Whitsunday Regional Council

Black Current Island Boat Ramp
Design Report

July 2017

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1. Introduction

1.1 Project Introduction and Background

At the request of Whitsunday Regional Council (WRC), GHD have undertaken the concept design of a proposed new boat ramp and access road to be constructed on Black Currant Island located at Dingo Beach, Queensland for the purposes of developing a risk adjusted cost estimate.

The key constraint for the new facility was a requirement for access to be available at "All tide – All weather". As a result, the associated access infrastructure also needed to comply with this requirement.

The project involves a new access road including causeway, boat and trailer parking including associated amenities, a new boat ramp and associated in water infrastructure.

Additionally, environmental agencies were liaised with and their input and advice incorporated into the design.

The cost estimation for the below water infrastructure was excluded from this project on the assumption that it will be provided by others (Department of Transport and Main Roads).

The concept drawings on which the estimate and report are based are included in Appendix A.

1.2 Purpose of Report

The purpose of this report is to support the understanding of the conceptual drawings and associated cost estimate. This report outlines the design assumptions which have been made in the development of the cost estimate.

The design has been limited to a concept level only with particular focus on high value items with a view of providing an accurate estimate for the project. As a result, some technical and environmental/approval elements remain fully unresolved with additional refinement required in future project stages. Identified issues are further outlined in the body of this report.

1.3 Scope and Limitations

This report: has been prepared by GHD for Whitsunday Regional Council and may only be used and relied on by Whitsunday Regional Council for the purpose agreed between GHD and the Whitsunday Regional Council as set out in sections 3,4 and 5 of this report.

GHD otherwise disclaims responsibility to any person other than Whitsunday Regional Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Whitsunday Regional Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in

connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD and its sub-consultants have prepared the P(90) Cost Estimate set out in section 6 of this report ("Cost Estimate") using information reasonably available to the GHD and sub-consultant employee(s) who prepared this report; and based on assumptions and judgments made by GHD and its sub-consultants.

The Cost Estimate has been prepared for the purpose of refining the previous cost estimates to provide WRC with additional surety and confidence in the magnitude of the project cost and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.

2. Environmental Advice

A pre-lodgement meeting was held between GHD, WRC and relevant environmental agencies on 24/03/2017. Pre-lodgement advice received identified several impacts which would require further resolution but generally held no significant concerns that would jeopardise the progression of the project. The pre-lodgement meeting record can be found in Appendix B.

An Approvals Management Plan (AMP) has been developed based on GHD's desktop assessment of the site and works and the provided environmental agency advice. This AMP outlines the expected approvals which will be required to be obtained for the project. The AMP can be found in Appendix C. Please note that the *Planning Act 2016*, came into effect as of 3 July 2017 and supersedes the previous *Sustainable Planning Act 2009*. Generally, this should not materially affect approval requirements as outlined within the Pre-lodgement meeting record however, a detailed review is currently being undertaken to confirm this.

It is also noted that during desktop environmental investigations a search of the Department of Aboriginal and Torres Strait Islander Partnerships cultural heritage database and register was undertaken for the site and its surrounding environment. The search identified that two Fish Traps of the Gia People were located in close proximity to the proposed boat ramp site. Relevant ID numbers and co-ordinates are as follows:

- GJ-0014-1: -20.080741, 148.493446
- GJ0015-1: -20.081066, 148.493449.

The *Aboriginal Cultural Heritage Act 2003* and *Torres Strait Islander Cultural Heritage Act 2003* (the Acts) require anyone who carries out a land-use activity to exercise a duty of care. Land users must take all reasonable and practicable measures to ensure their activity does not harm Aboriginal or Torres Strait Islander cultural heritage. The duty of care applies to any activity where Aboriginal or Torres Strait Islander cultural heritage is located. This includes cultural heritage located on freehold land and regardless of whether or not it has been identified or recorded in a database.

Consultation with the Aboriginal or Torres Strait Islander party for an area may be necessary if there is a high risk that the activity may harm Aboriginal or Torres Strait Islander cultural heritage.

3. Civil Design

3.1 Background

To provide access to the proposed Black Currant Island boat ramp an access road is required extending between an existing road stub from Gloucester Avenue, traversing along the esplanade to the location of the isthmus crossing, and through to the predetermined boat ramp location. The design was based upon an agreed road alignment. A parameter was set that the access road (and boat ramp) would be 'all weather, all tide' accessible.

3.2 Assumptions

3.2.1 Road/Alignment Design

- 'All weather, all tide' access. This term meant the access road and isthmus must be protected from a 100 year ARI storm tide event, which included a sea level rise factor (0.8m) and freeboard (0.5m). This gave a level of 4.7m AHD, which governed the edge of shoulder level for the roadway. The road would generally be protected from these events. Further scrutiny of this adopted level could be used to reduce the cost of the access road and Isthmus construction, for example, a closer look at the design life of the culverts in the Isthmus could find that they will require replacement prior to any rise in sea level is reached in year 2100. This could drop the road by 0.8m. The adoption of the 4.7m AHD represents current best practice and potentially a conservative approach.
- Traffic figures were not available and it was assumed that traffic numbers would be sporadic, seasonal and generally low. Traffic figures would be required for a detailed design.
- The design assumed the design vehicle was predominantly the 14.1m car, boat and trailer combination per TMR requirements. GHD also considered the standard garbage truck in design, but did not consider any larger vehicles.
- Assumed design speed of 50km/h. Detailed design will need to examine whether this speed limit is appropriate and whether design measures can be undertaken to limit speeds.
- It was assumed the 45 car trailer unit (CTU) parking spaces was a requirement that could not be altered (based on previous advice regarding TMR funding requirements). The size of the CTU parking facility has dictated the excessive cut amounts on the design. The site of the carpark is not an ideal location on a relatively steep 12% -16% hillside. Proposed amelioration is outlined in the appended design drawings. In detailed design, further scrutiny of the parking numbers could be undertaken to find the ideal CTU numbers, and options can be looked at to design the carpark to cater for those numbers. It should be noted however that the 45 CTU parking facility is a requirement from Transport and Main Roads (TMR) and any reductions would need to be approved by TMR.
- As directed by Council, the design assumed that the boat ramp would be provided with full facilities including toilet block, lighting, bin enclosure, rigging and de-rigging.
- The alignment discussed in pre-lodgement was assumed to be the agreed location of the access road and no alternatives were considered. Engineering solutions were devised to counteract difficulties with this alignment.

3.2.2 Embankment Design

- No geotechnical investigations were carried out as part of this project and the embankment design was based on a desktop review of the regional geology and site visit information. The Regional Geology of the area is shown in Appendix D.
- Where required, the embankment design has incorporated erosion protection of the earthworks to protect the embankment.

3.2.3 Pavement Design

- In the absence of detailed information, the following pavement assumptions have been made.
    - Design Subgrade CBR Strength = 5%
    - Design Traffic Loading = 5x10^5 ESA

3.2.4 Causeway Design

- The design was limited to culverts at 1500mm x 900mm RCBC's based on HAT water levels.
- Culverts to extend the full length of the Isthmus in accordance with concerns raised in the pre-lodgement meeting
- Stability of culverts in wave area are a concern and it was assumed that this issue would be further refined in future design phases. It was assumed that rock under laid the culverts and rock anchors would be used to anchor culverts. This would be subject to geotechnical investigation and detailed design and could vary the estimate.

3.3 Design

3.3.1 Road/Alignment Design

- The road cross section adopted is a standard rural 8m formation, including 2 x 3.5m travel lanes and 0.5m shoulder each side. This is considered to be the most cost effective cross section for the intended use of the access road.
- The limiting factor in the design is the requirement for an 'all weather, all tide' access, which was defined to cater for the 100 year ARI storm tide event including 0.8m for sea level rise and 0.5m freeboard (refer section 4 Marine Design). The vertical alignment based the road shoulder on the 4.7m AHD minimum level. In detailed design the vertical alignment will largely be governed by the geotechnical investigation and detailed survey. The current design gives a good indication of likely costs of an access road at this height.
- Undertook a basic design of stormwater culverts crossing the road at various low points along the access road, calculated using a basic rational method calculation. These would require refinement in detailed design.
- The horizontal alignment was designed to generally match the alignment discussed in the pre-lodgement meeting. The design took into account the balance of cut and fill across the access road area with a fairly consistent natural fall across the access road from the inland to the beachfront side, and from the island side toward the ocean on Black Currant Island. A review of the geometry of the road will be required in detailed design assessing the speed environment and curve radii adopted. The design was mindful of disturbance to the beachfront area, but was largely governed by the requirement to maintain a 4.7m AHD level at shoulder which saw the road aligned to its current position. Moving the alignment further inland will remove the need for rock protection and bring the majority of the road

embankment above 4.7m AHD, but will also require greater cut/fill quantities and more land disturbance due to the grades moving inland.

- The carpark area was driven by the requirement for 45 car trailer units. To minimise earthworks, the carpark was aligned along the contours of the island slope, while maintaining the requirements outlined in TMR boat ramp guidelines and standard drawings. The existing slope on the island in the area of the boat ramp is approximately 12%-16% which remains a design issue. In detailed design a review of the number of car trailer units could be undertaken to find the ideal CTU parking facilities. The carpark was stepped to reduce the amount retained in one wall, and it is unlikely that earth retainment of some form can be avoided with the location of the parking facility. The parking facility was generally designed to a grade of 4% which is likely to be at the highest grade recommended for a carpark.
- The existing facilities at Hydeaway Bay were considered in the design with the existing road stub being utilised for parking for the nearby playground on the shorefront. A footpath has been allowed for beside the road in this area for connection to the playground. At this concept design stage, the playground remains unaffected.

3.3.2 Embankment Design

- Based on the site inspection and regional geology mapping it is likely the road will be constructed on sandy alluvium and granite.
- In the absence of more detailed information and noting that the Council Standard designs would likely be unsuitable given the difficult ground conditions the embankment design has been based on TMR standard details referenced from MRTS04 relevant to the ground conditions.
- As many areas will be regularly inundated a homogenous embankment with non-dispersive fill (MRTS04 Table 14.2.2B - Class A1) was considered appropriate.
- Areas which have been identified as being subject to tidal affects have had specific erosion protection included into the cross-section to protect the underlying embankment from erosion and high flowrates.

3.3.3 Pavement Design

- An indicative pavement suitable for the purposes of producing this estimate has been developed. The pavement design is highly dependent upon the finalised embankment design.

3.3.4 Causeway Design

- Full base slab for culverts is not considered appropriate due to impacts on sediment transport. A concrete pad is shown under each leg of the culverts to provide bedding for the culverts and anchoring. This design is concept only and would require further investigation to confirm its suitability.
- The size of the culverts was limited to 1500mm x 900mm box culverts.
- The height of the culvert crossing was governed by the 'all weather, all tide' requirement.
- A guardrail and shoulder widening is recommended and has been allowed for the causeway crossing due to the embankment height and presence of water below.

3.4 Next Step for Design

3.4.1 Road/Alignment Design

Any detailed design in the future will require further road geometry refinement to ensure the design is in accordance with current standards at the time of design. The alignment at the connection to the existing road stub will require a more detailed examination. The future design would require further geotechnical investigation to inform the vertical alignment and whether fill and/or cut can be applied through various sections. This will also give an indication of pavement design (refer section 3.4.3) and whether any significant subgrade replacement/treatment would be required. The geotechnical investigation will also dictate the horizontal alignment and whether any specific areas need to be avoided.

Environmental approvals would need to be in place and inform the road design particularly through the erosion prone areas, across the Isthmus, and on the island in the vicinity of the existing mangrove colony. Detailed survey will provide clarity on mangrove locations and other significant features i.e rock outcrops. This would also determine final horizontal and vertical alignments.

Traffic figures and/or estimations will need to be confirmed. Besides the requirements for pavement design, it can be used to confirm CTU spaces required, and to define the carpark area to best utilise the available site area.

3.4.2 Embankment Design

The embankment design is highly dependent on the site specific geotechnical information. As such a detailed geotechnical investigation would be required along the proposed road alignment to inform and refine the embankment design.

3.4.3 Pavement Design

The pavement design will require the embankment design to be finalised along with anticipated traffic volumes and proposed design vehicles.

3.4.4 Causeway Design

Further refinement of the causeway design particularly the extent of causeway required would be beneficial to the project. This design would be reliant upon detailed marine modelling, particularly regarding sediment transport as well as further detailed environmental reporting including site flora and fauna studies.

The causeway design will be critical for the environmental agencies and would likely be an iterative design process to ensure the causeway is approved by all relevant agencies.

4. Marine Design

4.1 Background

As the boat ramp facility is intended to be accessible by land and water in all tides and all weather, marine input into the design was required to inform an appropriate road level, the nature of protection from coastal hazards required for the road, and the expected impacts on local beach sediments. Although the boat ramp and breakwater are to be considered by others, consideration has been given to a conceptual footprint of the breakwater and the effects this may have on coastal processes impacting on the proposed road and nearshore areas.

4.2 Assumptions

No existing detailed information was available for extreme waves in the vicinity of the project site. Development of this information is out of scope for the current project stage. High level assumptions as documented in the following section have been used to inform this preliminary assessment.

4.3 Design

4.3.1 Water levels

The nearest standard port for which tidal planes are given is Bowen. The ratio between Bowen and Cape Gloucester/Dingo Beach tide levels is 0.998 as documented on Maritime Safety Queensland hydrographic surveys for the area (plans G830-004, sheets 1 and 2).

Table 1 Tidal planes

Tidal Plane	Bowen (m above LAT)	Dingo Beach	
		(m above LAT)	(m AHD)
Lowest astronomical tide (LAT)	0	0	-1.75
Mean low water spring tide (MLWS)	0.67	0.66	-1.09
Mean sea level (MSL)	1.76	1.74	-0.01
AHD	1.78	1.75	0
Mean high water spring tide (MHWS)	2.83	2.80	1.05
Highest astronomical tide (HAT)	3.73	3.69	1.94

Extreme water level information is available for Dingo Beach from the Storm Tide Modelling Study of the Whitsunday Coast and Resort Islands (SEA and GHD, 2003). The storm tide levels determined for varying Average Recurrence Intervals (ARI) are:

- 1 in 50 year ARI – 3.0 m AHD
- 1 in 100 year ARI – 3.4 m AHD

Under current climate change projections, by the year 2100, the storm tide level was expected to increase by 0.7 m for to 1 in 50 year storm tide, and 0.8 m for the 1 in 100 year storm tide.

4.3.2 Wave climate

No existing detailed wave climate information for the Cape Gloucester area is available. However, as the boat ramp is intended to be available as an all-tide, all-weather facility, consideration of ambient and extreme waves is required.

Wave generation along the Whitsunday coast is largely a result of local winds, as swell waves are unable to penetrate through the Great Barrier Reef. Extreme waves are generally associated with the passage of tropical cyclones close to or through the area.

The closest sources of wind data for the area are at Bowen (closed weather stations) and Hayman Island (open weather station). All stations are more than 25 km from Black Currant Island. Review of wind data for both of these stations indicates a dominance of winds from the south-east through north to the north-west. Hayman Island also recorded frequent winds from the south, however it is not known whether there may be local sheltering of that wind gauge to northerly winds. Both sites indicate winds more than 20 km/h

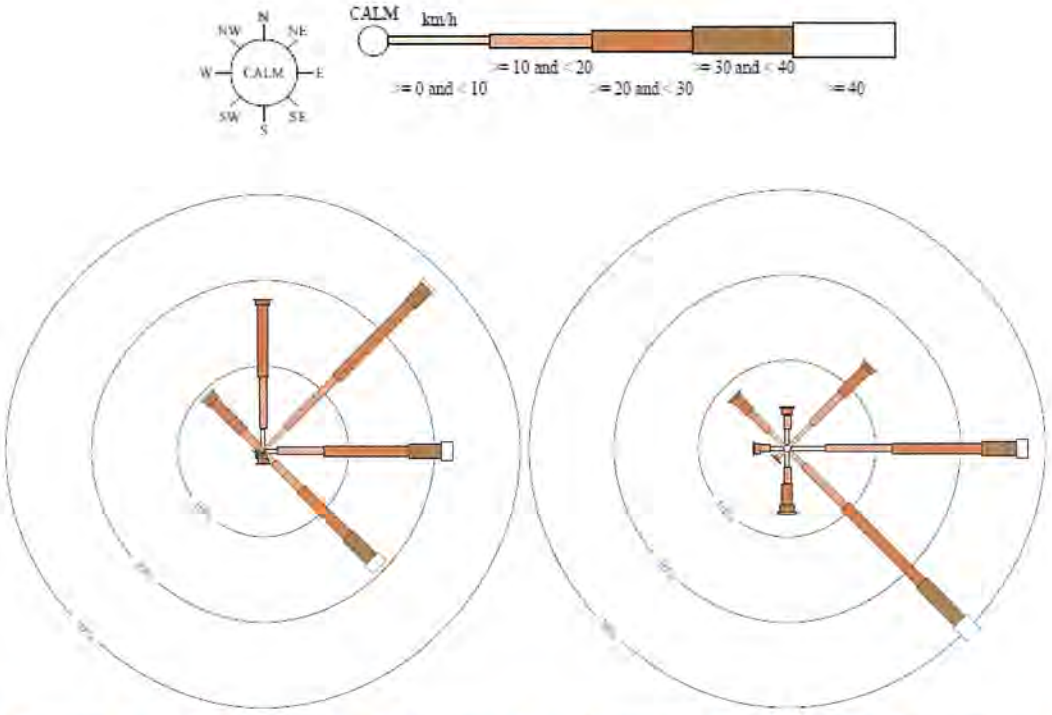


Figure 1 3pm wind roses, Bowen (left), Hayman Island (right) (Bureau of Meteorology, 2016)

As mangroves prefer calm waters, the mangrove growth present on the south-western shoreline of Black Currant Island confirms the sheltering offered by the Island under ambient wave conditions. These mangroves reduce in size and density on the southern shoreline, indicating the increased exposure of this side of the island to larger waves. No areas of mangroves appear to be present elsewhere on the island, indicating that the wave climate is too severe to encourage permanent mangrove establishment.

Under ambient conditions, waves approaching the site from the south-east are typically less than 0.3 m, due to the shallowness and size of the Dingo Beach embayment limiting wave development. However, significantly larger waves of up to 0.5 m at the proposed ramp location can be generated from east and north-easterly directions.

An assessment of cyclone waves was undertaken for the Bowen Shire Storm Surge Study (Connell Wagner, 2004), covering the region from Molongle Creek south to Sinclair Bay (north of Cape Gloucester). This study considered wave data recorded at the Abbot Point wave buoy, along with modelling of cyclone tracks through the region. While no recurrence intervals were assigned to the waves generated, it was noted that regardless of how large the cyclone waves were on the outer boundary of their wave model, the nearshore bathymetry tended to moderate the wave heights to similar sizes at the various locations recorded.

Of the sites considered, Cape Upstart provides the most similar bathymetry for the approach of a cyclone towards Gloucester Island. Under cyclone conditions, the largest wave generated for the southern side of Cape Gloucester resulted in a significant wave height (Hs) of 3.7 m and peak wave period (Tp) of 12.1 s in 5 m water depth approaching from 80° (just north of due east). This has been adopted as the design wave for the purposes of this assessment. Detailed numerical modelling of cyclone waves through the Dingo Beach area would be required to refine this further(and possibly reduce this wave height), and assign a recurrence interval.

4.3.3 Sediment transport

No existing assessments of sediment transport have been identified for this area.

Geological mapping of the area indicates that the Island and adjacent mainland area consists of Gloucester Granite, with the intertidal and supratidal (above mean high water springs) areas consisting of Quaternary deposits of mud, sand, sandy mud, muddy sand and minor gravel. This is confirmed by site photographs, which show areas of sand, mud and/or gravel deposits over outcropping bedrock. Further north along the beach towards the southern end of the Hydeaway Bay township, the depth of the sandy deposits increases to form a permanent beach in the embayment.

A review of historical aerial photography from 1960 onwards confirms that beach sediments in the area appear to be relatively consistent, indicating that the rate of sediment supply to and from the area appears to be relatively consistent. Of note also is the lack of expansion and small height of mangroves on the southern and north-western sides of the Island, indicating that the area is exposed to regular wave action.

Sediment transport appears to be bi-directional in the area around Black Currant Island, with a very slight dominance in transport from the east towards the west. Sediments in the nearshore area are transported across the isthmus connecting the Island to the mainland either by wind action (aeolian transport) at lower tides, or by wave action at tide levels around mean high water springs. Sediment transport occurs in both directions across the entire width of the isthmus, but the majority of transport occurs towards the landward end of the isthmus due to sheltering of dominant winds by the Island. There is very little sand observed in any historical imagery in the vicinity of the proposed boat ramp.

From the limited information available it is not possible to estimate an annual sediment transport rate, although it would be expected to be small due to the lack of a major nearby sand supply (such as a river) and the relatively calm ambient wave conditions in the area.

4.3.4 Erosion vulnerability

A detailed assessment of erosion vulnerability for the study area has not been undertaken, however the presence of outcropping bedrock and the geological assessment indicates that the unconsolidated beach sediments above the Gloucester granite are vulnerable to erosion. The formal erosion prone area maps for the area confirm the presence of outcropping bedrock and the lack of extensive beach sands in the vicinity of the island, with an erosion prone area width of 0 m covering the Island and immediate surrounds. Towards Hydeaway Bay (along the proposed access route), the erosion vulnerability increases as the sandy deposits increase). In this area, the erosion prone area width is 75 m.

Any fill placed within reach of storm tide and/or storm wave runup levels will be vulnerable to erosion. This fill will require scour protection on its seaward side.

4.3.5 Impacts on road design

For the road to be serviceable and avoid damage during a 1 in 100 year ARI, storm tide event, the road level would need to have a minimum elevation of 4.7 m AHD.

For the road pavement to be above wave breaking levels, an allowance for wave runup in the order of 0.5 m has been included.

At elevations lower than this, the risk of wave overtopping increases, reducing safe access along the road and potentially damaging/increasing the frequency of damage to the road pavement.

Positioning the access road further up the face of the slope to limit earthworks occurring below 4.7 m AHD will avoid the need to provide embankment protection from wave action and storm tide inundation.

The position of the road on the face of the slope close to the limit of storm tide inundation means that breaking of larger waves (shoaling) has already occurred on the lower parts of the hill slope. The preliminary armour sizing along the road has been based on the design wave parameters and the available survey information in this area.

4.3.6 Impacts on culvert design

As for the road, the fill above the culvert and underneath the pavement requires scour protection from wave action. Under storm tide conditions, waves will break directly on the

culverts as the water depth immediately adjacent will be significantly deeper in this area compared to the scour protection on the hillside, and shoaling of waves will be limited. Scour protection will be required on both sides of the culvert.

The length of culverts extends across the current extent of sediment transport. A reduction in culvert length could be considered if detailed sediment transport modelling indicated that the sediment transport of the Island end of the isthmus was negligible.

4.4 Next Step for Design

Detailed modelling of waves and sediment transport in the area will allow refinement of the breakwater layout and armour sizing.

Consideration should also be given to the availability of suitably sized rock armour in close proximity to the site. If insufficient suitable material is available, consideration of a berm breakwater or precast armour units could be made. A berm breakwater has a terraced outer face, and the armour is designed to re-profile in response to storm events.

Refinement of the local sediment transport through numerical modelling may permit a reduction in the length of culverts required, particularly at the Island end of the isthmus.

5. Electrical Design

5.1 Background

Road and carpark lighting have been requested to be included in the design. There are a number of difficulties associated with the supply and ongoing maintenance of lighting for the road and car parking which would require resolution in detailed design.

5.2 Assumptions

The lighting categories for the access road and carpark have been assumed to be P4 and P11c respectively (low pedestrian/cycle activity, low risk of crime).

5.3 Design

The design is for an access road and carpark with lighting levels to satisfy AS/NZS1158.3.1. The proposed light fitting is a 60W LED fitting (Sylvania RoadLED), mounted in a single sided arrangement, 9m high with 1.5-2m overhang.

5.4 Next Step for Design

In order to progress the design a suitable point of supply need to be determined to supply the lights. Alternatively, solar power for the lighting could be considered however there would be difficulties associated with this style of lighting in the exposed location.

Further refinement of the lighting design would be possible once the design progresses.

6. Risk Adjusted Cost Estimate (P90)

Based on the above assumptions and designs, a Risk Adjusted Cost Estimate has been undertaken to provide a cost estimate which has a 90% chance of not being exceeded for the project.

The Risk Adjusted P90 Cost Estimate can be found in Appendix E including an associated report on the construction methodology assumed for the project.

The project has an estimated base cost of approximately $10.94M with a calculated 25% risk/contingency allocation of $2.7M hence a total P90 Cost Estimate value of $13.64M ex GST.

This estimate specifically excluded:

- Below water infrastructure including Rock Breakwater and Boat Ramp
- Land resumption

Previous TMR advice regarding the below water component of the works indicated a Total Project Cost (For their below water works only) of approximately $2.2M (inclusive of a 20% contingency). The extent of the below water works has increased based on this detailed design and it could be reasonably expected that a revised cost estimate for the below water works would be at least $2.2M and possibly higher.

No Land resumption is expected to be required for these works based on the current alignment.

Inclusive of the below water works the project cost is estimated to be $15.84M ex GST.

6.1 Construction Methodology

The construction methodology assumes construction is undertaken in an estimated 21 weeks during the dry season of 2018. A coffer dam bund wall has been allowed for in the methodology for the construction of the causeway.

6.2 Risk Comments

The P90 Risk Estimate has been completed using a Monte Carlo Risk Simulation to develop planned and unplanned risk estimates. This returned a risk percentage of 24.7%.

When considering the level of design which has been completed (essentially a Business Case level) the TMR Project Cost Estimating Manual (PCEM) would typically expect contingencies in the range of 30-40%.

Assessing the project based on Appendix E: Contingency Example for strategic estimates of the TMR PCEM based on the current knowledge of the project estimates a contingency of 59%. The completed TMR PCEM Appendix E can be found in Appendix F of this report.

This indicates that for budgeting purposes the 25% risk should be considered a minimum contingency and higher contingencies in the order of 40-60% could be considered. This contingency would result in a revised project cost estimate in the order of $15M to $17.5M before the addition of below water components.

