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Gladstone Area Water Board

Capricorn Yellow Chat High-Level Risk Assessment – Trenchless Crossing Works

Fitzroy to Gladstone Pipeline Project

August 2024

Document History and Status

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Glossary

Acronym	Meaning
CEMP	Construction Environmental Management Plan
CG	Coordinator-General
CH	Chainage
CQG	CQ Environmental Pty Ltd T/A CQG Consulting
CYC	Capricorn Yellow Chat (*Epthianura croccea macgregori*)
EIS	*Gladstone – Fitzroy Pipeline Project: Environmental Impact Statement* (GAWB 2008)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
FGP	Fitzroy to Gladstone Pipeline
GAWB	Gladstone Area Water Board
IFC	Issued for Construction (drawings)
MBJV	BMD Constructors Pty Ltd and McConnell Dowell Constructors (Aust) Pty Ltd Joint Venture
RoW	Right of Way
SGIC SDA	Stanwell to Gladstone Infrastructure Corridor State Development Area
SAP	*Special Area Plan – Yellow chat habitat within the Stanwell to Gladstone Infrastructure Corridor (SGIC) State Development Area*
TBM	Tunnel boring machine

1 Introduction

1.1 Overview

On 23 February 2023, the Queensland Government approved the Fitzroy to Gladstone Pipeline (FGP) to progress to construction. Gladstone Area Water Board (GAWB) was appointed to manage the design and construction of the FGP. Following construction, GAWB will own and operate the FGP.

McConnell Dowell Constructors (Aust) Pty Ltd and BMD Constructions Pty Ltd Joint Venture (MBJV) was appointed by GAWB as the design and construction contractor for the FGP. MBJV will also be responsible for operation and maintenance for five years following construction completion. CQG Consulting (CQG) is engaged to deliver environmental and planning approval advisory services to MBJV for the FGP.

The FGP is a critical piece of infrastructure to provide a secure water supply to Gladstone's industrial sector which supports thousands of jobs and significantly contributes to the Central Queensland region and to the State's economy. It will supplement the single source water supply risk from Awoonga Dam and support the emerging hydrogen and renewables sector that is set to expand in the Gladstone region.

Construction on the FGP commenced on 29 August 2023, and construction in the Stanwell to Gladstone Infrastructure Corridor State Development Area (SGIC SDA) section of the FGP commenced on 6 October 2023.

The FGP currently has construction timing restrictions as stipulated in the approved *Special Area Plan – Yellow chat habitat within the SGIC SDA* (SAP, BASE / GAWB, June 2023). The intent of the time restrictions (May to September) was to reduce the potential for the FGP construction works to cause impacts to breeding activities of the Yellow Chat (Capricorn subspecies) (CYC) (*Epthianura croccea macgregori*). The CYC is listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)* (EPBC Act) and Endangered under the *Nature Conservation Act 1992 (Qld).*

The SAP covers the FGP right of way (RoW) within the SGIC SDA between Port Alma Rail Line / North Coast Line (approximate chainage (CH) 54000) to Raglan Creek (approximate CH73000) (refer to **Appendix A**, **Figure A.1**). As required by the SAP, MBJV is installing trenchless (micro-tunnelled) crossings to reduce the potential for environmental impacts on major creek lines through this section.

Construction in the SGIC SDA subject to the SAP commenced on 1 May 2024. However, due to unseasonal rains in April, May, June and August 2024 limiting access, and issues with ground conditions impacting shaft installation at two of the crossings, it will not be possible for MBJV to complete all works[1] for all the trenchless crossings before 30 September 2024. Under the current SAP[2], this would require demobilising and recommencing works in May 2025 which would result in a significant delay to the delivery of this critical Queensland Government infrastructure project, and could present additional environmental impacts to continuing the works to completion in 2024.

CQG's team, which includes CYC specialists, Wayne Houston and Bob Black, conducted a risk assessment on behalf of MBJV to determine the likely impact on the breeding activities of the CYC resulting from continued works on trenchless crossings post-September 2024 (noting likely maximum extension of up to December 2024 will only be required for one trenchless crossing at Inkerman Creek). CQG's subconsultants, Wayne Houston and Bob Black have extensive experience conducting CYC surveys and authoring reports; including those that informed the FGP environmental impact statement (EIS, GAWB 2008) and subsequent management plans, and contributing to Queensland Government (2023) Recovery Action Plan for the species (refer to CVs provided at **Appendix B**).

[1] "Works" are defined in the *EPBC Regulations 2000* (Cwlth) Dictionary (and approved GAWB CEMP, July 2023). Access to, and along, the FGP RoW is not considered to be construction works.

[2] The CYC SAP referenced throughout this risk assessment is the key document of relevance to minimising impacts to CYC habitats. It is noted that the May to September construction works restriction, as it relates to the CYC SAP, is also referenced in the approved *FGP Construction Environmental Management Plan* (CEMP, GAWB, July 2023) and *SAP – Trenchless Waterway Crossings in the SGIC SDA* (BASE / GAWB, June 2023). Changes made to the CYC SAP as a result of this risk assessment will also be reflected in subsequent revisions to these documents.

1.2 Purpose of this evaluation

The purpose of this report is to summarise the findings of an assessment conducted by CYC specialists to determine the potential risks and nominate appropriate mitigations to enable the completion of trenchless crossing works in creeks along the FGP between CH54000 to CH73000 post-September 2024. This report informs proposed amendments to the SAP[2] and is intended to be submitted to regulators for approval of works post-September 2024.

