADJACENT TO PAVEMENT AREAS.
   - 15.3. BEHIND RETAINING WALLS (IN ACCORDANCE WITH RETAINING WALL DETAILS).
   - 15.4. ALL OTHER AREAS SHOWN ON DRAWINGS.
   - 15.5. CONTRACTOR IS TO MAKE ALLOWANCE IN BOTH TENDER AND CONSTRUCTION COSTING TO ALLOW FOR SUBSURFACE DRAINAGE BEHIND ALL RETAINING WALLS / ABOVE LOCATIONS AND TO MAKE CONNECTION TO STORMWATER SYSTEM.
16. WHERE SUBSOIL DRAINAGE PASSES BENEATH BUILDINGS / PAVED AREAS AND/OR PAVEMENTS. CONTRACTOR TO ENSURE Ø100mm CLASS 'SN10' uPVC DRAINAGE LINE IS USED AND THAT PROPRIETARY FITTINGS ARE USED TO RECONNECT SUBSOIL DRAINAGE LINE.
17. THE CONTRACTOR SHALL INSTALL INSPECTION OPENINGS / CLEAROUTS TO ALL SUBSOIL DRAINAGE LINES AND DOWNPIPE LINES AS SPECIFIED ON DRAWINGS AND IN ACCORDANCE WITH COUNCIL SPECIFICATIONS AT MAXIMUM 30m CENTRE AND AT ALL UPSTREAM ENDPOINTS.
18. PROVIDE 3.0m LENGTH OF Ø100 SUBSOIL DRAINAGE LINE WRAPPED IN NON-WOVEN GEOTEXTILE FILTER FABRIC TO THE UPSTREAM SIDE OF STORMWATER PITS, LAID IN STORMWATER PIPE TRENCHES AND CONNECTED TO DRAINAGE PIT.
19. IN AREAS WHERE DUMPED / HAND PLACED ROCK IS USED AS A MEANS OF SCOUR PROTECTION, CONTRACTOR IS TO EXCAVATE A MINIMUM OF 100mm FROM PROPOSED SURFACE, LEVEL AND COMPACT SUBGRADE AS SPECIFIED. ROCK TO THEN BE PLACED ON GEOTEXTILE FILTER FABRIC.

PRECAST STORMWATER PITS

1. THE USE OF PRE-CAST STORMWATER DRAINAGE PITS IS NOT ACCEPTED WITHOUT CONFIRMATION BETWEEN NORTHROP ENGINEERS AND THE CONTRACTOR REGARDING QUALITY CONTROL AND CERTIFICATION OF FINISHES.
2. REFER MANUFACTURERS SPECIFICATIONS FOR INSTALLATION GUIDELINES.
3. PRECAST PIT TO BE PLACED ON MINIMUM 150mm THICK CONCRETE PAD AND BED MINIMUM 50mm WHILST CONCRETE IS STILL PARTIALLY WET.
4. ENSURE PENETRATION IS CORED THROUGH PIT FACE TO ALLOW CONNECTION.
5. ENSURE A SMOOTH SEALED FINISH AT PIPE CONNECTIONS BY HAND APPLYING CONCRETE AROUND THE PIPE ON THE INTERNAL FACE OF THE PIT TO FILL IN ANY VOIDS CREATED WHEN PENETRATION FOR THE PIPE WAS CORED.
6. ENSURE A SEALED FINISH AT PIPE CONNECTIONS BY HAND-APPLYING MINIMUM 150mm THICK CONCRETE AROUND PIPE AT THE EXTERNAL FACE OF THE PIT. ENSURE CONCRETE DOES NOT AFFECT THE INTEGRITY OF THE SUBSOIL DRAINAGE CONNECTED TO THE PIT.
7. ENSURE PIPEWORK DOES NOT PROTRUDE INTO THE BEYOND THE WALL. PIPEWORK IS TO FINISH FLUSH WITH INTERNAL WALL (UNLESS OTHERWISE NOTED OR DETAILED).
8. ENSURE THE OUTLET PIPE IS CONNECTED AT THE INVERT LEVEL OF THE PIT TO DRAIN. ALTERNATIVELY FILL THE BASE OF THE PIT WITH MASS CONCRETE (MIN 50mm THICK) OR APPROVED GROUTING COMPOUND (LESS THAN 50mm THICK) TO DRAIN.
9. PROVIDE CONCRETE BENCHING TO SIDES OF PIT TO SUIT PIPE DIAMETER. HEIGHT TO MATCH MINIMUM 1/3 PIPE DIAMETER.

SIGNAGE AND LINEMARKING

1. ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH AUSTRALIAN STANDARDS 1742 / RMS STANDARDS AND SPECIFICATIONS.
2. LINE MARKING AND PAINT SHALL BE IN ACCORDANCE WITH AS1742.3 AND RMS STANDARDS.
3. PAINT SHALL BE TYPE 3 CLASS 'A' AND THE COLOUR SHALL BE WHITE AND NOT SUBJECT TO DISCOLOURATION BY BITUMEN FROM ROAD SURFACE. ALL PAINT TO BE APPLIED BY MECHANICAL SPRAYER.
4. LINE MARKING SHALL BE SPOTTED OUT AND APPROVED PRIOR TO SPRAYING.
5. PAINT SHALL BE APPLIED AT A WET THICKNESS OF BETWEEN 0.35mm AND 0.40mm.
6. CARPARK LINEMARKING TO BE 80mm WIDE.

LANDSCAPING

1. REFER TO DRAWINGS BY OTHERS FOR DETAILS OF PROPOSED LANDSCAPING TREATMENT.
2. ALL DISTURBED SURFACE TO BE TEMPORARILY STABILISED WITH HYDROMULCH UPON COMPLETION OF WORKS. A 500mm STRIP OF TURF (CT2 COUCH) IS TO BE PLACED BEHIND ALL NEW KERB AND GUTTER / ROLL KERB.

PAVEMENTS

1. ALL PAVEMENT MATERIALS SHALL COMPLY WITH CURRENT RMS SPECIFICATIONS. PROVIDE MECHANICAL ANALYSIS FOR EACH BATCH OF PAVEMENT MATERIAL TO ENSURE CONFORMITY.
2. COMPACTION STANDARDS

BASE	98% MODIFIED MAXIMUM DRY DENSITY
SUBBASE	98% MODIFIED MAXIMUM DRY DENSITY
SUBGRADE	100% STANDARD MAXIMUM DRY DENSITY

3. THE CONTRACTOR SHALL CONFIRM THE DESIGN CBR WITH A MINIMUM OF 3 TESTS TAKEN AT SUBGRADE LEVEL. WHERE DISCREPANCY IS FOUND, CONTACT THE DESIGN ENGINEER.
4. ALLOW FOR COMPACTION TESTING BY A N.A.T.A. REGISTERED LABORATORY FOR BASE LAYER, SUBBASE LAYER AND SUBGRADE LAYER IN ACCORDANCE WITH THE LATEST VERSION OF AS3798 FOR PAVEMENTS (MINIMUM 2 TESTS PER LAYER). ALLOW FOR AT LEAST TWO SUCCESSFUL COMPACTION TESTS IN EACH LAYER.
5. MATCH NEW PAVEMENTS NEATLY AND FLUSH WITH EXISTING
6. AFTER BASE IS APPROVED, SWEEP CLEAN AND PRIME AT NOMINAL RATE OF 1.0L PER 1.0 sq.m.
7. PAVEMENT HOLD POINTS
   - 7.1. SUB-GRADE PROOF ROLL PRIOR TO SET-UP AND FORM FOR CONCRETE POUR.
   - 7.2. INSPECTION OF FORMWORK / STEEL PRIOR TO CONCRETE POUR.
   - 7.3. SUBMISSION OF SUB-GRADE AND BASE DENSITY TESTS.

ASPHALTIC CONCRETE

1. GENERAL
   - 1.1. ALL ASPHALTIC CONCRETE (AC) WORK TO BE PREPARED AND CARRIED OUT IN ACCORDANCE WITH GOOD ASPHALTIC PAVING PRACTICE AS DESCRIBED IN AS2150-2005 "ASPHALT (HOT-MIXED) PAVING - GUIDE TO GOOD PRACTICE" AND CURRENT RMS SPECIFICATIONS.
2. PAVEMENT PREPARATION
   - 2.1. THE FINISHED PAVEMENT SURFACE TO BE SEALED SHALL BE WITHIN +/- 2% OF THE OPTIMUM AND BROOMED BEFORE COMMENCEMENT OF WORK TO ENSURE COMPLETE REMOVAL OF ALL SUPERFICIAL FOREIGN MATTER.
   - 2.2. PRIME ALL SURFACES TO BE SEALED. ALLOW PRIME TO SETTLE FOR A MINIMUM OF 3 DAYS BEFORE APPLYING TACK COAT AND ASPHALT.
   - 2.3. SWEEP PRIMED SURFACES BEFORE APPLYING TACK COAT.
   - 2.4. ALL DEPRESSIONS OR UNEVEN AREAS ARE TO BE TACK-COATED AND BROUGHT UP TO GENERAL LEVEL OF PAVEMENT WITH ASPHALTIC CONCRETE BEFORE LAYING OF MAIN COURSE.
   - 2.5. ALL DEFECTS IN THE BASE COURSE INCLUDING CRACKS, SURFACE DEFORMATION AND THE LIKE SHALL BE REPAIRED AS DIRECTED BY THE SUPERINTENDENT PRIOR TO PLACEMENT OF TACK COAT AND/OR AC COURSES.
3. PLACEMENTS
   - 3.1. ALL ASPHALT SHALL BE PLACED UTILISING APPROVED MECHANICAL PAVING MACHINES. DO NOT HAND PLACE ASPHALT WITHOUT PRIOR APPROVAL FROM ENGINEER.
4. JOINTS
   - 4.1. THE NUMBER OF JOINTS BOTH LONGITUDINAL AND TRANSVERSE SHALL BE KEPT TO A MINIMUM.
   - 4.2. THE DENSITY AND SURFACE FINISH AT JOINTS SHALL BE SIMILAR TO THOSE OF THE REMAINDER OF THE LAYER.
5. COMPACTION
   - 5.1. ALL COMPACTION SHALL BE UNDERTAKEN USING SELF PROPELLED ROLLERS.
   - 5.2. INITIAL ROLLING SHALL BE COMPLETED BEFORE THE MIX TEMPERATURE FALLS BELOW 105°C USING A STEEL DRUM ROLLER HAVING A MINIMUM WEIGHT OF 8 TONNES AND A MAXIMUM UNIT LOAD ON THE REAR DRUM EQUIVALENT TO 55kN/m WIDTH OF DRUM.
   - 5.3. SECONDARY ROLLING SHALL BE COMPLETED BEFORE THE MIX TEMPERATURE FALLS BELOW 80°C USING A PNEUMATIC TYRED ROLLER OF AT LEAST 10 TONNES MASS. A MINIMUM TYRE PRESSURE OF 550kPA AND A MINIMUM TOTAL LOAD OF 1 TONNE ON EACH TYRE.
   - 5.4. ROLLED SURFACES SHALL BE SMOOTH AND FREE OF UNDULATIONS. BONY AND/OR UNEVEN SURFACES WILL BE REJECTED.
   - 5.5. PROVIDE 2 No. MINIMUM COMPACTION TESTS.
6. FINISHED SURFACE PROPERTIES
   - 6.1. FINISHED SURFACES SHALL BE SMOOTH, DENSE AND TRUE OF SHAPE AND SHALL NOT VARY MORE THAN;
     - 6.1.1. 3mm FROM THE SPECIFIED PLAN LEVEL AT ANY POINT.
     - 6.1.2. 3mm FROM THE BOTTOM OF A STRAIGHT EDGE LAID TRANSVERSELY.
     - 6.1.3. 5mm FROM THE BOTTOM OF A STRAIGHT EDGE LAID LONGITUDINALLY.
     - 6.1.4. MINUS 0 TO PLUS 2mm ADJACENT TO OTHER ELEMENTS SUCH AS KERBS AND THE LIKE TO AVOID POOLING OF SURFACE WATER.
     - 6.1.5. MINUS 0 FROM THE SPECIFIED THICKNESS.
7. DO NOT STORE PLANT EQUIPMENT OR TRAFFIC NEWLY LAID ASPHALTIC CONCRETE PAVEMENTS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
8. DO NOT APPLY MARKING PAINTS UNTIL ASPHALT HAS CURED IN ACCORDANCE WITH PAINT MANUFACTURERS SPECIFICATIONS.

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT: CHIODO corporation

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NOT TO SCALE

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PROJECT TITLE: CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS

DRAWING SHEET SIZE = A1

DRAWING TITLE: CIVIL SPECIFICATION NOTES

JOB NUMBER: 200372

DRAWING NUMBER: 200372-DA-C01.11

REVISION: 01

Plotted By : ANDREW RIVETT
Date : 07.08.2020 12:15 PM

LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- EASEMENT LINE
- EXISTING TRAM LINE
- FFLXX.XX — FINISHED FLOOR LEVEL
- XX.XX — CONTOURS
- SHEET LAYOUT 1:200
  REFER TO SITEWORKS DRAWINGS
  200372-DA-C-04.01 TO 04.04

DRAWN: D. CHAPMAN
DESIGNED: B. FIELD
JOB MANAGER: A. RIVETT
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT

CHIODO corporation

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SCALE 1:500@A1 — 0 5 10 15 20 25m

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PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE
GENERAL ARRANGEMENT PLAN