Appendices

Appendix A – Project Drawings

WHITSUNDAY REGIONAL COUNCIL
BLACK CURRANT ISLAND BOAT RAMP
42-20021-G001

LOCALITY PLAN
SCALE 1:2000

LOCALITY PLAN
NTS

DRAWING LIST

GENERAL

42-20021-G001	COVER SHEET, DRAWING LIST AND LOCALITY PLAN

CIVIL

42-20021-C001	GENERAL ARRANGEMENT - SHEET 1 OF 4
42-20021-C002	GENERAL ARRANGEMENT - SHEET 2 OF 4
42-20021-C003	GENERAL ARRANGEMENT - SHEET 3 OF 4
42-20021-C004	GENERAL ARRANGEMENT - SHEET 4 OF 4
42-20021-C005	CARPARK LAYOUT
42-20021-C006	TYPICAL DETAILS

CONCEPT DESIGN

Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
A	CONCEPT DESIGN	SM			

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

N

Level 1, 21 Wood Street Mackay QLD 4740 Australia
PO Box 494 Mackay QLD 4740
T 61 7 4953 6300 F 61 7 4951 4264
E mkymail@ghd.com.au W www.ghd.com.au

DO NOT SCALE

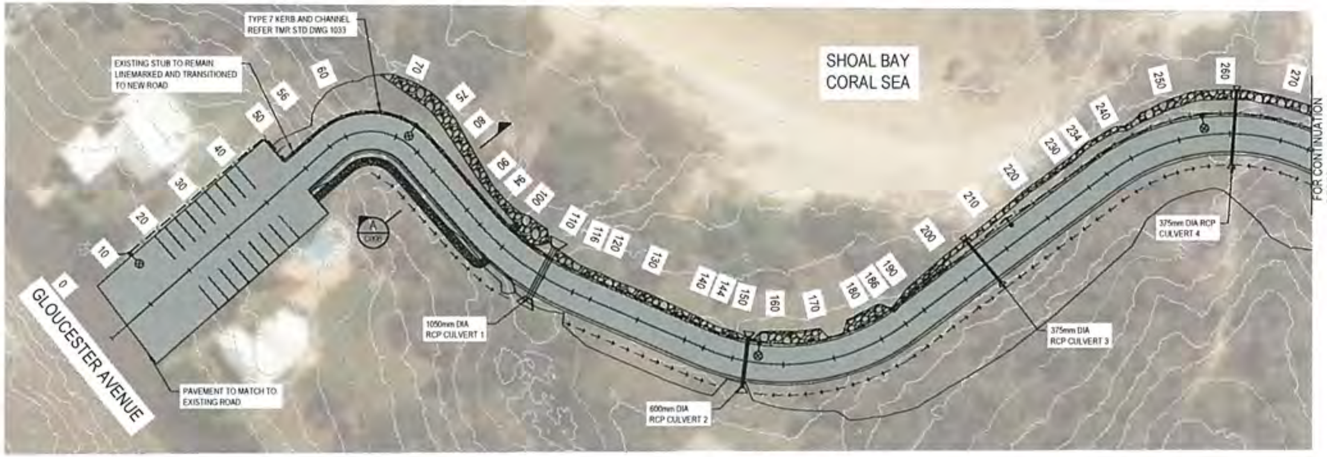
Drawn	S MENSFORTH	Designer	S WOODS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	WHITSUNDAY REGIONAL COUNCIL
Project	BLACK CURRANT ISLAND BOAT RAMP
Title	COVER SHEET, DRAWING LIST LOCALITY PLAN
Original Size	A1
Drawing No:	42-20021-G001
Rev:	A

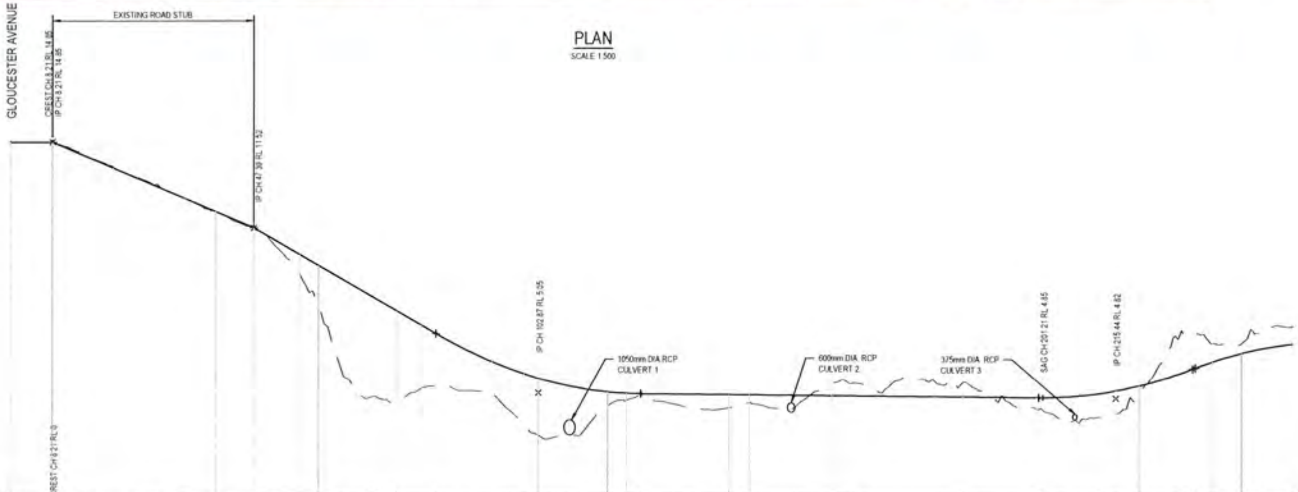
Plot Date: 7 July 2017 - 12:21 PM Plotted by: Sam Mensforth Cad File No: G:\42\20021\CADD\Drawings\42-20021-G001.dwg

NOTES

1. FOR LEGEND REFER TO 42-20021-C006
2. FOR TYPICAL SECTIONS REFER TO 42-20021-C006



PLAN
SCALE 1:500



DATUM RL 1.00

VERTICAL ALIGNMENT: L=8.21m G=0.08% | L=39.19m G=-8.5% | L=35.48m G=-11.65% | K=3.49 L=40m | L=77.57m G=-0.2% | K=3.8 L=30m | L=5m G=1.7% | K=3.47 L=50m

HORIZONTAL ALIGNMENT: L=56.35m | L=18.85m R=12.00m | L=18.58m | L=22.55m R=-50.00m | L=27.65m | L=41.56m R=-40.00m | L=48.76m | L=41.35m R=40.00m

LEVEL DIFFERENCE CUT - / FILL +	0.00	0.00	-0.04	0.03	-0.00	0.77	1.65	3.50	2.49	1.22	1.97	2.23	0.56	0.28	0.52	0.31	-0.48	-0.62	-0.54	0.45	0.90	0.27	-0.72	-0.37	-0.69
DESIGN SURFACE LEVEL	14.833	14.846	13.844	12.144	11.515	10.472	10.040	8.275	7.715	6.280	5.804	5.623	5.084	5.027	4.974	4.966	4.933	4.892	4.881	4.852	5.116	5.315	6.256	6.593	6.958
EXISTING SURFACE LEVEL	14.84	14.85	13.88	12.11	11.52	9.70	8.39	4.77	5.22	5.06	3.83	3.40	4.52	4.75	4.46	4.66	5.40	5.51	5.42	4.41	4.22	5.04	6.97	6.97	7.65
CHAINAGE	0.00	8.21	20.00	40.00	47.39	56.35	60.00	75.20	80.00	93.78	100.00	102.87	116.33	120.00	140.00	143.98	160.00	180.00	185.54	200.00	215.44	220.00	234.31	240.00	250.00

LONGITUDINAL SECTION
HORZ 1:500 VERT 1:100

CONCEPT DESIGN

Rev	Revision	Drawn	Job Manager	Project Director	Date
A	CONCEPT DESIGN	SM			

Note: * indicates signatures on original issue of drawing or last revision of drawing

SCALE 1:500 AT ORIGINAL SIZE (0 5 10 15 20 25m)
VERTICAL 1:100 AT ORIGINAL SIZE (0 1 2 3 4 5m)
HORIZONTAL 1:500 AT ORIGINAL SIZE (0 5 10 15 20 25m)

N

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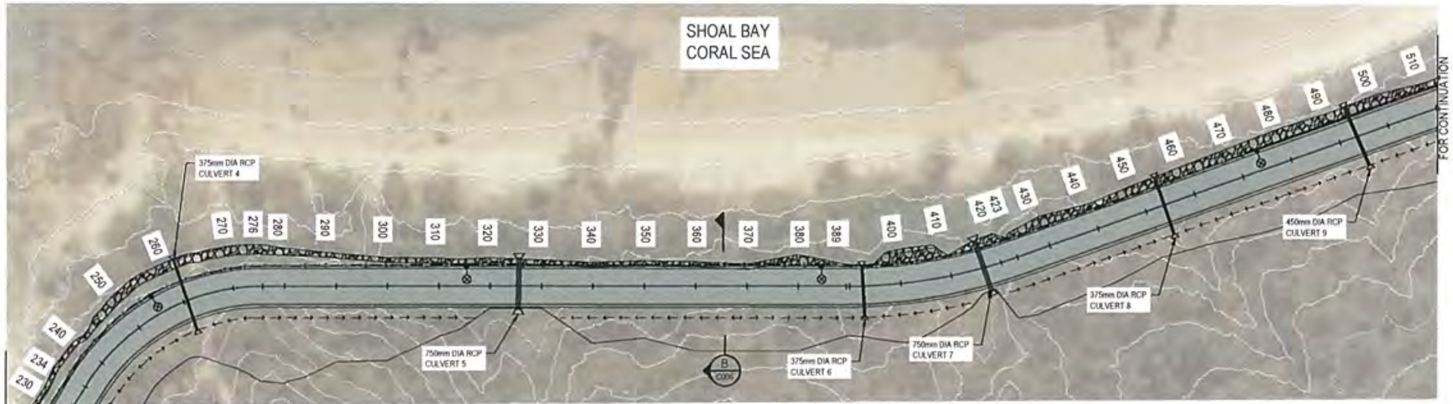
Drawn: S MENSFORTH	Designer: S WOODS	Client	WHITSUNDAY REGIONAL COUNCIL
Drafting Check	Design Check	Project	BLACK CURRANT ISLAND BOAT RAMP
Approved (Project Director)		Title	GENERAL ARRANGEMENT SHEET 1 OF 4
Date			
Scale: AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size: A1	Drawing No: 42-20021-C001 Rev: A

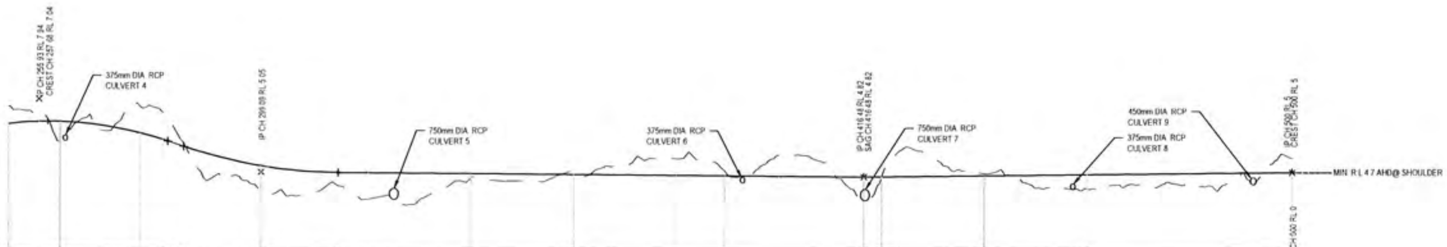
Plot Date: 7 July 2017 - 12:18 PM Plotted by: Sam Mensforth Cad File No: G:\42\20021\CADD\Drawings\42-20021-C001-C004.dwg

NOTES

1. FOR LEGEND REFER TO 42-20021-C006
2. FOR TYPICAL SECTIONS REFER TO 42-20021-C006



PLAN
SCALE 1:500



DATUM RL 2.00

VERTICAL ALIGNMENT	K=3.47 L=50m				L=3.16m G=-6.45%	K=4.62 L=30m	L=102.38m G=-0.2%							L=83.52m G=0.22%					G=-0.3%
HORIZONTAL ALIGNMENT	L=41.35m R=40.00m			L=113.70m								L=34.02m R=-100.00m			L=94.26m				
LEVEL DIFFERENCE CUT - / FILL +	-0.69	-0.39	0.80	-1.05	-1.05	0.94	1.02	0.16	-0.02	-0.65	-0.19	-0.82	0.82	-0.01	-0.99	-0.08	0.55	0.49	-0.56
DESIGN SURFACE LEVEL	6.958	7.038	7.035	6.578	6.326	5.294	5.009	4.970	4.931	4.891	4.873	4.852	4.820	4.828	4.835	4.871	4.914	4.957	5.000
EXISTING SURFACE LEVEL	7.65	7.43	6.24	7.63	7.38	4.35	3.99	4.81	4.95	5.54	5.06	5.67	4.00	4.84	5.83	4.96	4.36	4.47	5.56
CHAINAGE	250.00	255.93	260.00	275.66	280.00	299.09	320.00	340.00	360.00	380.00	389.36	400.00	416.48	420.00	423.38	440.00	460.00	480.00	500.00

LONGITUDINAL SECTION
HORZ 1:500 VERT 1:100

CONCEPT DESIGN

A	CONCEPT DESIGN	SM		
Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:100 AT ORIGINAL SIZE
HORIZONTAL 1:500 AT ORIGINAL SIZE
SCALE 1:500 AT ORIGINAL SIZE

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Date
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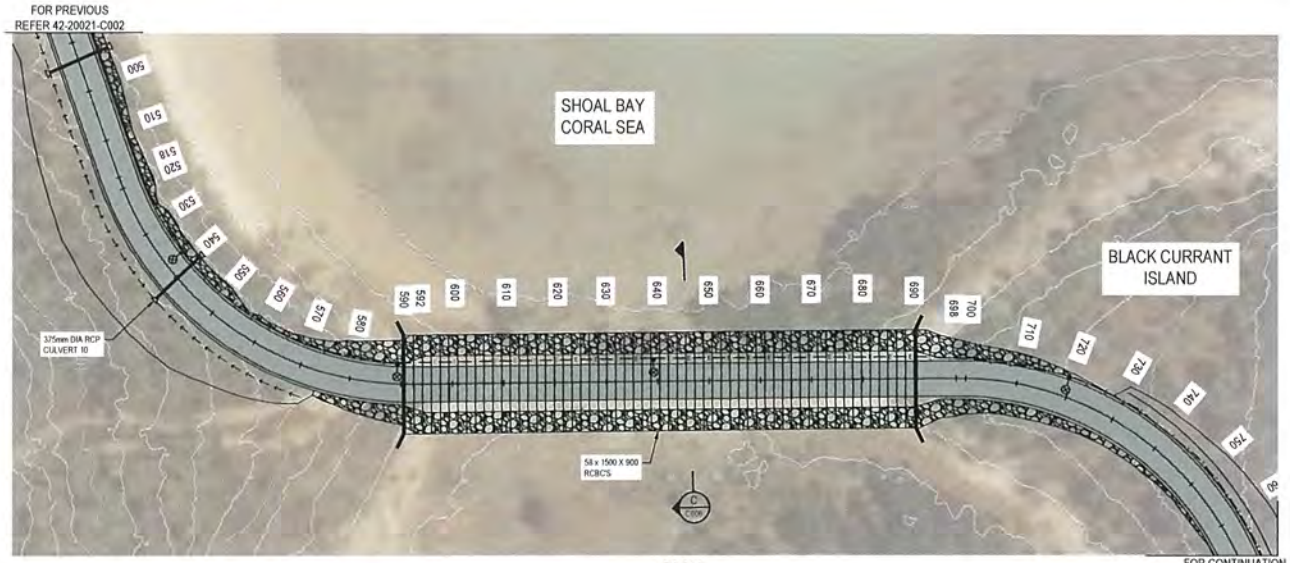
Client: WHITSUNDAY REGIONAL COUNCIL
Project: BLACK CURRANT ISLAND BOAT RAMP
Title: GENERAL ARRANGEMENT SHEET 2 OF 4
Original Size: A1
Drawing No: 42-20021-C002
Rev: A

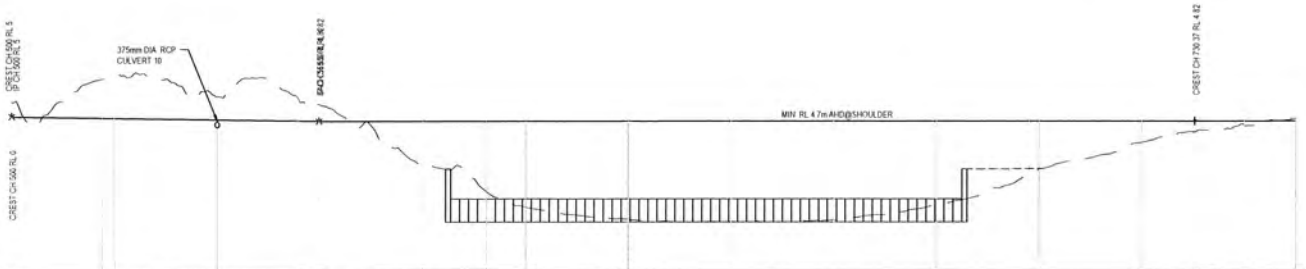
Plot Date: 7 July 2017 - 12:18 PM Plotted by: Sam Mensforth Cad File No: G:\42\20021\CADD\Drawings\42-20021-C001-C004.dwg



PLAN
SCALE 1:500

NOTES

1. FOR LEGEND REFER TO 42-20021-C005
2. FOR TYPICAL SECTIONS REFER TO 42-20021-C006



DATUM RL -1.00

VERTICAL ALIGNMENT	L=14.52m G=0.22%	L=59.8m G=-0.3%	L=170.57m G=0%	K=302.19 L=60m											
HORIZONTAL ALIGNMENT	L=94.26m	L=74.77m R=-60.00m	L=105.70m	L=76.79m R=60.00m											
LEVEL DIFFERENCE CUT - / FILL +	-0.56	-1.51	-1.63	-0.69	-0.85	1.77	2.74	3.34	3.82	3.90	3.83	3.27	2.06	1.48	0.83	0.16	-0.08
DESIGN SURFACE LEVEL	5.000	4.947	4.940	4.840	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.822	4.826
EXISTING SURFACE LEVEL	5.56	6.46	6.56	5.77	5.47	3.05	2.08	1.48	1.00	0.92	0.99	1.55	2.76	3.34	3.99	4.66	4.90
CHAINAGE	500.00	517.64	520.00	540.00	559.80	580.00	592.41	600.00	620.00	640.00	660.00	680.00	698.12	709.00	720.00	740.00	760.00

LONGITUDINAL SECTION
HORZ 1:500 VERT 1:100

CONCEPT DESIGN

A	CONCEPT DESIGN	SM				
	Revision Note * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date	

SCALE 1:500 AT ORIGINAL SIZE
VERTICAL 1:100 AT ORIGINAL SIZE
HORIZONTAL 1:500 AT ORIGINAL SIZE

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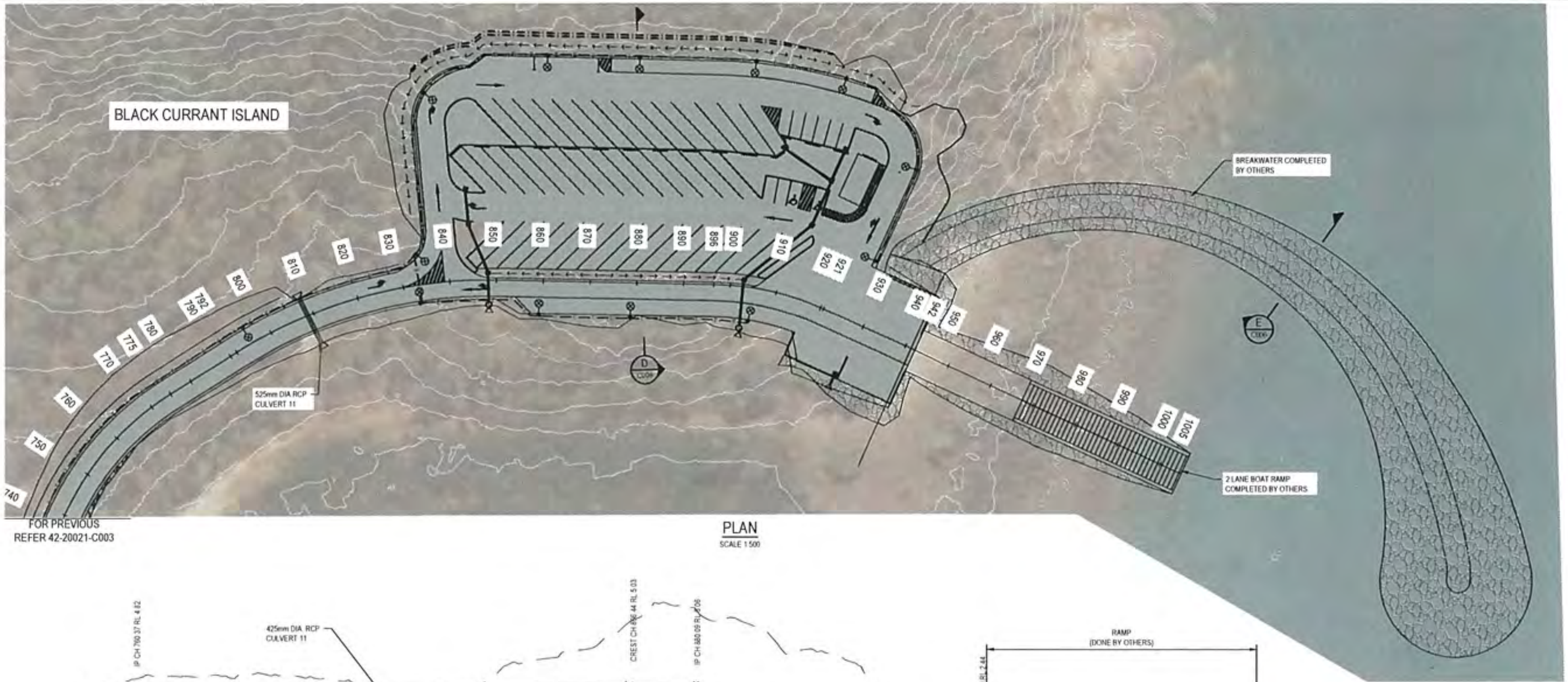
Drawn	S.MENSFORTH	Designer	S.WOODS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

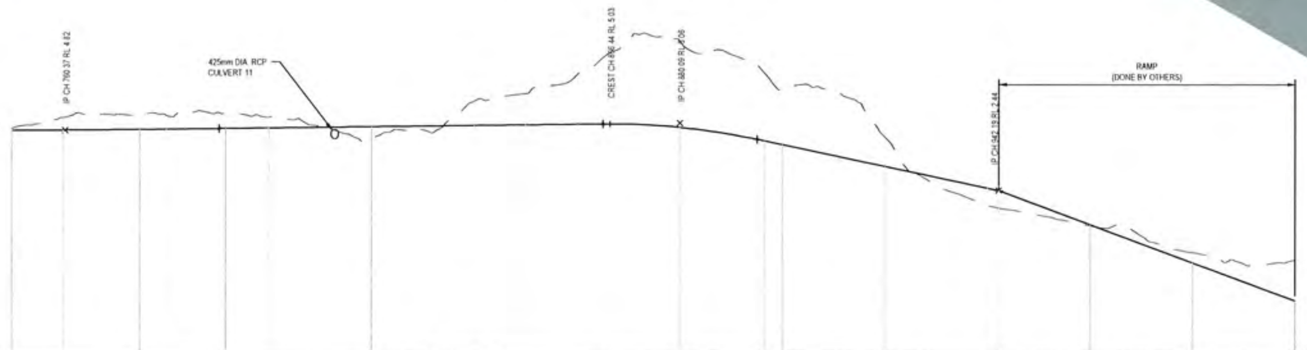
Client	WHITSUNDAY REGIONAL COUNCIL		
Project	BLACK CURRANT ISLAND BOAT RAMP		
Title	GENERAL ARRANGEMENT SHEET 3 OF 4		
Original Size	A1	Drawing No:	42-20021-C003 Rev: A

Plot Date: 7 July 2017 - 12:19 PM Plotted by: Sam Mensforth Cad File No: G:\42\20021\CAD\DrawingsA42-20021-C001-C004.dwg



FOR PREVIOUS
REFER 42-20021-C003

PLAN
SCALE 1:500



DATUM RL -4.00

VERTICAL ALIGNMENT: K=302.19 L=60m | L=74.72m G=0.2% | K=6.8 L=30m | L=47.1m G=-4.22% | L=62.79m G=-7.47%

HORIZONTAL ALIGNMENT: L=76.79m R=60.00m | L=16.68m | L=58.37m R=100.00m | L=46.50m | L=24.22m R=60.00m | L=21.50m | L=62.79m

LEVEL DIFFERENCE CUT - / FILL +	-0.08	-0.48	-0.57	-0.54	-0.60	-0.41	0.51	-0.94	-1.21	-1.92	-3.37	-2.65	-2.08	-1.14	0.69	0.69	0.05	-0.40	-1.60
DESIGN SURFACE LEVEL	4.826	4.835	4.853	4.861	4.882	4.900	4.938	4.978	4.998	5.018	4.894	4.367	4.218	3.375	2.532	2.440	1.109	-0.384	-1.878
EXISTING SURFACE LEVEL	4.90	5.32	5.43	5.40	5.48	5.31	4.43	5.92	6.21	6.94	8.27	7.02	6.30	4.52	1.84	1.75	1.06	0.02	-0.28
CHAINAGE	750.00	760.00	774.91	780.00	791.59	800.00	820.00	840.00	849.96	860.00	880.00	898.46	900.00	920.00	940.00	942.19	960.00	980.00	1000.00

LONGITUDINAL SECTION
HORZ 1:500 VERT 1:100

NOTES

1. FOR LEGEND REFER TO 42-20021-C006
2. FOR TYPICAL SECTIONS REFER TO 42-20021-C006

CONCEPT DESIGN

Rev	Revision	Drawn	Job Manager	Project Director	Date
A	CONCEPT DESIGN	SM			

Note: * indicates signatures on original issue of drawing or last revision of drawing

SCALE 1:500 AT ORIGINAL SIZE
VERTICAL 1:100 AT ORIGINAL SIZE
HORIZONTAL 1:500 AT ORIGINAL SIZE

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Drawn: S.MENSFORTH | Designer: S.WOODS
Drafting Check | Design Check
Approved (Project Director)
Date
Scale: AS SHOWN
This Drawing must not be used for Construction unless signed as Approved