This assessment is based on knowledge gained since the Initial Advice Statement (GAWB 2007) and the EIS (GAWB 2008), with Houston and Black (2024) confirming that the proposed trenchless crossing works within the FGP corridor is far enough from all known CYC breeding areas to not present a risk to CYC habitat or breeding as a result of noise, traffic, dust etc. This report considers the potential impacts of the actual location of the FGP RoW, and the trenchless crossings.

MBJV and GAWB need to secure this approval with sufficient time to ensure certainty for project scheduling and avoid the need to demobilise in September 2024 and remobilise in May 2025.

1.3 Legislative context

The FGP EIS was undertaken as per provisions of the bilateral agreement between the Queensland and Commonwealth Governments.

The CYC SAP was required by condition 11, under Section 8: Matters of National Environmental Significance in the *Coordinator-General's (CG) Evaluation Report for an EIS – FGP* (dated 2 February 2010). Condition 11 states the following:

> *Prepare a CEMP* (Construction Environmental Management Plan) *to contain a SAP for areas in proximity to confirm yellow chat habitat, that is, construction works in areas along the pipeline alignment between the Port Alma Railway and Horrigan Creek. The SAP is to include:*
>
> - *Construction works are to be undertaken during the period between May and September inclusive*
> - *For those crossings not being micro tunnelled, width of disturbance for each watercourse crossing is to be reduced to 15 m*
> - *Works will be programmed to ensure that trenched crossings will be completed and stabilised within one week*
> - *Creek water levels will be monitored during creek crossing construction to allow early identification of changed water levels that may affect yellow chat habitat and appropriate corrective action to be undertaken*
> - *Water from the coffer dam will be pumped downstream so that downstream flows are not reduced*
> - *Permanent construction roads will not be built across creeks or wetlands*
> - *Pre- and post-works surveys of the creek and vertical soil profiles will be undertaken to ensure the creek profile is restored*

Although the CG Evaluation Report has since lapsed, conditions related to the CEMP and SAPs were invoked by condition 1 of the Commonwealth approval of the FGP EIS (Ref: EPBC 2007/3501, dated 4 November 2011, with latest amendment dated 20 June 2022) under the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act).*

Condition 1 of the EPBC approval states the following:

> *To avoid and mitigate impacts to protected matters, each management plan must be approved by the Coordinator-General prior to commencement of the relevant stage or sub-stage (if applicable) of the action to which that management plan applies. Within 20 business days of the Coordinator-General having approved a management plan, the person taking the action must submit the approved management plan to the department and publish it on the website.*

Condition 1 of the EPBC approval has been met as follows:

- The SAP and other relevant management documentation[2] were approved by CG condition 1.1 of the SGIC SDA material change of use (MCU) approval (Ref: AP2022/018, dated 31 July 2023); and
- The currently approved management plans are publicly available on GAWB's website here: https://www.gawb.qld.gov.au/projects/fitzroy-to-gladstone-pipeline/.

Relevant to the approval of these proposed amendments to the SAP[2], condition 8 of the EPBC approval states the following:

> *If the person taking the action wishes to carry out any activity otherwise than in accordance with a management plan which has been approved by the Coordinator-General for the purposes of impact avoidance, mitigation or offsetting habitat for protected matters, the person taking the action must submit to the department, for the Minister's written approval, a revised version of that management plan. The varied activity shall not commence until the Minister has approved the varied management plan in writing. If the Minister approves the varied management plan, that management plan must be implemented in place of the management plan originally approved.*

MBJV and GAWB are seeking approval to undertake construction work in accordance with the measures outlined in this risk assessment and the updated SAP (provided separately in Word format including track changes for ease of review) i.e., works to continue post-September 2024.

2 Trenchless Crossing Overview

The SAP identifies six trenchless crossings, including five on major creeks to minimise potential impacts to these sensitive environments (refer to **Figure 1.1**).

Trenchless crossings are complex to construct, and the scope of each crossing varies, but in general terms includes the following stages:

1. **Erosion and sediment control**: installation of devices to manage erosion and sedimentation during construction;
2. **Vegetation clearing**: removal of vegetation within the RoW, including marine plants, to facilitate the construction of temporary trenchless launch and receival shafts;
3. **Construction of temporary access tracks**: development of trafficable access for construction vehicles and equipment to navigate unsuitable ground conditions;
4. **Temporary shaft construction**: typically involves the installation of 12 to 16 m long sheet piles with an excavation depth of approximately 8 to 10 m, and includes a concrete slab either side of the trenchless crossing i.e.,:
    i. launch shaft: a larger shaft, including a thrust wall and headwall, for launching equipment such as the microtunnelling machine, enveloper jacking pipe and carrier pipe; and
    ii. reception shaft: a smaller shaft for retrieving the pipeline and equipment.
5. **Microtunnelling**: utilisation of a tunnelling machine to excavate an underground path for the pipeline – powerful hydraulic jacks are employed to push the enveloper pipes through the ground behind the machine;
6. **Installation of carrier pipe**: after completing the bore, the carrier pipe is installed from within the launch shaft;
7. **Backfilling and removal of temporary works**: backfilling the shafts and removing temporary structures, including the sheet piles;
8. **Pipeline tie-ins**: installation of the pipeline connection to the trenchless crossings, including valve installation; and
9. **Reinstatement**: removal of temporary access tracks and replacement of topsoil to allow for rehabilitation of the site.