JOB NUMBER
200372

DRAWING NUMBER
200372-DA-C01.21

REVISION
01

Plotted By : ANDREW RIVETT
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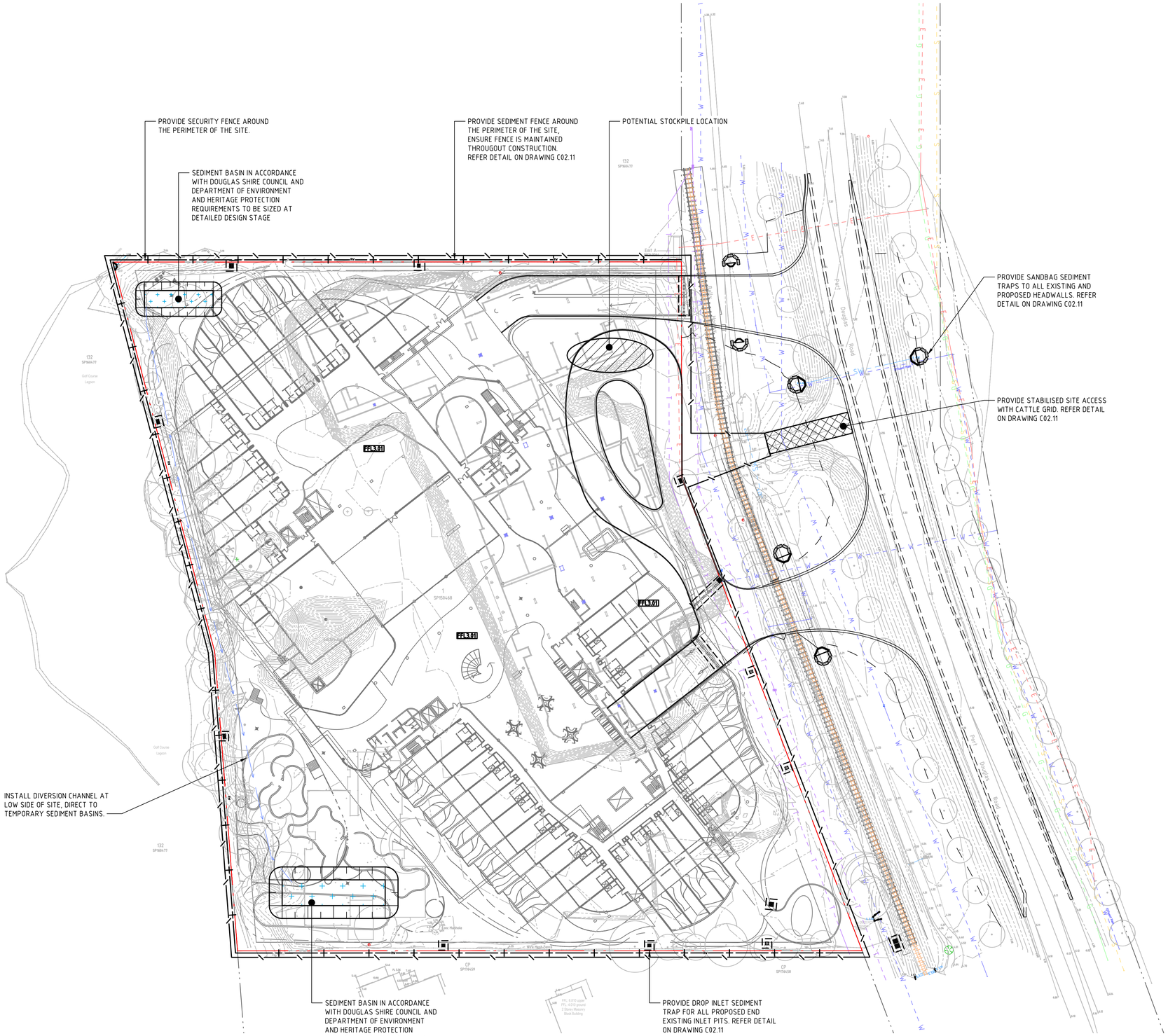
Found : \\nw-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\D-Drawings\D-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C01.21.dwg



LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- EASEMENT LINE
- EXISTING TRAM LINE
- EXISTING CONTOURS
- SEDIMENT FENCE
- SECURITY FENCE
- WIRE MESH AND GRAVEL SEDIMENT FILTER
- SANDBAG SEDIMENT FILTER
- DROP INLET SEDIMENT TRAP
- DIVERSION MOUND
- STABILISED SITE ACCESS
- STOCKPILE
- SEDIMENT BASIN

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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SCALE 1:500@A1 0 5 10 15 20 25m

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PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS

DRAWING SHEET SIZE = A1

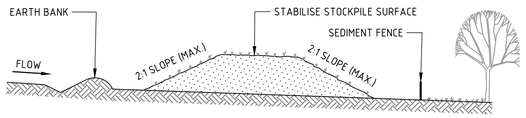
DRAWING TITLE
CONCEPT SEDIMENT EROSION MANAGEMENT CONTROL PLAN

JOB NUMBER **200372**

DRAWING NUMBER **200372-DA-C02.01**

REVISION **01**

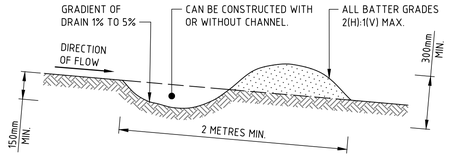
Plotted By : ANDREW RIVETT Date: 07.09.2020 12:15 PM Found : I:\na-file\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\D-Drawings\D-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C02.01.dwg



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILES (SD 4-1)

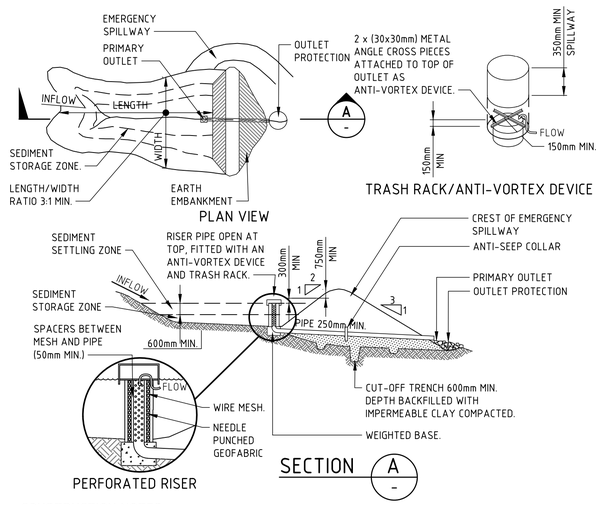


CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

NOTE: ONLY TO BE USED AS TEMPORARY BANK
WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

EARTH BANK - LOW FLOW (SD 5-5)

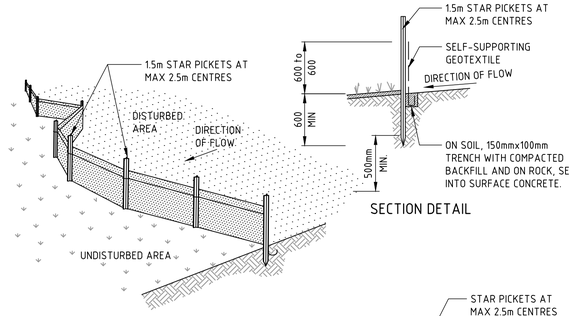


CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. FORM A CUT OFF TRENCH UNDER THE CENTRELINE OF THE EMBANKMENT 600mm DEEP AND 1200mm WIDE, EXTENDING TO A POINT ON THE WATERCOURSE WALL ABOVE THE RISER SILL LEVEL.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL ACCORDING TO THE SWMP THAT IS FREE FROM ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND THE COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. INSTALL THE PIPE OUTLET WITH SEEPAGE COLLARS AS SPECIFIED IN THE SWMP AND STANDARD DRAWING 6-3B.
8. FORM BATTER GRADES AT 2(H):1(V) UPSTREAM AND 3(H):1(V) DOWNSTREAM OR AS SPECIFIED IN THE SWMP.

(APPLIES TO 'TYPE C' SOILS ONLY)

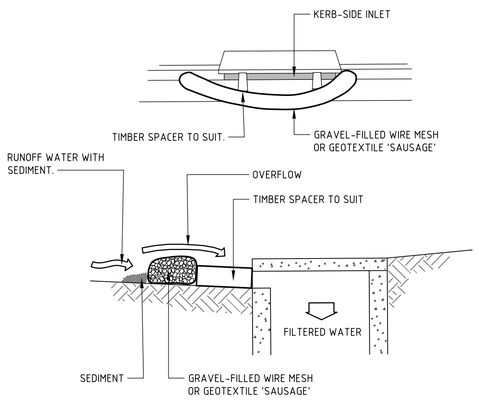
EARTH BASIN - DRY (SD 6-3)



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

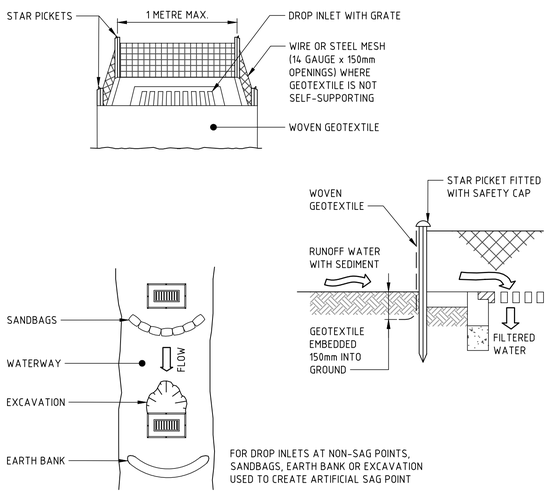
SEDIMENT FENCE (SD 6-8)



CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

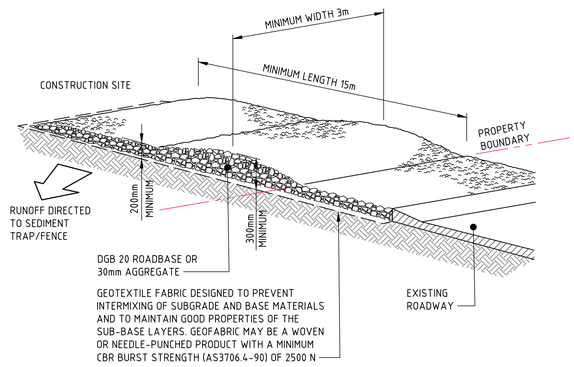
MESH AND GRAVEL INLET FILTER (SD 6-11)



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER (SD 6-12)



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS (SD 6-14)

NOT FOR CONSTRUCTION

DRAWN: D. CHAPMAN
DESIGNED: B. FIELD
JOB MANAGER: A. RIVETT
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT

CHIODO corporation

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SCALE VARIES

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PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE
SEDIMENT EROSION MANAGEMENT CONTROL DETAILS

JOB NUMBER
200372

DRAWING NUMBER
200372-DA-C02.11

REVISION
01

Plotted By : ANDREW RIVETT
Date : 07.08.2020 12:15 PM
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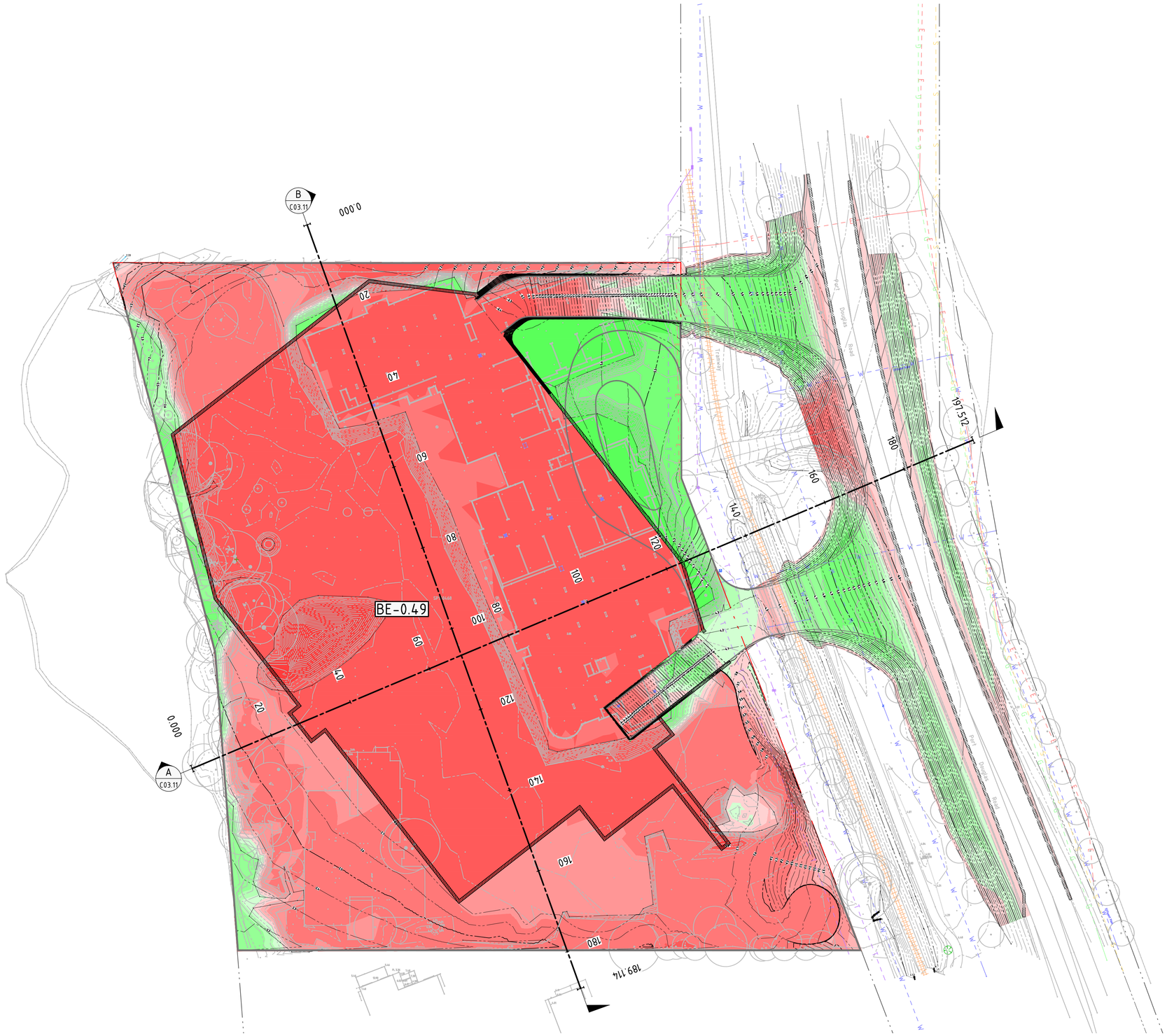

LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- EASEMENT LINE
- EXISTING TRAM LINE
- BEXX.XX — BULK EARTHWORKS PAD LEVEL
- XX.XX — CONTOURS
- SHORING

DEPTH OF CUT

	- 999m	TO	- 15.0m
	- 15.0m	TO	- 10.0m
	- 10.0m	TO	- 5.0m
	- 5.0m	TO	- 2.0m
	- 2.0m	TO	- 1.0m
	- 1.0m	TO	- 0.5m
	- 0.5m	TO	- 0.25m
	- 0.25m	TO	- 0.0m

DEPTH OF FILL

	0.0m	TO	0.25m
	0.25m	TO	0.5m
	0.5m	TO	1.0m
	1.0m	TO	2.0m
	2.0m	TO	5.0m
	5.0m	TO	10.0m
	10.0m	TO	15.0m
	15.0m	TO	999m

LEGEND

1. REFER SPECIFICATION NOTES FOR EARTHWORKS GENERAL NOTES.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL SPECIFICATIONS
3. FOR THE PURPOSES OF PRELIMINARY EARTHWORKS CALCULATIONSA STRIPPING DEPTH OF 150mm HAS BEEN ASSUMED OVER THE WHOLE SITE. A BULK EARTHWORKS LEVEL 300mm BELOW FINISHED SURFACE LEVEL HAS BEEN ASSUMED OVER THE WHOLE SITE
4. NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS; I.E. TRENCHES, FOOTINGS, RETAINING WALLS, ETC.
5. APPROXIMATE EARTHWORKS VALUES AS FOLLOWS:
   - CUT: 45,270 m3
   - FILL: 5,645 m3
   - EXCESS MATERIAL: 39,625 m3

   NOTE: SITE STRIPPING VOLUMES HAVE NOT BEEN INCLUDED IN ABOVE VOLUMES.