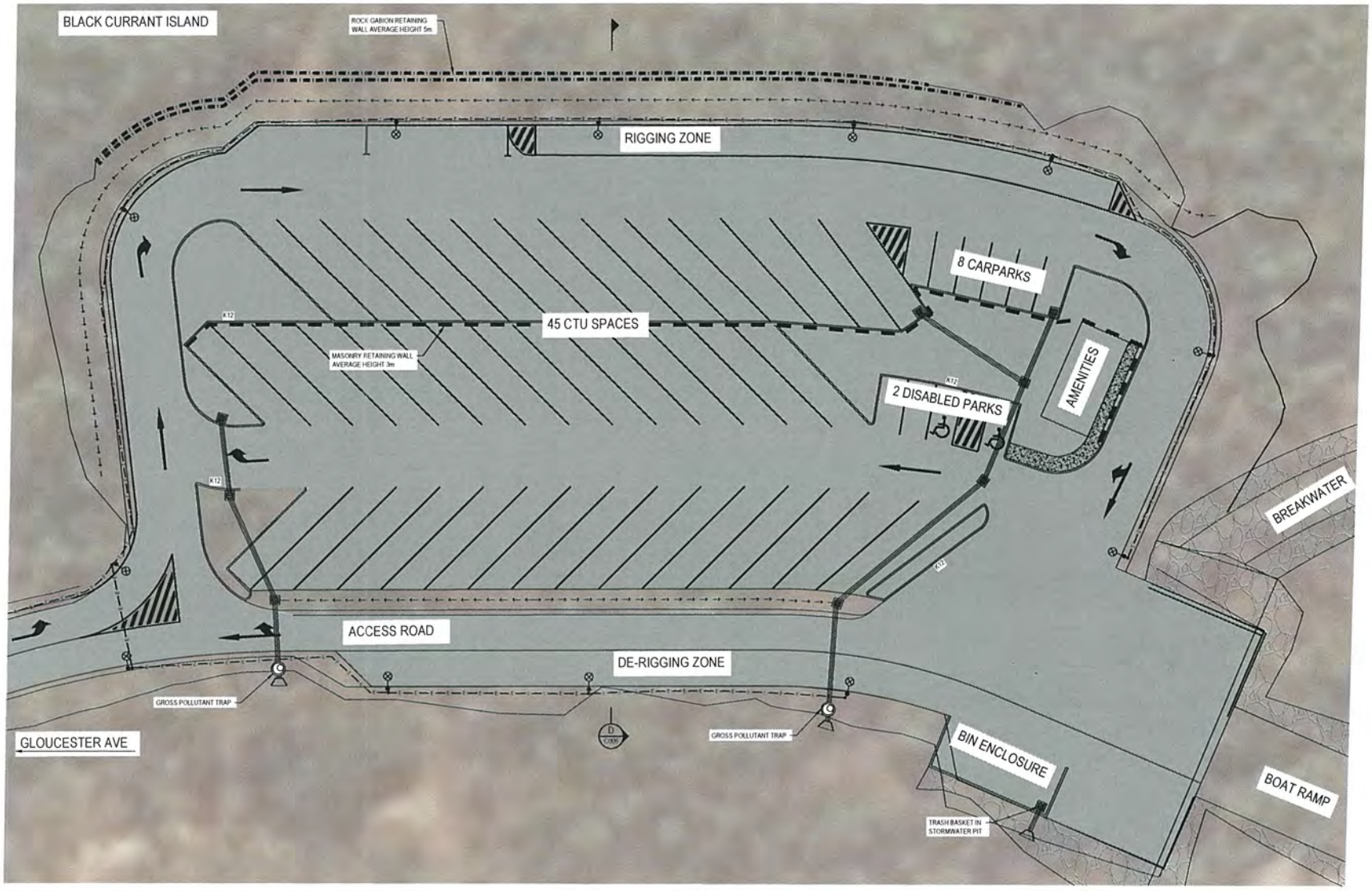
Client: WHITSUNDAY REGIONAL COUNCIL
Project: BLACK CURRANT ISLAND BOAT RAMP
Title: GENERAL ARRANGEMENT SHEET 4 OF 4

Original Size: A1 | Drawing No: 42-20021-C004 | Rev: A

Plot Date: 7 July 2017 - 12:19 PM | Plotted by: Sam Mensforth | Cad File No: G:\42\20021\CADD\Drawings\42-20021-C001-C004.dwg

NOTES

1. SIGNAGE AND LINE MARKING TO BE IN ACCORDANCE WITH TMR DESIGN GUIDELINES FOR BOAT RAMP CAR TRAILER UNIT (CTU) PARKING AREAS ARRANGEMENT AND NOTES DRAWING NO 626331 REV B
2. FOR NOTES AND LEGEND REFER 42-20021-C006



PLAN
SCALE 1:500

CONCEPT DESIGN

A	CONCEPT DESIGN	SM				
	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date	

SCALE 1:200 AT ORIGINAL SIZE

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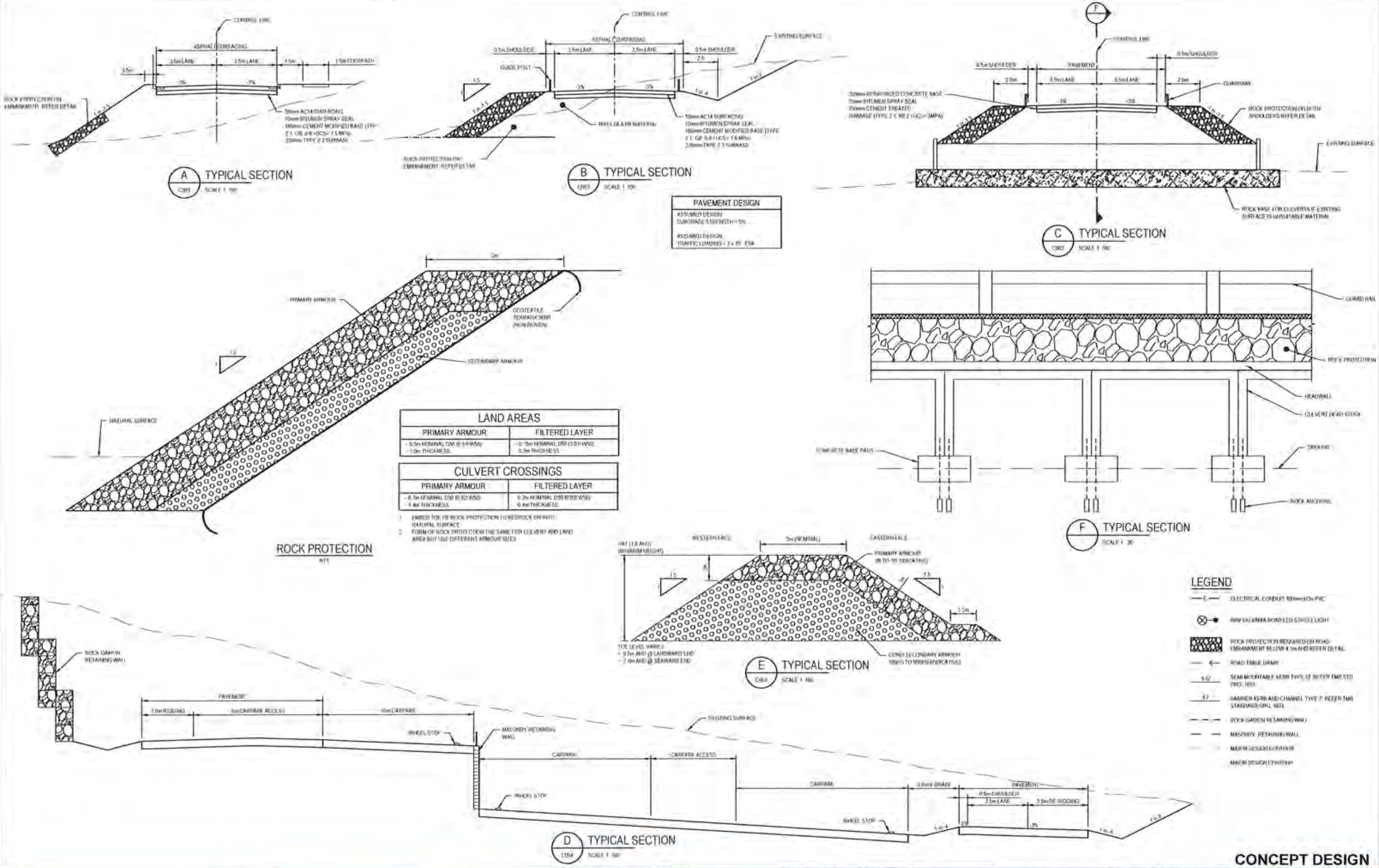
Drawn	S.MENSFORTH	Designer	
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	WHITSUNDAY REGIONAL COUNCIL
Project	BLACK CURRANT ISLAND BOAT RAMP
Title	CARPARK LAYOUT
Original Size	A1
Drawing No:	42-20021-C005
Rev:	A

Plot Date: 7 July 2017 - 12:20 PM Plotted by: Sam.Mensforth Cad File No: G:\42\20021\CADD\Drawings\42-20021-C005.dwg



PAVEMENT DESIGN

ASSUMED DESIGN SUBGRADE STRENGTH = 5%

ASSUMED DESIGN TRAFFIC LOADING = 2 x 10^5 ESA

LAND AREAS	
PRIMARY ARMOUR	FILTERED LAYER
- 0.5m NOMINAL D50 (0.31t W50) - 1.0m THICKNESS	- 0.15m NOMINAL D50 (0.01t W50) - 0.3m THICKNESS

CULVERT CROSSINGS	
PRIMARY ARMOUR	FILTERED LAYER
- 0.7m NOMINAL D50 (0.92t W50) - 1.4m THICKNESS	- 0.2m NOMINAL D50 (0.02t W50) - 0.4m THICKNESS

1. EMBED TOE OF ROCK PROTECTION TO BEDROCK OR INTO NATURAL SURFACE
2. FORM OF ROCK PROTECTION THE SAME FOR CULVERT AND LAND AREA BUT USE DIFFERENT ARMOUR SIZES

CONCEPT DESIGN

DO NOT SCALE

Drawn	S MENSFORTH
Designer	S WOODS
Scale	AS SHOWN

Client: WHITSUNDAY REGIONAL COUNCIL

Project: BLACK CURRANT ISLAND BOAT RAMP

Title: TYPICAL DETAILS

A1 Drawing No: 42-20021-C006 Rev: A

A CONCEPT DESIGN SM

Appendix B – Pre Lodgement Meeting Record

Queensland Government

Department of Infrastructure, Local Government and Planning

Our reference: SPL-0317-037563

Date: 2 May 2017

Kieran Kerr and Whitsunday Regional Council
C/- GHD
PO Box 104
Proserpine QLD 4800

Dear Mr. Kerr,

Pre-lodgement meeting record — Development Permit for Operational Works (Prescribed Tidal Works) – proposed boat ramp and access road at Blackcurrant Island over Lot 1 on AP13184, Lot 1 on SP211546 and Lot 17 on HR1210, Hideaway Bay QLD 4800

This pre-lodgement record provides a summary of the matters discussed at the pre-lodgement meeting in addition to providing further advice prepared subsequent to the meeting. This record provides initial advice regarding the likely major issues relevant to the development proposal to assist in the timely processing of a development application. While this pre-lodgement advice is provided in good faith, if the proposal is changed to that which was discussed with the department during the pre-lodgement meeting, this advice is not binding.

Reference information

Departmental role:	Concurrence agency
Jurisdiction:	- **Schedule 7, Table 2, Item 13** – Tidal Works, or Development in a Coastal Management District - **Schedule 7, Table 2, Item 5** - Clearing Vegetation - **Schedule 7, Table 2, Item 29** - Waterway Barrier Works - **Schedule 7, Table 2, Item 30** - Removal, damage or destruction of marine plants - **Schedule 7, Table 2, Item 15** – Maritime Safety
Pre-lodgement meeting date:	24 March 2017

Mackay Isaac Whitsunday Regional Office
Level 4, 44 Nelson Street
PO Box 257
Mackay QLD 4740

Reference information

Meeting attendees:

Name	Position	Organisation
Amanda Smedley	Environmental Scientist	GHD, Gladstone
Ian Wallace	Principal Civil Engineer	GHD, Mackay
Andrew Whitehead	Structural Engineer	GHD, Townsville
Ray Tree	Design Manager	Whitsunday Regional Council (WRC)
Michael Downing	Environmental Resource Management Officer	WRC
Scott Hardy	Manager – Natural Resource Management	WRC
Dylan Brown	A/Senior Planning Officer	Department of Infrastructure, Local Government and Planning (DILGP)
Vivian Luxton	Planning Officer	DILGP
Ian Draper	Fisheries Biologist	Department of Agriculture and Fisheries (DAF)
Adam Gilmour	Senior Natural Resource Management Officer	Department of Natural Resources and Mines (DNRM) - Vegetation
Carey Gabriel	Senior Land Officer	DNRM - State Land Asset Management
Jill Williams	Land Officer	DNRM - State Land Asset Management

Site details

Street address:	Blackcurrant Island, Hideaway Bay
Real property description:	Lot 1 on AP13184, Lot 1 on SP211546 and Lot 17 on HR1210
Local government area:	Whitsunday Regional Council

Proposed development details

Development type: **Operational Work (Prescribed Tidal Works)**

- Construction of an all-weather Boat Ramp and Breakwater on Blackcurrant Island.
- Construction of new road over Lot 1 on SP211546 along the "esplanade" and through Lot 1 on AP13184 (Unallocated State Land). Access to be obtained from Gloucester Avenue.
- Construction of an access road through Lot 1 on AP13184 (Unallocated State Land).
- Building a causeway between Lot 1 on AP13184 and Blackcurrant Island.
- Construction of an access road over Lot 17 on HR1210.

Meeting minutes

Item	Discussion and advice
Background – GHD - Ian Wallace	
1.	- GHD have been engaged by Whitsunday Regional Council (WRC) to do an optioning assessment for boat facilities. GHD investigated eight potential sites, including the current proposal site. - Local residents have lobbied to Whitsunday Regional Council for a boat ramp on Blackcurrant Island. - Council has engaged GHD to test the viability and approximate costings of this project. - At this stage, GHD have not done any engineering work – the preliminary plans have been produced by the Department of Transport and Main Roads. - Proposal to provide a boat ramp, parking facility and break wall at the south eastern side of Blackcurrant Island. An access road will traverse from Gloucester Avenue, through a vacant lot along the beachfront between two residential lots and follow through the esplanade on Lot 1 on SP211546 and then Lot 21 on CP858290. The Island is Lot 17 on HR1210. - The ramp is proposed in this location to get to deep water. The proposal is for an all-weather and all-hours boat ramp. - GHD need to understand limitations and requirements of this proposal. GHD have reviewed the existing pre-lodgement advice and are now looking for more in-depth advice. - GHD will be doing hydrographic work, sediment work and feasibility about the boat ramp, including tidal and sediment assessments. - The difference between this proposal and previous proposal for SPL-1015-025262 is the location of the access road, which previously traversed Lot 1 on AP13184.

Item	Discussion and advice
Great Barrier Reef Marine Park Authority (GBRMPA) – Previous Advice Question	
2.	- Item 24 in SPL-1015-025262 states, "The proposal to install a causeway has the potential of changing the boundary of the Great Barrier Reef Marine Park. This is a very complex process and would require a proclamation of Federal Parliament agreed to by both houses." - GHD requests DILGP to follow up with Department of National Parks, Sport and Racing (NPSR) and GBRMPA for further detail. (Further detail and advice from GBRMPA is in item 2 of the "further advice" section of this response below).
Department of Natural Resources and Mines – Vegetation – Adam Gilmour	
3.	- The current proposed route would be preferred over previously proposed routes. - The current proposal appears to avoid endangered vegetation and impact only least concern remnant vegetation. - The application will need to address tables 8.1.3 and 8.1.4 of the latest State Development Assessment Provisions (SDAP) Module 8. - An important matter to address in the response to Module 8 is essential habitat. It is likely that the area is home to the False Water Rat. - Please be advised that a potential Environmental Offset for Vegetation Clearing may be required. Under Acceptable Outcome AO9 of Table 8.1.4 the proposal will need to state the acceptable outcome and address if you will require an offset – possibly because the clearing will be wider than 20m. The applicant will need to address the requirements under Table 1 of the SDAP Module 8 to determine allowable clearing areas. - To address AO9, Table 8.1.4 should be used to determine if an offset is required if clearing areas are exceeded. If there will be a significant residual impact the applicant will need to determine if an offset is likely by assessing against section 3.1 of the Significant Residual Impact Guideline and the relevant Queensland Environmental Offsets Policy. - The Applicant will need to address AO10 or Performance Outcome PO10 if AO10 cannot be met as part of the SDAP response. - The entire area is also triggered for protected plants and flora survey – this will need to be addressed with the Department of Environment and Heritage Protection prior to undertaking any clearing activities. - The current footprint for the proposed access route is most preferred by the state as it avoids mapped endangered remnant vegetation. Least concern remnant vegetation will still be impacted. - If the application does require an offset there are a few different offset options and assessment pathways to go down and DILGP can assist with this. If you have an environmental offset – DILGP will condition that an offset be provided – if you choose a financial offset the timing of the condition will be to provide the offset prior to the commencement of works.

Item	Discussion and advice
	The applicant will need to have the offset agreement in place before work can commence in all cases where offsets are required. - It is recommended that the applicant identifies significant residual impacts and works out if offsets are required sooner, rather than later. - DNRM request the final proposal be submitted with applicable shapefiles or spatial data layers to DILGP as part of the common application material as this makes it easier to assess the information.
Department of Environment and Heritage Protection – Dylan Brown	
4.	- If a raised causeway is proposed to provide access to Blackcurrant Island, it could prevent natural sediment transfer. The application will be required to meet PO5 of Module 10 of the latest version of the SDAP. As a bed level crossing is not an option, reports on sediment transfer showing that development will not impact on natural coastal processes by a suitably qualified person will be required. - For works within the Coastal Management District, the Department of Environment and Heritage Protection (DEHP) would not generally support vegetation clearing on Lot 1 on AP13184. This reconfirms that the current access proposal location is preferable to the old alignment. - Need to meet Performance Outcome PO9 of Module 10 – development should avoid Matters of State Environmental Significance (MSES), or offsets for MSES may also apply. - There is a narrow section of land to traverse between the freehold parcel and the high tide mark on the mainland. Any commentary on the road, given high tide and rising sea levels and what assessment may be required for this section given it won't be tidal works, but given it is still on state land – only a narrow strip of land between the freehold lot and the tidal land. (Detail from DEHP in item 8 of the "further advice" section below).
Department of Agriculture and Fisheries (DAF) – Marine Plants and Waterway Barrier Works - Ian Draper	
5.	- It was noted that the application now includes a breakwater. - It would be DAF's preference to avoid marine plants by placing the ramp and breakwater further to the northwest. - PO3 and PO8 of the latest version of SDAP Module 5.3 would be required to be assessed and fully justified. The application will need to demonstrate that there are no other viable locations for the proposal. The proposal will need to demonstrate why the boat ramp location on the island can't be moved further around to avoid and minimise marine plant disturbance. Engineering advice in relation to the prevailing wind, current and wave set-up at the proposed location, to provide for safety of operation, may be a valid consideration. - On Blackcurrant Island the carparks and roadway appear to largely avoid marine plants, and would be advised to do so without significant justification.

Item	Discussion and advice
	- For the causeway – this contains sparse marine plants and there are some fringing plants on the western side. There may be the potential to be able to avoid marine plant disturbance through this causeway area. If there is disturbance the assessment need to demonstrate how it was avoided and minimised, and justify the disturbance in terms of the POs in the SDAP. - The application may also trigger Schedule 7, Table 2, Item 29 for waterway barrier works as there may be a barrier created across tidal waters. Requirements would be guided by the coastal processes aspects of the design. The application should maintain coastal processes so mangrove seeds, flotsam, jetsam and other potential fisheries habitat can pass through unhindered. Fish passage is not a key concern in this instance, as the island presents other movement options for fish. Works would still be required to meet the PO requirements of Module 5.2 of SDAP, or justify why a particular PO cannot be met through an alternate performance solution. - The self-assessable codes for waterway barrier works will not apply. A bridge would negate the need for a waterway barrier works approval. DAF's preference is for a bridge rather than a culvert. - There are no marine plants in the section of the road on the mainland. - If the area of disturbance of Marine Plants is under 25m^2 then this will not be considered to be a significant residual impact. - If the area of disturbance is over 25m^2 then environmental offsets for Marine Plant Clearing will apply as this would be considered a significant residual impact. - Performance Outcome 25 of SDAP Module 5.3 addresses offsets. - The prevailing winds are south-easterly so the ramp is facing into the wind. This will impact on the location of the ramp and may be the driver of the location of the ramp and should be used as justification in SDAP.
Cary Gabriel – State Land Asset Management (SLAM)	
6.	- Lot 1 on SP211546 is a Recreation and Environment Reserve in favour of Whitsunday Regional Council (WRC). - Lot 21 on CP858290 is a Recreation Reserve with WRC as trustee. - Lot 17 on HR1210 (the island) is a Recreation Reserve with WRC as trustee. - An application for a road opening will have to be made. - SLAM will rely heavily on DEHP for coastal advice. - In terms of the Island – the boat ramp is covered under tidal works and section 123 of the *Coastal Protection and Management Act 1995* gives it a right to be there (no tenure required). - Not sure if the breakwater will require tenure or if the tidal works will cover off on tenure requirements, however SLAM will confirm post meeting. (Further detail and advice from SLAM is in item 16 of the "further advice" section of this response below).

Item	Discussion and advice
	- If the causeway is a bridge, tenure will not be required. - If the crossing is not a bridge a road may need to be opened or a causeway may be a bridge for SLAM purposes. Land reclamation may be required for the causeway as well. SLAM can issue tenure over reclaimed land. (Further detail and advice from SLAM is in item 16 of the "further advice" section of this response below).
DILGP - Dylan Brown	
7.	- DILGP will provide further advice about GBRMPA approval - this will need Native Title approval. - DILGP will provide further advice from DEHP – about road way along beach and about sediment transfer. - DILGP will provide clarity about the tenure of the causeway (land reclamation) etc. - DILGP will also provide information regarding application fees and will communicate and confirm who the assessment manager will be. - The causeway will likely have to be 2 lane and have significant rock wall protection. Proposed to be around 15m wide after adding road width and protection. - The application should use safety as reason for the impact of the footprint. Multiple sections of the SDAP ask to demonstrate how the proposal can 'avoid and minimise impacts'. If the design cannot avoid or minimise impacts due to safety considerations this can form part of the SDAP responses. - DILGP to provide further advice from DTMR - Marine Safety Queensland.

It is considered that the above summary is an accurate record of the matters discussed at the pre-lodgement meeting.

The following information is provided as further advice prepared subsequent to the meeting.

Item	Further advice
Making a Development Application (DA)	
1.	The proposed works will require a development application to be submitted under the *Sustainable Planning Act 2009* (SPA) for a Development Permit for Operational Works (Prescribed Tidal Works and Vegetation Clearing).
Assessment Roles	
2.	Whitsunday Regional Council will be the assessment manager for the application and the department will be a concurrence agency.
Referral Triggers and Fees	
3.	Triggers and Fees are set out in Schedule 7 and 7A of the Sustainable Planning Regulation 2009 and the following are current as at 30 January 2017 and are subject to change.

Item	Further advice
	Please note depending on final design some of the following triggers may not be applicable to the application: - **Schedule 7, Table 2, Item 13** – $3,024.00 - **Schedule 7, Table 2, Item 5** – $3,024.00 - **Schedule 7, Table 2, Item 29** – $3,024.00 - **Schedule 7, Table 2, Item 33** – $12,095.00 - **Schedule 7, Table 2, Item 15** – $12,095.00
Electronic lodgement of DA	
4.	Referral to the department can be made via our online system, MyDAS: http://dilgp.qld.gov.au/planning/development-assessment/electronic-lodgement.html. Please note that payment for referral triggers is done through the MyDAS system and can be paid either by EFT, BPAY or Credit Card.
Application Forms	
5.	An application must include all relevant Integrated Development Assessment System (IDAS) forms. These forms can be downloaded from: http://www.dilgp.qld.gov.au/forms-templates/sara-idas-forms.html.
State Development Assessment Provisions (SDAP)	
6.	Please be advised the referral will be assessed against the SDAP. To support the development application an assessment against the relevant parts of SDAP is required (see further details against specific triggers below). SDAP documentation is available at the department's website: http://www.dilgp.qld.gov.au/planning/development-assessment/state-development-assessment-provisions.html. The department also has templates to assist in responding to the codes which are available at: http://www.dilgp.qld.gov.au/forms-templates/sara-sdap-state-code-response-templates.html.
Marine Park Boundary – Federal Government Jurisdiction	
7.	The *Great Barrier Reef Marine Park Act 1975*, section 31 (subsections 1, 3, 4, 5, 6, 7) outlines the process for the Governor-General to revoke or amend a Proclamation made by the Governor-General under section 31 (1) of the *Great Barrier Reef Marine Park Act 1975* that declares – an area within the Great Barrier Reef Region to be a part of the Marine Park. However, before the amendment or revocation Proclamation can be made the Minister must be satisfied that the Proclamation would, if made, be in accordance with a resolution passed by each House of Parliament on a motion and that the notice of the motion was given no less than 15 sitting days in each House (refer subsection 4). In addition, before the Governor-General makes a Proclamation the Minister must consider a report by the Authority in relation to the matter dealt with in the Proclamation.

Item	Further advice
	Please note the steps toward revocation or amendment of a Proclamation by the Governor-General are briefly: • GBRMPA must seek approval from the Marine Park Authority board to prepare a report and conduct public consultation for a minimum of 60 days, before preparing the report (see subsection 6). • The Marine Park Authority board would then need to approve the report, which includes any comments made during public consultation and the Authority's views on those comments (see subsection 7). • The report would then be considered by the Minister (subsection 5) before it goes to the Governor-General (after subsection 4 of the Act referred to above) has been satisfied. Further consideration is required as to whether an amendment to the *Great Barrier Reef Marine Park Zoning Plan 2003* would also be required in these particular circumstances. Please be advised this process is likely to be a time consuming exercise. The boundary of the Great Barrier Reef Marine Park refers to mean low water. Mean low water is defined as the mean of all low waters over 18.6 years to take into account planetary influences. To determine if a proposal or structure will change the Marine Park Boundary the onus is on the applicant to provide supporting information to GBRMPA as to the specific location of the mean low water along the coast line in that area. To achieve this, the location, or area of interest, would have to be accurately surveyed to determine the Marine Park boundary. Other important boundary considerations would be the location of the Great Barrier Reef Coast Marine Park (Qld) boundary which is Highest Astronomical Tide (HAT). Please contact the Great Barrier Reef Marine Park Authority to discuss this further via email at assessments@gbrmpa.gov.au or on (07) 4750 0700.
Coastal Protection (DEHP)	
8.	Please be advised that SDAP Module 10 – Coastal Protection will need to be thoroughly addressed in any application for tidal works or works in the coastal management district. In particular: • PO2 and PO6 – the application will need to demonstrate, with the support of RPEQ certified drawings, that the proposed structures are able to withstand coastal erosion impacts and defined storm tide events. Further, the proposed carpark should be placed as far landward as possible to minimise potential coastal erosion impacts. • PO5 – per your draft minutes but also in relation to the proposed removal of vegetation and demonstrating that the breakwater is the only feasible option for protecting permanent structures from coastal erosion. • PO7 - demonstrate that it is not feasible to locate the proposed marine development with other marine facilities and that natural channel is sufficient for use of the proposed boat ramp. Impacts on coastal resources, water quality and acid sulfate soils will also need to be thoroughly addressed. • PO9 – per your draft minutes.