As noted in **Table 2.1**, trenchless crossing works will not be completed by 30 September 2024 due to delays resulting from wet weather in April, May, June and August 2024 and ground conditions encountered since; combined with limited availability of specialist sub-contractors, tunnel boring machines (TBMs) and shaft bracing materials.

Table 2.1: FGP trenchless crossing locations and construction details

Approx CH	Location	Design	Sub-contractor (TBM)	Status (as at 30/07/24) *(refer to stages listed above)*
56800	Inkerman Creek	99 m microtunnel	DJ MacCormick (TCC1200)	Stage 4 commenced – cementitious ground encountered that has delayed progress – will not be complete by 30 September 2024
57700	Port Alma Road	35 m augur bore	Bothar (AB1350)	Stages 1 to 9 complete
65200	Twelve Mile Creek	87 m microtunnel	DJ MacCormick (AVN1200)	Stage 5 almost complete – works suspended due to movement in reception shaft – Stage 8 and 9 may not be complete by 30 September 2024 (no contingency)
65900	Marble Creek	60 m microtunnel	DJ MacCormick (AVN1200)	Stage 5 underway – Stage 8 and 9 may not be complete by 30 September 2024 (no contingency)
72340	Horrigan Creek	47 m microtunnel	Bothar (AVN1200)	Stage 4 almost complete – Stage 5 scheduled to commence in next 2 to 3 weeks – Stage 7, 8 and 9 may not be complete by 30 September 2024 (no contingency)
73450	Raglan Creek	71 m microtunnel	Bothar (AVN1200)	Stage 5 underway – works should be complete by 30 September 2024

Refer to **Appendix C** for Issued for Construction (IFC) drawings for each of the major creek crossing.

3 CYC Background

3.1 CYC and the Fitzroy Delta

CYCs are wetland associated species, confined to a few treeless marine plains in Broad Sound, the Fitzroy River Delta and Curtis Island (Houston *et al.* 2013). Typically, they breed following wet season freshwater inundation of marine plain wetlands, which leads to a pulse of productivity including foliage and mud-associated invertebrates upon which they feed (Houston 2013; Houston *et al.* 2020a). Greater inundation leads to a greater area of wetland activated and provides more breeding habitat for a longer period, thus enhancing numbers and survival.

Breeding is opportunistic, mostly in warmer, wetter months (spring, summer, autumn) however, CYCs have been observed breeding in most months depending on preceding conditions (Houston *et al.* 2020a). There are local movements approximately 10 km from breeding habitats that support them during the drier months for breeding such as supratidal saltmarsh and associated grasslands following inundation (Houston *et al.* 2018). This may not always occur, particularly in severe droughts where these sites may not support breeding.

The southern Fitzroy Delta CYC population uses the Cheetham Salt Limited (Cheetham) Bajool and Port Alma saltfields (associated with Inkerman, Pelican and Raglan Creeks) as a dry season refuge (Houston *et al.* 2018). These saltfields provide a stable year-round source of food (Houston *et al.* 2012).

When substantial rain events, (typically more than 30 mm) stimulate a pulse in plant and invertebrate growth in the saltmarsh wetlands at Twelve-Mile Creek, the Horrigan (Christiansen's) Oxbow and the Raglan Creek Oxbow, and saltmarsh areas adjoining the Cheetham saltfields near Inkerman Creek, CYCs often move to these areas to breed. Their importance as breeding habitat is probably due to a combination of the peak in food supply and the ample cover for concealing nests.

In prolonged droughts, these wetlands may not be activated, and CYC may spend the entire year at the saltfields. These saltfields have embedded saltmarsh as well as well vegetated banks providing shelter and foraging opportunities. The saltfields are now managed by Cheetham to support CYC habitat, and CYCs appear to successfully breed there. A survey conducted in by Birdlife Australia in June 2020 found large numbers of immature CYCs fledged that year, when conditions outside the two saltfields were not suitable for breeding, most likely due to the impacts of drought years and extreme tidal events on habitat condition (Bob Black, pers. comm., 2024).

The most significant creeks with inputs into CYC breeding and foraging habitat along the FGP are Twelve-Mile and Marble Creeks. Both creeks feed directly into the Twelve-Mile Creek saltmarsh and associated wetlands, which is the major CYC breeding site in this area (Houston 2013). Refer to **Appendix A**, **Figure A.2** which shows the location of the FGP RoW within the SGIC SDA, the creek crossings and the location of the trenchless creek crossings and the CYC breeding habitats.

Inkerman Creek is associated with the Inkerman Creek saltmarsh and associated wetlands, which are directly adjacent to Cheetham's Bajool saltfield.

Horrigan (also known locally as Hourigan) Creek and Raglan Creek also flow close to opportunistic breeding sites for a smaller number of CYCs.

The important Inkerman, Raglan and Pelican Creek CYC refuge areas are contained within the Cheetham saltfield banks and will not be affected by the FGP.

3.1.1 Inkerman Creek

The seasonally used CYC breeding habitat adjoins the Bajool saltfield (Inkerman Creek).

A channel just west of the salt ponds has been partly severed from the main creek by the Bajool Port Alma Road and the railway line to the north. This channel probably fills after substantial local rain or when the Inkerman Creek channel to the west breaks its banks in flood events. In dryer years the *Schoenoplectus* sedge beds here fail to activate, and do not provide CYC breeding habitat.

A small swale between the saltfield banks and Bajool Port Alma Road also provides breeding habitat for a few pairs of CYCs in wetter seasons. This is cut off from stream flows by banks, so also fills after substantial local rain, and is not likely to be affected by work upstream on Inkerman Creek.