DRAWN: D. CHAPMAN
DESIGNED: B. FIELD
JOB MANAGER: A. RIVETT
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT

CHIODO corporation

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SCALE 1:500@ A1 — 0 5 10 15 20 25m

NORTHROP
Sydney
Level 11 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

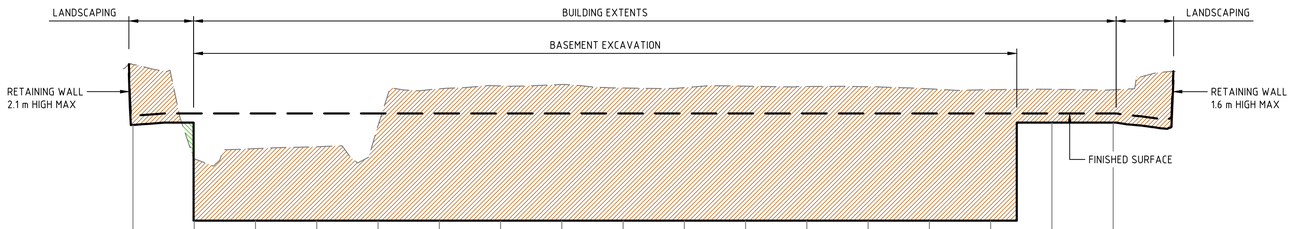
DRAWING TITLE
EARTHWORKS CUT FILL PLAN

JOB NUMBER
200372

DRAWING NUMBER
200372-DA-C03.01

REVISION
01

Plotted By : ANDREW RIVETT Found : \\nw-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\0-Drawings\0-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C03.01.dwg
Date: 07.08.2020 12:15 PM

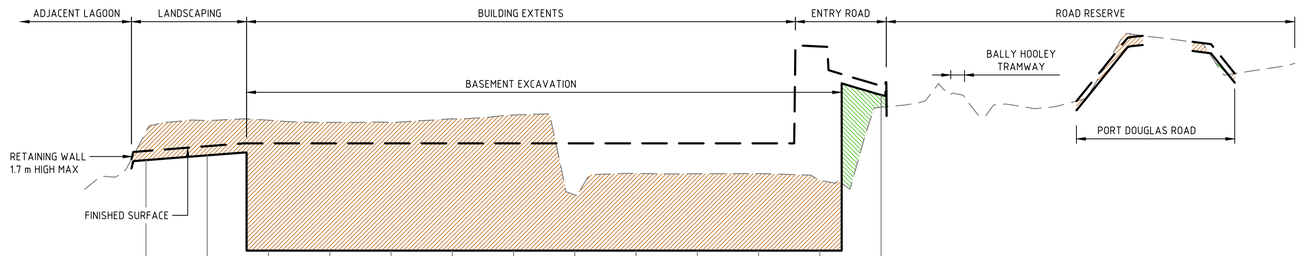


DATUM RL -3.0

BULK EARTHWORKS SURFACE		2.635	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	2.71	2.71			
EXISTING SURFACE		4.605	1.532	1.861	1.922	2.612	3.814	3.909	3.954	3.841	3.853	3.9	3.889	3.881	3.813	3.786	3.798	3.783	4.383			
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	189.114		

SECTION B C03.01

HORIZONTAL SCALE 1:500@A1
VERTICAL SCALE 1:100@A1



DATUM RL -3.0

BULK EARTHWORKS SURFACE		2.462	2.618	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	4.59			6.094					
EXISTING SURFACE	1.514	3.385	3.754	3.767	3.695	3.69	3.808	3.935	1.327	2.027	2.018	2.021	1.8	4.186	4.819	4.289	4.291	6.593	6.343	5.359	5.629	
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	197.512	

SECTION A C03.01

HORIZONTAL SCALE 1:500@A1
VERTICAL SCALE 1:100@A1

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT

CHODO corporation

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SCALE VARIES

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Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE
EARTHWORKS CUT FILL SECTIONS

JOB NUMBER
200372

DRAWING NUMBER
200372-DA-C03.11

REVISION
01

Found : \\nr-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\0-Drawings\0-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C03.11.dwg
Plotted By : ANDREW RIVETT
Date : 07.08.2020 12:15 PM

LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- EASEMENT LINE
- EXISTING TRAM LINE
- PROPOSED KERB
- SAWCUT AND PAVEMENT INFILL
- KO — KERB ONLY
- KG — KERB AND GUTTER
- FK — FLUSH KERB
- IKK-RW — INTEGRAL KERB WITH RETAINING WALL
- MTE — MATCH TO EXISTING
- FFLXX.XX — PROPOSED FINISHED FLOOR LEVEL
- XX.XX — CONTOURS
- XX.XX — EXISTING CONTOURS
- STORMWATER PIPE
- EXISTING STORMWATER PIPE
- GRATED INLET PIT (NEW / EXTG)
- KERB INLET PIT (NEW / EXTG)
- JUNCTION PIT (NEW / EXTG)
- X / X — STORMWATER PIT TAG LINE ID / STRUCTURE No
- GTD — GRATED TRENCH DRAIN
- CONCRETE HEADWALL
- RW — RETAINING WALL
- MC01 — CONTROL LINE
- SAWCUT AND PAVEMENT INFILL
- TRAFFICABLE PAVEMENT
- NON-TRAFFICABLE PAVEMENT
- LANDSCAPING
- POOL
- SUSPENDED DECKING

NOTES

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2. REFER TO SPECIFICATION NOTES DRAWINGS FOR DETAILED NOTES.
3. REFER TO ARCHITECTURAL DA DRAWINGS PREPARED BY BUCHAN GROUP.
4. INTERNAL SITE DRAINAGE INCLUDING SIZE AND LOCATION OF DOWPIPE CONNECTIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE.

NOT FOR CONSTRUCTION

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT: CHIODO corporation

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SCALE 1:200@ A1 (0 2 4 6 8 10m)

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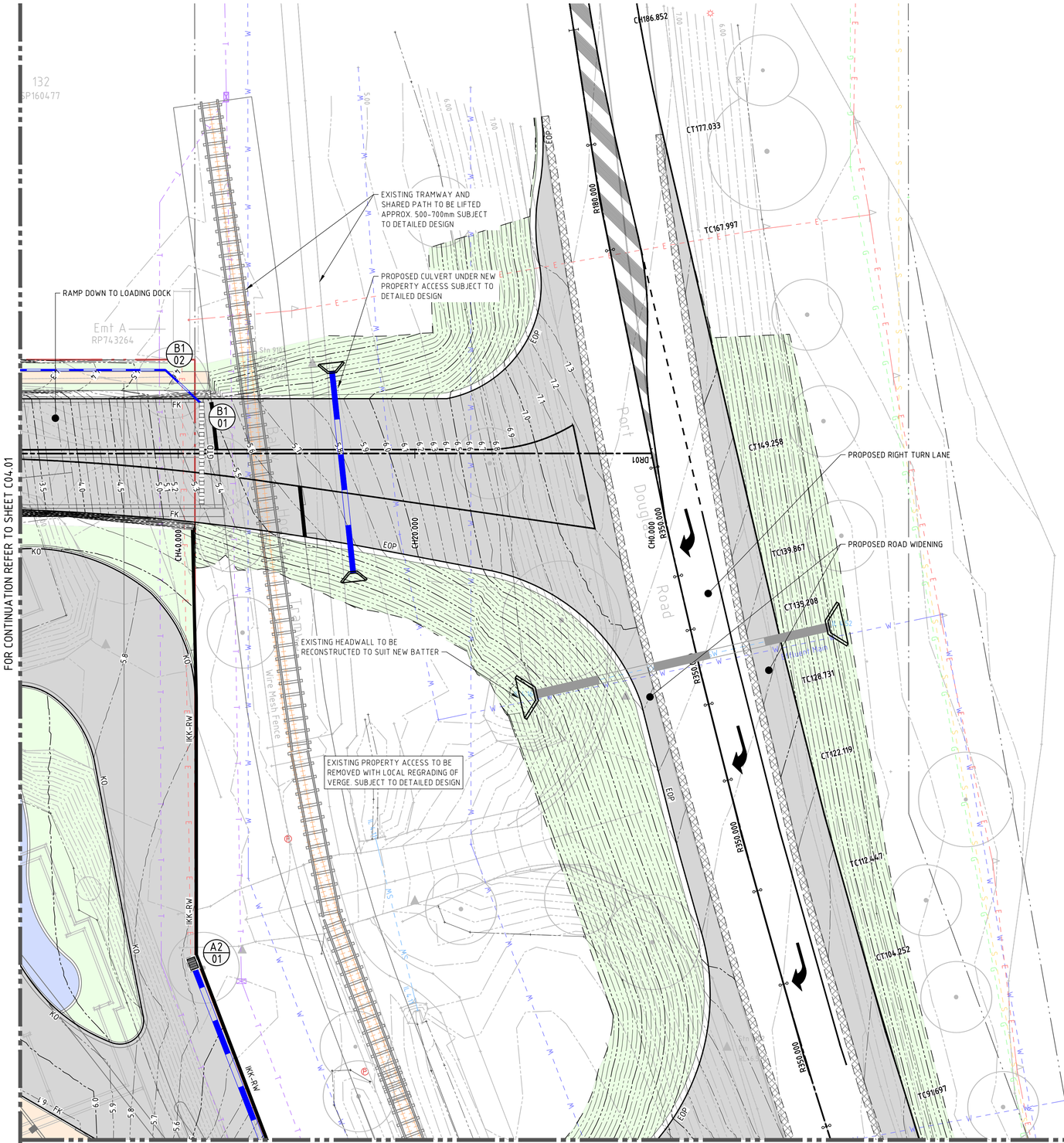
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT TITLE: CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE: SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 01
JOB NUMBER: 200372
DRAWING NUMBER: 200372-DA-C04.01
REVISION: 01



LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
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- PROPOSED KERB
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- KG — KERB AND GUTTER
- FK — FLUSH KERB
- IKK-RW — INTEGRAL KERB WITH RETAINING WALL
- MTE — MATCH TO EXISTING
- FFLXX.XX — PROPOSED FINISHED FLOOR LEVEL
- XX.XX — CONTOURS
- XXXX — EXISTING CONTOURS
- STORMWATER PIPE
- EXISTING STORMWATER PIPE
- GRATED INLET PIT (NEW / EXTG)
- KERB INLET PIT (NEW / EXTG)
- JUNCTION PIT (NEW / EXTG)
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- GTD — GRATED TRENCH DRAIN
- CONCRETE HEADWALL
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- SAWCUT AND PAVEMENT INFILL
- TRAFFICABLE PAVEMENT
- NON-TRAFFICABLE PAVEMENT
- LANDSCAPING
- POOL
- SUSPENDED DECKING

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4. INTERNAL SITE DRAINAGE INCLUDING SIZE AND LOCATION OF DOWPIPE CONNECTIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE.

NOT FOR CONSTRUCTION

DESIGNED: B. FIELD
DRAWN: D. CHAPMAN
JOB MANAGER: A. RIVETT
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT: CHODO corporation

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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT TITLE: CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE: SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 02
JOB NUMBER: 200372
DRAWING NUMBER: 200372-DA-C04.02
REVISION: 01

FOR CONTINUATION REFER TO SHEET C04.01

FFL3.01

FOR CONTINUATION REFER TO SHEET C04.04

Golf Course
Lagoon

132
SP160477

Stn 9105
Pin RL: 3.748

Stn 9106
Screw in Concrete
RL: 3.893

Stn 9111
Screw in
Concrete
RL: 3.940

A3
01

A1
05

A1
04

RW

OUTLET TO GOLF COURSE LAGOON

RISER WITH GRATED INLET TO RCBC

PROPOSED 1200x600 RCBC
TO CONVEY 1% AEP FLOW
THROUGH SITE

Jc Manhole

LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- EASEMENT LINE
- EXISTING TRAM LINE
- PROPOSED KERB
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- KO — KERB ONLY
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- EXISTING CONTOURS
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- EXISTING STORMWATER PIPE
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- POOL
- SUSPENDED DECKING

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NOT FOR CONSTRUCTION

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DEVELOPMENT APPLICATION	DC		AR	31.08.20

CLIENT

CHIODO corporation

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SCALE 1:200@ A1 — 0 2 4 6 8 10m

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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE
SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 03

JOB NUMBER
200372

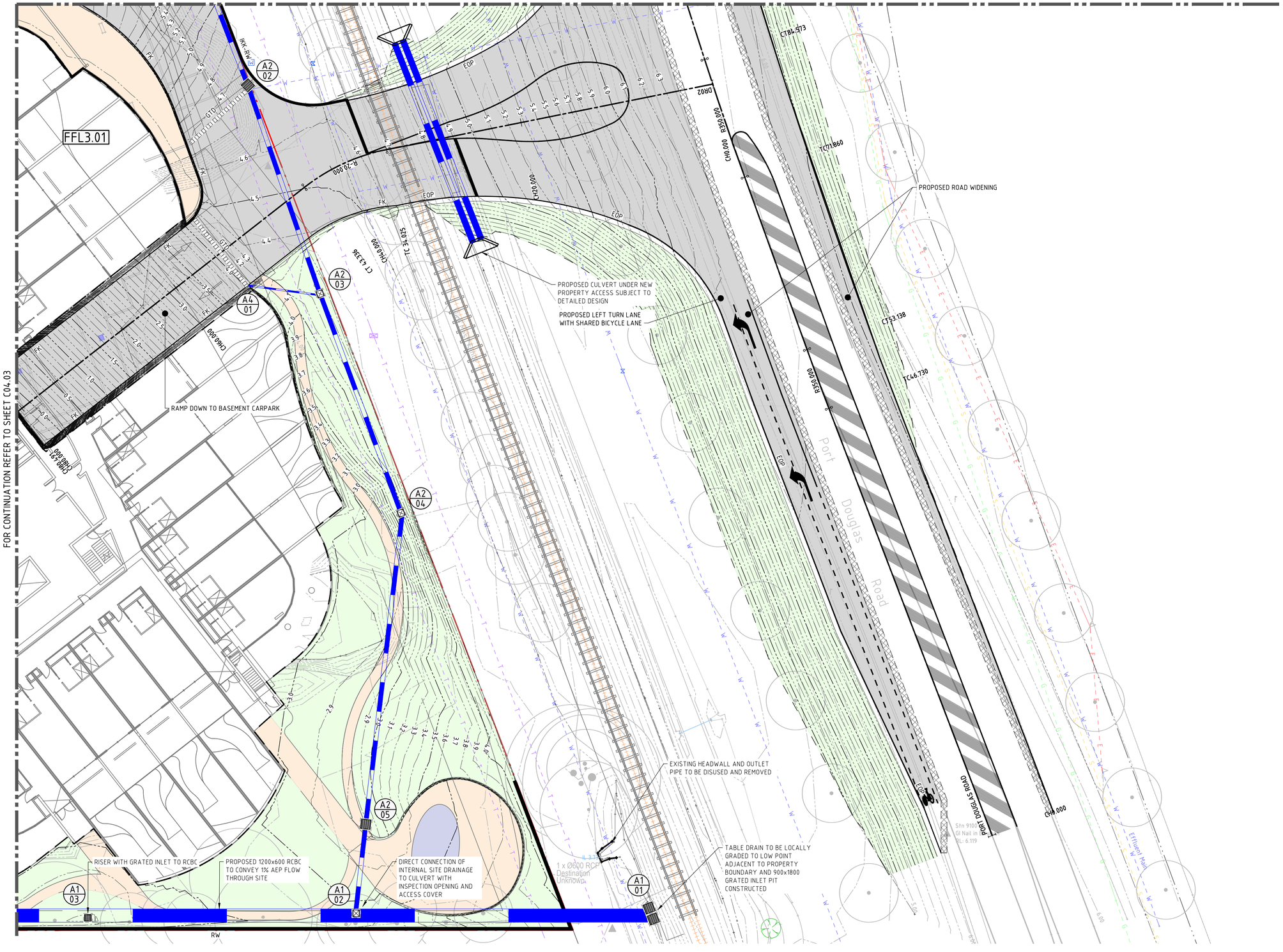
DRAWING NUMBER
200372-DA-C04.03

REVISION
01

Plotted By : ANDREW RIVETT Date : 07.08.2020 12:16 PM
Found : \\nw-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\D-Drawings\D-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C04.01.dwg