Item	Further advice
	With regards to the section of road in the foreshore reserve, while this is not tidal works, it will trigger interfering with quarry material on State coastal land and therefore still require assessment by DEHP. An application for the proposed road will need to address potential impacts of erosion and storm tide inundation on the structure. • The meeting minutes state that the proposed boat ramp is to be "all-weather and all-hours"; the applicant will need to provide details of lighting proposed and the potential impact of the lighting and night-time activity on Matters of State Environmental Significance such as the coastal sheath-tail bat, false water rat and marine turtles. • It is recommended the applicant undertake a protected plants survey trigger search: http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/map-request.php.
Operational works to raise or construct a Waterway Barrier Work (DAF)	
9.	Please note works within tidal areas which alter or disrupt fish passage and the flow of tidal waters may be considered to be waterway barrier works. Design options for consideration may be: • to leave the existing low-level access to Blackcurrant Island as is, which would restrict vehicle access on very high tides, or • construct a raised vehicle access across the existing isthmus. This could be either a bridge, or raised causeway incorporating culverts. The preferred design approach would be a bridge. New multi-span bridges in tidal areas are generally not considered to be Waterway Barrier Works, provided they meet the design requirements listed in the Factsheet What is not a waterway barrier work? Furthermore, DAF would have no additional requirement if the existing isthmus were to be used as a crossing in in its current form.
10.	Please be advised any works to construct a raised vehicle access (causeway) would require assessment for Waterway Barrier Works. Any design must address the Performance Outcomes in Module 5.2 of the State Development Assessment Provisions (SDAP), however the main driver in this instance would be to minimise or negate any impact on coastal processes across the existing isthmus (i.e. – any raised crossing should be designed so that sand, water or debris/seeds/propagules etc., can pass freely from one side to the other, without creating a physical barrier).
Operational work for the removal, destruction or damage of marine plants (DAF)	
11.	An assessment of the area (m^2) of marine plant disturbance must be included in order to calculate the relevant development assessment fee.
12.	From previous investigations of this site, it appears that the proposed location would meet most of the Acceptable Outcomes of Module 5.3 of the SDAP in this instance, but would require detailed assessment once a more formal proposal or designs were available. The proposed works location is generally rocky, with some coverage of marine plants. Other sites in the general vicinity may result in reduced impacts on marine plants.

Item	Further advice
	Detailed assessment against PO3, PO8 and PO11 must be provided to demonstrate there is an overriding functional requirement to locate the proposed ramp and breakwater in the proposed location.
13.	Any permanent marine plant loss over 25m² is likely to result in a Significant Residual Impact requiring an Environmental Offset, as described in the *Significant Residual Impact Guideline (for MSES and prescribed activities assessable under SPA)*.
Marine Plants – Roadworks and Car Parking Areas	
14.	It is likely there would be no assessment trigger for the construction of any access roads or carparks on either the mainland or island, provided that any road alignment avoided marine plants.
Land Tenure and Road Opening Requirements	
15.	No tenure is required as the tidal works will cover off as it will be constructed for the general public. If the crossing is not a bridge, a road will need to be opened.

If you require any further information, please contact Dylan Brown, A/Senior Planning Officer, Mackay Isaac Whitsunday Regional Office on (07) 4898 6812 who will be pleased to assist.

Yours sincerely

Patrick Ruettjes
Manager (Planning) – Mackay Isaac Whitsunday Regional Office

Appendix C – Approvals Management Plan

No inclusion

Appendix D – Regional Geology

QCt – Quaternary Alluvium: Mud, sand, sandy mud, muddy sand, and minor gravel, salt; mainly intertidal and supratidal deposits

Rggc - Gloucester Granite - Pale pink to pale pinkish grey, fine to medium-grained, porphyritic biotite and hornblende-biotite monzogranite, biotite and biotite-hornblende syenogranite; locally coarse-grained, miarolitic, granophyric; with traces of sphene, allanitebiotite and biotite-hornblende syenogranite; locally coarse-grained, miarolitic, granophyric; with traces of sphene, allanite

Appendix E – P(90) Cost Estimate

CIVIL PROJECT PARTNERS

Black Currant Island Boat Ramp

Preliminary Design Cost Estimate Report

Prepared for GHD

JULY 2017

Prepared for

GHD

Contact information

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Document name

Report | CPP-18-001-CD-A

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A	7 July 2017	Chris Dale	Draft
B	11 July 2017	Chris Dale	Correction to table 2 and 13

Document approved by

Name	Signature	Date
Chris Dale		11 July 2017

Disclaimer

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Executive Summary

Civil Project Partners (CPP) was commissioned by GHD to provide estimating services for the Black Current Island Boat Ramp, Whitsunday, Queensland. The project owner is Whitsunday Regional Council.

CPP's scope of services is to provide an estimate of costs, developed in line with Department of Transport Main Roads (TMR) requirements as outlined in the Project Cost Estimating Manual sixth edition (PCEM). GHD provided schedule items, quantities and design drawings. CPP developed a cost estimate, construction programme and developed a risk and opportunity register for inclusion to the P90 estimate calculation.

At the time of preparing this report, the project's base estimate stage is **concept phase**. In relation to the PCEM, the corresponding design stage is a combination of **options analysis and business case**. The table below is an extract from the PCEM table 3.5 and provides guidance to contingency percentages, corresponding to the base estimate stage. Many of the inputs such as geotechnical, existing condition of the causeway with respect to the possible impact from the tidal effect, have yet to be finalised at the time of developing this cost estimate report.

Table 1: PCEM contingency guidance

Base estimate stage	Level of project definition	Typical contingency ranges
Options analysis estimate	N/A	N/A
Business case (P90)	10% to 40%	30% to 40%

The risk adjusted cost estimate for the project is summarised below (in $2017) based on construction commencing in Q2 of CY2018 and completed Q4 of CY2018.

Table 2: P90 cost estimate summary

Item	P90 Amount (ex GST)	
Contractor's Costs	$9,335,468	
Principal's Costs	$1,603,367	
Project Base Cost	**$10,938,835**	
Planned Risk	$1,695,518	
Unplanned risk	$1,005,622	
Total Risk Adjusted Cost	**24.7%**	**$2,701,140**
Escalation	Nil	
Total Outturn Cost ($2017)	**$13,639,975**	

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1 Introduction

1.1 Background and Scope

Black Current Island is situated in the Whitsunday region at approximately 55km north west of Airlie Beach, Queensland. The project functional objectives are to construct an approximately 0.9km of two lanes sealed road leading from Gloucester Avenue to the proposed boat ramp in Black Current Island, with a carpark facility. The proposed road is within the green field site, as such minimum disturbance of public traffic will be expected during the construction.

GHD has provided a preliminary concept design layout showing the proposed road, drainage and carpark along the alignment. As part of the design, a significant drainage structure, RCBC with 58 no of cells has been designed and will be located on the existing causeway which is currently joining between the mainland and the Black Current Island.

Figure 1: Project Location

The scope of work includes;

- Clearing and grubbing of trees and vegetation within the proposed road reserve
- Earthworks to the cutting and filling to form the road embankment (34,900m3 cut, 8,800m3 fill)
- Drainage with reinforced concrete pipe culverts (size 375mm to 1050mm dia.) crossing along the road
- 58 cell RCBC structure (1.5 m wide x 0.9m depth) at the causeway
- Rock protection along the causeway and road embankment
- Gabion baskets
- Unbound gravel pavements
- Bound gravel pavements (CMB at 1.5%)
- Asphalt surfacing for the road and continuous reinforced concrete pavement at the causeway
- Road Lighting

- Toilet facility at carpark
- Line Marking on the road and carpark

Typical Cross Section of the proposed road and causeway.

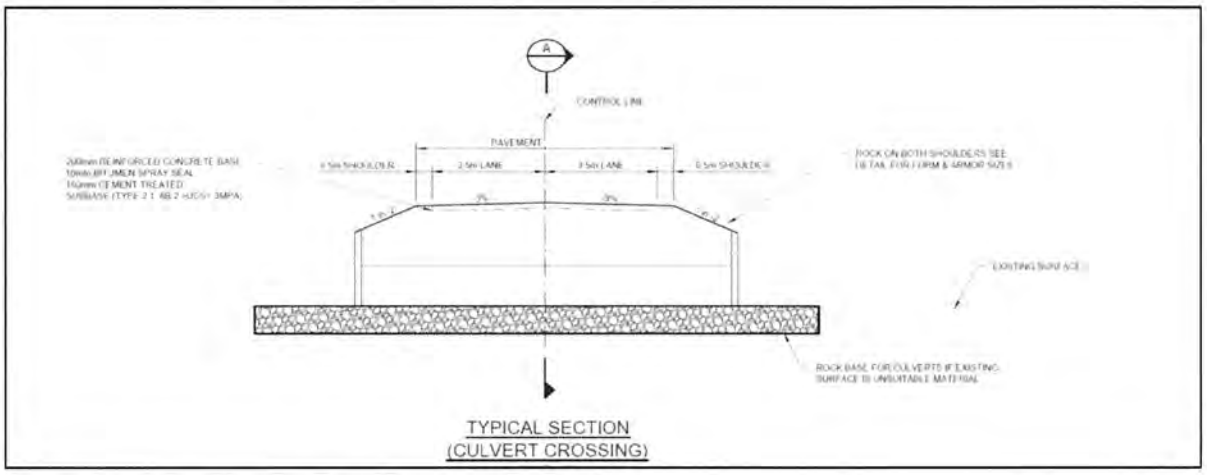


Figure 2: Typical Section (Culvert Crossing)

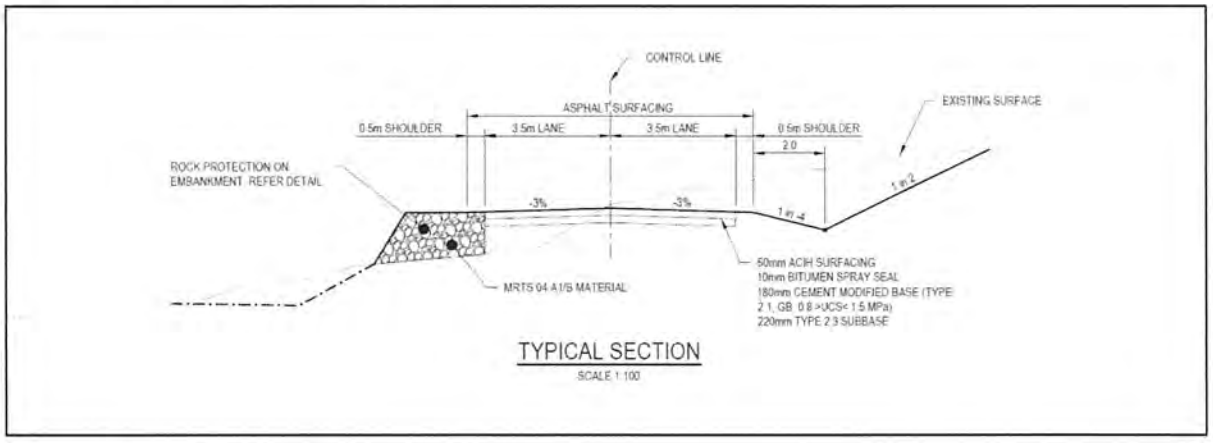


Figure 3: Typical Section (Road)

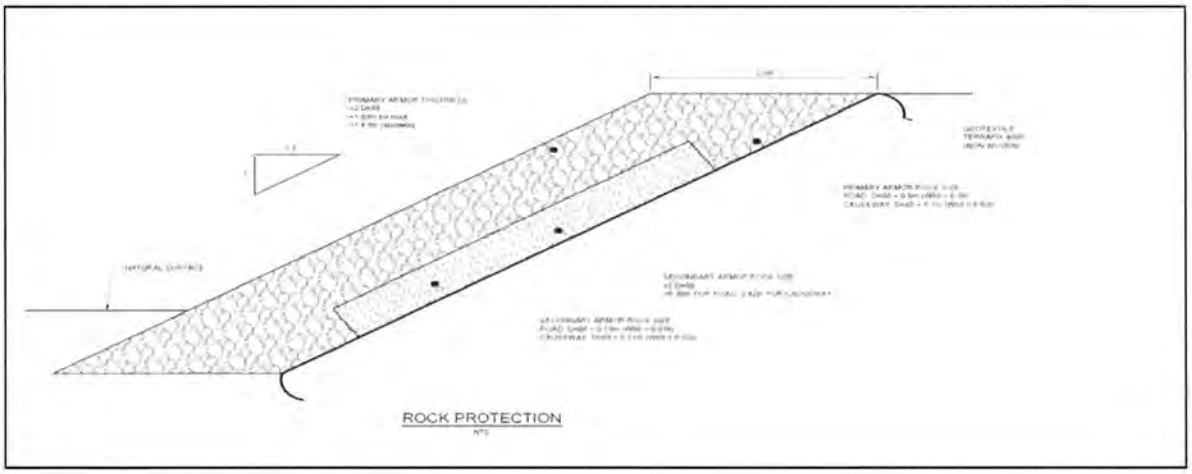


Figure 4: Rock protection - causeway

1.2 Purpose

The purpose of this report is to provide assurance that due process has been followed in the preparation of the cost estimate. It is intended to detail the methodology, assumptions, constraints and key parameters used in the development of the cost estimate. This will act as a record of the works to inform Whitsunday Regional Council of the estimate outcomes to assist with procurement of the construction works.

CPP has relied on information received at the time of preparation of this report and has applied assumptions that are considered reasonable in the opinion of the estimator to prepare the cost estimate. CPP disclaims all liability arising from the assumptions being incorrect or not eventuating.

2 Approach

2.1 Sources of Information

CPP has received the following technical information from GHD in preparing the cost estimate report. Level of detail varies between the documentation.

Table 3. Project Documents

Document ID	Document Title
Email on 03th July 2017 from Andrew Whitehead	Concept Design Drawings, No 42-0021-C001 - 006 Bill of quantities, received 03th July 2017
Email on 06th July 2017 from Shaun Woods	Additional Information regarding BOQ
Email on 07th July 2017 from Shaun Woods	Additional Information regarding BOQ

2.2 Cost Estimate Method

The cost estimate was developed in line with TMR requirements as outlined in the Project Cost Estimating Manual (Sixth Edition) September 2015. The estimates have been produced in line with recommendations in the TMR Estimate Manual for preliminary design in the development phase. The structure of the estimates is illustrated below.

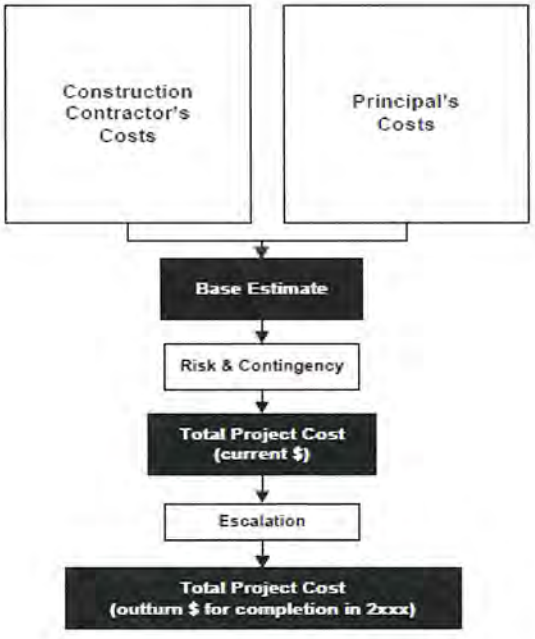


Figure 5. Estimating structure

The cost estimate has been completed using the following steps:

1. Obtained bill of quantities and enter into the estimating software, Pronamics Expert Estimation
2. Developed first principle work item build-ups for all common self-performing work, using market rates for materials, subcontractors, labour and plant (drainage, earthworks, pavements)
3. Material supply rates and subcontractor packages of works adopted in the estimate are based on market rate or other similar project which subject to further confirmation.
4. Developed an overhead structure common to a typical contractor likely to compete for a project of this size and nature
5. Developed preliminary construction program
6. Apply contingency percentage appropriate for level of detail
7. Aggregated estimate and risk outputs.

2.3 Statistical Risk Analysis

The risk and opportunity has not been statistically analysed in accordance with the PCEM for this cost estimate report. It is CPP's understanding that no workshop has been completed at the time of developing the cost estimate. CPP has developed a risk register for the project incorporating risk that we see as influential to the project

Key Risks

Table 4: Key risks identified

Risk	Driver	Potential consequence
Causeway construction	Tidal effects can cause damage to culvert construction	Re-work to culvert Additional costs to project Delay to project
Design scope creep	Project still in concept phase Immature design components affecting final design (i.e. hydrology etc)	Additional costs to project due to scope growth
Design omissions	Project not fully design with additional activities required in detailed design	Additional costs to project Delay to project
Embankment fill	Allowance made for 100% cut to fill with site won material	Site won material does not match required material properties Additional cost to project to import material suitable for embankment fill
Temporary works for causeway culvert construction	Tidal area effecting temporary works	Additional temporary works required. Greater than expected

Risk	Driver	Potential consequence
		Additional costs to project
Severe wet weather	Project located in cyclone affected area	Re-work Additional costs to project Delay to project

Key Opportunities

Table 5: Key opportunities identified

Opportunity	Driver	Potential consequence
Alternative causeway construction	Current design would be difficult to build due to water ingress Other options available to work 'above water' level	Reduce risk to temporary works Reduction of work at water level

3 Assumptions

The assumptions underlying the cost estimate have been developed to complete the estimate and fill any gaps of information not contained within the sources of information in **Section 2**. As design progresses, the assumptions may be removed and the proposed design scope priced.

3.1 Global

A list of assumptions affecting the project globally are listed below.

Table 6: Global assumptions

Item	Assumption
Construction timing	Delivery of works commencing early CY2018 Assume construction to occur in drier months of the year
Working Calendar	5 day week, 7AM – 6PM working hours, with no work on declared public holidays or industry Christmas shut down period.
Staff and labour	Accommodation allowances included in estimate Assume labour force to be accommodation for the project duration

3.2 Work Items

Specific assumptions regarding work items are listed below

Table 7: Work item assumptions (separate to common works practices)

Item	Assumption
Provision for traffic	Provision for traffic item is based upon the following assumptions: • The proposed site is located at the green field site with no existing traffic involved during the construction • Side track for general vehicle movement on site has not been allowed in the estimate though some existing tracks observed from the google map at the Western side of the Causeway. Fencing included to reduce public movement through site (motor bikes) • A working side track will be provided along the causeway parallel to the culvert for construction traffic during the culvert construction (6m wide x length of causeway) • Provision of traffic warning signs near the work zone entrance, to alert the public traffic of the site vehicles movement at the entrance.

Item	Assumption
	• Traffic Control – traffic control utilised as required to manage vehicles and pedestrians. Little traffic controlled expected for the project • Pedestrian management – temporary footpaths where the proposed construction works disturb existing pathways (at entrance only)
Clear and Grub	• Clearing and grubbing of trees and vegetation within the proposed road reserve. Site inspection will be required to confirm the actual site condition. Mulching allowed and to be used on site for erosion control • No allowance made in the estimate for relocation and protection to the scarred trees or threaten species that found on site
Drainage	• Excavation depth of drainage pipe is up to 1.5m for 375mm to 750mm diameter and 1.8m for 1050mm diameter • Box culvert at the causeway, no allowance for excavation in rock • Concrete Gully pits 900mm x 900mm, no more than 1.5m deep • Subsoil drain, Type D, no allowance for excavation of hard ground or rocks
Protective treatments	• Rock protection at causeway completed using traditional excavator and delivered in body trucks • All rock material to be imported from registered quarry
Earthworks, preparation	• Stripped topsoil to be re-used on site, no allowance for disposal off site • Unsuitable material to be carted to legal spoil site. • A haul distance of 55km has been assumed for distance to appropriate disposal site. Council advise on a closer tip facility would be appreciated and included in a revised report • Tip fees have been included for the disposal of this material. This assumed a conservative approach to the disposal of material off site • All unsuitable material replaced with imported material from quarry
Earthworks, excavation	• 100% cut to fill has been included • All surplus material to be carted off site to suitable disposal site (55km haul + free tip • Excavator + trucks at various productions to allow for detailed and bulk works
Earthworks, embankment	• 100% cut to fill from site won material • All material to be placed using grader, 18t Roller and Water cart • Water assumed to come from mains supply at $1.70/kl
Pavements	• Base - Cement Modified, Type 2.1 road base gravel, GB, 0.8>UCS<1.5Mpa • Subbase – Type 2.3 road base gravel • Grader placement of material (no self propelled paving machine) • Reinforced Concrete pavement on top of the box culvert along the causeway

Item	Assumption
Surfacing works (sealing and asphalt)	• One coat seal allowed for underneath asphalt wearing course. Submission schedule shows assumptions made for seal and cover aggregate spread rates • Asphalt to be completed by specialist subcontractor
Contract site facilities	• Allowance made to utilise area within road reserve on site • Site facilities made self sufficient
Road lighting	• Installation of new road lighting along the road and the carpark with provision of new electrical conduit and power cable • Road lighting, 9.0m vertical with 3m outreach with RoadLED60W luminaire • Specialist subcontractor rates included for these activities • Conduit installation has been priced as self performing
Landscaping	• Supply and installation of Turf / Hydro-seeding
In Pit Trash Basket	• Typical rates included due to the absence of information / detail
Gross Pollutant Trap	• Typical rates included due to the absence of information / detail. • 900mm dia Hume Stormceptor equivalent included in this case
Toilet Blocks	• Typical rates included due to the absence of information / detail
Block wall	• Typical rates included due to the absence of information / detail.

4 Construction Program

The program has assumed that the design and documentation would be ready to be put to the market in Q1 of CY2018 which suggests an award date in Q2 of CY2018. The contractor's works program has been broken up into two sections as per the following;

4.1 Methodology

The project has been broken up into three stages

1. West of crossing (Gloucester Avenue to Causeway, Ch0 – 580)
2. Causeway
3. East of causeway (Causeway to Carpark, Ch580 – Ch942)

Temporary works

Construction of the coffer dam will consist of an earth bund from material derived from the excavation material. Construction methodology includes for trucks to end tip the material to a receiving excavator. This bund is to be founded and wrapped with geotextile and black plastic to offer some protection from the ocean tides and to allow for full recovery of material.

Causeway

The causeway consists of a 58 cell 1500 x 900 RCBC. This structure will be founded on an 800mm depth rock platform. The rock layer will be placed with a dozer with trucks end tipping onto a layer of geofabric. The rock platform will be extended past the outside of the culvert by an additional 1m.

The culvert units will be placed on a concrete strip footing which if founded in the rock layer. These strip footings will be formed and poured using 32MPA concrete. A concrete pump has been included to aid in placement of the concrete

Culvert units will be installed using mobile crane as per TMR specifications. The RCBC units will have to be double handled on site due to restriction on available laydown area close to the work face

A concrete headwall extends to approx. 1.5m above the crown units to help contain the embankment fill above the units

Wingwalls have been included in the design at each end of the structure. These wingwalls help contain the road embankment and extend to the same height of the headwall.

Drainage

The proposed drainage for the project are RCP culverts. These activities have been priced as self-performing with a drainage crew and small plant. Production rates vary depending on culvert size. Assumption have been made on invert levels and are included in **section 3.2 work items.**

Earthworks

All earthworks will be completed using traditional excavator and trucks. Material will be moved around to suit the embankment volumes. All surplus material is to be carted off site to an approved disposal site. In this case, allowance has been made to transport the surplus material to Airlie beach assuming there would be a suitable disposal site at this location.

An allowance has been made to lime stabilise any ASS / PASS material before carting off site. The appropriate dosage rate will have to be calculated further in the detailed design phase

All embankment fill is expected to be derived from site won material. The risk for this is that the existing material does not conform to the requited material parameters and the construction will have to be imported from a registered quarry.

All material is to be placed using a grader, 18t roller and water cart. Production rates have been included to allow for elements of detailed and bulk filling

Pavements

Pavements vary between unbound and bound materials. In all cases, grader placement has been included in lieu of self-propelled paving machine. All material to be supplied from a registered quarry and delivered in a combination of body trucks and semi tippers. This allows for the small areas to be completed with a slower production.

QA Testing

All testing has been included within each item and CPP have assumed a DTMR testing regime. Typical lot sizes have been assumed from previous projects similar in nature

Road lighting

The civil component for road lighting has been included as a self-performing activity with site inspections included for conduit inspections. Installation of cabling, light poles and commissioning has been priced assuming a specialist subcontractor to complete. It is expected that the majority of this work can be completed in one mobilisation.

Surfacing

The design allows for a single coat seal and wearing course. Minimal mobilisations are expected for this project with the bulk of the asphalt being placed in one continuous activity. As the project is predominately a green fields site, areas can be put on hold until a significant lot size is available.

4.2 Program Dates

The dates shown below have been extracted from the construction program in **Appendix E**.

Table 8: Program dates

Event	Project Dates
Letter of award	05th March 2018
Commence works on site	04th April 2018
Practical completion (dry)	23nd August 2018
Easter shutdown	30th March 2018 to 2nd April 2018
Wet weather allowance	11 working days
Contract completion (wet)	07th September 2018

5 Contractor's Cost Estimate

5.1 Project Contractor's Cost Estimates

The contractor's cost estimate comprises of direct job costs (DJC) and indirect job costs (IJC) plus a margin for corporate overhead and profit. The DJC includes costs associated with directly carrying out the scope of works, while IJC contain the site overhead component to manage the project, for example site staff and facilities. A full project summary is included in **Appendix B** showing the values of each cost component.

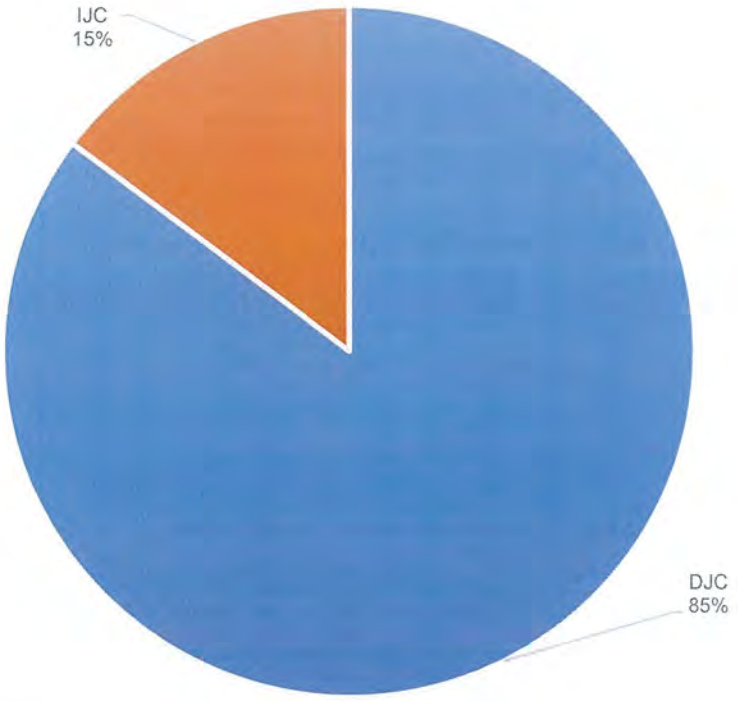


Figure 6: IJC/DJC breakdown

5.2 Direct Job Costs

Work breakdown structure

Figure 7 and the corresponding tables shows the breakdown of DJCs according to the work type, by percentage. The graphical representations provide an indication of 'big ticket' items and where the bulk of the project costs lie.