A large area of tidally connected salt marsh south of the saltfields, just south of Bajool Port Alma Road also becomes activated by substantial local rainfall, or freshwater flows down a side channel of Inkerman Creek. In the dry years of 2018 and 2019 this area was subject to large amounts of salt deposition from increasing tidal incursion and was not viable CYC breeding habitat. The small amount of freshwater sediment which could possibly reach this area is unlikely to be deleterious and may slightly improve CYC habitat by raising the terrain, and lessening salt deposition.

3.1.2 Twelve Mile Creek

Twelve-Mile Creek runs into the most important CYC seasonal breeding habitat in the southern Fitzroy Delta. Downstream of the FGP RoW it forms large, mostly permanent freshwater pools, before flowing over a small block wall and into a large and deep permanent saltwater pool upstream of CYC breeding habitat. This pool then flows into a complex, braided distributary system which is the core of the CYC breeding habitat. Breeding by CYC here follows substantial local rain, or heavy rain in the catchment area.

3.1.3 Marble Creek

Marble Creek is a tributary of Twelve-Mile Creek, flowing into the large permanent saltwater pool upstream of CYC breeding habitat which then flows into the most significant seasonal breeding habitat for CYCs in the southern Fitzroy Delta (as discussed in **Section 3.1.2**).

Unlike Twelve-Mile Creek, Marble Creek does not have large permanent pools. It has tree-lined banks for most of this section, and is fairly well vegetated, so should filter much of the sediment flowing downstream after substantial rain.

3.1.4 Horrigan Creek

Horrigan Creek flows into the tidal reach of Raglan Creek about 900 m downstream of the pipeline crossing. Both creeks here are deeply incised tidal, mangrove-lined channels with steep muddy banks. This means that heavy rainfall and subsequent flooding is likely to carry a large sediment load from the soft, muddy channel banks independent of FGP activities.

These creeks do not flow directly into the adjacent Oxbow breeding area (Christiansen's Oxbow), except in large creek flood events. They are separated by levee banks along Raglan Creek, which is a substantial tidal channel there. The breeding sites are usually activated by local rain events in a fairly small catchment area.

4 Potential Risks to CYC and Mitigation Measures

4.1 Risk assessment methodology

4.1.1 Risk ratings

The environmental risk assessment process underwent the following steps to determine potential risks and recommend appropriate treatments and control measures:

- Risk identification – identify potential risk events considering risk causes and outcomes;
- Risk analysis – identify source of risks, potential impacts and apply risk ratings to determine the consequence (refer to **Table 4.1**) (informed by previous CYC studies and information provided by MBJV 2024, refer to **Section 2** and **Section 4.3**);
- Risk evaluation – Consider risk controls, mitigation measures, risk resources and their effectiveness in reducing risk ratings; and
- Establish risk treatments and controls – determine what can be done in response to the evaluated risks to reduce risk ratings (consequence) by avoidance, applying risk treatments or risk transfer.

Table 4.1: Risk rating table

Likelihood	Consequence Rating				
Rating	**Insignificant**	**Minor**	**Moderate**	**Major**	**Severe**
Almost Certain	Low	Medium	High	Very High	Very High
Likely	Low	Medium	High	High	Very High
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	Medium

Key:

Likelihood rating:

Almost certain – The risk event will definitely occur.

Likely – The risk event may occur in most circumstances.

Possible – The risk event will possibly occur in most circumstances.

Unlikely – The risk event may occur sometimes.

Rare – The risk event could occur on a rare occasion.

Consequence rating:

Insignificant – Little environmental impact with recovery and remediation options within 24 hours.

Minor – Temporary environmental impact and locally contained. Can be rectified within 1 month.

Moderate – Environmental impact is not locally contained and cannot be rectified within 12 months.

Major – Environmental impact will only recover with ongoing management for more than 12 months.

Severe – Catastrophic environmental impact with no option for full recovery.

Risk rating:

Low (Green) – Low risk, maintain controls and follow recommended monitoring.

Medium (Yellow) – Medium risk, maintain and review controls, follow recommended monitoring.

High (Orange) – High risk, implement additional design, construction or safety measures to reduce risk rating.

Very High (Red) – Very high risk, risk source and relevant operational aspect to stop. Further advice required.

4.2 Risk assessment

Applying the methodology described in above, **Appendix D**, **Table D1: Risk Assessment Trenchless Crossing CYC** outlines the identified risks and hazards, the associated environmental values and impacts and the likelihood and consequences for each risk with controls to ascertain the residual risk level was then determined with consideration of the design measure (i.e., trenchless crossings, refer for **Appendix C**), and the additional mitigation measures as outlined in the SAP.

Key hazards that could arise as a result of the proposed works associated with the trenchless crossings (refer to **Section 4.3**) include (if mitigation measures not implemented):

- Disturbance to CYCs when breeding (refer to **Section 4.4**); and
- Decline in habitat condition of wetlands downstream of disturbed areas (refer to **Section 4.5**).

4.3 Trenchless crossing works

Table 4.2 lists the four creeks where trenchless crossing works may need to take place post-September 2024, the type of activities that may need to be conducted (refer to **Section 2**) and the distance to the nearest downstream CYC breeding habitat areas.