FOR CONTINUATION REFER TO SHEET C04.02

FOR CONTINUATION REFER TO SHEET C04.03



LEGEND

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- PROPOSED KERB
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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT TITLE: CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS

DRAWING SHEET SIZE = A1

DRAWING TITLE: SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 04

JOB NUMBER: 200372

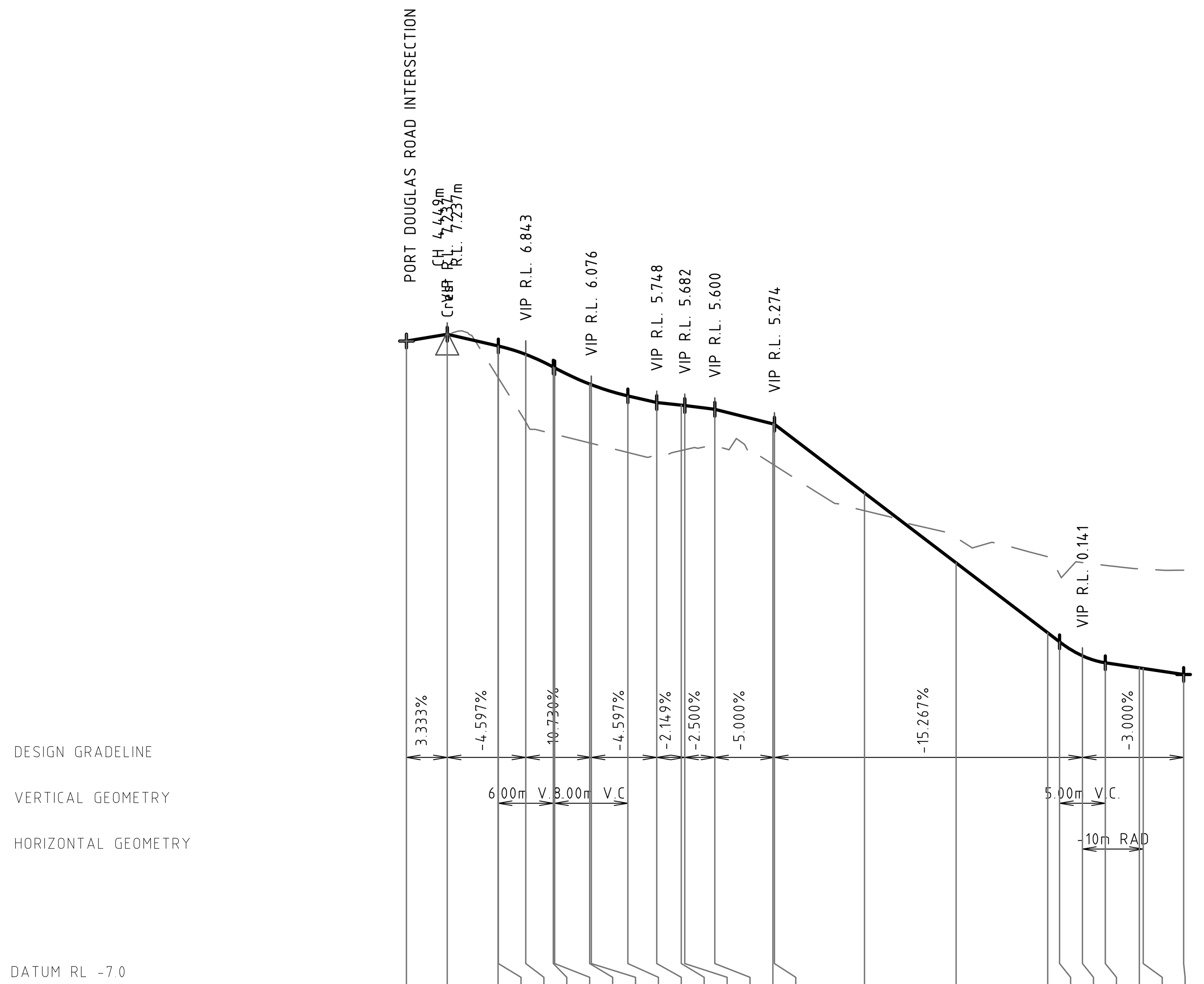
DRAWING NUMBER: 200372-DA-C04.04

REVISION: 01

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

Plotted By: ANDREW.RIVETT Date: 07.09.2020 12:15 PM

Found: I:\ne-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas\6. OLD\D-Drawings\D-Northrop\C-CIVIL\2-CAD\C-CAD FILES\1-DA\200372-DA-C04.01.dwg

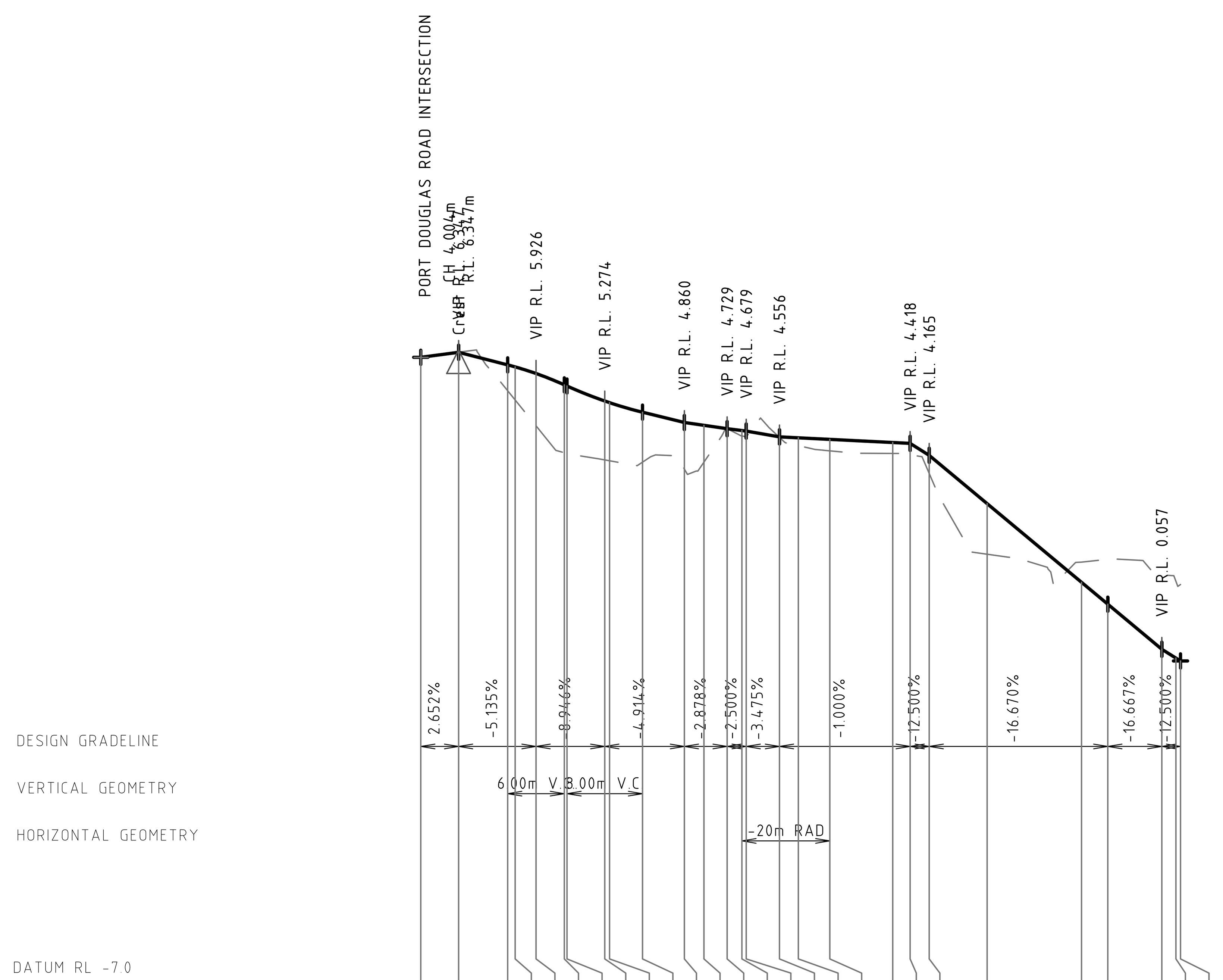


CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
0.000	7.089	7.094
4.449	7.237	7.237
10.000	6.982	6.294
10.025	6.981	6.286
13.025	6.797	5.323
16.025	6.521	5.063
16.172	6.505	5.056
20.000	6.151	4.865
20.172	6.138	4.856
24.172	5.892	4.657
27.318	5.748	4.577
30.000	5.69	4.699
30.381	5.682	4.716
33.655	5.6	4.8
40.000	5.283	4.398
40.170	5.274	4.376
50.000	3.773	3.386
60.000	2.247	2.798
70.000	0.72	2.381
71.292	0.523	1.994
73.792	0.218	2.254
76.292	0.066	2.192
80.000	-0.045	2.116
80.422	-0.058	2.111
84.833	-0.19	2.087

LONGITUDINAL SECTION ALONG DR01

HORIZONTAL SCALE 1:500@A1

VERTICAL SCALE 1:100@A1



CHAINAGE	FINISHED SURFACE	EXISTING SURFACE
0.000	6.241	6.241
4.004	6.347	6.349
9.209	6.08	5.532
10.000	6.037	5.336
12.209	5.897	4.789
15.209	5.657	4.22
15.490	5.632	4.205
19.490	5.315	4.067
20.000	5.28	4.049
23.490	5.078	4.02
27.929	4.86	3.87
30.000	4.8	4.02
32.454	4.729	4.729
34.025	4.69	4.574
34.475	4.679	4.558
38.002	4.556	4.545
40.000	4.536	4.37
43.336	4.503	4.26
50.000	4.436	4.204
51.847	4.418	4.171
53.870	4.165	3.778
60.000	3.143	2.07
70.000	1.476	1.903
72.787	1.011	1.962
78.512	0.057	1.632
80.000	-0.129	1.499
80.491	-0.19	1.43

LONGITUDINAL SECTION ALONG DR02

HORIZONTAL SCALE 1:500@A1

VERTICAL SCALE 1:100@A1

DRAWN: D. CHAPMAN   DESIGNED: B. FIELD   JOB MANAGER: A. RIVETT   VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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CLIENT: CHIODO corporation

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SCALE VARIES

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PROJECT TITLE: CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION — FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS

DRAWING SHEET SIZE = A1

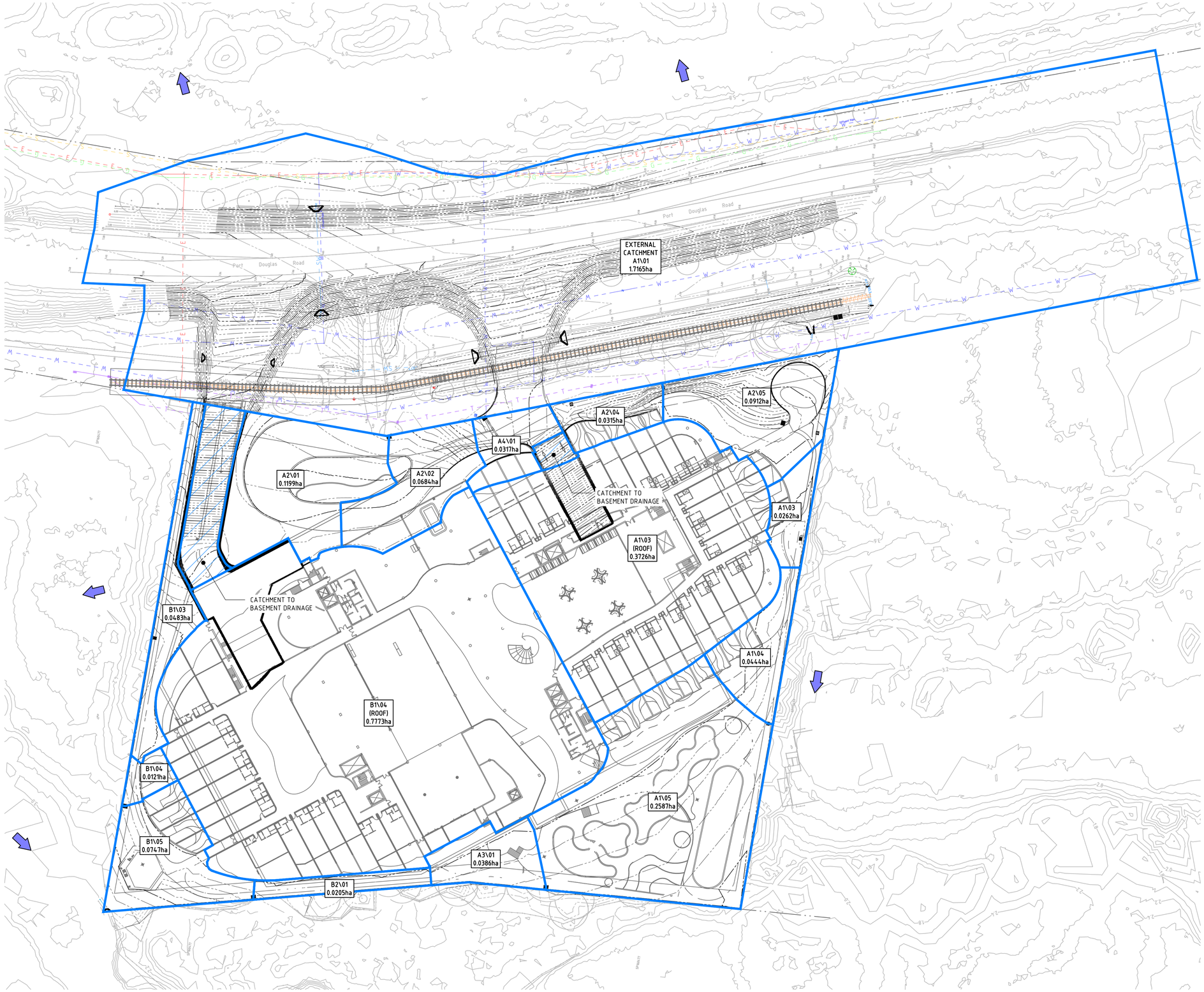
DRAWING TITLE: DRIVEWAY LONGITUDINAL SECTIONS