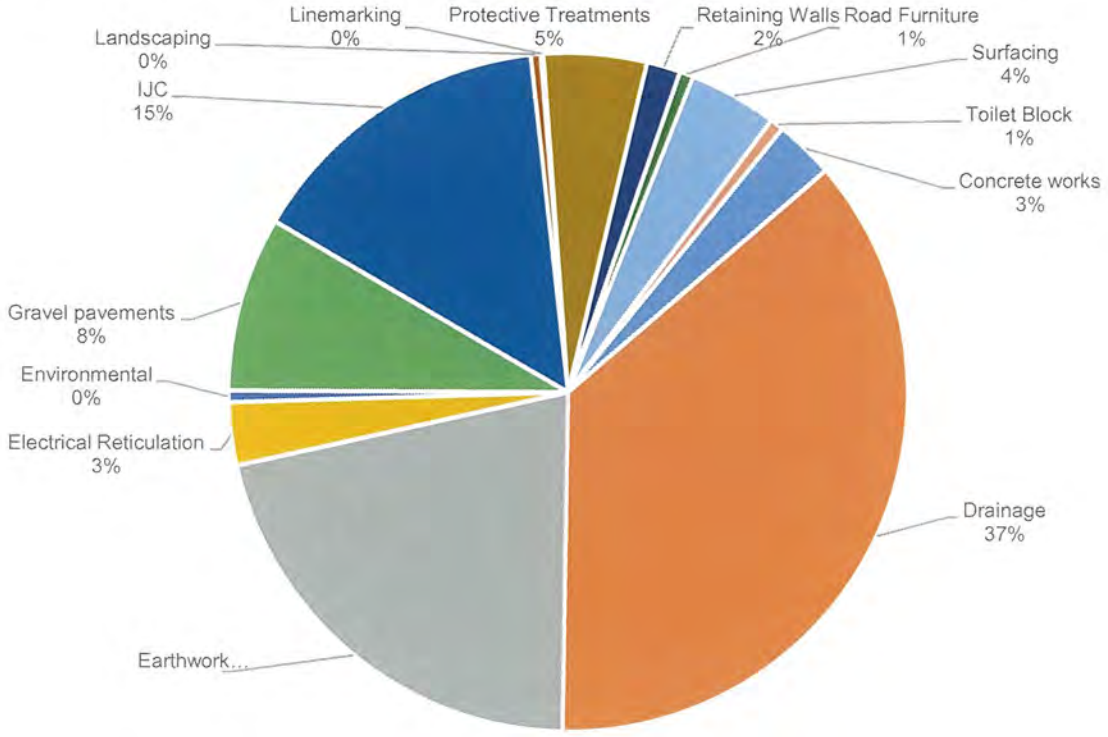


Figure 7: Work breakdown summary (pie chart)

The table below shows the numerical value break down of costs associated with each area of works. This table helps to identify 'big ticket' items. The below table excludes margin and is comparable to the project summary in **appendix B.**

Table 9: Work breakdown summary

Item	Amount
Concrete works	$237,319
Drainage	$3,081,286
Earthworks	$1,789,540
Electrical Reticulation	$251,286
Environmental	$47,795
Gravel pavements	$699,434
IJC	$1,253,665
Landscaping	$38,025
Line marking	$10,368
Protective Treatments	$410,659
Retaining Walls	$135,000
Road Furniture	$53,988
Surfacing	$354,254
Toilet Block	$55,000
Traffic Management	$69,167
Total	**$8,486,785**

5.3 Key Rates

The cost inputs are divided into four groups comprising of labour, plant, materials and subcontract resources. CPP has grouped labour and plant for presentation of rates, to align with contractor's presumed internal costs and shown in **Table 10**. The cost estimate presumes the labour will be direct and that plant is also owned by the contractor, or hired in on a dry hire basis at market rates. Materials and subcontractor resources have been considered as external costs to the contractor and have been presented in **Table 11** separately.

Labour Rates

The calculated labour rate provided is reflective of the current market rate in the Brisbane area. The rate shown in **Table 10** provides the rate per timesheet hour. Loss in productivities due to inactivity and industry mandatory safety toolbox sessions are built into the rate within the estimate.

The rate is inclusive of:

- Annual Allowances
- Workers Compensation
- Payroll Tax
- Superannuation
- Training

Plant Rates

The calculated plant rates in **Table 10** below include;

- Dry hire of plant (ownership and running costs)
- Ground engaging tools (if applicable)
- Fuel
- Operator

Table 10: Key labour and plant rates

Resource	Unit	Rate ($)
Labour		
Operator (excavator)	hr	$57.84
Operator (grader)	hr	$67.49
Labourer	hr	$54.85
Plant (including operator and fuel)		
12 tonne tipper truck	hr	$102.43
Watertruck 14KL	hr	$98.20
13 tonne excavator	hr	$120.14
24 tonne excavator	hr	$140.35
Backhoe	hr	$99.98
Grader 140M	hr	$169.73
Roller – 15-18T (incl operator)	hr	$89.25

Material and Subcontractors

Table 11: Ranked materials and subcontractor resources

Rank	Resource	Qty	Unit	DJC rate	DJC Amount	Source
1	Bitumen Seal	1	LS	Varies	118,798	Plugged market rate
2	Asphalt Concrete	1,325	tonnes	195	258,375	Plugged market rate
4	Line Marking	1	LS	Varies	13,281	Plugged market rate
5	Road Lighting subcontractor	1	LS	Varies	101,400	Plugged market rate
6	Traffic control, 3 men and ute	220	hrs	159.36	35,059	Plugged market rate
7	Type 2.1 gravel CMB	6,654	tonne	37.00	246,184	Plugged market rate
8	Type 2.3 gravel	12,034	tonne	28.00	336,958	Plugged market rate
9	Type 2.5 gravel	467.28	tonne	25.00	11,907	Plugged market rate
10	Rock	9,458	tonne	30.00 – 35.00	313,916	Plugged market rate
11	Concrete	794	m3	variolus	139,074	Plugged market rate
12	Reinforcement	132.7	tonne	1150.00	152,605	Plugged market rate
13	Precast Box Culvert (1500 x 900mm)	1,136	m	1159.20	1,290,886	Plugged market rate
14	Precast items (drainage)	1	item	Varies	170,768	Plugged market rate

5.4 Indirect Job Costs

The scope of the project requires a relatively small contractor's site team. The construction duration onsite is in the order of 21 weeks. The proposed contractor's site organisation chart is shown below in **Figure 8**.

- Project Manager
- Project Engineer
- Site Engineer x 2no.
- Supervisor x 2 no.
- WHSO
- Environmental Officer
- Surveyor

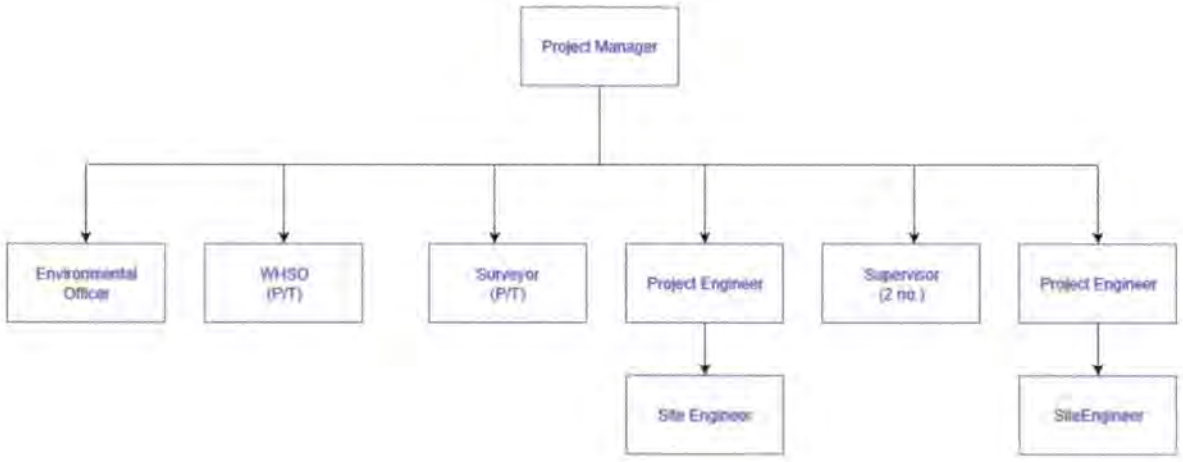


Figure 8: Contractor's organisation chart

5.5 Margins

The contractor's margin and overhead is made up of an allowance for profit and corporate overhead. CPP has adopted 10% margin on total cost as a reasonable estimate for the forecast period reflecting expected market conditions in the industry.

6 Principal's Costs

At the time of the cost estimate, no information had been received with respect to Principal's costs and therefore the Principal's costs have been estimated from benchmarks of previous TMR regional projects. The benchmark represents a percentage of construction costs, calculated on **$1,603,367**.

Table 12 Principal's costs

Item	% of Const. Costs	Amount (ex GST)	Benchmark Comment
Concept phase (Options and Business Case)	2.5%	233,387	Adopted above average benchmark
Development phase (Preliminary and Detailed)	5.0%	466,773	Adopted above average benchmark
Implementation phase (Construction)	8.0%	856,529	Allows for PLSL and WHS fee within adopted percentage
Finalisation phase (Post-construction closeout)	0.5%	46,677	Adopted above average benchmark
Total Principal's Costs (excl. resumptions)	16.0%	1,603,367	
Property resumptions		Nil	No resumptions anticipated
Total Principal's Costs	16.0%	1,603,367	

7 Escalation

At this stage, no direction has been given on the timings for project delivery. The P90 estimate report has been calculated using costs typical to that in the current market. In this case, no escalation has been included in this report.

8 Estimate Summary

Table 13 summarises the findings of the risk adjusted cost estimate, excluding GST.

Table 13: Preliminary design stage cost estimate summary

Item	P90 Amount (ex GST)	
Contractor's Costs	$9,335,468	
Principal's Costs	$1,603,367	
Project Base Cost	**$10,938,835**	
Planned Risk	$1,695,518	
Unplanned risk	$1,005,622	
Total Risk Adjusted Cost	**24.7%**	**$2,701,140**
Escalation	Nil	
Total Outturn Cost ($2017)	**$13,639,975**	

9 Conclusion

As requested, this report has provided the reader with the estimate of the project costs, inclusive of detailed direct job costs, indirect job costs, risk outputs and a consideration of escalation possibilities. Also included in this report are the methodologies, assumptions and data used to produce the above information, with the purpose of instilling confidence in the content of the results presented.

Appendix A Submission Schedule

Submission Schedule

Black Current Island Boat Ramp

Printed : July 7, 2017 17:39:27

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
	MRS02 Apr 16				
	PROVISION FOR TRAFFIC				
1201.01	Provision for traffic (MRS02 Apr 16)	lump	1.00	89,053.74	89,054
	MRS03 Oct 16				
	SUPPLY AND INSTALLATION OF CULVERTS				
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [1050] mm diameter (MRS03 Oct 16)	m	12.20	1,408.37	17,182
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [600] mm diameter (MRS03 Oct 16)	m	12.20	564.69	6,889
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [375] mm diameter (MRS03 Oct 16)	m	120.00	317.96	38,155
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [750] mm diameter (MRS03 Oct 16)	m	24.40	841.77	20,539
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [450] mm diameter (MRS03 Oct 16)	m	12.20	376.98	4,599
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [525] mm diameter (MRS03 Oct 16)	m	12.20	435.83	5,317
2243.01	Supply and installation of concrete box culvert components, [58 cell / 1500mm x 900mm Marine Class] (MRS03 Oct 16)	m	19.20	112,135.45	2,153,001
	CONCRETE IN CULVERTS AND END STRUCTURES				
2302.01	Concrete bases in culverts (MRS03 Oct 16) (800mm wide x 600mm deep)	m3	544.00	1,805.35	982,110
2308.04	End structures to culverts, reinforced concrete (MRS03 Oct 16) - wingwall only	m3	19.36	2,057.56	39,834
2308.01	End structures to culverts, reinforced concrete (MRS03 Oct 16) - headwall only	m3	30.00	1,430.15	42,905
2317.01	Precast concrete end structures to culverts, [1050mm] (MRS03 Oct 16)	each	1.00	2,699.54	2,700
2317.01	Precast concrete end structures to culverts, [600mm] (MRS03 Oct 16)	each	1.00	2,032.17	2,032
2317.01	Precast concrete end structures to culverts, [375mm] (MRS03 Oct 16)	each	1.00	1,659.72	1,660
2317.01	Precast concrete end structures to culverts, [750mm] (MRS03 Oct 16)	each	1.00	2,342.99	2,343
2317.01	Precast concrete end structures to culverts, [450mm] (MRS03 Oct 16)	each	1.00	1,698.34	1,698
2317.01	Precast concrete end structures to culverts, [525mm] (MRS03 Oct 16)	each	1.00	1,987.10	1,987
	PAVEMENT DRAINAGE				
2401.01	Concrete kerb, [type 12] (MRS03 Oct 16)	m	264.00	78.40	20,698
2402.01	Concrete kerb crossings (MRS03 Oct 16)	each	2.00	1,597.67	3,195

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
2404.01	Concrete kerb and channel, [type 7] (MRS03 Oct 16)	m	125.00	54.37	6,796
2405.01	Concrete kerb and channel crossings, [type] (MRS03 Oct 16)	each	2.00	1,597.67	3,195
2413.01	Concrete gullies, [single gully per tmr std. drg 1309 900x900] (MRS03 Oct 16)	each	3.00	7,030.57	21,092
2416.01	Precast concrete side inlet gullies with precast shaft, [roadway sag1C2T trm std drg 1311] (MRS03 Oct 16)	each	6.00	4,081.32	24,488
	SUBSURFACE DRAINAGE				
2502.01	Subsoil drains, Type D (MRS03 Oct 16)	m	125.00	39.44	4,930
	PROTECTIVE TREATMENTS				
2643.01	Rock protection - Causeway (Primary Armour, Dn50 rock (MRS03 Oct 16)	m3	1,150.00	107.47	123,591
2643.02	Rock protection - Causeway (Secondary Armour, Dn50 Rock) (MRS03 Oct 16)	m3	345.00	115.37	39,803
2643.03	Rock protection - Road (Primary Armour, Dn50 Rock) (MRS03 Oct 16)	m3	900.00	118.28	106,452
2643.04	Rock protection - Road (Secondary Armour, Dn50 Rock) (MRS03 Oct 16)	m3	280.00	108.26	30,313
2643.05	Rock base for Culverts if exisitng surface is unsuitable material [98.6m +1m+1m) x (19.2m + 1m + 1m) * 0.8m depth]	m3	1,703.81	105.36	179,513
2644.01	Steel wire gabion protection work (MRS03 Oct 16)	m3	900.00	253.97	228,573
2751.01P	Active rock bolts (MRS03 Oct 16)	m	300.00	549.34	164,802
	MRS04 Oct 14				
	EARTHWORKS, PREPARATION				
3101.01	Clearing and grubbing (MRS04 Oct 14)	m2	20,800.00	2.10	43,680
3103.01P	Stripping of topsoil (Provisional Quantity as directed) (MRS04 Oct 14)	m3	2,080.00	23.78	49,462
3104.01	Ground surface treatment under embankment, standard	m2	5,900.00	1.79	10,561
3107.01P	Ground surface treatment, in situ treatment of acid sulphate soils with lime (Provisional Quantity if ordered) (MRS04 Oct 14)	m2	500.00	7.83	3,915
3108.01P	Excavation and disposal of Unsuitable Material with individual excavation <= 10 m3 (Provisional Quantity as directed) (MRS04 Oct 14)	m3	500.00	32.91	16,455
3109.01P	Excavation and disposal of Unsuitable Material with individual excavation > 10 m3 (Provisional Quantity as directed) (MRS04 Oct 14)	m3	1,550.00	22.59	35,015
3111.01P	Supply and storage of agricultural lime (Provisional Quantity as directed) (MRS04 Oct 14)	tonne	1.00	238.19	238
3112.01P	Quantitative laboratory testing of actual or potential acid sulphate soils (Provisional Quantity if ordered) (MRS04 Oct 14)	per s	5.00	772.51	3,863
3113.01P	Treatment of water contaminated by acid sulphate soil (Provisional Quantity if ordered) (MRS04 Oct 14)	kL	50.00	154.50	7,725
3304.01	Supply and installation of geotextile, Terrafix 900R (Non Woven) (MRS04 Oct 14)	m2	1,740.00	3.47	6,038
	EARTHWORKS, EXCAVATION				
3201.01	Road excavation, all materials (MRS04 Oct 14)	m3	34,900.00	30.48	1,063,752

Annexure E
Contingency example for strategic estimates
(Based on Appendix B from RTA's Project Estimating Manual)

Queensland Government

Complete cells with green shading

Estimate Stage: Strategic / Planning

Project Location:	Black Current Island
Project Description:	Access Road including Causeway to new Boat Ramp

Task/activity	Comments	Highly Confident & Reliable	Reasonably Confident & Reliable	Not Confident & Not Reliable	Adopted Contingency
Project Scope	Is it well defined? Yes V No Λ	3%	4%	5%	4%
	Is there room to vary the works? Yes Λ No V	3%	4%	5%	4%
	Are there many options? Yes Λ No V	3%	4%	5%	4%
Risks	Are there Significant Risks? Yes Λ No V Political, Community, Technical, Financial.	5%	6%	8%	8%
	Has a detailed Risk analysis been done? Yes V No Λ	4%	6%	7%	6%
Constructability	Has a constructability review been undertaken? Yes V No Λ	3%	4%	5%	4%
	Is constructability a problem? Yes Λ No V	3%	4%	5%	5%
Key Dates	Are the Project dates known? Yes V No Λ	1%	2%	3%	3%
	Is the project planned for the distant future? Yes Λ No V	1%	2%	3%	2%
Information	Has investigation been Undertaken? Yes V No Λ Geotechnical, Heritage, Environmental, Technical, Hydraulic	9%	12%	15%	12%
Length of the Project	Is the Project Short? Yes Λ No V <1km Short >25km Long	4%	7%	10%	7%
	Total Contingency percentage to be adopted:				**59%**

Notes:
No V denotes that if the answer is No, decrease contingency.
No Λ denotes that if the answer is No, increase contingency.
Yes Λ denotes that if the answer is Yes, increase contingency.
Yes V denotes that if the answer is Yes, decrease contingency.

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
3211.01P	Excavation of non-rippable material in road excavation, rate additional to rate for Work Item 3201 (Provisional Quantity) (MRS04 Oct 14)	m3	5,600.00	51.59	288,904
	EARTHWORKS, EMBANKMENT				
3301.01	Road embankment - Class A1/B (MRS04 Oct 14)	m3	9,800.00	30.05	294,490
3305.01P	Addition of lime to embankment materials to neutralise acid sulphate soils, rate additional to rates for Work Items 3301 to 3303 (Provisional Quantity as directed) (MRS04 Oct 14)	m3	8,063.00	10.04	80,953
	EARTHWORKS, SUBGRADE				
3401.01P	Testing of existing material below subgrade level in cuttings (Provisional Quantity if ordered) (MRS04 Oct 14)	per s	5.00	618.00	3,090
3402.01P	Subgrade treatment Type A in cuttings and in embankments (Provisional Quantity if ordered) (MRS04 Oct 14)	m2	13,600.00	1.71	23,256
3403.01P	Subgrade in cuttings, subgrade treatment Type B, replace with subgrade fill material (Provisional Quantity, if ordered) - Material supplied by the Head Contractor to the point of placement (Imported fill meeting the classification requirements of MRTS04)	m3	1,880.00	72.94	137,127
	EARTHWORKS, BACKFILL				
3502.01	Backfill with select backfill material to [description] (MRS04 Oct 14)	m3	2,050.00	104.69	214,615
	UNBOUND PAVEMENTS				
4151.01	Type 2.1 Unbound Pavement [Roadway - Base Cement Modified, GB, 0.8>UCS<1.5MPa] (MRS05 Oct 16)	m3	1,910.00	151.71	289,766
4151.01	Type 2.1 Unbound Pavement [Culvert Crossing - SubBase Cement Treated, GB, 2>UCS<3MPa] (MRS05 Oct 16)	m3	540.00	167.72	90,569
4153.01	Type 2.3 Unbound Pavement [Roadway Subbase] (MRS05 Oct 16)	m3	2,336.40	111.32	260,088
4153.01	Type 2.3 Unbound Pavement [Roadway Subbase] (MRS05 Oct 16)	m3	2,336.40	111.32	260,088
	MRS11 Oct 14				
	SPRAYED BITUMINOUS EMULSION SURFACING				
5241.01	Sprayed bituminous emulsion surfacing, [including | excluding] supply of binder, [including | excluding] supply of cover aggregates, [location], refer to Clause 1 of Annexure MRS12.1 (MRS12 Oct 14) - 11,700m2				
5101.01	Prime, grade [AMC00], spray rate [1 L/m2], [including] supply of binder, [Widening] (MRS11 Jan 17)	litre	11,700.00	2.38	27,846
5103.11	Seal, class [PMB S0.7S SAM], spray rate [1.9 L/m2], [including] supply of binder, (MRS11 Jan 17)	litre	22,230.00	2.00	44,460
5107.02P	Supply and addition of adhesion agent (Provisional Quantity) (MRS11 Jan 17)	litre	195.00	5.59	1,090
5108.02P	Supply and addition of cutter oil (Provisional Quantity) (MRS11 Jan 17)	litre	3,231.00	8.38	27,076

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
5112.03	Spreading cover aggregate [10 mm], [190m2/m3], [Widening] (MRS11 Jan 17)	m3	62.00	109.44	6,785
	MRS22 Oct 14				
	SUPPLY OF COVER AGGREGATE				
5011.03	Supply of cover aggregate [precoated], [10] mm nominal size (MRS22 Oct 16)	m3	62.00	193.13	11,974
	GUIDANCE AND INFORMATION SYSTEMS				
6111.01	Road edge guide posts (MRS14 Oct 16)	each	30.00	61.55	1,847
6122.01	Supply of regulatory, warning and hazard sign faces (MRS14 Oct 16)	each	30.00	386.26	11,588
6123.01	Supply of direction and information sign faces, as listed in Clause 2.3 of Annexure MRS14A.1 (MRS14 Oct 16)	each	5.00	321.88	1,609
6132.01	Installation of regulatory, warning and hazard signs, [number of posts] (MRS14 Oct 16)	each	30.00	334.37	10,031
6135.01	Installation of direction and information signs (MRS14 Oct 16)	each	5.00	334.37	1,672
6136.01	Supply, erection and removal of project signs (MRS14 Oct 16)	lump	1.00	1,924.08	1,924
	ROADSIDE STRUCTURES				
6161.01	Steel beam guardrail, w beam (MRS14 Oct 16)	m	197.20	128.75	25,390
6162.01	Steel beam guardrail, terminal type 1	each	4.00	3,862.56	15,450
	MRS16 Oct 14				
	GROUND PREPARATION WORKS - TESTING AND AMELIORANTS				
3802.01	Preparation of a Soil Management Plan - Construction - Form A (MRS16 Oct 14)	lump	1.00	1,931.28	1,931
	GROUND PREPARATION WORKS - TOPSOIL				
3830.01	Install topsoil 100mm (MRS16 Oct 14)	m2	4,500.00	2.53	11,385
	VEGETATION WORKS - SEEDING				
3839.01	Hydromulch native seeding - double pass [mix name] (MRS16 Oct 14)	m2	4,500.00	0.84	3,780
	VEGETATION WORKS - TURFING				
3847.01	Turf [description] (MRS16 Oct 14)	m2	240.00	9.01	2,162
	ESTABLISHMENT AND MONITORING OPERATIONS				
3891.01	Establishment Period (MRS16 Oct 14)	lump	1.00	22,489.09	22,489
3892.01P	Establishment Period Watering (Provisional Quantity, as directed) (MRS16 Oct 14)	kilol	1.00		INCLUDED
3895.01	Monitoring Period [90 days] (MRS16 Oct 14)	lump	1.00	7,237.91	7,238
3896.01P	Monitoring Period Watering (Provisional Quantity, as directed) (MRS16 Oct 14)	kilol	1.00		INCLUDED
	MRS257 Jul 15				
	CONTRACTOR'S SITE FACILITIES AND CAMP				
1101.01	Contractor's site facilities (MRS28 Apr 16)	lump	1.00	47,820.00	47,820
1102.01	Contractor's camp (MRS28 Apr 16)	lump	1.00		N/A
	MRS30 Jan 16				
	ASPHALT SURFACING				
4159	Medium Duty dense graded asphalt in surfacing (50mm)	tonne	1,325.00	251.07	332,668

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
	MRS40 Oct 16				
	CONCRETE PAVEMENT BASE				
4514.01	Supply and Place Concrete in Continuously Reinforced Base (MRS40 Oct 16)	m3	216.00	1,355.91	292,877
	MRS45 Jan 17				
	LINE MARKING				
6301.01	Spotting only for longitudinal lines (MRS45 Jan 17)	m	900.00	1.29	1,161
6315.01	Barrier line, both directions, 80 mm wide each line, 80 mm lateral gap between lines, colour [colour], material [material] (MRS45 Jan 17)	m	900.00	1.93	1,737
6319.01	Edge line, 150 mm wide, colour white, material (MRS45 Jan 17)	m	1,800.00	1.74	3,132
6321.01	Continuity line, 200 mm wide, colour [colour], material [material] (MRS45 Jan 17)	m	150.00	2.12	318
6332.01	Transverse lines (diagonal and chevron markings,parking areas and kerb markings), colour [colour], material [material] (MRS45 Jan 17)	m2	100.00	51.50	5,150
	RAISED PAVEMENT MARKERS				
6351.01	Retroreflective raised pavement markers (MRS45 Jan 17)	each	180.00	10.30	1,854
	MRS51 Oct 16				
	ENVIRONMENTAL MANAGEMENT				
1330.01	Environmental Inspections (MRS51 Oct 16)	lump	1.00	8,111.38	8,111
1331.01	Develop Environmental Management Plan (Construction) (MRS51 Oct 16)	lump	1.00	4,828.20	4,828
1332.01	Implement Environmental Management Plan (Construction) (MRS51 Oct 16)	lump	1.00	8,111.38	8,111
1333.01	Environmental Licences, Permits and Approvals (MRS51 Oct 16)	lump	1.00	11,207.87	11,208
1351.01	Cultural Heritage Management (MRS51 Oct 16)	lump	1.00	4,828.20	4,828
1355.01P	Noise monitoring, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1.00	4,248.82	4,249
1361.01P	Condition survey and vibration monitoring, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1.00	2,575.05	2,575
1365.01P	Air quality monitoring, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1.00	2,768.17	2,768
1371.01P	Management of contaminated sites, if ordered (Provisional Quantity) (MRS51 Oct 16)	m3	1.00	2,575.04	2,575
1375.01P	Fauna management, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1.00	2,626.54	2,627
1381.01P	Pest Control, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1.00	3,218.80	3,219
	MRS52 Oct 16				
	EROSION AND SEDIMENT CONTROL				
1231.01	Erosion and Sediment Control Plan/s (MRS52 Oct 16)	lump	1.00	2,575.05	2,575
1232.01	Independent Verification and Auditing (MRS52 Oct 16)	lump	1.00	3,862.56	3,863
	MRS91 Jan 17				
	CONDUIT AND CONDUIT FITTINGS UNDERGROUND				

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
6507.01	Supply and installation of 100 mm, HDuPVC, elec. conduit(s), in fill (MRS91 Jan 17)	m	1,120.00	74.88	83,866
	ANCILLARY WORKS				
6534.01	Flush and clear conduit (all types) (MRS91 Jan 17) Provisional	m	1,120.00	0.24	269
	CABLE JOINTING PITS				
6554.01	Supply and installation of cable jointing pit [type] (MRS91 Jan 17)	each	24.00	1,322.82	31,748
6555.01	Construction of pit surround (MRS91 Jan 17)	each	24.00	362.99	8,712
6558.01	Supply and installation of maintenance marker post (MRS91 Jan 17)	each	24.00	66.88	1,605
	ROAD LIGHTING FOOTINGS				
6701.01	Road lighting pole footing, 786x346x159 mm diameter (MRS92 Jan 17)	each	24.00	1,519.51	36,468
6703.01P	Road lighting pole footing extension in poor soil, 400 mm long, [diameter] mm diameter, if ordered (Provisional Quantity) (MRS92 Jan 17)	each	1.00	1,475.23	1,475
6704.01P	Excavation in excessively hard material, rate additional to rate for Work Items 6701, 6702 and 6703P (Provisional Quantity) (MRS92 Jan 17)	m3	1.00	97.51	98
	MRS94 Jan 16				
	ROAD LIGHTING				
6711.01	Supply of [slip base] road lighting pole, [9000] mm vertical height (MRS94 Jan 16)	each	24.00	3,991.32	95,792
6714.01	Supply of road lighting luminaire headframe, [number of spigots] way headframe (MRS94 Jan 16)	each	24.00	321.88	7,725
6731.01	Supply of road lighting luminaire, [Sylvania], [RoadLED] [60W] (MRS94 Jan 16)	each	24.00	354.07	8,498
6742.01	Installation of road lighting outreach arm 3m (MRS94 Jan 16)	each	24.00	482.82	11,588
6744.01	Installation of road lighting luminaire headframe (MRS94 Jan 16)	each	24.00	96.56	2,317
6761.01	Installation of road lighting luminaire (MRS94 Jan 16)	each	24.00	193.13	4,635
	MRS256 Power Cables				
6811.01	Supply of underground road lighting cable, 16 mm2, 4 cores, XLPE, PVC, Cu	m	950.00	19.31	18,345
6821.01	Installation, jointing and termination of underground road lighting cable, 16 mm2, 4 cores, XLPE, PVC, Cu	m	950.00	10.94	10,393
	MRS96 Jul 16				
9000.01	1.2m wide concrete footpath x 0.1m depth	m	80.00	158.47	12,678
9000.02	In pit trash basket	each	1.00	3,218.80	3,219
9000.03	Gross Pollutant Trap	each	2.00	106,165.61	212,331
9000.04	Toilet Block [Male Female and Ambulant, stand alone self treating system]	each	1.00	70,813.67	70,814
9000.05	Block work retaining wall	Item	1.00	173,815.36	173,815

Item	Description	Unit	Quantity	Unit Rate	Amount (AUD)
	Total for project (excluding GST)				*9,335,468*
	GST for project (GST rate = 0.00)				
	Total for project (including GST)				*9,335,468*

Tenderer's signature .....