Table 4.2: FGP works post-September 2024 and nearest CYC breeding habitat areas

Location	Potential works post-September 2024 (Note 1)	Nearest CYC breeding habitat areas and distance (Note 2)
Inkerman Creek	Stage 5 to 9	Adjacent to Bajool Saltfield ~2 km north-east
Twelve Mile Creek	Stages 8 and 9	Twelve Mile Creek braided system of pools and channels ~900 m north
Marble Creek	Stages 8 and 9	Twelve Mile Creek braided system of pools and channels ~900 m north-west
Horrigan Creek	Stages 7 to 9	Christiansen's Oxbow ~700 m north

Note:

1. Refer to stage descriptions in **Section 2** – potential works listed assume worst-case.
2. Refer to **Appendix A**, **Figure A.2** and further details in **Section 4.4.1**.

4.4 Disturbance to CYCs when breeding

4.4.1 Potential risk

Disturbances to CYC breeding habitats potentially reduces breeding success leading to a decline in its population.

This is considered to be a relatively low risk during the proposed trenchless crossing works as the CYC habitat sites range from 700 m to over 2 km downstream from the FGP trenchless crossing work sites (i.e., no CYC habitats within the FGP corridor so no direct impacts). **Table 4.2** lists the location of the trenchless crossing sites proposed to be completed post-September 2024, in relation to the nearest CYC habitat areas.

Inkerman Creek crossing is approximately 2 km, Twelve Mile Creek crossing is approximately 900 m and Marble Creek crossing is about 900 m from the nearest CYC habitat.

The Christiansen's Oxbow complex is less than 500 m from the FGP RoW, but it is over 700 m from the Horrigan Creek trenchless crossing construction site.

The presence of relatively well-treed areas (a mix of mangroves and woodlands) between the FGP RoW and the wetland habitat also provides some buffering to disturbance.

The FGP RoW runs adjacent to the main railway line and the Bruce Highway (refer to **Appendix A**, **Figure A.2**), so noise or vibration from the trenchless crossing construction activities is unlikely to be a significant added disturbance to breeding CYC being over 700 m away.

In 2024 the unseasonal frequent rain events would have provided at least four opportunities for CYC to breed at Twelve-Mile Creek and Christiansen's Oxbow, and at the saltmarsh sites adjacent to the Bajool saltfield (Inkerman Creek). A survey on 4 May 2024 conducted by Birdlife Capricornia (Bob Black, *pers. comm.*, 2024) did not find CYCs present at the Christiansen's Oxbow site although conditions were identified as suitable for CYC breeding.

The risk of disturbance to CYC breeding due to the trenchless crossing works could be considered very low at any time due to the distance to the breeding sites.

However, this risk can be completely eliminated if surveys of the known breeding sites prior to and during the works monitor for the evidence of breeding and management measures put in place to cease works in the unlikely event that nesting CYC are detected, until such time the young fledge from the nest. The monitoring would continue during the works to show no CYCs are using those sites at the time of proposed extension to construction activities (to December 2024).

Regardless, the likelihood of disturbance to CYCs is still very low even if they are present and breeding because of the distance from the FGP trenchless crossings.

4.4.2 Mitigation

The SAPs managed the potential risks associated with works by aiming to complete construction during months when likelihood of breeding activity is relatively low (between May and September), noting the SAPs were informed by Houston (2006) as referenced in the EIS (GAWB 2008) which assumed the FGP RoW could be closer to the CYC habitats (refer to **Section 1.2**).

If work on the trenchless crossings is approved to take place post-September 2024, an initial survey at nearby wetlands and downstream of the proposed work areas will be conducted by CYC specialist Bob Black accompanied by ecologists and fauna spotter catchers working on the FGP to ensure this knowledge is shared through on-ground training and implemented during the works. Ecologists and fauna spotter catchers conducting the surveys need to be instructed on CYC behaviours as this species can be very furtive when breeding.

Surveys will be undertaken at the works areas by trained ecologists and fauna spotter catchers at weekly intervals while work is in progress to confirm no nesting CYC sighted.

A survey should be completed by the CYC specialist Bob Black at the end of the works and a report prepared to confirm the success of the mitigation measures.

Sites where the trenchless crossing construction work has been completed by 30 September 2024 will not need to be surveyed.

The Cheetham saltfields will not need surveying as works are at least 2 km from the FGP (proposed works more than 4 km for the Port Alma saltfield). The Cheetham saltfields are also much closer to existing disturbances e.g., the salt refinery and Bajool-Port Alma Road.

4.5 Decline in habitat condition of wetlands downstream of disturbed areas

4.5.1 Potential risk

Habitat loss or decline in condition of habitats leads to reduced breeding opportunities and a potential decline in population of CYCs.

The key risk factors that could lead to a decline in CYC habitat are listed below and addressed in the SAPs:

- Changes in creek hydrology – this predominately involves changes to creek flow events but could also include damage to groundwater aquifers underlying creeks;
- Alteration of surface overland flows – some wetlands rely more on these types of flows than creek inputs (e.g., possibly around the Inkerman Creek area);
- Decline in water quality from spill events; and
- Increased sedimentation infilling shallow basins.

Increased sedimentation is the only potential adverse impact on habitat that could be presented by trenchless construction activities during the breeding season, if appropriate controls are not implemented. More risk is likely during the wet season due to impacts of storms and potential erosion associated with major rainfall events. For the trenchless crossing works this risk will be addressed by carrying out work during the lower rainfall months of the year and the implementation of controls to prevent soil movement such as ensuring exposed soil and surfaces are stabilised. It is likely that demobilisation and remobilisation after the wet season could result in more impacts to the CYC habitats than completing the works prior to the wet season.