JOB NUMBER: 200372

DRAWING NUMBER: 200372-DA-C04.11

REVISION: 01

Found : \\ne-files\Projects\2020 Jobs\200372 - Fairmont Hotels and Resorts, Port Douglas, QLD\D-Drawings\D-Northrop\C-CIVIL\2-CAD\2-CAD FILES\1-DA\200372-DA-C04.11.dwg
Plotted By : ANDREW RIVETT
Date : 07.08.2020 12:15 PM



LEGEND

- SITE BOUNDARY LINE
- ADJACENT BOUNDARY LINE
- EASEMENT LINE
- EXISTING TRAM LINE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- CATCHMENT BOUNDARY
- XX\XX X.XXXXha — CATCHMENT TAG
- EXISTING DRAINAGE STRUCTURE
- NEW DRAINAGE STRUCTURE
- OVERLAND FLOW DIRECTION

DRAWN: D. CHAPMAN DESIGNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:

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SCALE 1:500@A1 — 0 5 10 15 20 25m

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PROJECT TITLE
CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION
FAIRMOUNT HOTELS AND RESORTS, PORT DOUGLAS
DRAWING SHEET SIZE = A1

DRAWING TITLE
CONCEPT CATCHMENT PLAN

JOB NUMBER
200372

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Appendix L – Building Code of Australia Assessment

mckenzie group

A Bureau Veritas Group Company

Building Code of Australia Assessment Report

Fairmont Resort Hotel
71-85 Port Douglas Road, Port Douglas

Prepared for: **Pure Projects Project Management**
Date: **21 August 2020**
Revision: **Preliminary / DA**

Table of Contents

Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
21/08/20	Preliminary / DA	34	Pre DA-Lodgement	Ersin Acar	Matthew Kennedy	21/08/20

1. Executive Summary

Development Overview

The proposed development is a new 6 storey Hotel /Resort facility with a basement carpark and pool area, located at 71-85 Port Douglas Road, Port Douglas QLD. Major use of building is Resort Hotel (Class 3) with retail (Class 6) and function areas (Class 9b) located on ground /street level. As design further develops, McKenzie Group will be required to carry out more detailed BCA review.

Compliance Summary

As Private Certifiers we have reviewed the DA architectural design documents prepared by Buchan Group (refer appendix A) for compliance with the current building assessment provisions, including (but not limited to) the following:

- Building Code of Australia 2019; and
- Building Act 1975 and Building Regulation 2006, including specific provisions relating to existing buildings; and
- The Disability Access to Premises (Buildings) Standard 2010

The report is intended as an overview of the relevant provisions of the BCA for assistance only. Detailed drawings and associated review will be required as the final design is developed.

Performance Solutions

The assessment of the DA Lodgement design documentation has revealed that the following areas are required to be assessed against the relevant performance requirements of the BCA, as they deviate from the deemed-to-satisfy provisions of the BCA.

No.	Preliminary Performance Solutions	DTS Clause	Performance Requirements
Fire Safety Items (To be developed further)			
1	Please advise if there are any proposed performance solutions with regard to design of the building services for the project.	TBC	TBC
2	Allow for the thickness of floor slabs to be reduced to 170mm for wet areas within units (in lieu of 200mm). (Preliminary Performance solution)	C1.1	CP1, CP2 & EP2.2
3	Permit rationalised FRLs for proposed Food and Beverage, and Events Spaces to be not more than 90min, in lieu of 180 minutes and 120minutes respectively.	C1.1 & Spec C1.1	CP1 & CP2
4	Allow for the rationalisation of fire compartment sizes.	C2.2	CP2, CP4
5	Public corridors on hotel rooms levels to be subdivided by smoke doors at intervals greater than 40m. (Corridor Lengths to be confirmed as the design develops)	C2.14	EP2.2
6	Permit Central/Grand Stairs to connect more than 3 storeys.	D1.3	DP2, DP4, EP2.2
7	Permit extended travel distances from the entrance door of SOUs to a point of choice or single exit of up to 12m	D1.4	DP4 & EP2.2
8	Permit Extended Travel Distances as per below ***(May be amended as design develops):*** <u>Carpark Basement Level</u> • Overall travel distance to an exit where two exits are available is up to 50m • Distance between alternative exits are up to 70m in lieu of 60m <u>Lower Ground Level</u> • Overall Travel distance to an exit from the Common Areas is up to 50m in lieu of 40m. • Distance between alternative exits is up to 75m in lieu of 60m. • Distance between alternative exits is up to 50m in lieu of 45m. <u>Upper Ground Level</u> • Distance between alternative exits is up to 55m between exits in lieu of 45m. <u>Level 1</u> • Travel distance to a point of choice from the change rooms/pamper room is 25m in lieu of 20m. • Overall distance to an exit is 65m in lieu of 40m from the change rooms/pamper room. • Distance between alternative exits is up to 60m in lieu of 45m. <u>Level 2</u> • Distance between alternative exits is up to 75m in lieu of 45m.	D1.4	DP4 & EP2.2

No.	Preliminary Performance Solutions	DTS Clause	Performance Requirements
	Level 3 • Distance between alternative exits is up to 65m in lieu of 45m. Roof Terrace • Overall distance to an exit is 65m in lieu of 40m. • Distance between alternative exits is up to 80m in lieu of 60m.		
9	Permit convergence of 2 exits at the basement level toward North East FS7.	D1.5	DP4,DP6, EP2.2
10	Permit Basement stair discharge egress widths to reduce from 2m to 1m	D1.6	DP4,DP6, EP2.2
11	Omit FHR to Class 6 and 9b parts of the building, as the building is predominantly Class 3. (Preliminary Performance Solution)	E1.4	EP1.1
12	Rationalisation of extent of stair pressurisation provided to fire stairs serving the following areas: - Rooftop Terrace - Basement discharge from FS5 and FS6 (Preliminary Performance Solution)	E2.2	CP2, CP3, EP2.2
13	Rationalise the atrium provisions of Part G3 of the BCA	G3, C1.1, E1.5, E2.2	CP2, DP4, EP1.4, EP2.2
Accessibility Items			
14	Range of Accessible Rooms The accessible sole occupancy units will not be 'representative of the range of rooms provided'.	D3.1	DP1
Miscellaneous Items			
15	**Weatherproofing of External Walls** As there are no deemed to satisfy provisions relating to the weatherproofing of external walls, a performance solution is to be provided by the façade engineer/registered architect demonstrating that the external walls comply with the requirements of Performance Requirement FP1.4.	-	FP1.4

Fire Safety Services

The following key fire safety services are required to meet the minimum DTS requirements.

1.	Sprinklers system throughout the building.
2.	Fire hydrant system throughout the building.
3.	Fire hose reels throughout the building (except to the Class 3 portions)
4.	Zone smoke control system throughout building.
5.	Fire precautions during construction.
6.	Air-pressurization throughout the fire isolated stairs.
7.	Automatic smoke detection and alarm system throughout the building.
8.	Automatic smoke exhaust throughout the building.

9.	Sound System and Intercom System for Emergency Purposes.
10.	Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated

Refer to part 7 of this report for further details regarding the required services.

QFES Referral

The project and above noted Performance Solutions relating to fire safety matters will need to be approved following consultation with the Queensland Fire & Emergency Service as part of the Building Approval process.

The QFES are a designated advice agency under Queensland legislation for building works involving a special fire service, and they have a statutory 15 business day period to provide their advice on the submission to the applicant.

Special fire services on this project will include:

1	Automatic Fire Detection and Alarm System
2	Automatic Fire Suppression System
3	Building Occupant Warning System activated by the Sprinkler System
4	Sound and Intercom Systems for emergency purposes
5	Fire Control Centres (FIP)
6	Fire Hydrant System
7	Mechanical Air Handling System
8	Pressurising Systems
9	Residential Automatic Sprinkler System
10	Smoke and Heat Vents
11	Smoke Hazard Management System
12	Smoke and/or Heat Alarm System

Further Assessment

The assessment of the design documentation has also revealed that the following additional information is required in order to complete the assessment, and/or the following areas need to be further reviewed.

No.	Items for review	Responsibility
1.	Please advise if there are any proposed performance solutions with regard to design of the building services for the project.	Services Consultants
2.	Further investigation is required to determine the Importance Level of the building and whether this is to be designed as a 2 or 3.	Structural Engineer
3.	Please identify/outline the fire compartments for the purposes of compartment area and volume review. Preliminary performance solutions include the rationalisation of fire compartment sizes already.	Architect

No.	Items for review	Responsibility
4.	Please ensure the use of non-combustible materials for attachments to and for the cladding of the external walls is in accordance with BCA C1.9 & C1.14.	Architect
5.	Fire Resistance Levels of walls separating car parking areas from the back of house and administration areas on Basement Level & those separating car parking areas from floors above.	Architect
6.	Fire and Acoustic ratings achieved by internal partition walls between the hotel rooms and between the public corridors and the hotel rooms will be required to be determined.	Architect
7.	Please provide penetration tested systems for review.	Architect
8.	Please provide detailed drawings of fire isolated stairs.	Architect
9.	Please provide detailed stair and ramp drawings.	Architect
10.	Please provide balustrade detailed drawings.	Architect
11.	Please provide door schedule for review.	Architect
12.	Please provide hydrant drawings and design certificate.	Services Consultants
13.	Please provide fire extinguisher locations.	Services Consultants
14.	Please confirm fire precautions during construction.	Services Consultants
15.	Please confirm proposed weatherproofing for external wall system. A template for the required performance solution can be provided for review and use.	Architect / Façade Consultant (if engaged)

Documentation to enable assessment and demonstrate compliance will be required to address the above items prior to approval.

The application for Building Approval shall be assessed under the relevant provisions of the Building Act 1975 and the Building Regulation 2006.

2. Introduction

The proposed development comprises a new 6 storey Hotel /Resort facility with a basement carpark and pool area, located at 71-85 Port Douglas Road, Port Douglas QLD. Major use of building is Resort Hotel (Class 3) with Food and Beverage (Class 6) and function areas (Class 9b) located throughout the building.

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

The report utilises the applicable provisions of the Building Act 1975 (as amended), the Building Regulations 2006 and the Building Code of Australia 2019.

3. Preliminaries

3.1. Building Assessment Data

Summary of Construction Determination:

Classification	3, 6, 7a, 9b, 10b
Number of Storeys	6
Rise in Storeys	5
Type of Construction	Type A
Effective Height (m)	<25m

Note: The effective height of the project includes all stories included in the rise in stories of the project.

Summary of the floor areas and relevant populations where applicable: -

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Approximate Volume (m^3)	Assumed Population
Basement, Ancillary Offices/BOH	7a, 5	9053²	TBC	168 Cars 27 Staff
Lower Ground Floor	3, 6, 9b	11029m²	TBC	1167
Upper Ground Floor	3, 5 (Ancillary)	5306m²	TBC	112
Level 1	3, 6 (Use of the F&B and Café Areas TBC if open to public)	6520m²	TBC	368
Level 2	3	5243m²	TBC	117
Level 3	3, 9b	6364m²	TBC	248
Roof Top	9b, 10b	TBC	TBC	TBC
Total				

Notes:

- The above populations have been based on floor areas and calculations in accordance with Table D1.13 of the BCA and the provided information by the client.
- The floor areas to retail portions have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas.
- The carpark areas have been considered ancillary to the use for the purposes of population numbers

3.2. Council Development Approval / Planning Permit Approval

A Development Approval will be required from the Local Authority for the development. A copy of the Development Approval conditions, and approved drawings will be required prior to the issuing of the Building Approval for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

Following a review of the Council Development Approval the conditions are to be reviewed prior to the issue of the Building Approval.

3.3. Copy of Certificate of Title:

A copy of the Certificate of Title and associated plan of subdivision is required. Where it is proposed to construct any part of the building over, under or within an easement, the consent of the relevant authority and Council is required prior to the issue of the Building Approval.

3.4. Building Over Sewer / Council Consents

A copy of the property information for the site is required to indicate the location of Council sewer and stormwater assets within or adjacent to the subject site.

Where it is proposed to construct the building over or near these services, Council or relevant authority approval will be required prior to the issue of the Building Approval.

Refer to Page 29, Section 11 - QDC MP1.4 – Building over or near relevant infrastructure, for specific compliance requirements.

4. Structure

4.1. Structural Provisions (BCA B1):

Initial assessment of the building shows importance level of is 2. However, further assessment and advice from the Structural Engineer is to be provided.

Any new structural works are to comply with the applicable requirements of BCA Part B1, including AS/NZS 1170.0-2002, AS/NZS 1170-1-2002, AS/NZS 1170.2-2011 and AS 1170.4-2007.

The non-structural elements of the building, including partitions (and non-structural fire walls), ceilings, services and racking/shelving may be required to comply with the seismic restraint requirements of AS 1170.4-2007. Certification will be required confirming that the design of the seismic restraints comply with AS 1170.4-2007. This may be provided by a specialist seismic consultant or by the architect and services design engineers.

It is noted that BCA 2019 introduced a new Verification Method, BV2, which is a pathway available to verify compliance with BCA Performance Requirement BP1.1(a)(iii).

Glazing is to comply with AS1288-2006, and AS2047-2014.

Prior to the issue of the Building Approval structural certification is required to be provided by an RPEQ.

5. Fire Protection

5.1. Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire-resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the building, it is required to be constructed in accordance with the requirements of Type A Construction, in accordance with Table 3 of Specification C1.1 of the Building Code of Australia 2019.

The building will be assessed on the basis of the following fire separation / compartmentation within the development:

- Bounding construction to the sole occupancy units of 90 minutes,
- Separation between the carpark level and the BOH portions of 120 minutes,
- Fire compartmentation of the building at each floor level,
- Fire compartmentation of the development.