Appendix B **Project Summary**

Project Summary

Black Current Island Boat Ramp

Printed July 7, 2017 17:40:01

	Labour	Material	Plant	Subcontract	Total	% CV	% TC	% DC
Direct costs	1,453,924	3,650,639	827,758	1,300,799	7,233,120	77.48	85.23	100.00
Overhead costs	881,323	169,790	121,000	81,552	1,253,665	13.43	14.77	17.33
Sub total, costs	***2,335,247***	***3,820,429***	***948,758***	***1,382,351***	***8,486,785***	***90.91***	***100.00***	***117.33***
Risks and opportunities	0	0	0	0	0	0.00	0.00	0.00
Preadjustments	0	0	0	0	0	0.00	0.00	0.00
Cost Total	***2,335,247***	***3,820,429***	***948,758***	***1,382,351***	***8,486,785***	***90.91***	***100.00***	***117.33***
Overall margin	10.00	% overall (on total cost), and			848,679	9.09	10.00	11.73
Corporate margin	0.00	% overall (on total cost), and			0	0.00	0.00	0.00
Margins on direct costs (%)	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
Margins on overhead costs (%)	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
Margins on risks and opportunities (%)	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
Margins on preadjustments (%)	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
Defined margin					0	0.00	0.00	0.00
Margins on provisional sums (%)				0.00	0	0.00	0.00	0.00
			Margins total		***848,679***	***9.09***	***10.00***	***11.73***
			Items on which no margin is calculated		0	0.00	0.00	0.00
			Post adjustments		0	0.00	0.00	0.00
			Provisional sums		0	0.00	0.00	0.00
			Anticipated Direct Costs		0	0.00	0.00	0.00
			Anticipated Overhead Costs		0	0.00	0.00	0.00
			Project Total		***9,335,464***	***100.00***	***110.00***	***129.07***
			GST amount		0	0.00	0.00	0.00
			Project total including GST		***9,335,464***	***100.00***	***110.00***	***129.07***

0 unfinished direct cost items exist in a total of 190 items
0 unfinished overhead cost items exist in a total of 26 items

Appendix C **Risk Register**

Black Current Island Boat Ramp

Risk Register

					Inherent Risk				Residual Risk				Contingency Range			
Risk / Opportunity	Risk / Opportunity	Drivers / Potential Consequence	Proposed Risk Treatment	Organisation	Likelihood	Consequence	Risk Rating	Inherent Risk Treatment	Likelihood	Consequence	Risk Rating	Likelihood	Min.	Likely	Max.	Comments
R	Failure to define the project scope in consultation with stakeholders due to use of incorrect standards, access requirements and conflicts with utility services within construction extents.	Increase costs for design and construction changes Delay to project delivery Legal and compliance issues Adverse media and reputation effects.	- On going communications between parties involved in particular stakeholders. - Options analysis complete	DIID	Possible	Moderate		No Further Risk Treatment	Unlikely	Minor	Low					No Risk Allowance.
R	Design / scope creep to project due to current knowledge.	Increase costs for design and construction changes. Delay to project delivery.	- Project design to level of detail for concept phase	WRC	Almost Certain	Moderate	Extreme	Allow for % of CV for risk assessment 0, 3, 7% of CV.	Almost Certain	Moderate	Extreme	98%	2	$ 210,000	$ 560,000	
R	Poor/partly complete knowledge of ground conditions due to insufficient/inaccurate geotechnical information.	Increase costs for re-design. Delay to project delivery	- Site visits by suitably qualified persons. - Unsuitable material allowance in schedule. - Research the available geotechnical information and use appropriately - Follow appropriate guidelines and standards for survey and geotechnical investigations. - Follow appropriate procedures and standards for material testing - Approximated pavement design completed for concept phase	DHD / WRC	Possible	Moderate		1 Seek understanding to quantification of unsuitable material allowances. 2 Planned risk assessment	Unlikely	Moderate						Included in planned risk
R	Poor / incorrect interpretation of hydraulic model	Increase costs for re-design and construction re -work Delay to project delivery Post-construction complaints Model impact may be questioned	- Hydraulic model assessed by experienced and competent persons	GHD / WRC	Possible	Minor	Medium	1 Concept phase excluded hydraulic modelling 2 Increased design creep to cater for this	Rare	Minor	Low					No Risk Allowance.
R	Design omissions / errors due to inadequate design inputs (concept Phase)	Increase in costs due to unavailability of materials Delay to project delivery	- Completed Survey Model - Best assessment at quantifying unsuitable materials - Contract quality plan and management requirements.	GHD / WRC	Almost Certain	Moderate	Extreme	Allow for nominal % of CV for a nominal allowance for risk. Say B: 1 .3% of CV	Almost Certain	Moderate	Extreme	98%	$	$ 90,000	$ 240,000	Say B: 1 .3% of CV
R	Severe weather events may cause damage prior to, or during construction. Wet weather over and above from normal wet weather	Maintenance and repair costs. Disruption to the community Delay to project delivery Restrictions to traffic movement and access.	Consult BOM to make assessment and predict future weather events and make allowance for 'normal' wet weather inside estimate	GHD / WRC	Possible	Moderate		Allow for 'normal' wet weather (5 weeks) inside estimate. This will allow for Recurring costs to be covered for a period of time Allow for 0, 1, 4 weeks extra over wet weather	Possible	Moderate		46%	$	$ 12,432	$ 50,808	Allow for 0, 1, 4 weeks extra over wet weather
R	Change of current design standards or specifications due to departmental discussion to change or update current standards in response to incident/evidence.	Increase in costs. Delay to project delivery. Media and reputation	State current design standards used for project. Any changes may result in a variation to the contract (for the contractor / GHD)	WRC	Unlikely	Minor	Low	No Further Risk Treatment	Rare	Minor	Low					No Risk Allowance.
R	WRC internal approvals for design	Delay to project delivery	- Detailed program to ensure all parties are aware of upcoming expectations. - Ongoing project meetings and communications	WRC	Unlikely	Minor	Low	No Further Risk Treatment	Unlikely	Minor	Low					No Risk Allowance.
R	Design survey not adequate for construction	Delay to project delivery Increase in costs to re-do survey	- Specific detailed design survey/models completed for project.	GHD	Possible	Minor	Medium	1 Design creep allowance to include for this (see risk no 2).	Unlikely	Minor	Low					No Risk Allowance.
R	Workplace health and safety	Injury to personnel	- Contractors safety plan to be assessed by WRC and approved for construction. - Safety in design workshop completed.	WRC / Contractor	Possible	Extreme	Extreme	TCC Inspectors to be on site at all times and help manage safety on site in line with Safety Management Plan. Costs for TCC as a result of an incident. Allow minimal amount for H&S Contingency range >> 0, $25K, $75K	Possible	Extreme	Extreme					No Risk Allowance.
R	Construction under traffic	Irate road users Road rage Media and reputation	- Complete traffic management plan for WRC to approve. - Little impact to traffic due to green fields project.	WRC / Contractor	Possible	Minor	Medium	1 Connection to Gloucester Avenue will have little impact to traffic. 2 Low traffic environment	Rare	Minor	Low					No Risk Allowance.
R	Unexpected protected flora / fauna present	Delay to project Costs to project	Project footprint will urbanised little / low risk to project.	SMEC / TCC / Contractor	Unlikely	Minor	Low	No Further Risk Treatment	Unlikely	Minor	Low					No Risk Allowance.
R	Conflict with services (unidentified)	Low dense build-up area Delay to project Additional costs to project	1 Complete DBYD assessment 2 Low likelihood in finding existing services due to 'green field' environment	GHD / WRC	Possible	Minor	Medium	1 Allow for Additional pot hole works to be included as a line item in BOQ. Put onus onto contractor to ensure pot holing is completed and all services are identified 2 No risk allowance	Rare	Minor	Low					No Risk Allowance.
R	Conflict with services (identified) *Note: Defence cable*	Delay to project Costs to contractor	Complete DBYD assessment Allow for geoholing as a BOQ item	WRC / Contractor	Possible	Minor	Medium	1 Allow for Additional pot hole works to be included as a line item in BOQ. Put onus onto contractor to ensure pot holing is completed and all services are identified 2 No risk allowance	Rare	Minor	Low					No Risk Allowance.
R	Quantification of BOQ	Additional costs for project	Complete unplanned risk on Quantity	SMEC	Possible	Moderate		1 Planned risk to be included in PID estimate	Rare	Moderate	Medium					Included in planned risk
R	Embankment fill	Utilise excavation material as possible embankment fill	Allow for cut to fill in lieu of purchasing material	Contractor	Possible	Minor	Medium	1 Allow for 100% cut to fill for estimate 2 Allow for 0, 20, 50% of material to be import.	Possible	Minor	Medium	46%	$	$ 80,243	$ 219,950	
R	Environmental Approvals	Working around marginals Additional costs for project to satisfy approvals Delay to project for extended approvals process	Concept phase will not have addressed the full extend of environmental approvals. Will be a principal cost and needs to be included in PID estimate	WRC	Likely	Moderate		Significant risk on suitable environmental approvals for this project. Planned risk on principal costs	Unlikely	Moderate	Medium					Included in planned risk

Black Current Island Boat Ramp

Risk Register

					Inherent Risk				Residual Risk				Contingency Range			Comments
Risk / Opportunity	Risk / Opportunity	Drivers / Potential Consequence	Proposed Risk Treatment	Organisation	Likelihood	Consequence	Risk Rating	Inherent Risk Treatment	Likelihood	Consequence	Risk Rating	Likelihood	Min.	Likely	Max.	
R	Dewatering for culvert construction	Insufficient work methodology for de-watering for specific construction activities Additional costs for project	Simple de-watering techniques to be included in DIC	DHD	Likely	Moderate		Extra over allowance to be made for significant dewatering as this project would be effected by tidal movements Earth bund to be constructed to offer some protection to culvert structure whilst under construction Allow for ½ of de-watering costs to increase dewatering capacity (allow 0, 15, 30% ratio)	Possible	Moderate		48%	$	$ 8,760	$ 22,500	
R	Foundation to culvert structures	Insufficient foundation treatment causing structure failure Delay to project Additional costs	Rock foundation allowance made in BOQ. Depth based on concept design detail	GHD / WRC	Possible	Moderate		Planned risk assessment to be completed	Unlikely	Moderate	Moderate					Included in planned risk
R	Loss of major culvert structure during construction	Possible high / king tide / tidal surge to wash out culvert structure during construction Additional costs to project Delay to programme	Allow for earth bund both sides (temporary works) to provide some safety to structure whilst building	WRC / Contractor	Possible	Moderate		Allow ¼ f costs for structure t replace what is damaged Allow 0, 15, 30% of culvert costs	Possible	Moderate		48%	$	$ 243,843	$ 317,810	

Appendix D **Planned Risk Register**

Item	Description	Unit	Quantity	Unit rate	Amount	Range on Quantity				@Risk Data				Range on Rate				@Risk Data		
						Low	High	Min	Max	Shape	Low %	Upper %	Model Input for Quantity	Low	High	Min	Max	Shape	Low %	Upper %
	MRS02 Apr 16																			
	PROVISION FOR TRAFFIC																			
1201.01	Provision for traffic (MRS02 Apr 16)	lump	1	$ 89,053.74	$89,054	100%	100%	1	1	Trigen	10	90	-	90%	150%	80,148	133,581	Trigen	10	90
	MRS03 Oct 16																			
	SUPPLY AND INSTALLATION OF CULVERTS																			
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [1050] mm diameter (MRS03 Oct 16)	m	12	$ 1,408.37	$17,182	92%	110%	11	13	Trigen	10	90	-	90%	125%	1,268	1,760	Trigen	10	90
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [600] mm diameter (MRS03 Oct 16)	m	12	$ 564.69	$6,889	90%	110%	11	13	Trigen	10	90	-	90%	125%	508	706	Trigen	10	90
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [375] mm diameter (MRS03 Oct 16)	m	120	$ 317.96	$38,155	90%	110%	108	132	Trigen	10	90	-	90%	125%	286	397	Trigen	10	90
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [750] mm diameter (MRS03 Oct 16)	m	24	$ 841.77	$20,539	90%	110%	22	27	Trigen	10	90	-	90%	125%	758	1,052	Trigen	10	90
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [450] mm diameter (MRS03 Oct 16)	m	12	$ 376.98	$4,599	90%	110%	11	13	Trigen	10	90	-	90%	125%	339	471	Trigen	10	90
2241.01	Supply and installation of concrete pipe culvert components, Class [Marine Class 2], [525] mm diameter (MRS03 Oct 16)	m	12	$ 435.83	$5,317	90%	110%	11	13	Trigen	10	90	-	90%	125%	392	545	Trigen	10	90
2243.01	Supply and installation of concrete box culvert components, [58 cell / 1500mm x 900mm Marine Class] (MRS03 Oct 16)	m	19	$ 112,155.45	$2,163,001	90%	110%	17	21	Trigen	10	90	-	90%	125%	100,922	140,169	Trigen	10	90
	CONCRETE IN CULVERTS AND END STRUCTURES		-	$ -																
2302.01	Concrete bases in culverts (MRS03 Oct 16) [600mm wide x 600mm deep]	m3	544	$ 1,805.35	$982,110	90%	110%	490	598	Trigen	10	90	1.44	90%	120%	1,625	2,166	Trigen	10	90
2308.04	End structures to culverts, reinforced concrete (MRS03 Oct 16) - wingwall only	m3	19	$ 2,057.56	$39,834	90%	110%	17	21	Trigen	10	90	-	90%	120%	1,852	2,469	Trigen	10	90
2308.01	End structures to culverts, reinforced concrete (MRS03 Oct 16) - headwall only	m2	30	$ 1,430.15	$42,905	90%	110%	27	33	Trigen	10	90	-	90%	120%	1,287	1,716	Trigen	10	90
2317.01	Precast concrete end structures to culverts, [1050mm] (MRS03 Oct 16)	each	1	$ 2,699.54	$2,700	90%	110%	1	1	Trigen	10	90	-	90%	120%	2,430	3,239	Trigen	10	90
2317.01	Precast concrete end structures to culverts, [600mm] (MRS03 Oct 16)	each	1	$ 2,032.17	$2,032	90%	110%	1	1	Trigen	10	90	-	90%	120%	1,829	2,439	Trigen	10	90
2317.01	Precast concrete end structures to culverts, [375mm] (MRS03 Oct 16)	each	1	$ 1,659.72	$1,660	90%	110%	1	1	Trigen	10	90	-	90%	120%	1,494	1,992	Trigen	10	90
2317.01	Precast concrete end structures to culverts, [750mm] (MRS03 Oct 16)	each	1	$ 2,342.59	$2,343	90%	110%	1	1	Trigen	10	90	-	90%	120%	2,109	2,812	Trigen	10	90
2317.01	Precast concrete end structures to culverts, [450mm] (MRS03 Oct 16)	each	1	$ 1,698.24	$1,698	90%	110%	1	1	Trigen	10	90	-	90%	120%	1,529	2,039	Trigen	10	90
2317.01	Precast concrete end structures to culverts, [525mm] (MRS03 Oct 16)	each	1	$ 1,987.10	$1,987	90%	110%	1	1	Trigen	10	90	-	90%	120%	1,788	2,385	Trigen	10	90
	PAVEMENT DRAINAGE		-	$ -																
2401.01	Concrete kerb, [type 12] (MRS03 Oct 16)	m	264	$ 78.40	$20,698	90%	120%	238	317	Trigen	10	90	275	90%	120%	73	94	Trigen	10	90
2402.01	Concrete kerb crossings (MRS03 Oct 16)	each	2	$ 1,597.67	$3,195	90%	120%	2	2	Trigen	10	90	2	90%	120%	1,438	1,917	Trigen	10	90
2404.01	Concrete kerb and channel, [type 7] (MRS03 Oct 16)	m	125	$ 54.37	$6,796	90%	120%	113	150	Trigen	10	90	130	90%	120%	49	65	Trigen	10	90
2405.01	Concrete kerb and channel crossings, [type] (MRS03 Oct 16)	each	2	$ 1,597.67	$3,195	90%	120%	2	3	Trigen	10	90	2	90%	120%	1,438	1,917	Trigen	10	90
2412.01	Concrete gullies, [single gully per tmr std drg 1309 900x900] (MRS03 Oct 16)	each	3	$ 7,030.57	$21,092	90%	120%	3	4	Trigen	10	90	3	90%	120%	6,328	8,437	Trigen	10	90
2416.01	Precast concrete side inlet gullies with precast shaft, [roadway sag1-C27 tmr std drg 1311] (MRS03 Oct 16)	each	6	$ 4,081.32	$24,488	90%	110%	5	9	Trigen	10	90	7	90%	120%	3,673	4,898	Trigen	10	90
	SUBSURFACE DRAINAGE																			
2502.01	Subsoil drains, Type D (MRS03 Oct 16)	m	125	$ 39.44	$4,930	90%	120%	113	150	Trigen	10	90	125	90%	120%	35	47	Trigen	10	90
	PROTECTIVE TREATMENTS																			
2643.01	Rock protection - Causeway (Primary Armour, Dn50 rock (MRS03 Oct 16)	m3	1,150	$ 107.47	$123,591	90%	120%	1035	1495	Trigen	10	90	1149	90%	120%	97	140	Trigen	10	90
2643.02	Rock protection - Causeway (Secondary Armour, Dn50 Rock) (MRS03 Oct 16)	m3	345	$ 115.37	$39,803	90%	120%	311	449	Trigen	10	90	345	90%	120%	104	150	Trigen	10	90
2643.03	Rock protection - Road (Primary Armour, Dn50 Rock) (MRS03 Oct 16)	m3	900	$ 118.28	$106,452	90%	120%	810	1170	Trigen	10	90	900	90%	120%	106	154	Trigen	10	90
2643.04	Rock protection - Road (Secondary Armour, Dn50 Rock) (MRS03 Oct 16)	m3	280	$ 108.26	$30,313	90%	120%	252	364	Trigen	10	90	364	90%	120%	97	141	Trigen	10	90
2643.05	Rock base for Culverts if existing surface is unsuitable material [(8.6m -1m-1m) x (19.2m – 1m – 1m) * 0.8m depth]	m3	1,704	$ 105.36	$179,513	90%	150%	1533	2215	Trigen	10	90	1533	90%	120%	95	137	Trigen	10	90
2644.01	Steel wire gabion protection work (MRS03 Oct 16)	m3	900	$ 253.97	$228,573	90%	120%	810	1170	Trigen	10	90	675	90%	120%	229	330	Trigen	10	90
2751.01P	Active rock bolts (MRS03 Oct 16)	m	300	$ 549.34	$164,802	90%	150%	270	390	Trigen	10	90	315	90%	150%	494	824	Trigen	10	90
	MRS04 Oct 16																			
	EARTHWORKS, PREPARATION																			
3101.01	Clearing and grubbing (MRS04 Oct 14)	m2	20,800	$ 2.10	$43,680	90%	130%	18720	27040	Trigen	10	90	22880	90%	120%	2	3	Trigen	10	90
3103.01P	Stripping of topsoil (Provisional Quantity as directed) (MRS04 Oct 14)	m3	2,080	$ 23.78	$49,462	90%	130%	1872	2704	Trigen	10	90	2704	90%	110%	21	26	Trigen	10	90
3104.01	Ground surface treatment under embankment, standard	m2	5,900	$ 1.79	$10,561	90%	130%	5310	7670	Trigen	10	90	5400	90%	130%	2	2	Trigen	10	90
3107.01P	Ground surface treatment, in situ treatment of acid sulphate soils with lime (Provisional Quantity if ordered) (MRS04 Oct 14)	m2	500	$ 7.83	$3,915	90%	130%	450	650	Trigen	10	90	450	90%	150%	7	12	Trigen	10	90
3108.01P	Excavation and disposal of Unsuitable Material with individual excavation <= 10 m3 (Provisional Quantity as directed) (MRS04 Oct 14)	m3	500	$ 32.91	$16,455	90%	150%	450	750	Trigen	10	90	450	90%	125%	30	39	Trigen	10	90
3109.01P	Excavation and disposal of Unsuitable Material with individual excavation > 10 m3 (Provisional Quantity as directed) (MRS04 Oct 14)	m3	1,550	$ 22.59	$35,015	90%	150%	1395	2325	Trigen	10	90	1395	90%	120%	20	27	Trigen	10	90
3111.01P	Supply and storage of agricultural lime (Provisional Quantity as directed) (MRS04 Oct 14)	tonne	1	$ 236.19	$236	90%	130%	1	1	Trigen	10	90	1	90%	125%	214	298	Trigen	10	90
3112.01P	Quantitative laboratory testing of actual or potential acid sulphate soils (Provisional Quantity if ordered) (MRS04 Oct 14)	per s	5	$ 772.51	$3,863	90%	130%	5	7	Trigen	10	90	5	90%	120%	695	927	Trigen	10	90
3113.01P	Treatment of water contaminated by acid sulphate soil (Provisional Quantity if ordered) (MRS04 Oct 14)	kL	50	$ 154.50	$7,725	90%	130%	45	65	Trigen	10	90	54	90%	125%	139	193	Trigen	10	90
3304.01	Supply and installation of geotextile, Terrafix 900R (Non Woven) (MRS04 Oct 14)	m2	1,740	$ 3.47	$6,039	90%	130%	1566	2262	Trigen	10	90	1890	90%	110%	3	4	Trigen	10	90
	EARTHWORKS, EXCAVATION																			
3201.01	Road excavation, all materials (MRS04 Oct 14)	m3	34,900	$ 30.48	$1,063,752	90%	130%	31410	45370	Trigen	10	90	37730	90%	110%	27	34	Trigen	10	90
3211.01P	Excavation of non-rippable material in road excavation, rate additional to rate for Work Item 3201 (Provisional Quantity) (MRS04 Oct 14)	m3	5,600	$ 51.59	$288,904	90%	150%	5040	8400	Trigen	10	90	6721	90%	110%	46	57	Trigen	10	90
	EARTHWORKS, EMBANKMENT																			
3301.01	Road embankment - Class A1/B (MRS04 Oct 14)	m3	9,800	$ 30.05	$294,490	90%	150%	8820	12740	Trigen	10	90	10640	90%	110%	27	33	Trigen	10	90
3305.01P	Addition of lime to embankment materials to neutralise acid sulphate soils, rate additional to rates for Work Items 3301 to 3303 (Provisional Quantity as directed) (MRS04 Oct 14)	m3	8,063	$ 15.04	$80,963	90%	150%	7257	12095	Trigen	10	90	9451	90%	120%	9	12	Trigen	10	90
	EARTHWORKS, SUBGRADE																			
3401.01P	Testing of existing material below subgrade level in cuttings (Provisional Quantity if ordered) (MRS04 Oct 14)	per s	5	$ 618.00	$3,090	90%	150%	5	8	Trigen	10	90	6	90%	120%	556	742	Trigen	10	90