Potential risks by location are identified as follows

- Inkerman Creek: seasonal breeding sites are between 2 km and 2.7 km from the trenchless crossing. Some of the CYC breeding sites are connected by flood events to a side channel east of Inkerman Creek, but any meaningful habitat damage from trenchless crossing sediments is extremely unlikely and the risks low to extremely low.
- Twelve Mile Creek:the risk will be low as core CYC breeding areas are at least 900 m from the creek crossing. The trenchless crossings minimise possible sediment flow into breeding habitat. However, this crossing is a greater risk of impact on the breeding area because Twelve Mile Creek has a larger catchment and greater flows than Marble Creek.
- Marble Creek: he risk will be low to very low risk as CYC breeding areas are in braided distributary channels at least 900 m from the creek crossing, and Marble Creek is well vegetated with less likely flooding events.
- Horrigan Creek: breeding sites are approximately 700 m from the trenchless crossings and Horrigan Creek does not flow directly into the Christiansen's Oxbow and habitat damage from trenchless crossing sediment is very unlikely and the risks low to extremely low.

4.5.2 Mitigation

MBJV (2024) has confirmed that crossings for the four remaining creeks in the area identified by the SAP will be at eight to ten metres depth. Shafts are excavated on the high banks above the creek, and spoil is maintained to minimise dispersion. These protocols are designed to minimise erosion and other hydrological disturbances.

It is noted for the two trenchless crossings closest to the core CYC breeding habitat (i.e., Twelve Mile Creek and Marble Creek) that the Stage 7: Backfilling and removal of temporary works including shafts will be complete by 30 September 2024. At these locations, post-September 2024 work will entail:

- Stage 8: Pipeline tie-ins occur over a limited footprint within a trench of approximately 3 m in depth, to the landward-side of the former shaft; and
- Stage 9: Reinstatement involves the removal of temporary tracks that provided access to the shafts.

Proposed mitigation measures are addressed in the draft update of the SAP (provided separately in Word format including track changes for ease of review).

If construction works for the trenchless crossings occurs post-September 2024 (i.e. in the CYC breeding season) care should be taken to ensure soil stockpiles are well protected, and bare areas stabilised as soon as possible, in accordance with current protocols; as the risk of heavy rain events increases as summer approaches.

5 Conclusion

The precautionary approach taken in the EIS (GAWB 2008) recommended that possible impacts on CYC habitat or breeding would be minimised by limiting adjacent construction to the May to September period. This restriction became part of the Government conditions of acceptance of the FGP (refer to **Section 1.3**).

Due to delays to site access caused by a number of substantial unseasonal rain events in April, May, June and August 2024, and issues with ground conditions impacting shaft installation at two of the crossings it is likely that up to four crossings will be substantially, but not fully completed by 30 September 2024.

This will leave two options as follows:

1. Suspend operations in late September 2024, remove infrastructure, temporarily stabilise and rehabilitate disturbed sites, and re-commence operations in May 2025 (or later, if conditions similar to 2024 are experienced); or
2. Complete the remaining crossings as expeditiously as possible while maintaining safeguard protocols and establish permanent rehabilitation.

This assessment by CYC specialists (Houston & Black) reported here, based on current knowledge of the location of the pipeline and of the species, found the likelihood of the trenchless crossing works post-September 2024 causing impacts to the species' breeding activities to be low as there is no habitat within the FGP RoW footprint. The closest CYC breeding site is approximately 700 m, with others over 2 km away from trenchless crossing locations.

It is likely that expeditious completion of the trenchless crossing construction works along the FGP carries less risk to CYC habitats and breeding than suspension of completion, demobilisation and remobilisation after the wet season.

It is likely that expeditious completion of the trenchless crossing construction works along the FGP carries less risk to CYC habitats and breeding than suspension of completion, demobilisation and remobilisation after the wet season; as they flow into the most important seasonal breeding area in this area.

Based on the risk assessment the proposed activity is unlikely to result in a significant impact to the CYC. The proposed activity is not considered contradictory to the *Capricorn Yellow Chat (Capricorn subspecies) Epthianura crocea macgregori Recovery Action Plan 2023-2033* (Queensland Government, 2023) or the specific recovery objectives for the species.

As such, a Significant Impact Assessment in accordance with the Matters of National Environmental Significance; Significant impact guidelines 1.1 *Environment Protection and Biodiversity Conservation Act (1999)* is not required.

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Limitations

This report has been prepared for the use of the client, MBJV, for the purpose of this commission only. It is based on a desktop assessment of survey and research results collated by Capricorn Yellow Chat specialists in the Fitzroy Delta.

The risk assessment assumes the mitigation measures as described in the MBJV FGP Construction Environmental Management Plan (CEMP) and Special Area Plan (SAP) for the CYC, are implemented.

CQG[3] takes no responsibility and disclaims all liability for any loss or damage that any party may suffer as a result of using or relying on any such information or recommendations contained in this report.

To the maximum extent permitted by law CQG expressly disclaims responsibility for or liability arising from:

- Any error in, or omission in connection with assumptions, or
- Reliance on the report by a third party, or use of the report other than for the purpose stated.

The report relates only to the project described herein and must be reviewed by a competent expert before being used for any other purpose. CQG accepts no responsibility for other use of the data.

This report does not provide a complete assessment of the environmental status of the site but is limited to the scope defined herein.