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		**Type of Construction**
		A
9b	max floor area—	8 000 m^2
	max volume—	48 000 m^3
6, 7a	max floor area—	5 000 m^2
	max volume—	30 000 m^3

If the building exceeds the area / volume limitations of the BCA provisions, the building is then considered a large isolated building and the following provisions will apply:

- Automatic sprinkler protection to AS2118.1 and BCA Specification E1.5 throughout the development / smoke detection and alarm system in accordance with AS1670,
- Perimeter emergency vehicular access 6m wide located within 18m of the entire building perimeter in accordance with BCA Clause C2.4,
- Smoke exhaust or smoke and heat vents required throughout the development if the building exceeds 18,000m^2 or 108,000m^3 in volume
- Provision of a fire hydrant ring main.

Fire Compartment sizes to be reviewed once the compartmentation strategy is finalised. It is expected the above requirements will be addressed as fire engineering performance solution.

5.2. Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type A Construction. Please refer to table below which outlines the required fire rating to be achieved by the development.

Table 3 **TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS**	**Class of building — FRL: (in minutes)** ***Structural adequacy|Integrity|Insulation***		
	3	**5, 7a or 9**	**6**
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is -			
For *loadbearing* parts-			
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120
3 m or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90
For non-*loadbearing* parts -			
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180
1.5 to less than 3 m	–/ 60/ 60	–/ 90/ 90	–/180/120
3 m or more	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is -			
less than 3 m	90/–/–	120/–/–	180/–/–
3 m or more	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS	90/ 90/ 90	120/120/120	180/180/180
INTERNAL WALLS			
Fire-resisting lift and stair *shafts*			
Loadbearing	90/ 90/ 90	120/120/120	180/120/120
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like			
Loadbearing	90/ 90/ 90	120/–/–	180/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–
Between or bounding *sole-occupancy units*			
Loadbearing	90/ 90/ 90	120/–/–	180/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–
Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion			
Loadbearing	90/ 90/ 90	120/ 90/ 90	180/120/120
Non-*loadbearing*	–/ 90/ 90	–/ 90/ 90	–/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS	90/–/–	120/–/–	180/–/–
FLOORS	90/ 90/ 90	120/120/120	180/180/180
ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30

Other passive fire protection issues that will need to be addressed in detailed documentation phase include:

- Lift Motor Rooms;
- Emergency Power Supply;
- Emergency Generators;
- Electricity Supply;
- Boilers or Batteries;

The above areas are to be separated from the remainder of the building by construction achieving a minimum fire resistance level of 120 minutes.

5.3. Atrium Provisions (BCA G3)

Part G3 of the BCA contains additional fire and smoke management provisions for buildings containing atriums, but only applies where the atrium connects –

i. More than 2 storeys, or
ii. More than 3 storeys if each storey is protected with a sprinkler system and one of those storeys connected is situated at a level which has direct egress to a road or open space

The BCA deemed to satisfy provisions for atriums are outlined below:

Dimensions of Atrium Well

The atrium well must have a width throughout that is able to contain a cylinder having a horizontal diameter of not less than 6m.

Separation of Atrium by Bounding Construction

The atrium must be separated from the remainder of the building at each storey by bounding walls set back not more than 3.5m from the perimeter of the atrium void.

The boundary walls must be constructed to achieve a 60/60/60 FRL and have any door openings protected with self-closing -/60/30 fire doors; or

Be constructed of fixed toughened safety or wired glass in non-combustible frames with wall wetting sprinklers.

If a bounding wall separating the atrium is set back from the perimeter of the atrium wall, the balustrade around the atrium wall should be constructed of non-combustible material and be imperforate.

Separation at Roof

The roof of the atrium will require either an FRL as prescribed in Table 3 of Specification C1.1 , or the roof structure and membrane must be protected by a sprinkler system.

The following fire services must be provided to the entire building in accordance with BCA Specification G3.8:

- Sprinkler system complying with AS2118.1-2017 and BCA Specification G3.8 Part 2;
- Specific smoke control requirements to any mechanical air handling systems serving the atrium, and dedicated smoke exhaust to the atrium itself complying with AS1668.1-2015 and BCA Specification G3.8 Part 3;
- Fire detection and alarm system complying with AS1670.1-2018 and BCA Specification G3.8 Part 4;
- Emergency Warning and Intercom system for emergency purposes complying with AS1670.4-2018 and BCA Specification G3.8 Part 5;

- Where a required path of travel to an exit is within an atrium, a standby power supply system must be provided to operate required fire safety systems in the building (including sprinkler and hydrant pumps, air handling systems, alarms occupant warning and communication systems, etc). The standby power system must comply with BCA Specification G3.8 Part 6;

It is understood that there will be Performance Solutions incorporated into the design to rationalise atrium construction requirements. Details are to be provided as the design further develops.

5.4. Fire Hazard Properties (BCA C1.10 and BCA C1.9)

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to Specification C1.10 of the Building Code of Australia. The following requirements apply:

- *Floor Coverings (Generally) – Critical Radiant Flux not less than 1.2 kW/m2 ;*
- *Floor Coverings (in Fire Isolated Stairs) - Critical Radiant Flux not less than 2.2 kW/m2 ;*
- *Wall and Ceiling Linings (Generally) – Material Group No. 1, 2 or 3;*
- *Wall and Ceiling Linings (Fire Isolated Stairs) – Material Group No. 1;*
- *Other Materials and Installations (e.g. Insulation) – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8 (if spread of flame is >5);*
- *Rigid and flexible air handling ductwork must comply with AS4254 Parts 1 & 2 2012.*
- *Lift Cars - Floor linings and floor coverings must have a Critical Radiant Flux not less than 2.2 kW/m2, and Wall and Ceiling linings must be a Material Group No. 1 or 2.*

External Wall Cladding

Since the building is of Type A construction, the following components are required to be completely non-combustible:

- External walls, including façade coverings, framing, insulation;
- Flooring and framing of lift pits;
- Non-loadbearing internal walls required to have an FRL;
- All non-loadbearing shafts;
- All loadbearing internal walls and loadbearing fire walls, including those that are part of loadbearing shafts.

Please provide product specifications and test reports to AS 1530.1-1994 for all materials to demonstrate compliance

For materials and assemblies that are required to be non-combustible, the material or system must be not deemed combustible when tested in accordance with AS 1530.1-1994.

Combustible Materials

The following materials, though combustible or containing combustible fibres, may be used wherever a non-combustible material is required:

a) Plasterboard.
b) Perforated gypsum lath with a normal paper finish.
c) Fibrous-plaster sheet.
d) Fibre-reinforced cement sheeting.
e) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.
f) Sarking type materials that do not exceed 1mm in thickness and have a Flammability Index not greater than 5.

g) Bonded laminated materials where -
   (i) each laminate is non-combustible; and
   (ii) each adhesive layer does not exceed 1 mm in thickness; and
   (iii) the total thickness of the adhesive layers does not exceed 2 mm; and
   (iv) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole does not exceed 0 and 3 respectively.

It is recommended that once material selections are made, copies of the fire test certificates/reports be provided for review and approval.

The BCA does nominate that ancillary elements may not be fixed to an external wall that is required to be non-combustible unless they comprise of the following:

a) An ancillary element that is non-combustible.
b) A gutter, downpipe or other plumbing fixture or fitting.
c) A flashing.
d) A grate or grille not more than 2 m² in area associated with a building service.
e) An electrical switch, socket-outlet, cover plate or the like.
f) A light fitting.
g) A required sign.
h) A sign other than one provided under (a) or (g) that—
   i) achieves a group number of 1 or 2; and
   ii) does not extend beyond one storey; and
   iii) does not extend beyond one fire compartment; and
   iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.

Please provide fire hazard properties reports for any proposed signs and confirm their extent i.e. not spanning more than one storey or fire compartment:

5.5. Separation of equipment (C2.12)

Equipment listed below must be separated from the remainder of the building providing an FRL as required by Spec C1.1 but not less than 120/120/120 with a self-closing fire door with an FRL or not less than -/120/30. When separating a lift shaft and lift motor room, an FRL of not less than 120/-/- is required.

a) Lift motors and lift control panels; or
b) Emergency generators used to sustain emergency equipment operating in the emergency mode; or
c) Central smoke control plant; or
d) Boilers; or
e) A battery system installed in that building that has total voltage of 12 volts or more and a storage capacity of 200kWh or more.

5.6. Vertical Separation of openings in external walls (BCA C2.6)

A building of Type A construction must be provided with spandrel separation between openings on different storeys unless the building is protected with a sprinkler system) throughout in accordance with Specification E1.5.

The subject building will be provided with a sprinkler coverage. Therefore, BCA C2.6 does not apply.

5.7. Public Corridors: Class 3 Buildings (BCA C2.14)

Public corridors exceeding 40m in length to be divided into intervals of not more than 40m by smoke proof walls complying with Clause 2 of BCA Specification C2.5.

The review of the provided drawings has identified the public corridors extends up to 120m. However, implementation of a performance solution to address the extend of the public corridors to be over 40m. Further assessment to lower the extend of the non-compliance will be carried out as the design develops.

5.8. Protection of Openings in External Walls (BCA C3.2 / C3.3 / C3.4)

The prescriptive provisions of the BCA stipulate that any external opening within 3m of the boundary, within 6m of the far boundary of a road, river, lake or the like that adjoins the allotment, or within 6m of another building on the allotment requires protection by -/60/- fire rated construction, or externally located wall wetting sprinklers.

Where a building is separated into fire compartments, the distance between parts of external walls and openings within them must be not less than the table below unless those parts of each external wall has an FRL not less than 60/60/60 and openings are protected.

Angle Between Walls	Minimum Distance
0º (walls opposite)	6m
More than 0º to 45º	5m
More than 45º to 90º	4m
More than 90º to 135º	3m
More than 135º to 180º	2m
More than 180º	Nil

Further review will be undertaken once the fire compartments are identified as the design develops.

Fire source feature is defined as;

a) The far boundary of a road, river, lake or the like adjoining an allotment,
b) The side or rear boundary of the allotment,
c) The external wall of another building on the allotment which is not a class 10 building.

5.9. Protection of Openings fire rated building elements (BCA C3.5 and BCA C3.10)

The prescriptive provisions of the BCA stipulate that openings within building elements required to have an FRL shall be protected as follows:

a) Penetrations through fire rated floors to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a fire rated shaft achieving an FRL of 90/90/90;
b) Any penetration through a wall or room required to have an FRL (e.g. substation, boiler room, hotel room separating wall etc) is to be protected either by a tested prototype (e.g. fire collar, fire damper, etc) or be installed within a shaft achieving an FRL of 90/90/90;
c) Self-closing -/60/30 fire doors to the doors opening to the fire isolated stairs (note that this also includes the access doors to the condenser units on the plant platforms).

Note that where fire dampers, fire collars, etc are utilised, allowance needs to be made for access hatches to be provided within the walls / ceilings to ensure that maintenance access is provided.

As the design develops, details will need to be included in relation to sealing of penetrations / construction of fire rated shafts.

6. Access and Egress

6.1. Provision for Escape (BCA D1)

The egress provisions for the proposed building are provided by the following:

- Fire isolated stairways
- External perimeter doorways
- External Doors
- Horizontal Exits
- Fire Isolated Corridors

Detailing issues that will need to be addressed as the design develops include:

- Door Hardware
- Exit Door Operation
- Stair Construction
- Handrail and Balustrade construction
- Details of Separation of Rising and Descending Stairs
- Discharge from Fire Isolated Exits
- Details of the egress provisions to the Road.
- Door swings

Consideration will need to be given to the evacuation strategy for the building with special consideration to occupants with a disability and/or mobility impairment who may not be capable of traversing in excess of 80 flights of stairs to reach ground level.

Options that may be considered, but are not necessarily limited to, include:

- Stay in place, where residents stay with their apartment until evacuated by the QFES;
- Refuge zones adjacent to a fire stair and an emergency lift;
- Refuge zones within the fire stair/s;
- 'Safe' floors in the building where residents evacuate to via stairs or a dedicated lift/s and await further evacuation by QFES.

6.2. Travel via Fire Isolated Exits (BCA D1.7)

The proposed exits are required to be fire isolated.

The BCA requires each fire isolated stairway to provide independent egress from each storey served and discharge directly, or by way of its own fire isolated passageway to:

- A road or open space; or
- To a point in a storey within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least 2/3 of its perimeter, and an unimpeded path of travel not more than 20m to a road or open space; or
- A covered area that adjoins a road or open space, is open for at least 1/3 of its perimeter, has an unobstructed clear height throughout of not less than 3m, and provides an unimpeded path of travel to a road or open space of not less than 6m.

Additionally, where the path of travel from the point of discharge requires occupants to pass within 6m of any part of the external wall of the same building (measured horizontally), that external wall must have a 60/60/60 FRL and have any openings protected internally for a distance of 3m above or below the path of travel.

The assessment of the provided drawings has identified general compliance. However, further assessment is required for the fire isolated corridors as the design further develops.

6.3. Exit Travel Distances (BCA D1.4)

The travel distances to exits should not exceed:

Class 6, and 9

- no point on the floor must be more than 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m

Class 3

- 6m from an exit or from a point of choice from the entrance doorway of a sole occupancy unit
- 20m from a single exit at the level of egress to a road or open space
- Alternate exits not more than 45m apart

The locations of the proposed exits indicate that the deemed to satisfy requirements in terms of travel distances would be satisfied, with the exception of the following:

Carpark Basement Level
- Overall travel distance to an exit where two exits are available is up to 50m
- Distance between alternative exits are up to 70m in lieu of 60m

Lower Ground Level
- Overall Travel distance to an exit from the Common Areas is up to 50m in lieu of 40m.
- Distance between alternative exits is up to 75m in lieu of 60m.
- Distance between alternative exits is up to 50m in lieu of 45m.

Upper Ground Level
- Distance between alternative exits is up to 55m between exits in lieu of 45m.

Level 1
- Travel distance to a point of choice from the change rooms/pamper room is 25m in lieu of 20m.
- Overall distance to an exit is 65m in lieu of 40m from the change rooms/pamper room.
- Distance between alternative exits is up to 60m in lieu of 45m.

Level 2
- Distance between alternative exits is up to 75m in lieu of 45m.

Level 3
- Distance between alternative exits is up to 65m in lieu of 45m.

Roof Terrace
- Overall distance to an exit is 65m in lieu of 40m.
- Distance between alternative exits is up to 80m in lieu of 60m.

The extended travel distances and distance between the exit stairs will need to be addressed as performance solutions by the Fire Safety Engineer using BCA Performance Requirements DP4 & EP2.2 or the design will be amended to comply with DtS of the BCA.

6.4. Dimensions of Exits (BCA D1.6)

Minimum dimensions of 1000mm and 2000mm height to be provided within exits, with the paths of travel should provide a minimum width of 1000mm (note that all maintenance access, cat walks, etc may comply with AS1657-2018 in which case a 600mm clear width is required).