Black Current Island Boat Ramp

Planned Risk Model Inputs

Item	Description	Unit	Quantity	Unit rate	Amount	Range on Quantity				@Risk Data			Range on Rate				@Risk Data		
						Low	High	Min	Max	Shape	Low %	Upper %	Model Input for Quantity	Low	High	Min	Max	Shape	Low %	Upper %
3402.01P	Subgrade treatment Type A in cuttings and in embankments (Provisional Quantity if ordered) (MRS04 Oct 14)	m2	13,600	$ 1.71	$23,256	90%	130%	12240	17680	Trigen	10	90	13774	90%	120%	2	2	Trigen	10	90
3403.01P	Subgrade in cuttings, subgrade treatment Type B, replace with subgrade fill material (Provisional Quantity, if ordered) - Material supplied by the Head Contractor to the point of placement (imported fill meeting the classification requirements of MRTS04)	m3	1,880	$ 72.94	$137,127	90%	150%	1692	2820	Trigen	10	90	2204	90%	130%	66	96	Trigen	10	90
	EARTHWORKS, BACKFILL																			
3502.01	Backfill with select backfill material to: [description] (MRS04 Oct 14)	m3	2,050	$ 104.65	$214,518	90%	150%	1845	3075	Trigen	10	90	2406	90%	130%	94	136	Trigen	10	90
	UNBOUND PAVEMENTS																			
4151.01	Type 2.1 Unbound Pavement [Roadway - Base Cement Modified, GB, 0.8<UCS<1.5MPa] (MRS05 Oct 16)	m2	1,910	$ 151.71	$289,786	90%	130%	1719	2483	Trigen	10	90	2243	90%	130%	137	197	Trigen	10	90
4151.01	Type 2.1 Unbound Pavement [Culvert Crossing - SubBase Cement Treated, GB, 2<UCS<3MPa] (MRS05 Oct 16)	m3	540	$ 167.72	$90,569	90%	130%	486	702	Trigen	10	90	635	90%	130%	151	218	Trigen	10	90
4153.01	Type 2.3 Unbound Pavement [Roadway Subbase] (MRS05 Oct 16)	m3	2,336	$ 111.32	$260,088	90%	150%	2103	3037	Trigen	10	90	2734	90%	130%	100	145	Trigen	10	90
4153.01	Type 2.3 Unbound Pavement [Roadway Subbase] (MRS05 Oct 16)	m3	2,336	$ 111.32	$260,088	90%	130%	2103	3037	Trigen	10	90	2436	90%	130%	100	145	Trigen	10	90
	MRS11 Oct 14																			
	SPRAYED BITUMINOUS EMULSION SURFACING																			
5241.01	Sprayed bituminous emulsion surfacing, [including - excluding] supply of binder, [including - excluding] supply of cover aggregates, [location], refer to Clause 1 of Annexure MRS12.1 (MRS12 Oct 14) - 11,700m2																			
5101.01	Prime, grade [AMC00], spray rate [1 L/m2], [including] supply of binder, [Widening] (MRS11 Jan 17)	litre	11,700	$ 2.38	$27,846	90%	130%	10530	15210	Trigen	10	90	12716	90%	120%	2	3	Trigen	10	90
5103.11	Seal, class [PMB S0.7S, SAM], spray rate [1.9 L/m2], [including] supply of binder, (MRS11 Jan 17)	litre	22,230	$ 2.00	$44,460	90%	130%	20007	28899	Trigen	10	90	24167	90%	130%	2	3	Trigen	10	90
5107.02P	Supply and addition of adhesion agent (Provisional Quantity) (MRS11 Jan 17)	litre	195	$ 5.59	$1,090	90%	130%	176	254	Trigen	10	90	212	90%	130%	5	7	Trigen	10	90
5108.02P	Supply and addition of cutter oil (Provisional Quantity) (MRS11 Jan 17)	litre	3,231	$ 8.56	$27,076	90%	130%	2908	4200	Trigen	10	90	3512	90%	130%	8	11	Trigen	10	90
5112.03	Spreading cover aggregate [10 mm] [150m2/-m3], [Widening] (MRS11 Jan 17)	m3	62	$ 109.44	$6,785	90%	130%	56	81	Trigen	10	90	67	90%	130%	98	142	Trigen	10	90
	MRS22 Oct 14																			
	SUPPLY OF COVER AGGREGATE																			
5611.03	Supply of cover aggregate [precoated], [10] mm nominal size (MRS22 Oct 16)	m3	62	$ 195.13	$11,974	90%	150%	56	81	Trigen	10	90	67	90%	130%	174	251	Trigen	10	90
	GUIDANCE AND INFORMATION SYSTEMS																			
6111.01	Road edge guide posts (MRS14 Oct 16)	each	30	$ 61.56	$1,847	90%	120%	27	36	Trigen	10	90	34	90%	120%	55	74	Trigen	10	90
6122.01	Supply of regulatory, warning and hazard sign faces. (MRS14 Oct 16)	each	30	$ 396.26	$11,568	90%	110%	27	33	Trigen	10	90	30	90%	150%	348	522	Trigen	10	90
6123.01	Supply of direction and information sign faces, as listed in Clause 2.3 of Annexure MRS14A.1 (MRS14 Oct 16)	each	5	$ 321.88	$1,609	90%	110%	5	6	Trigen	10	90	5	90%	130%	290	418	Trigen	10	90
6132.01	Installation of regulatory, warning and hazard signs, [number of posts] (MRS14 Oct 16)	each	30	$ 334.37	$10,031	90%	110%	27	33	Trigen	10	90	30	90%	120%	301	401	Trigen	10	90
6135.01	Installation of direction and information signs. (MRS14 Oct 16)	each	5	$ 334.37	$1,672	90%	110%	5	6	Trigen	10	90	5	90%	120%	301	401	Trigen	10	90
6136.01	Supply, erection and removal of project signs. (MRS14 Oct 16)	lump	1	$ 1,924.08	$1,924	100%	100%	1	1	Trigen	10	90	1	90%	130%	1,732	2,309	Trigen	10	90
	ROADSIDE STRUCTURES																			
6161.01	Steel beam guardrail, w beam (MRS14 Oct 16)	m	197	$ 129.75	$25,390	90%	100%	177	197	Trigen	10	90	194	90%	130%	116	167	Trigen	10	90
6162.01	Steel beam guardrail terminal type 1	each	4	$ 3,862.56	$15,450	100%	100%	4	4	Trigen	10	90	4	90%	150%	3,476	5,021	Trigen	10	90
	MRS16 Oct 14																			
	GROUND PREPARATION WORKS - TESTING AND AMELIORANTS																			
3802.01	Preparation of a Soil Management Plan - Construction - Form A (MRS16 Oct 14)	lump	1	$ 1,931.28	$1,931	100%	100%	1	1	Trigen	10	90	1	90%	120%	1,728	2,318	Trigen	10	90
	GROUND PREPARATION WORKS - TOPSOIL																			
3830.01	Install topsoil 100mm (MRS16 Oct 14)	m2	4,500	$ 2.53	$11,385	90%	130%	4050	5850	Trigen	10	90	4958	90%	120%	2	3	Trigen	10	90
	VEGETATION WORKS - SEEDING																			
3839.01	Hydromulch native seeding - double pass [mix name] (MRS16 Oct 14)	m2	4,500	$ 0.84	$3,780	90%	130%	4050	5850	Trigen	10	90	4884	90%	120%	1	1	Trigen	10	90
	VEGETATION WORKS - TURFING																			
3847.01	Turf [description] (MRS16 Oct 14)	m2	240	$ 9.01	$2,162	90%	130%	216	312	Trigen	10	90	264	90%	130%	8	11	Trigen	10	90
	ESTABLISHMENT AND MONITORING OPERATIONS																			
3891.01	Establishment Period (MRS16 Oct 14)	lump	1	$ 22,489.09	$22,489	100%	100%	1	1	Trigen	10	90	1	90%	120%	20,240	26,987	Trigen	10	90
3892.01P	Establishment Period Watering (Provisional Quantity, as directed) (MRS16 Oct 14)	kilo	1		INCLUDED															
3895.01	Monitoring Period [90 days] (MRS16 Oct 14)	lump	1	$ 7,237.91	$7,238	100%	100%	1	1	Trigen	10	90	1	90%	120%	6,514	8,685	Trigen	10	90
3896.01P	Monitoring Period Watering (Provisional Quantity, as directed) (MRS16 Oct 14)	kilo	1		INCLUDED															
	MRS257 Jul 15																			
	CONTRACTOR'S SITE FACILITIES AND CAMP																			
1101.01	Contractor's site facilities (MRS28 Apr 16)	lump	1	$ 47,820.00	$47,820	100%	100%	1	1	Trigen	10	90	1	90%	130%	43,038	62,166	Trigen	10	90
1102.01	Contractor's camp (MRS28 Apr 16)	lump	1	$ -	N A															
	MRS30 Jan 16																			
	ASPHALT SURFACING																			
4159	Medium Duty dense graded asphalt in surfacing (50mm)	tonne	1,325	$ 251.07	$332,668	98%	130%	1193	1723	Trigen	10	90	1430	98%	150%	226	326	Trigen	10	90
	MRS40 Oct 16																			
	CONCRETE PAVEMENT BASE																			
4614.01	Supply and Place Concrete in Continuously Reinforced Base (MRS40 Oct 16)	m3	216	$ 1,355.91	$292,677	90%	110%	194	238	Trigen	10	90	219	90%	180%	1,220	1,627	Trigen	10	90
	MRS45 Jan 17																			
	LINE MARKING																			
6301.01	Spotting only for longitudinal lines (MRS45 Jan 17)	m	900	$ 1.29	$1,161	98%	120%	810	1080	Trigen	10	90	933	90%	130%	1	2	Trigen	10	90
6315.01	Barrier line, both directions, 80 mm wide each line, 80 mm lateral gap between lines, colour [colour], material [material] (MRS45 Jan 17)	m	900	$ 1.93	$1,737	90%	120%	810	1080	Trigen	10	90	938	98%	130%	2	3	Trigen	10	90
6319.01	Edge line, 150 mm wide, colour white, material (MRS45 Jan 17)	m	1,800	$ 1.74	$3,132	90%	120%	1620	2160	Trigen	10	90	1877	90%	130%	2	2	Trigen	10	90
6321.01	Continuity line, 200 mm wide, colour [colour], material [material] (MRS45 Jan 17)	m	150	$ 2.12	$318	90%	120%	135	180	Trigen	10	90	156	90%	130%	2	3	Trigen	10	90
6332.01	Transverse lines (diagonal and chevron markings,parking areas and kerb markings), colour [colour], material [material] (MRS45 Jan 17)	m2	100	$ 51.50	$5,150	90%	120%	90	120	Trigen	10	90	104	90%	130%	46	67	Trigen	10	90
	RAISED PAVEMENT MARKERS																			

Black Current Island Boat Ramp

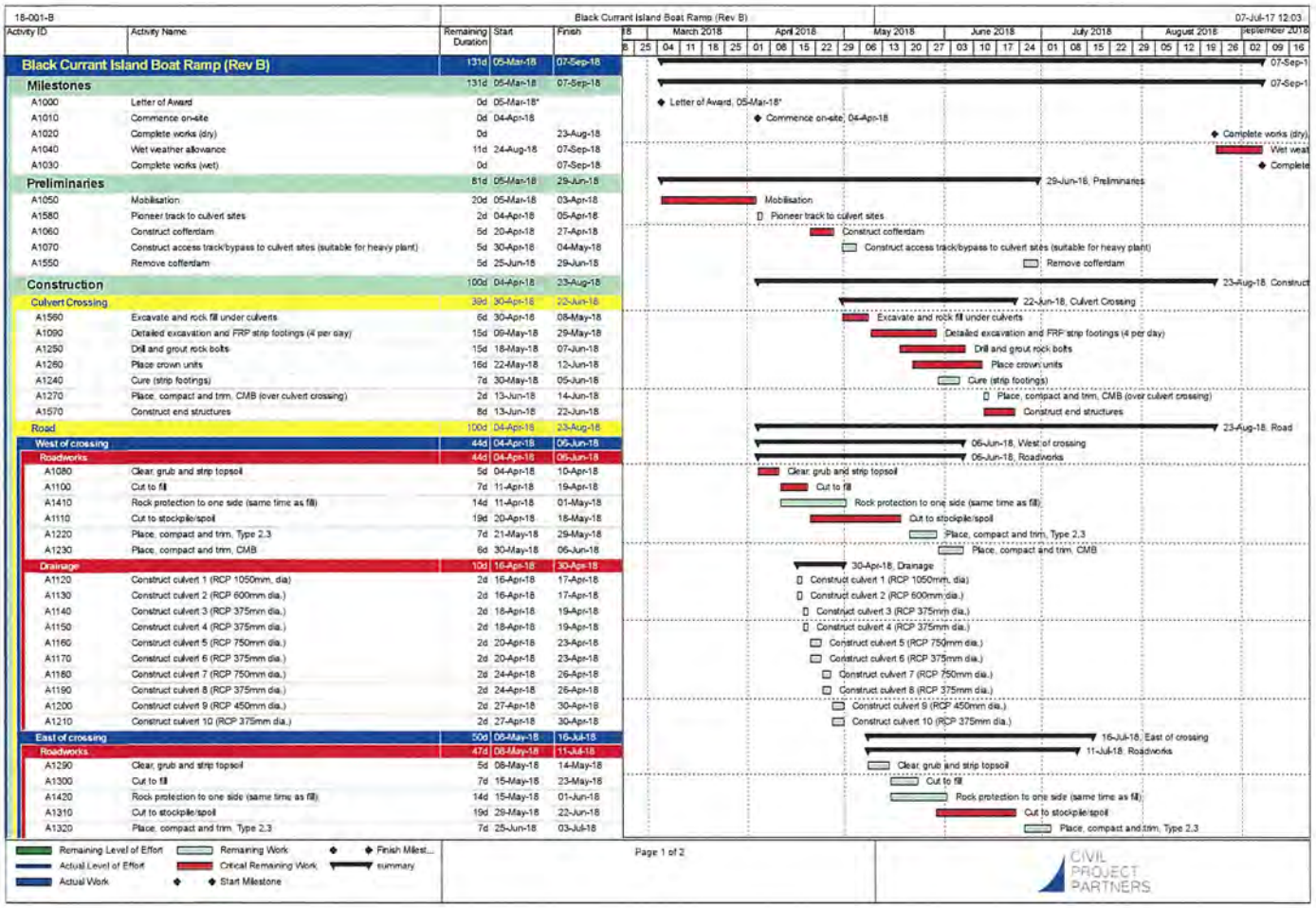
Planned Risk Model Inputs

Item	Description	Unit	Quantity	Unit rate	Amount	Range on Quantity				@Risk Data				Range on Rate				@Risk Data		
						Low	High	Min	Max	Shape	Low %	Upper %	Model Input for Quantity	Low	High	Min	Max	Shape	Low %	Upper %
6351.01	Retroreflective raised pavement markers (MRS45 Jan 17)	each	180	$ 10.30	$1,854	90%	120%	162	216	Trigen	10	90	168	90%	130%	9	13	Trigen	10	90
	MRS51 Oct 16																			
	ENVIRONMENTAL MANAGEMENT																			
1330.01	Environmental Inspections (MRS51 Oct 16)	lump	1	$ 8,111.38	$8,111	100%	100%	1	1	Trigen	10	90	1	90%	130%	7,300	10,545	Trigen	10	90
1331.01	Develop Environmental Management Plan (Construction) (MRS51 Oct 16)	lump	1	$ 4,826.20	$4,826	100%	100%	1	1	Trigen	10	90	1	90%	130%	4,345	6,277	Trigen	10	90
1332.01	Implement Environmental Management Plan (Construction) (MRS51 Oct 16)	lump	1	$ 8,111.38	$8,111	100%	100%	1	1	Trigen	10	90	1	90%	130%	7,300	10,545	Trigen	10	90
1333.01	Environmental Licences, Permits and Approvals (MRS51 Oct 16)	lump	1	$ 11,207.87	$11,208	100%	100%	1	1	Trigen	10	90	1	90%	130%	10,087	14,570	Trigen	10	90
1351.01	Cultural Heritage Management (MRS51 Oct 16)	lump	1	$ 4,828.20	$4,828	100%	100%	1	1	Trigen	10	90	1	90%	130%	4,345	6,277	Trigen	10	90
1355.01P	Noise monitoring, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1	$ 4,246.82	$4,249	80%	150%	1	2	Trigen	10	90	1	90%	130%	3,824	6,523	Trigen	10	90
1361.01P	Condition survey and vibration monitoring, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1	$ 2,575.05	$2,575	90%	150%	1	2	Trigen	10	90	1	90%	130%	2,318	3,348	Trigen	10	90
1365.01P	Air quality monitoring, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1	$ 2,768.17	$2,768	90%	150%	1	2	Trigen	10	90	1	90%	130%	2,491	3,599	Trigen	10	90
1371.01P	Management of contaminated sites, if ordered (Provisional Quantity) (MRS51 Oct 16)	m3	1	$ 2,575.04	$2,575	90%	150%	1	2	Trigen	10	90	1	90%	130%	2,318	3,348	Trigen	10	90
1375.01P	Fauna management, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1	$ 2,626.54	$2,627	90%	150%	1	2	Trigen	10	90	1	90%	130%	2,364	3,415	Trigen	10	90
1381.01P	Pest Control, if ordered (Provisional Quantity) (MRS51 Oct 16)	each	1	$ 3,218.80	$3,219	90%	150%	1	2	Trigen	10	90	1	90%	130%	2,897	4,184	Trigen	10	90
	MRS52 Oct 16																			
	EROSION AND SEDIMENT CONTROL																			
1231.01	Erosion and Sediment Control Plans (MRS52 Oct 16)	lump	1	$ 2,575.05	$2,575	100%	100%	1	1	Trigen	10	90	1	90%	130%	2,318	3,348	Trigen	10	90
1232.01	Independent Verification and Auditing (MRS52 Oct 16)	lump	1	$ 3,862.56	$3,863	100%	100%	1	1	Trigen	10	90	1	90%	130%	3,476	5,021	Trigen	10	90
	MRS91 Jan 17																			
	CONDUIT AND CONDUIT FITTINGS UNDERGROUND																			
6507.01	Supply and installation of 100 mm, HDuPVC, elec. conduit(s), in fill (MRS91 Jan 17)	m	1,120	$ 74.88	$83,866	90%	120%	1008	1344	Trigen	10	90	1008	90%	120%	67	90	Trigen	10	90
	ANCILLARY WORKS																			
6534.01	Flush and clean conduit (all types) (MRS91 Jan 17) Provisional	m	1,120	$ 0.24	$269	90%	120%	1008	1344	Trigen	10	90	1008	90%	120%	0	0	Trigen	10	90
	CABLE JOINTING PITS																			
6554.01	Supply and installation of cable jointing pit (type) (MRS91 Jan 17)	each	24	$ 1,322.82	$31,748	100%	110%	24	26	Trigen	10	90	25	90%	120%	1,191	1,587	Trigen	10	90
6555.01	Construction of pit surround (MRS91 Jan 17)	each	24	$ 362.99	$8,712	100%	110%	24	26	Trigen	10	90	25	90%	120%	327	436	Trigen	10	90
6556.01	Supply and installation of maintenance marker post (MRS91 Jan 17)	each	24	$ 66.88	$1,605	100%	110%	24	26	Trigen	10	90	25	90%	120%	60	80	Trigen	10	90
	ROAD LIGHTING FOOTINGS																			
6701.01	Road lighting pole footing, 786x546x159 mm diameter (MRS92 Jan 17)	each	24	$ 1,519.51	$36,468	100%	110%	24	26	Trigen	10	90	25	90%	120%	1,368	1,823	Trigen	10	90
6703.01P	Road lighting pole footing extension in poor soil, 400 mm long, (diameter) mm diameter, if ordered (Provisional Quantity) (MRS92 Jan 17)	each	1	$ 1,475.23	$1,475	100%	110%	1	1	Trigen	10	90	1	90%	120%	1,328	1,770	Trigen	10	90
6704.01P	Excavation in excessively hard material, rate additional to rate for Work Items 6701, 6702 and 6703P (Provisional Quantity) (MRS92 Jan 17)	m3	1	$ 97.51	$98	100%	110%	1	1	Trigen	10	90	1	90%	120%	88	117	Trigen	10	90
	MRS94 Jan 16																			
	ROAD LIGHTING																			
6711.01	Supply of (tip base) road lighting pole, [9030] mm vertical height (MRS94 Jan 16)	each	24	$ 3,991.32	$95,792	100%	110%	24	26	Trigen	10	90	25	90%	130%	3,592	5,189	Trigen	10	90
6714.01	Supply of road lighting luminaire headframe, [number of spigots] way headframe (MRS94 Jan 16)	each	24	$ 321.88	$7,725	100%	110%	24	26	Trigen	10	90	25	90%	130%	290	418	Trigen	10	90
6731.01	Supply of road lighting luminaire, [Sylvania] [RoadLED] [60W] (MRS94 Jan 16)	each	24	$ 354.07	$8,498	100%	110%	24	26	Trigen	10	90	25	90%	130%	319	460	Trigen	10	90
6742.01	Installation of road lighting outreach arm 3m (MRS94 Jan 16)	each	24	$ 462.82	$11,588	100%	110%	24	26	Trigen	10	90	25	90%	130%	435	629	Trigen	10	90
6744.01	Installation of road lighting luminaire headframe (MRS94 Jan 16)	each	24	$ 96.56	$2,317	100%	110%	24	26	Trigen	10	90	25	90%	130%	87	126	Trigen	10	90
6761.01	Installation of road lighting luminaire (MRS94 Jan 16)	each	24	$ 193.13	$4,635	100%	110%	24	26	Trigen	10	90	25	90%	130%	174	251	Trigen	10	90
	MRS256 Power Cables																			
6811.01	Supply of underground road lighting cable, 16 mm2, 4 cores, XLPE, PVC, Cu	m	950	$ 19.31	$18,345	100%	120%	950	1140	Trigen	10	90	1026	90%	130%	17	25	Trigen	10	90
6821.01	Installation, jointing and termination of underground road lighting cable, 16 mm2, 4 cores, XLPE, PVC, Cu	m	950	$ 10.94	$10,393	100%	120%	950	1140	Trigen	10	90	1026	90%	130%	10	14	Trigen	10	90
	MRS96 Jul 16																			
9000.01	1.2m wide concrete footpath x 0.1m depth	m	80	$ 158.47	$12,678	90%	120%	72	96	Trigen	10	90	86	90%	130%	143	206	Trigen	10	90
9000.02	In pit trash basket	each	1	$ 3,218.80	$3,219	100%	150%	1	2	Trigen	10	90	1	90%	130%	2,897	4,184	Trigen	10	90
9000.03	Gross Pollutant Trap	each	2	$ 106,165.61	$212,331	100%	100%	2	2	Trigen	10	90	2	90%	130%	95,549	138,015	Trigen	10	90
9000.04	Toilet Block (Male Female and Ambulant, stand alone self treating system)	each	1	$ 70,613.67	$70,614	100%	100%	1	1	Trigen	10	90	1	90%	130%	63,732	92,058	Trigen	10	90
9000.05	Block work retaining wall	item	1	$ 173,815.36	$173,815	100%	100%	1	1	Trigen	10	90	1	90%	130%	156,434	225,960	Trigen	10	90
	Total				**9,335,468**															

	BELOW THE LINE COSTS																			
	PRINCIPAL'S COSTS																			
	Concept Phase																			
	Concept Phase	lump sum	2.5%	$ 9,335,468	$233,387	100%	100%	0	0	Trigen	10	90	0	100%	130%	9,335,468	12,136,108	Trigen	10	90
	Sub-total - Concept Phase				**$233,387**															
	Development Phase																			
	Development phase	lump sum	5.0%	$ 9,335,468	$466,773	100%	100%	0	0	Trigen	10	90	0	100%	150%	9,335,468	14,003,202	Trigen	10	90
	Sub-total - Development Phase				**$466,772**															
	Implementation Phase																			
	Implementation Phase at 11% of CV	lump sum	8%	$ 9,335,468	$746,837	100%	100%	0	0	Trigen	10	90	0	90%	150%	8,401,921	12,136,108	Trigen	10	90
	Other payments and costs																			
	Portable LSL levy and WHS fee (0.525%)	lump sum	0.525%	$ 9,335,468	$49,011	100%	100%	0	0	Trigen	10	90	0	100%	110%	9,335,468	10,269,015	Trigen	10	90
	Principal arranged insurance (0.65% of contract)	lump sum	0.650%	$ 9,335,468	$60,681	100%	100%	0	0	Trigen	10	90	0	100%	110%	9,335,468	10,269,015	Trigen	10	90

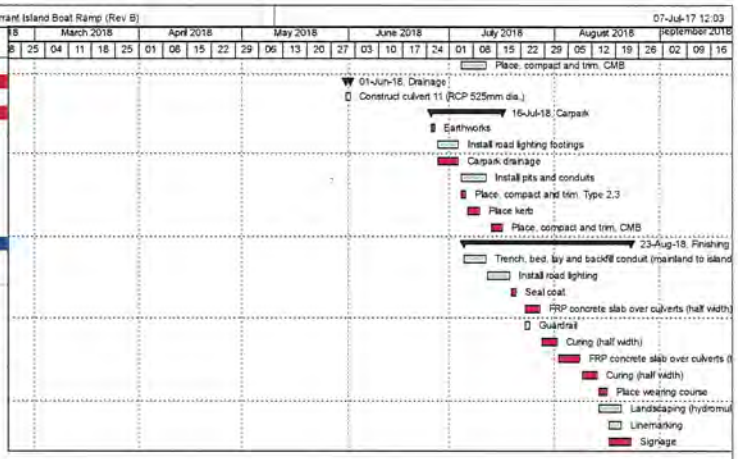
Item	Description	Unit	Quantity	Unit rate	Amount	Range on Quantity				@Risk Data			Model Input for Quantity	Range on Rate				@Risk Data		
						Low	High	Min	Max	Shape	Low %	Upper %		Low	High	Min	Max	Shape	Low %	Upper %
	Sub-total - Implementation Phase				**856,529**															
	Finalisation Phase																			
	Finalisation Phase	lump sum	0.5%	$ 9,335,468	546,677	100%	100%	0	0	Trigen	10	90	0	100%	150%	9,335,468	12,136,108	Trigen	10	90
	Sub-total - Finalisation Phase				**546,677**															
	BELOW THE LINE COSTS				***1,403,207***															