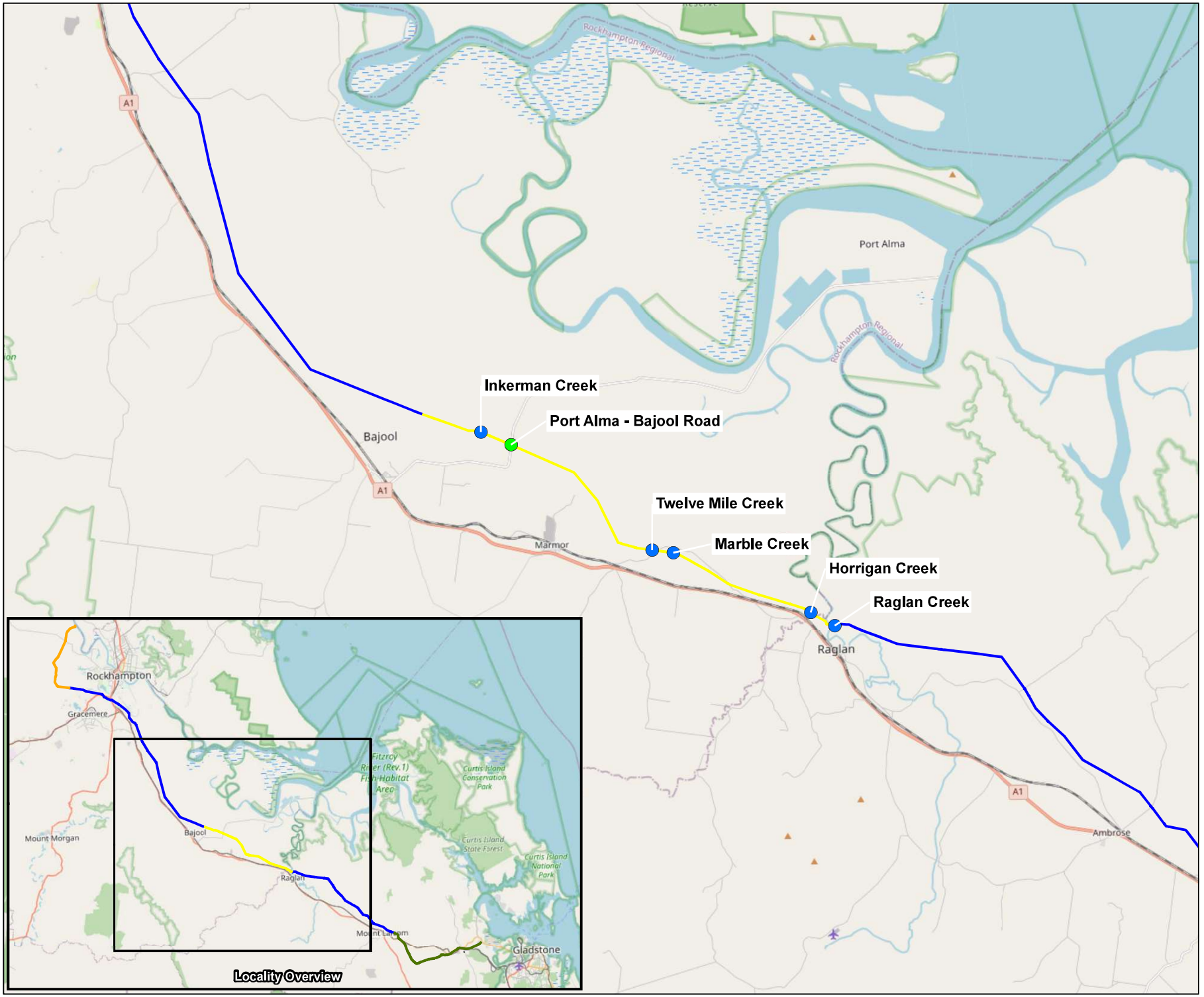
Should further information become available regarding the conditions of the Study Area, CQG reserves the right to review the report in the context of the additional information.

This report is based on information issued and supplied to CQG by others as well as publicly available information.

[3] *CQ Environmental Pty Ltd (ABN 61 107 574 514) trading as CQG Consulting (CQG)*

APPENDIX A:

Site Figures



Legend

- Completed Trenchless Crossing
- Current Trenchless Crossings
- FGP RoW - SGIC SDA (CYC SAP extent)
- FGP RoW - Northern
- FGP RoW - SGIC SDA (other)
- FGP RoW - GSDA

N

Scale 1:650,000 (A3)