The following table summarises the exit widths required by BCA Clause D1.6:

Storey	Provided Egress Width	Population provided by the client	Allowed population as per the egress widths
Carpark	6m	222	680
Lower Ground	13m	1167	1520
Upper Ground	13m	112	1520
Level 1	7m	368	820
Level 2	7m	117	820
Level 3	7m	248	820
Rooftop	4m	TBC	320

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm, with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e. minimum 920 mm doors).

BCA Part D1.6 also stipulates that the unobstructed width of a required exit must not diminish in the direction of travel to a road or open space.

Assessment of the provided drawings identified the below discrepancies from compliance:

- FS5 and FS6 discharges to a fire isolated corridor where the egress path width is diminished to 1m in lieu of 2m. The design can be amended to keep the corridor width at 2m.

6.5. Balustrades and Handrails (BCA D2.16 / BCA D2.17 / D2.24)

Generally

Balustrading to a minimum height of 1000mm with a maximum opening of 124mm in any direction should be provided adjacent to balconies, landings, corridors etc where located adjacent to a change in level exceeding 1000mm, or where it is possible to fall through an openable window located more than 4m above the surface beneath.

Where it is possible to fall more than 4m to the surface below, the balustrade shall not contain any horizontal or near horizontal members that facilitate climbing between 150 – 760mm above the floor.

Handrails should be provided at a minimum height of 865mm alongside of all ramps and stairs.

The public stairs and ramps located along an accessible path of travel should be designed in accordance with the requirements of AS1428.1 for persons with disabilities. This requires a handrail on each side of the stair and ramp and for the handrail to extend approximately 550mm – 600mm past the last tread / end of ramp.

Fire Isolated Stairways

Handrails are required on both sides of all stairways except for fire isolated stairways used only for emergency egress purposes.

Note: in a required exit serving an area required to be accessible, handrails must be designed and constructed to comply with Clause 12 of AS1428.1-2009

Openable Windows in Bedrooms

In bedrooms of Class 3 buildings, where the distance from the floor level to the level below exceeds 2m, window openings shall be provided with protection in accordance with BCA Clause D2.24.

Where the lowest part of the window opening is less than 1.7m above a floor, the window opening must be:

a) Fitted with a device to restrict the opening; or
b) Fitted with a screen with secure fittings

The device or screen required must –

a) Not permit a 125mm sphere to pass through it; and
b) Resist an outward horizontal action of 250N; and
c) Have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden

Further review will be undertaken to ensure compliance as the design develops.

6.6. Slip Resistance

The adoption of BCA 2014 introduced a requirement for slip resistance of stairway treads and ramp surfaces. The requirements are as follows:

Table D2.14 SLIP-RESISTANCE CLASSIFICATION

Application	Surface conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

7. Services and Equipment

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures. A draft essential fire safety schedule can be found in Appendix B.

7.1. Fire Hydrants (BCA E1.3)

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005.

The building is required to be provided with a booster assembly as part of the fire hydrant requirements. The booster is required to be located attached to the building at the main entry. If remote from the building, the booster is to be located at the main vehicle entry or with sight of the main entry of the building within 20m of a hardstand area. Also, the hydrant booster is to be in a position where the distance is not less than 10m from the substation.

A fire ring main is not required.

Fire Hydrants, Booster/Pump Location to be provided for review.

7.2. Fire Hose Reels

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005.

The system is required to provide coverage to the Class 6 and 9b zones which are not for the exclusive use of the hotel guests.

Fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length and 4m of water spray. Where required, additional fire hose reels shall be located internally as required to provide coverage. These hose reels are to be located adjacent to internal hydrants.

Fire hose reel cupboards must not contain any other services such as water meters, etc., and doors to fire hose reel cupboards are not to impede the path of egress unless an alternative solution is developed under BCA Performance Requirement EP1.1

Fire Hose reel are not to extend through Fire and Smoke Walls.

The locations of FHR to be provided for further assessment.

7.3. Fire Extinguishers (BCA E1.6)

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444 - 2001 to provide coverage.

Table E.6 details when portable fire extinguishers are required:

Occupancy Class	Risk Class (as defined in AS 2444)
Class 3 buildings	a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1) b) To cover Class F fire risks involving cooking oils and fats in kitchens. c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not excluding that held in fuel tanks of vehicles). d) To cover Class A fire risks in normally occupied fire compartments less than 500m^2 not provided with fire hose reels (excluding open deck carparks). e) To cover Class A fire risks in classrooms and associated schools not provided with fire hose reels. f) To cover Class A fire risks associated with Class 2 or 3 building or class 4 part of building.

In addition, extinguishers are to be provided to the class 3 portions of the building in accordance with the below:

- an ABE type fire extinguisher is to be installed with a minimum size of 2.5 kg; and
- extinguishers are to be distributed outside a sole-occupancy unit:

a) to serve only the storey at which they are located; and
b) so that the travel distance from the entrance doorway of any sole-occupancy unit to the nearest fire extinguisher is not more than 10 m.

Fire extinguishers are to be located in accordance with AS 2444 - 2001, often co-located with fire hydrants and/or fire hose reels.

The fire extinguisher locations are to be provided for further review.

7.4. Automatic Sprinkler Protection (BCA E1.5)

A sprinkler system is required to be provided throughout the whole building in a Class 3 building where any part of the building has a rise in storeys of 4 or more. This system is to comply with Specification E1.5a and the relevant parts of Specification E1.5a.

Location of pumps, tanks, FIP, control valves and booster assemblies will be subject to review by the QFES as part of the Building Approval process.

The sprinkler system shall be connected to and activate an occupant warning system complying with BCA Specification E2.2a.

Details of the proposed sprinkler system design will need to be reviewed as the design develops.

An occupant warning system should be provided in accordance with BCA Specification E1.5.

7.5. Smoke Hazard Management (BCA E2.2)

Smoke hazard management shall be provided throughout the building by means of the following systems:

- Zone Smoke Control in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1 ;
- Automatic Shutdown of Mechanical Systems in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1;
- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2a and AS1670.1-2018
- Automatic Smoke and Heat Vents in accordance with the requirements of BCA Spec E2.2b
- Automatic Smoke Detection and Alarm System in accordance with the requirements of BCA Spec E2.2a and AS 1670.1-2018;
- Automatic Pressurisation to Fire Isolated Exits in accordance with the requirements of AS/NZS 1668.1-2015 Amendment 1
- Automatic smoke detection and alarm system complying with BCA Specification E2.2b and AS/NZS1668.1-2015 Amendment 1;
- Natural smoke venting with ventilation openings distributed as evenly as practicable and comprising permanent openings at roof level with a free area comprising not less than 1.5% of the floor area, and low-level openings which may be permanent or readily openable with a free area not less than 1.5% of floor area;
- Carpark ventilation systems must comply with Clause 5.5 of AS/NZS1668.1-2015 Amendment 1 except that fans with metal blades suitable for operation at normal temperature may be used and the electrical power and control cabling need not be fire rated.

A fire indicator panel is required as part of the detection system. This panel is to be located within 4m of the main entry and should be incorporated within the fire control room. Any variation to the prescriptive provisions will require the consent of the fire brigade and should form part of the fire safety engineering report to verify the performance requirements of the BCA.

In addition to the above, the following additional smoke hazard management provisions are required due to the atriums in the building:

- The operation of mechanical air handling systems serving the atrium must be designed to operate in accordance with BCA Specification G3.8, Section 3
- The atrium must be provided with a smoke exhaust system in accordance with BCA Specification G3.8, Section 3.4
- A smoke detection system complying with AS1670.1-2018 and BCA Specification G3.8; Section 4 is to be installed throughout the building
- A break glass fire alarm system must be provided at each door to a fire isolated stairway.

7.6. Lift Services (BCA E3.4 and BCA E3.6)

The passenger lifts to be installed are to be:-

- Fitted with warning signs, fire service controls in accordance with Clauses E3.3, Figure E3.3, E3.7, E3.9 and E3.10 of the BCA.
- Stretcher facilities are to be provided within at least one of the lifts serving to the levels above 12m, with minimum dimensions of 600m wide, 2000mm long and 1400mm high;
- Be provided with the following in order to satisfy accessibility requirements:
  - A handrail in accordance with AS1735.12-1999,
  - Minimum internal floor dimensions of 1400 x 1600mm for lifts which travel more than 12m, or 1100 x 1400mm for lifts which travel not more than 12m,
  - Fitted with a series of door opening sensory devices which will detect a 75mm diameter or across the door opening between 50mm and 1550mm above floor level,
  - Have a set of buttons for operating the lift located at heights above level complying with AS1735.12 - 1999
  - For lifts serving more than 2 levels, automatic audible information within the lift car identifying the level each time the car stops, and audible and visual indication at each lift landing to indicate the arrival of a car

7.7. Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with BCA Part E4 and AS/NZS 2293.1-2018, including the potential use of photo luminescent exit signs.

Details are required to be provided for review.

7.8. Sound Systems and Intercom Systems for Emergency Purposes (BCA E4.9)

A Sound System and Intercom System is required in accordance with AS1670.4-2018 and BCA Clause E4.9

Details are to be provided for our review.

7.9. Fire Control Centre (BCA E1.8)

Although the building has an effective height of less than 25m, and a fire control centre is not required; with the incorporation of the atrium provisions and the required fire safety systems, Fire Indicator panel technically will be upgraded to a Fire Control Centre.

As the effective height of the building does not exceed 50m, the fire control centre need not be located within a dedicated room in accordance with the requirements of BCA Specification E1.8

7.10. Fire Precautions During Construction (BCA E1.9)

After the building has reached an effective height of 12m, the following fire services are required to be operational:

- Required fire hydrants and fire hose reels on every storey covered by the roof/floor structure (except the 2 uppermost storeys); and
- Booster connections installed.

Due to the height of the building this will need to be considered and implemented during construction.

8. Health and Amenity

8.1. Sanitary Facilities (BCA F2.2 and BCA F2.3)

Public Areas

The below calculations are based on the assumption that the food and beverage areas, as well as the pool facilities may be open to general public.

Separate sanitary facilities are required to be provided for male & female employees as well. The assumed staff population will be provided by the client to carry out these calculations.

The following table summarises the sanitary facilities required, and the number indicated to be provided within the whole building, which can be distributed across the levels:

Sanitary Facilities Required			
	WC	Urinals	Basins
Male	5	13	7
Female	14	-	7
Accessible	1	-	1

** Note that an accessible facility is to be provided where there is a bank of sanitary facilities is provided at a storey.*

** Note that the number of provided fixtures does not include the use of the accessible facility shown on this level as permitted under BCA Clause F2.2(c). The final number of accessible facilities then can be subtracted from the total number of Male and Female facility numbers.

*** It is accepted that a toilet pan may be used as a substitute for a urinal. Given the surplus in toilet pans provided to the male amenities.

Detailed designs will need to be developed as to the layout, dimensions, etc of the sanitary facilities.

Note: The Unisex facilities provided for people with disabilities may be counted once for each sex. These facilities are to be provided in accordance with AS1428.1-2009.

Bathroom Construction

Where bathrooms or rooms containing water, closets have the WC within 1200mm of the doorway, the door shall be either sliding, open outwards, or be provided with removable hinges.

8.2. Floor Wastes

Floor wastes to be provided within bathrooms and laundries where located above another sole occupancy unit. The floor shall be sloped towards these wastes.

Floor wastes are required to be provided where wall hung urinals are provided and the floor shall be sloped towards these wastes.

Floor wastes are not indicated.

8.3. Light and Ventilation (BCA Part F4)

Class 3

Natural light and ventilation are to be provided to all habitable rooms at a rate of 10% and 5% of the floor area of the rooms respectively.

Class 6, 9

Natural Ventilation is required to be provided to rooms at a rate of 5% of the floor area in openings. Alternatively, mechanical ventilation is required in accordance with AS1668.2-2012

Artificial lighting complying with AS/NZS1680.0-2009 is to be incorporated with the final detailed design to be developed to confirm this.

8.4. Sound Transmission and Insulation (BCA F5)

Building elements within Class 3 buildings should provide the following sound insulation levels.

Location	Notes	Sound Insulation Requirement
Walls separating habitable rooms		$R_w + C_{tr} \geq 50$
Walls separating habitable room and kitchen or bathroom	Wall must be of Discontinuous Construction	$R_w + C_{tr} \geq 50$
Floor separating habitable rooms	Impact isolation required	$R_w + C_{tr} \geq 50$ $L_{n,w} + C_I \leq 62$
Duct, soil, waste or water supply pipe, including pipes that is located in a floor or wall cavity, serves or passes through more than one room	Adjacent habitable room or Adjacent non-habitable room	$R_w + C_{tr} \geq 40$ or $R_w + C_{tr} \geq 25$
Door to habitable room		$R_w \geq 30$

Please note for walls requiring impact resistance an air gap between leaves of the wall construction is required to be provided.

Please provide a report from the acoustic engineer verifying design compliance with the provisions of part F5 of the BCA.

Details are to be provided for our review.

8.5. Condensation management (BCA Part F6)

Pliable building membranes installed to an external wall must achieve compliance with AS 4200.1, be installed in accordance with AS4200.2, be located on the exterior side of the primary insulation layer or the wall assembly and except for the single skin mason and single sin concrete be separated from water sensitive materials.

Exhaust systems must achieve 25L/s for bathrooms and sanitary compartment with discharge directly or via a duct to our door air or to a roof space that is ventilated. Kitchens and laundries to achieve 40L/s and discharge directly or via a shaft or duct to outdoor air.

Exhaust systems discharging directly or via a shaft or a duct to a roof space must be through evenly distributed systems. Opening for minimum flow requirements must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is greater than 22º. 30% of the total unobstructed area required for exhaust being discharged directly or via a shaft or duct to outdoor air must be located not more than 900 mm below the ridge or highest point of the roof space.

8.6. Waterproofing (BCA FP1.4)

Performance Requirement FP1.4 which relates to the prevention of the penetration of water through external walls, must be complied with. It is noted that there are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As such, a performance solution is to be prepared by a suitably qualified professional that demonstrates that the external walls of the proposed building comply with Performance Requirement FP1.4 which reads as follows:

A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—

a) unhealthy or dangerous conditions, or loss of amenity for occupants; and
b) undue dampness or deterioration of building elements.

<u>External above Ground Membranes</u>

All external above ground areas (roof slabs, balconies etc.) shall be protected by a waterproofing system in accordance with AS4654 Parts 1 and 2 – 2012.

For external balconies the waterproofing membrane must have a vertical upward termination height in accordance with the wind class is determined by the structural engineer.

<u>Wet Areas</u>

Internal wet areas throughout the development (e.g. bathrooms, laundries) shall be waterproofed in accordance with AS3740 - 2010 requirements.

Further review will be undertaken as the design develops with respect to the specification of waterproofing membrane, provision of water-stops at doorways etc.