Appendix E **Construction Programme**


18-001-B
Black Currant Island Boat Ramp (Rev B)
07-Jul-17 12:03
Activity ID
Activity Name
Remaining Duration
Start
Finish
March 2018
April 2018
May 2018
June 2018
July 2018
August 2018
September 2018
Black Currant Island Boat Ramp (Rev B) 131d 05-Mar-18 07-Sep-18
Milestones 131d 05-Mar-18 07-Sep-18
A1000 Letter of Award 0d 05-Mar-18*
A1010 Commence on-site 0d 04-Apr-18
A1020 Complete works (dry) 0d 23-Aug-18
A1040 Wet weather allowance 11d 24-Aug-18 07-Sep-18
A1030 Complete works (wet) 0d 07-Sep-18
Preliminaries 81d 05-Mar-18 29-Jun-18
A1050 Mobilisation 20d 05-Mar-18 03-Apr-18
A1580 Pioneer track to culvert sites 2d 04-Apr-18 05-Apr-18
A1060 Construct cofferdam 5d 20-Apr-18 27-Apr-18
A1070 Construct access track/bypass to culvert sites (suitable for heavy plant) 5d 30-Apr-18 04-May-18
A1550 Remove cofferdam 5d 25-Jun-18 29-Jun-18
Construction 100d 04-Apr-18 23-Aug-18
Culvert Crossing 39d 30-Apr-18 22-Jun-18
A1560 Excavate and rock fill under culverts 6d 30-Apr-18 08-May-18
A1090 Detailed excavation and FRP strip footings (4 per day) 15d 09-May-18 29-May-18
A1250 Drill and grout rock bolts 15d 18-May-18 07-Jun-18
A1260 Place crown units 16d 22-May-18 12-Jun-18
A1240 Cure (strip footings) 7d 30-May-18 05-Jun-18
A1270 Place, compact and trim, CMB (over culvert crossing) 2d 13-Jun-18 14-Jun-18
A1570 Construct end structures 8d 13-Jun-18 22-Jun-18
Road 100d 04-Apr-18 23-Aug-18
West of crossing 44d 04-Apr-18 06-Jun-18
Roadworks 44d 04-Apr-18 06-Jun-18
A1080 Clear, grub and strip topsoil 5d 04-Apr-18 10-Apr-18
A1100 Cut to fill 7d 11-Apr-18 19-Apr-18
A1410 Rock protection to one side (same time as fill) 14d 11-Apr-18 01-May-18
A1110 Cut to stockpile/spoil 19d 20-Apr-18 18-May-18
A1220 Place, compact and trim, Type 2.3 7d 21-May-18 29-May-18
A1230 Place, compact and trim, CMB 6d 30-May-18 06-Jun-18
Drainage 10d 16-Apr-18 30-Apr-18
A1120 Construct culvert 1 (RCP 1050mm, dia) 2d 16-Apr-18 17-Apr-18
A1130 Construct culvert 2 (RCP 600mm dia.) 2d 16-Apr-18 17-Apr-18
A1140 Construct culvert 3 (RCP 375mm dia.) 2d 18-Apr-18 19-Apr-18
A1150 Construct culvert 4 (RCP 375mm dia.) 2d 18-Apr-18 19-Apr-18
A1160 Construct culvert 5 (RCP 750mm dia.) 2d 20-Apr-18 23-Apr-18
A1170 Construct culvert 6 (RCP 375mm dia.) 2d 20-Apr-18 23-Apr-18
A1180 Construct culvert 7 (RCP 750mm dia.) 2d 24-Apr-18 26-Apr-18
A1190 Construct culvert 8 (RCP 375mm dia.) 2d 24-Apr-18 26-Apr-18
A1200 Construct culvert 9 (RCP 450mm dia.) 2d 27-Apr-18 30-Apr-18
A1210 Construct culvert 10 (RCP 375mm dia.) 2d 27-Apr-18 30-Apr-18
East of crossing 50d 05-May-18 16-Jul-18
Roadworks 47d 08-May-18 11-Jul-18
A1290 Clear, grub and strip topsoil 5d 08-May-18 14-May-18
A1300 Cut to fill 7d 15-May-18 23-May-18
A1420 Rock protection to one side (same time as fill) 14d 15-May-18 01-Jun-18
A1310 Cut to stockpile/spoil 19d 29-May-18 22-Jun-18
A1320 Place, compact and trim, Type 2.3 7d 25-Jun-18 03-Jul-18
07-Sep-1
Letter of Award, 05-Mar-18*
Commence on-site, 04-Apr-18
Complete works (dry)
Wet weat
Complete
29-Jun-18, Preliminaries
Mobilisation
Pioneer track to culvert sites
Construct cofferdam
Construct access track/bypass to culvert sites (suitable for heavy plant)
Remove cofferdam
23-Aug-18, Construct
22-Jun-18, Culvert Crossing
Excavate and rock fill under culverts
Detailed excavation and FRP strip footings (4 per day)
Drill and grout rock bolts
Place crown units
Cure (strip footings)
Place, compact and trim, CMB (over culvert crossing)
Construct end structures
23-Aug-18, Road
06-Jun-18, West of crossing
06-Jun-18, Roadworks
Clear, grub and strip topsoil
Cut to fill
Rock protection to one side (same time as fill)
Cut to stockpile/spoil
Place, compact and trim, Type 2.3
Place, compact and trim, CMB
30-Apr-18, Drainage
Construct culvert 1 (RCP 1050mm, dia)
Construct culvert 2 (RCP 600mm dia.)
Construct culvert 3 (RCP 375mm dia.)
Construct culvert 4 (RCP 375mm dia.)
Construct culvert 5 (RCP 750mm dia.)
Construct culvert 6 (RCP 375mm dia.)
Construct culvert 7 (RCP 750mm dia.)
Construct culvert 8 (RCP 375mm dia.)
Construct culvert 9 (RCP 450mm dia.)
Construct culvert 10 (RCP 375mm dia.)
16-Jul-18, East of crossing
11-Jul-18, Roadworks
Clear, grub and strip topsoil
Cut to fill
Rock protection to one side (same time as fill)
Cut to stockpile/spoil
Place, compact and trim, Type 2.3
Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Start Milestone
Finish Milest...
summary
Page 1 of 2
CIVIL PROJECT PARTNERS

18-001-B | Black Current Island Boat Ramp (Rev B) | 07-Jul-17 12:03

Activity ID	Activity Name	Remaining Duration	Start	Finish
A1330	Place, compact and trim, CMB	6d	04-Jul-18	11-Jul-18
Drainage		2d	31-May-18	01-Jun-18
A1280	Construct culvert 11 (RCP 525mm dia.)	2d	31-May-18	01-Jun-18
Carpark		16d	25-Jun-18	16-Jul-18
A1390	Earthworks	2d	25-Jun-18	26-Jun-18
A1350	Install road lighting footings	5d	27-Jun-18	03-Jul-18
A1430	Carpark drainage	5d	27-Jun-18	03-Jul-18
A1360	Install pits and conduits	6d	04-Jul-18	11-Jul-18
A1370	Place, compact and trim, Type 2.3	2d	04-Jul-18	05-Jul-18
A1400	Place kerb	2d	06-Jul-18	09-Jul-18
A1380	Place, compact and trim, CMB	2d	13-Jul-18	16-Jul-18
Finishing works		36d	05-Jul-18	23-Aug-18
A1340	Trench, bed, lay and backfill conduit (mainland to island)	5d	05-Jul-18	11-Jul-18
A1500	Install road lighting	5d	12-Jul-18	18-Jul-18
A1440	Seal coat	2d	19-Jul-18	20-Jul-18
A1460	FRP concrete slab over culverts (half width)	5d	23-Jul-18	27-Jul-18
A1510	Guardrail	2d	23-Jul-18	24-Jul-18
A1480	Curing (half width)	5d	28-Jul-18	01-Aug-18
A1470	FRP concrete slab over culverts (half width)	5d	02-Aug-18	08-Aug-18
A1490	Curing (half width)	5d	09-Aug-18	13-Aug-18
A1450	Place wearing course	3d	14-Aug-18	16-Aug-18
A1540	Landscaping (hydromulching and turf)	5d	14-Aug-18	20-Aug-18
A1520	Linemarking	2d	17-Aug-18	20-Aug-18
A1530	Signage	5d	17-Aug-18	23-Aug-18



Remaining Level of Effort | Remaining Work | Finish Milest...
Actual Level of Effort | Critical Remaining Work | summary
Actual Work | Start Milestone

CIVIL PROJECT PARTNERS

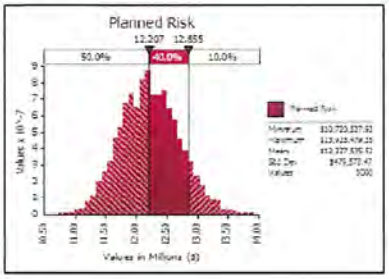
Appendix F Project Risk Outputs

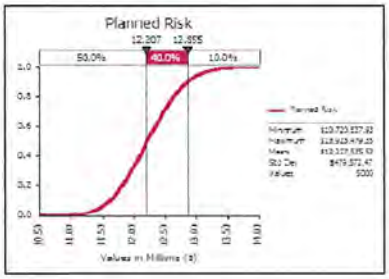
Refer overleaf for the output results;

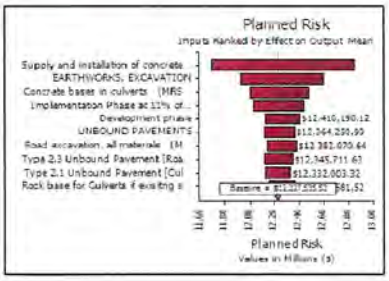
1. Planned risk,
2. Unplanned risk
3. Total project risk

@RISK Output Report for Planned Risk

Performed By: Chris Dale
Date: Friday, 7 July 2017 5:48:57 PM







Simulation Summary Information

Workbook Name	Black Current Island Boat Ramp
Number of Simulations	1
Number of Iterations	5000
Number of Inputs	384
Number of Outputs	3
Sampling Type	Latin Hypercube
Simulation Start Time	7/07/2017 17:47
Simulation Duration	00:00:09
Random # Generator	Mersenne Twister
Random Seed	1

Summary Statistics for Planned Risk

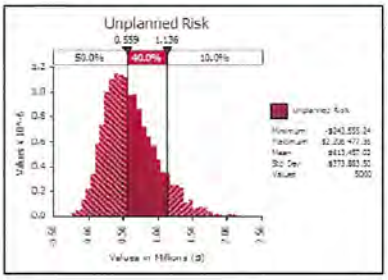
Statistics			Percentile		
Minimum	$	10,720,538	**5%**	$	11,457,413
Maximum	$	13,923,479	**10%**	$	11,622,617
Mean	$	12,227,536	**15%**	$	11,726,366
Std Dev	$	479,572	**20%**	$	11,814,032
Variance	2.2999E+11		**25%**	$	11,885,315
Skewness	0.149054453		**30%**	$	11,950,727
Kurtosis	2.859834008		**35%**	$	12,028,824
Median	$	12,207,012	**40%**	$	12,097,880
Mode	$	12,440,173	**45%**	$	12,153,523
Left X	$	12,207,012	**50%**	$	12,207,012
Left P	50%		**55%**	$	12,273,271
Right X	$	12,854,884	**60%**	$	12,343,810
Right P	90%		**65%**	$	12,413,138
Diff X	$	647,872	**70%**	$	12,471,134
Diff P	40%		**75%**	$	12,553,864
#Errors	0		**80%**	$	12,635,705
Filter Min	Off		**85%**	$	12,735,448
Filter Max	Off		**90%**	$	12,854,884
#Filtered	0		**95%**	$	13,031,998

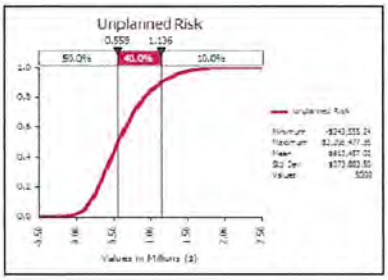
Change in Output Statistic for Planned Risk

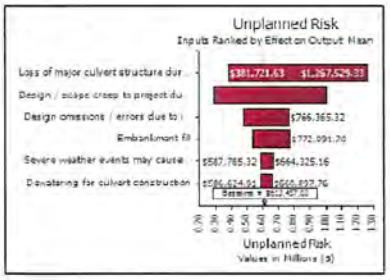
Rank	Name	Lower	Upper
1	Supply and installation of concrete box culvert components. [58 cell / 1500mm x 900mm Marine Class] (MRS03 Oct 16)	$ 11,696,198	$ 12,846,519
2	EARTHWORKS. EXCAVATION	$ 11,929,573	$ 12,592,749
3	Concrete bases in culverts (MRS03 Oct 16) (800mm wide x 600mm deep)	$ 12,007,225	$ 12,472,203
4	Implementation Phase at 11% of CV	$ 12,031,807	$ 12,444,217
5	Development phase	$ 12,121,028	$ 12,410,190
6	UNBOUND PAVEMENTS	$ 12,114,676	$ 12,364,251
7	Road excavation, all materials (MRS04 Oct 14)	$ 12,138,765	$ 12,383,071
8	Type 2.3 Unbound Pavement [Roadway Subbase] (MRS05 Oct 16)	$ 12,111,901	$ 12,345,712
9	Type 2.1 Unbound Pavement [Culvert Crossing - SubBase Cement Treated; GB, 2>UCS<3MPa] (MRS05 Oct 16)	$ 12,121,660	$ 12,332,003
10	Rock base for Culverts if exisitng surface is unsuitable material [98.6m +1m+1m) x (19.2m + 1m + 1m) * 0.8m depth]	$ 12,158,856	$ 12,368,582

@RISK Output Report for Unplanned Risk

Performed By: Chris Dale
Date: Friday, 7 July 2017 5:49:46 PM







Simulation Summary Information

Workbook Name	Black Current Island Boat Ramp
Number of Simulations	1
Number of Iterations	5000
Number of Inputs	384
Number of Outputs	3
Sampling Type	Latin Hypercube
Simulation Start Time	7/07/2017 17:47
Simulation Duration	00:00:09
Random # Generator	Mersenne Twister
Random Seed	1

Summary Statistics for Unplanned Risk

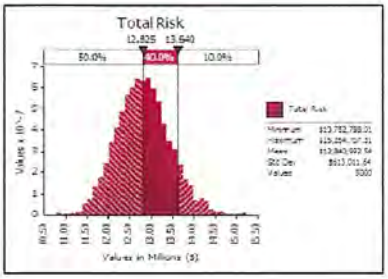
Statistics			Percentile		
Minimum	$	243,555	**5%**	$	95,155
Maximum	$	2,206,477	**10%**	$	178,469
Mean	$	613,457	**15%**	$	244,901
Std Dev	$	373,883	**20%**	$	293,073
Variance		1.39789E+11	**25%**	$	339,337
Skewness		0.674434642	**30%**	$	382,041
Kurtosis		3.322184966	**35%**	$	427,028
Median	$	558,673	**40%**	$	471,239
Mode	$	533,696	**45%**	$	514,625
Left X	$	558,673	**50%**	$	558,673
Left P	50%		**55%**	$	609,802
Right X	$	1,136,421	**60%**	$	659,904
Right P	90%		**65%**	$	711,429
Diff X	$	577,748	**70%**	$	768,315
Diff P	40%		**75%**	$	833,869
#Errors	0		**80%**	$	913,355
Filter Min	Off		**85%**	$	1,003,366
Filter Max	Off		**90%**	$	1,136,421
#Filtered	0		**95%**	$	1,319,483

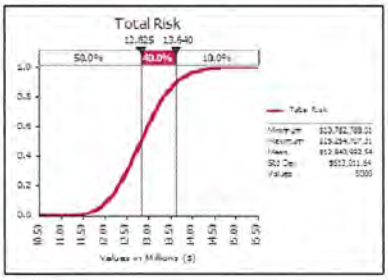
Change in Output Statistic for Unplanned Risk

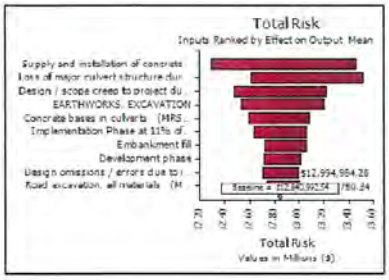
Rank	Name	Lower		Upper	
1	Loss of major culvert structure during construction	$	381,722	$	1,267,529
2	Design / scope creep to project due to current knowledge	$	285,284	$	1,002,074
3	Design omissions / errors due to inadequate design inputs (concept Phase)	$	475,451	$	766,365
4	Embankment fill	$	538,550	$	772,092
5	Severe weather events may cause damage prior to, or during construction. Wet weather over and above from 'normal' wet weather	$	587,785	$	664,325
6	Dewatering for culvert construction	$	586,625	$	660,898

@RISK Output Report for Total Risk

Performed By: Chris Dale
Date: Friday, 7 July 2017 5:50:40 PM







Simulation Summary Information

Workbook Name	Black Current Island Boat Ramp
Number of Simulations	1
Number of Iterations	5000
Number of Inputs	384
Number of Outputs	3
Sampling Type	Latin Hypercube
Simulation Start Time	7/07/2017 17:47
Simulation Duration	00:00:09
Random # Generator	Mersenne Twister
Random Seed	1

Summary Statistics for Total Risk

Statistics			Percentile		
Minimum	$	10,782,788	**5%**	$	11,859,778
Maximum	$	15,254,707	**10%**	$	12,069,624
Mean	$	12,840,993	**15%**	$	12,204,427
Std Dev	$	613,012	**20%**	$	12,320,043
Variance		3.75783E+11	**25%**	$	12,415,158
Skewness		0.202133849	**30%**	$	12,501,622
Kurtosis		3.022935786	**35%**	$	12,590,052
Median	$	12,824,872	**40%**	$	12,667,792
Mode	$	13,056,017	**45%**	$	12,745,769
Left X	$	12,824,872	**50%**	$	12,824,872
Left P	50%		**55%**	$	12,904,538
Right X	$	13,639,975	**60%**	$	12,977,943
Right P	90%		**65%**	$	13,061,716
Diff X	$	815,103	**70%**	$	13,144,390
Diff P	40%		**75%**	$	13,238,543
#Errors	0		**80%**	$	13,335,880
Filter Min	Off		**85%**	$	13,481,485
Filter Max	Off		**90%**	$	13,639,975
#Filtered	0		**95%**	$	13,882,258

Change in Output Statistic for Total Risk

Rank	Name	Lower		Upper	
1	Supply and installation of concrete box culvert components. [58 cell / 1500mm x 900mm Marine Class] (MRS03 Oct 16)	$	12,293,298	$	13,466,871
2	Loss of major culvert structure during construction	$	12,608,543	$	13,514,546
3	Design / scope creep to project due to current knowledge	$	12,477,663	$	13,222,870
4	EARTHWORKS. EXCAVATION	$	12,535,382	$	13,207,195
5	Concrete bases in culverts (MRS03 Oct 16) (800mm wide x 600mm deep)	$	12,597,118	$	13,081,925
6	Implementation Phase at 11% of CV	$	12,641,713	$	13,061,234
7	Embankment fill	$	12,727,104	$	13,057,663
8	Development phase	$	12,716,651	$	13,014,848
9	Design omissions / errors due to inadequate design inputs (concept Phase)	$	12,704,520	$	12,994,984
10	Road excavation, all materials (MRS04 Oct 14)	$	12,744,016	$	13,005,780

Appendix G Risk Matrix

TMR RISK ASSESSMENT AND RATINGS MATRIX

CONSEQUENCE LEVELS	Workplace Health and Safety	Time or Schedule Delay	Legal and Compliance	Assets, Operations and Services	Performance and Capability	Historical and Indigenous Heritage	Environmental	Media and Reputation	Financial	LIKELIHOOD LEVELS AND RISK RATINGS: Rare	Unlikely	Possible	Likely	Almost Certain
	RISK DIMENSIONS									0-5%	6-30%	31-60%	61-90%	>91%
										This event may have happened previously in TMR or like organisations. Not expected to occur in TMR in the foreseeable future	The event has occurred infrequently in TMR or like organisations. Occurrence in TMR would be considered highly unusual	This event may have occurred occasionally in TMR or like organisations. Distinct possibility of occurrence	This event may have occurred in TMR or like organisations on a regular basis. Occurrence within the financial year	This event occurs frequently within TMR
										WH&S - Once in five to ten years. The event may occur only in very exceptional circumstances	WH&S - Once in one to five years. The event could occur at some time but unlikely	WH&S - Once per month to one year. The event will probably occur in some circumstances	WH&S - Once per week to one month. The event will probably occur in most circumstances	WH&S - Once per day to one week. The event is expected to occur in most circumstances
Severe	Safety Fatality or significant disabling injury/illness to one or more persons Health Significant prolonged health issues	> 20% delay	Significant litigation activities and fines with whole of department or government impacts May involve class actions Major breach (non-compliance) with regulation/legislation that requires parliamentary inquiry	Multiple system failure/damage resulting in prolonged service disruption Significant critical infrastructure assets are destroyed/are unusable for extended period Critical impact to transport system users over a wide geographic area with major effects lasting more than a month Disruption to operations and product delivery for an indeterminate period	Multiple critical business services cannot be delivered Inability to source resources	Irreversible impact to heritage Significant breach of historical or indigenous cultural heritage legislation, resulting in prosecution Breach of stop order, injunction or protection declaration resulting in significant financial and/or legal penalties Potential for inquiry and widespread high level public concern Ministerial intervention	Irreversible impact on the environment including ecosystems and air quality or community health impact that covers a wide area, or is of high intensity and/or is difficult to contain. Irreversible impact to conservation areas or Endangered Vulnerable and Near Threatened species. Significant breach of legislation resulting in prosecution Potential for inquiry and widespread high level public concern Ministerial intervention	Significant and prolonged adverse community impact (months) Prolonged negative media attention (months) Campaign for change through media Irreparable loss of community confidence in the organisation Cabinet/ Executive recall/ Whole of Government/ Ministerial intervention	> 5% variance of budget or amounts in excess of $10 million Not recoverable for several years	HIGH (Workplace health and safety) / MEDIUM	HIGH	HIGH	EXTREME	EXTREME
Major	Safety • Considerable irreversible injury/illness to one or more persons • Serious reversible injury/illness to one or more persons Health Progressive chronic condition, serious health issues.	11% - 20% delay	Litigation and undertakings requiring significant dedicated time by legal counsel to address liability and consequences Litigation or policy that may set a precedent or adversely impact reputation Major breach (non-compliance) with legislation, regulation, policy or contract/agreement	Multiple system failure/damage Significant critical assets are destroyed/are unusable for a determinate period, possibly weeks or months Significant impact to transport system users over a wide geographic area with major effects lasting a week or more Disruption to operations and product delivery is able to be rectified but may take up to 6 months	Critical business service cannot be delivered Major changes in activities and resource allocation	Major breach of stop order injunction or protection declaration Notification of application for state ministerial stop order injunction or similar Significant decline in stakeholder relationship which results in requests for mediation (e.g. traditional owners) or DG intervention Major non-compliance with indigenous cultural heritage process and legislation	Medium to long-term impact on the environment including ecosystems and air quality or community health impact that requires specific specialist actions to contain Major breach of environmental legislation (including restoration orders) Potential for high-level public concern in a regional area D-G intervention	Considerable adverse community impact and concerns (weeks) Significant negative media attention (weeks) Significant loss of community confidence in the organisation	3% - 5% variance of budget or amounts in excess of $5 million Not recoverable within current or next financial year	MEDIUM	MEDIUM	HIGH	HIGH	EXTREME
Moderate	Safety • Moderate irreversible injury/illness to one or more persons • Reversible injury/illness to one or more persons resulting in time lost and/or restricted duties Health Acute short term health issues.	5% - 10% delay	Serious issue requiring investigation and advice into legal liability and impacts Litigation requiring moderate dedicated time by legal counsel with limited adverse impact Non-compliance with legislation, regulation, policy or contract/agreement	Equipment replaced or repair Non-critical assets are destroyed/ unusable for a determinate period, possibly days or weeks Assets stolen or destroyed Disruption to operations and product delivery can be rectified over a 2 month period Moderate impact to transport system users over a wide geographic area with effects lasting up to a day or major impacts to specific users for prolonged periods	Multiple business services cannot be delivered Requires hiring external or building internal capability	Formal interview regarding a breach and / or formal / informal investigation by external authorities Decline in stakeholder relationship (e.g. traditional owners)	Temporary impact on the environment where the impacts are on a medium scale Breach of or non-compliance with environmental legislation. Potential for moderate public concern	Widespread community impacts and concerns (days) Significant negative media attention (days) Loss of community confidence in the organisation The impact will be of major interest to a number of external groups	1% <3% variance of budget or amounts in excess of $1million Not recoverable within the current financial year	LOW	MEDIUM	MEDIUM	HIGH	HIGH
Minor	Safety Reversible injury/illness to one or more persons requiring medical treatment but does not result in time lost or restricted duties Health Unresolved minor health issues	1% - 5% delay	Legal issues are able to be managed with legal advice Minor non-compliance with legislation, regulation, policy or contract/agreement	Component level replacement or repair Non-critical assets are unavailable or unusable for a short period, possibly hours or days. Moderate impact to transport system users over a restricted geographic area with effects lasting up to a day or moderate impacts to specific users for prolonged periods Disruption to operations and product delivery can be rectified within one month with existing staff	Business service delivery impacted Can be rectified with existing staff and by review of existing procedures	Minor non-compliance with cultural or historical heritage process Unresolved breach of Cultural Heritage Management Plan or the TMR Cultural Heritage Process Manual which result in requests for mediation or compensation	Short-term impact on the environment limited to a small area and can be rectified using an existing process Non-compliance with environmental legislation not resulting in environmental harm but with minor potential environmental impact e.g environmental nuisance	Local community impacts and concerns Occasional once off negative media attention Loss of confidence in organisation is easily restored The impact will be of interest to small located external groups	0.5% <1% variance of budget Recoverable within current financial year	LOW	LOW	MEDIUM	MEDIUM	MEDIUM
Insignificant	Safety Injury/illness requiring first-aid treatment at most Health Treatable health issues.	< 1% delay	Issues are able to be managed by routine procedures Does not affect compliance with legislation, regulation, policy or contract/agreement	Minimal damage Non-critical assets are unavailable/unusable but can be replaced within acceptable timeframes Minimal impact to transport system users over a restricted geographic area with effects lasting up to a few hours or minimal impacts to specific users for prolonged periods Minimal impact on operations or product delivery	Minimal impact on business service delivery Can be rectified with existing staff	Minimal or reversible effect on historical or indigenous cultural heritage Minimal action required for management or containment Administrative breach of legislation that could not be anticipated or prevented with no harm to historical or indigenous cultural heritage	Minimal short term effect on the environment Minor to no action required for management or containment Administrative breach of legislation that could not be anticipated or prevented with no environmental harm.	Individual concerns Minimal media attention No interest to external groups	< 0.5% variance of budget Recoverable within current quarter or month	LOW	LOW	LOW	MEDIUM	MEDIUM

Please note: Inputs to the risk matrix (likelihood and consequence) and resulting output (risk rating) require subjective interpretation. If a calculated risk rating appears to be too high or too low, you should exercise your local knowledge and discretion.

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Appendix F – TMR PCEM Appendix E

Annexure E
Contingency example for strategic estimates
(Based on Appendix B from RTA's Project Estimating Manual)

Queensland Government

Complete cells with green shading

Estimate Stage: Strategic / Planning

Project Location:	Black Current Island
Project Description:	Access Road including Causeway to new Boat Ramp

Task/activity	Comments	Highly Confident & Reliable	Reasonably Confident & Reliable	Not Confident & Not Reliable	Adopted Contingency
Project Scope	Is it well defined? Yes V No Λ	3%	4%	5%	4%
	Is there room to vary the works? Yes Λ No V	3%	4%	5%	4%
	Are there many options? Yes Λ No V	3%	4%	5%	4%
Risks	Are there Significant Risks? Yes Λ No V Political, Community, Technical, Financial.	5%	6%	8%	8%
	Has a detailed Risk analysis been done? Yes V No Λ	4%	6%	7%	6%
Constructability	Has a constructability review been undertaken? Yes V No Λ	3%	4%	5%	4%
	Is constructability a problem? Yes Λ No V	3%	4%	5%	5%
Key Dates	Are the Project dates known? Yes V No Λ	1%	2%	3%	3%
	Is the project planned for the distant future? Yes Λ No V	1%	2%	3%	2%
Information	Has investigation been Undertaken? Yes V No Λ Geotechnical, Heritage, Environmental, Technical, Hydraulic	9%	12%	15%	12%
Length of the Project	Is the Project Short? Yes Λ No V <1km Short >25km Long	4%	7%	10%	7%
	Total Contingency percentage to be adopted:				**59%**

Notes:
No V denotes that if the answer is No, decrease contingency.
No Λ denotes that if the answer is No, increase contingency.
Yes Λ denotes that if the answer is Yes, increase contingency.
Yes V denotes that if the answer is Yes, decrease contingency.

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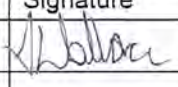
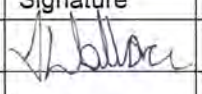
Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	A.Whitehead	I.Wallace		I.Wallace		11/7/17