8.7. Stormwater Drainage

Stormwater drainage systems serving the building are to comply with AS3500.3 - 2018.

9. Energy Efficiency

9.1. SECTION J

Efficient energy use must be achieved appropriate to the function and use of the building, level of human comfort, solar radiation, energy source of the services and sealing of the building envelope. To achieve this JV1, JV2, JV3 and JV4 verification methods have been introduced as options available to achieve compliance.

It is noted that a deemed to satisfy pathway is still available.

Access for maintenance is to be provided to the building in accordance with the requirements of BCA Part J8.

Certification from an appropriately qualified engineer should be provided for either option with a report / computation outlining how compliance is achieved.

10. Access for People with Disabilities

The development is required to comply with the accessibility provisions contained within:

- The Building Code of Australia 2019;
- Disability (Access to Premises – Buildings) Standards 2010;
- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4.1 -2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Note: With the introduction of the Commonwealth *Disability Discrimination Act (DDA)* in 1992 (enacted in 1993), all organisations have a responsibility to provide equitable and dignified access to goods, services and premises used by occupants. Organisations and individuals since its introduction, are required to work to the objects of the Act which are to eliminate, as far as possible, discrimination against persons on the ground of disability in the **areas of work, accommodation, education, access to premises, clubs and sports, and the provision of goods, facilities, services and land, existing laws and the administration of Commonwealth laws and programs.**

This report assesses against the requirements contained with the Building Code of Australia (and documents referred to therein) and is not considered to be a full assessment against the Disability Discrimination Act.

10.1. General Building Access Requirements (BCA D3.1)

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2019 and AS 1428.1. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4.1 -2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

10.2. Provision for Access to Buildings

The BCA prescribes access to be provided to and within the building as follows:

- Via the principle pedestrian entry and at least 50% of all other entrances from the allotment boundary
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the occupants.

In buildings over 500m^2 in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

Where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the doorways must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the doorways must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

10.3. Swimming Pools (BCA D3.10)

Where pools exceed 40m in total perimeter, at least 1 means of accessible entry in the form of the following is required.

a) Fixed or movable ramps (and an aquatic wheelchair) or
b) Zero depth entry at a maximum gradient of 1:14 (and an aquatic wheelchair)
c) Platform swimming pool lift (and an aquatic wheelchair) or
d) A sling style swimming pool lift

Where the perimeter exceeds 70m in total, sling style lifts are not permitted.

10.4. Stairs (BCA D3.3 inter Alia AS1428.1)

Stairs shall be constructed as follows:

a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900mm so that the handrail and TGSIs do not protrude into the transverse path of travel.
b) Where the intersection is at an internal corridor, the stair shall be set back one tread width plus 300mm (nominally 700mm as per AS 1428.1-2009 Fig 26(b)), so the handrails do not protrude into transverse path of travel.
c) Stairs shall have opaque risers.
d) Stair nosing shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm.
e) Stair nosing profiles shall;
   - Have a sharp intersection;
   - Be rounded up to 5mm radius; or
   - Be chamfered up to 5mm x 5mm
f) All stairs, including fire isolated stairs shall, at the nosing of each tread have a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall not exceed a difference of 5mm.

10.5. Accessible Sanitary Facilities (BCA F2.4)

Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary products and as per following.

Building Type	Minimum accessible unisex sanitary compartments to be provided
Hotels Class 3 building	a) In every accessible sole-occupancy unit provided with sanitary compartments within the accessible sole-occupancy unit, not less than 1; and b) At each bank of sanitary compartments containing male and female sanitary compartments provided in common areas, not less than 1.

Ambulant Facilities

At each bank of toilets where there is one or more toilets in addition to an accessible unisex sanitary compartment, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Where male sanitary facilities are provided at a separate location to female sanitary facilities, accessible unisex sanitary facilities are only required at one of those locations.

An accessible unisex sanitary compartment or an accessible unisex shower need not be provided on a storey or level that is not provided with a passenger lift or ramp complying with AS 1428.1-2009

Accessible unisex showers

Accessible unisex showers must be provided in accordance with AS 1428.1 and at the following rates;

Building	Minimum accessible unisex showers to be provided
Hotels	a) In every accessible sole – occupancy unit provided with showers within the accessible sole-occupancy unit, not less than 1; and b) 1 for every 10 showers or part thereof provided in common areas

10.6. Signage (BCA D3.6)

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);
- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating ‘EXIT’ and ‘Level” number
- Braille and tactile signs must be illuminated to ensure *luminance contrast* requirements are met at all times during which the sign is required to be read.

10.7. Lifts (BCA E3.6)

Lifts compliant to BCA E3.6 and BCA E3.7 must be provided, where required to be provided, with a minimum size of 1400 x 1600mm or 1100mm x 1400mm (whichever is appropriate) in size – with appropriate handrails and auditory commands.

11. Queensland Development Code

The following parts of the Queensland Development Code apply to this development:

QDC Part MP1.4 – Building over or near relevant infrastructure

This QDC Part applies to building work for a building or structure proposed to be carried out on a lot that contains, or is adjacent to a lot that contains relevant infrastructure *(sewer main, stormwater main, water main or combined sanitary drain).*

The building or structure is required to be sited to comply with the following;

a) The invert level for a pipe forming part of the infrastructure is at least 300mm above the point of the zone of influence of the building or structure that intersects the vertical plane along the centreline; and

b) When the work is completed, all parts of the building or structure will be located at least 5m from the vertical plane along the centreline; and

c) If the work involves the use of ground anchors or rock bolts, the ground anchors or rock bolts are located at least 10m from the vertical plane along the centreline.

d) Where the proposed design fails to meet the above requirements an application for a Build Over Sewer or Build Over Stormwater application is required to be lodged with the Local Authority/Infrastructure Owner.

QDC MP 3.4 – Swimming Pool Barriers

This part of the QDC applies to a *'Regulated Pool'* on *"Regulated Land"* as defined by the Building Act 1975. *"Regulated Land"* includes a site which has (is to have) a residential building of Class 1, 2 or 3 constructed on it.

The swimming pool barriers must therefore comply with the requirements of QDC MP3.4, which will be reviewed as the design develops and fencing details become available.

QDC MP3.5 – Construction of Buildings in Flood Hazard Areas

This part of the QDC applies to the carrying out of building work that is wholly or partly within a *"Flood Hazard Area",* which is defined as an area which has been designated as such by the Local Government.

Part of the site is located with a flood area (see below), so this part of the QDC will apply to the development.

The requirements of the QDC can be summarised below:

- The building must comply with sections 2.3, 2.4, 2.5-2.8 and 2.10 of the national flood standards prepared by the Australian Building Codes Board. These sections relate to assessment of the structure to determine that it has been suitably designed to address the impact of a flood scenario.
- Utilities such as lift motor rooms, electrical switch boards, back-up power supplies and generators for essential services, sprinkler valve rooms and associated pumps, Fire indicator panels, controls for air handing and smoke control systems, hot water systems. Specifically, these services are required to be located above the flood hazard level.
- Plumbing services, specifically the building needs to be protected by backflow by a reflux valve fitted between the building and the connection point. The reflux valve needs to be accessible for maintenance in accordance with AS3500.2:2003.
- Provisions of sub-stations to buildings which should be located above the defined flood hazard level.

QDC Part MP4.4 – Buildings in Transport Noise Corridors

The Queensland Development Code Part MP4.4 applies to residential buildings located in *Transport Nose Corridors*, and its intent is to ensure that habitable rooms in residential buildings are designed and constructed to reduce the intrusion of transport noise into these rooms.

The IRD site is located in a Transport Noise Corridor Category 2, 3 and 4 as indicated below.

The external envelope of each habitable room in Towers 1, 2, 3 and 4 must therefore comply with the minimum R_W, for each building component specified in schedule 1 of the QDC.

Materials for selection must comply with Schedule 2 of QDC MP4.4, or the relevant manufacturer's specifications to comply with the Minimum R_w requirements listed below.

Noise category	Minimum *transport noise reduction (dB (A))* required for *habitable rooms*	Component of building's *external envelope*	Minimum R_w required for each component
Category 4	40	Glazing	43
		External walls	52
		Roof	45
		Floors	51
		Entry doors	35
Category 3	35	Glazing	38 (where total area of glazing for a *habitable room* is greater than 1.8m²)
			35 (where total area of glazing for a *habitable room* is less than or equal to 1.8m²)
		External walls	47
		Roof	41
		Floors	45
		Entry doors	33
Category 2	30	Glazing	35 (where total area of glazing for a *habitable room* is greater than 1.8m²)
			32 (where total area of glazing for a *habitable room* is less than or equal to 1.8m²)
		External walls	41
		Roof	38
		Floors	45
		Entry doors	33
Category 1	25	Glazing	27 (where total area of glazing for a *habitable room* is greater than 1.8m²)
			24 (where total area of glazing for a *habitable room* is less than or equal to 1.8m²)
		External walls	35
		Roof	35
		Entry Doors	28
Category 0	No additional acoustic treatment required – standard building assessment provisions apply.		

Further review will be required with an acoustic consultant as the design develops to ensure compliance is achieved.

12. Appendix A - Reference Documentation

The following documentation was used in the assessment and preparation of this report:

DA-0000_COVER SHEET AND DRAWING LIST_B.pdf
DA-0010_LOCATION & AERIAL_B.pdf
DA-0011_LOCATION & AERIAL-02_B.pdf
DA-0060_SITE COVERAGE - LOWER GROUND FLOOR_C.pdf
DA-0061_GRID SETOUT PLAN_A.pdf
DA-0201_BASEMENT_C.pdf
DA-0202_LOWER GROUND_C.pdf
DA-0203_UPPER GROUND_D.pdf
DA-0204_LEVEL 1_C.pdf
DA-0205_LEVEL 2_C.pdf
DA-0206_LEVEL 3_C.pdf
DA-0207_ROOF LEVEL_D.pdf
DA-0401_BUILDING ELEVATIONS_B.pdf
DA-0402_BUILDING ELEVATIONS_B.pdf
DA-0403_BUILDING ELEVATIONS RENDERED_A.pdf
DA-0404_BUILDING ELEVATIONS RENDERED_A.pdf
DA-0500 - BUILDING SECTIONS_B.pdf
DA-0500_BUILDING SECTIONS_B.pdf
DA-0501_BUILDING SECTIONS_B.pdf
DA-0510_DETAIL SECTIONS_B.pdf
DA-0700_BUILDING PERSPECTIVE_A.pdf
DA-0710_BUILDING PERSPECTIVE_A.pdf
DA-0720_BUILDING PERSPECTIVE_A.pdf
DA-0730_BUILDING PERSPECTIVE_A.pdf
DA-0740_BUILDING PERSPECTIVE_A.pdf
DA-0810_SHADOW DIAGRAMS - SUMMER_B.pdf
DA-0811_SHADOW DIAGRAMS - WINTER_B.pdf
DA-0900_EXTERNAL FINISHES_A.pdf

13. Appendix B - Draft Fire Safety Schedule

	Essential Fire Safety Measures	Standard of Performance
1.	Access Panels, Doors and Hoppers	BCA Clause C3.13
2.	Automatic Fail-Safe Devices	BCA Clause D2.19 & D2.21
3.	Automatic Smoke Detection and Alarm System	Clause 3 or 4 or 5 BCA Spec. E2.2a, AS 1670.1 – 2018, AS/NZS 1668.1 – 2015, AS 3786-2014
4.	Automatic Fire Suppression System	BCA Spec. E1.5 & AS 2118.1 – 2017 Amdt 1, AS 2118.4 – 2012 (Residential) AS 2118.6 – 2012 (Combined sprinkler & hydrant)
5.	Building Occupant Warning System activated by the Sprinkler System	BCA Spec. E1.5 & Specification E2.2a Clause 7
6.	Emergency Lighting	BCA Clause E4.2, E4.4 & AS/NZS 2293.1 – 2018
7.	EWIS	BCA Clause E4.9 & AS 1670.4 - 2018
8.	Emergency Evacuation Plan	AS 3745 – 2002
9.	Exit Signs	BCA Clauses E4.5, E4.6 & E4.8 and AS/NZS 2293.1 – 2018
10.	Fire Control Centres	BCA Spec. E1.8
11.	Fire Blankets	BCA Clause E1.6, H3.11 and AS 2444 – 2001
12.	Fire Dampers	BCA Clause C2.12, C3.15, Spec C2.5, D1.7, E2.2, E2.3, F4.12, Spec E2.2, E2.3, Spec E2.2b, Spec G3.8 & AS 1668.1 – 2015
13.	Fire Doors	BCA Clause C3.2, C3.4, C3.5, C3.6, C3.7 & C3.8 and AS 1905.1 – 2015
14.	Fire Hose Reels	BCA Clause E1.4 & AS 2441 – 2005 Amdt 1
15.	Fire Hydrant System	Clause C2.12, E1.3, Spec E1.5a, H3.9 & AS 2419.1 – 2005 Amdt 1
16.	Fire Seals	BCA Clause C3.15, C3.16, Spec C3.15, Spec D1.12, & AS 1530.4 –2014
17.	Lightweight Construction	BCA Clause C1.8, Spec C1.8
18.	Mechanical Air Handling System	BCA Clause E2.2, AS/NZS 1668.1 – 2015 & AS 1668.2 – 2012
19.	Paths of Travel	EP&A Reg 2000 Clause 186
20.	Portable Fire Extinguishers	BCA Clause E1.6 & H3.11, AS 2444 – 2001
21.	Pressurising Systems	BCA Clause E2.2 & AS/NZS 1668.1 – 2015
22.	Required Exit Doors (power operated)	BCA Clause D2.19 (b)(iv)
23.	Residential Automatic Sprinkler System	E1.3, Spec E1.5, Spec E1.5a & AS 2118.4 – 2012, FPAA101D – 2018, FPAA101H - 2018
24.	Self-Closing Fire Hoppers	BCA Clause C3.13 & AS 1530.4 – 2014
25.	Smoke Alarms	AS 3786
26.	Smoke and Heat Vents	BCA Spec. E2.2c & AS 2665 – 2001

	Essential Fire Safety Measures	Standard of Performance
27.	Smoke Hazard Management System	BCA Part E2 & AS/NZS 1668.1 – 2015
28.	Smoke and/or Heat Alarm System	BCA Spec. E2.2a & AS 3786 – 2014
29.	Smoke Dampers	BCA Clause Spec E2.2, E2.3, Spec E2.2b, Spec G3.8 & AS/NZS 1668.1 – 2015
30.	Smoke Doors	BCA Spec. C3.4
31.	Solid Core Doors	BCA Clause C3.11
32.	Stand-by Power System	BCA Clause G3.8
33.	Wall-Wetting Sprinklers	BCA Clause C3.4
34.	Warning and Operational Signs	AS 1905.1 –2015, BCA Clause C3.6, D2.23, E3.3

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Revision	Author	Reviewer		Approved for Issue		
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