0 1 2 4 6

Kilometres

Coordinate System: GDA2020 MGA Zone 56

Figure A.1

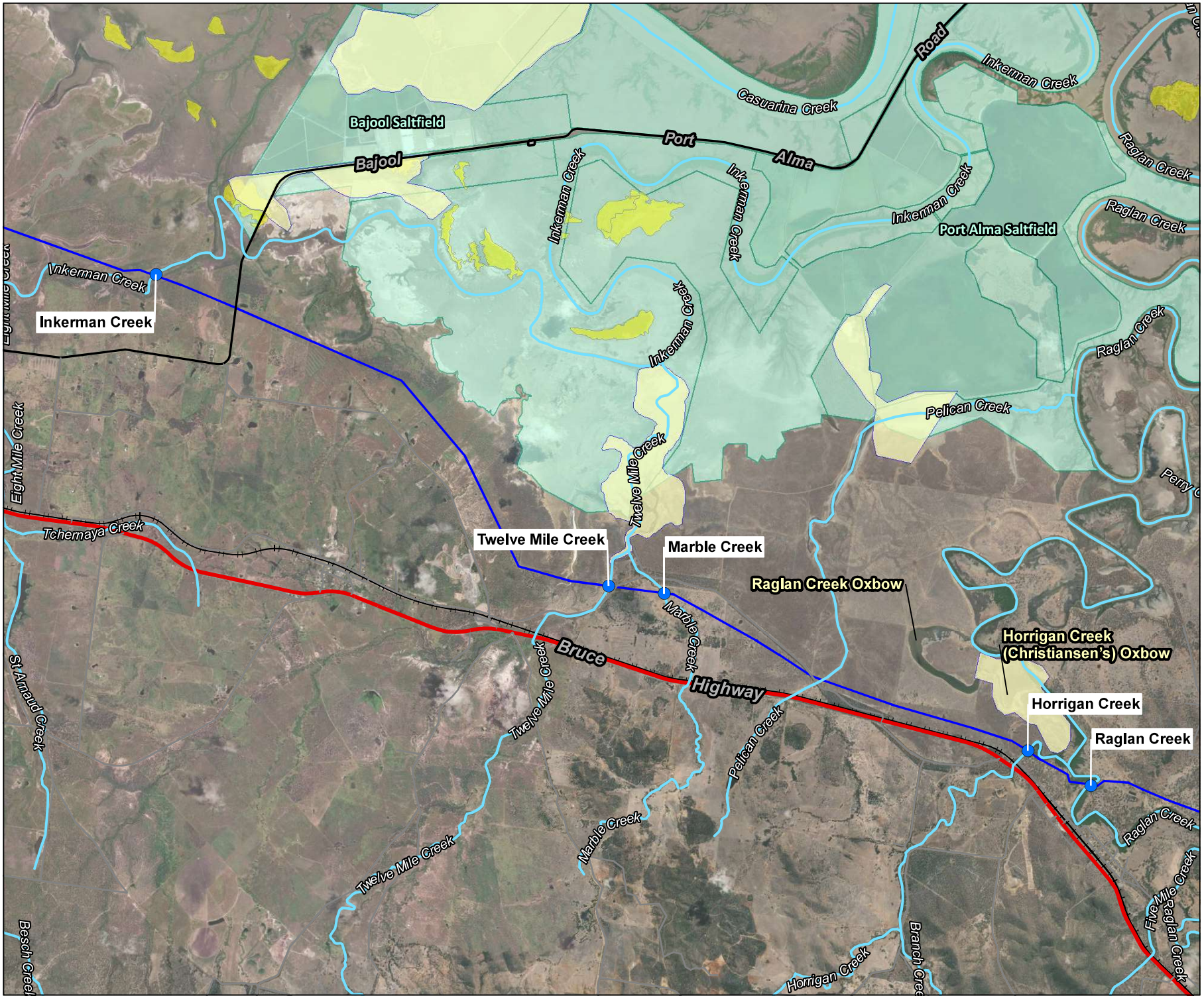
Fitzroy to Gladstone Pipeline Project

SGIC SDA – Trenchless crossings in Yellow chat zone

CQG Consulting

180 Quay Street, Rockhampton Q 4700
PO Box 8384, Allenstown 4700
Ph: +61 7 4922 9252 Fax: +61 7 49220195

Project No: 21148
Map No: 21148-37-02
Revision: Rev 0
31 July 2024



Legend

- Trenchless creek crossing sites
- Bruce Highway
- Major Road
- Minor Road
- Named waterways
- Rail network
- FGP RoW - SGIC SDA
- Cheetham Salt fields
- CYC Habitat Areas (Houston, W. 2024)
- Regional ecosystems of importance to CYC (Houston, W. et all 2012)

N

Scale 1:52,721 (A3)

0 0.5 1 2

Kilometres

Coordinate System: GDA2020 MGA Zone 56

Figure A.2

Fitzroy to Gladstone Pipeline Project

Inkerman Creek to Raglan Creek CYC Habitat

CQG Consulting

180 Quay Street, Rockhampton Q 4700
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Ph: +61 7 4922 9252 Fax: +61 7 49220195

Project No: 21148
Map No: 21148-37-01
Revision: Rev 0
12 August 2024

APPENDIX B:

CYC Specialist CVs / Publications List

Robert Black's experience with Capricorn Yellow Chats

Present at rediscovery of CYC on the mainland at Fernleigh, Torilla Plain, July 2003.

Present at most subsequent sub-population discoveries, including Toorilla Plains, Hollin's Bay, Glenprairie, Fitzroy Vale, Casuarina Island and others.

Searched marine plain wetlands from Townsville to 1770 looking for new sites in 2004.

Has surveyed every known CYC population.

Monitored CYC every two months on Curtis Island 2016-2023.

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WAYNE HOUSTON

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As a senior researcher in the Conservation Biology group at CQUniversity, I have had over 30 years' experience in ecological research with a particular interest in biodiversity and conservation. This has included ecological studies of a range of fauna from invertebrates to mammals in freshwater, terrestrial and intertidal ecosystems. During this time, I have developed skills in bird, reptile, mammal, frog and invertebrate identification, including bioindicator taxa such as ants. Recent research and a Master's degree has focussed on the ecology of the critically endangered Capricorn Yellow Chat, a local endemic to marine plains in Central Queensland. From these studies, I have published more than 40 scientific papers, most as first author, and over a 100 technical reports.

Particular interests lie in:

- using biodiversity to evaluate sustainable land management practices in rangelands
- environmental drivers and the ecology of endangered species, particularly birds
- wetland ecology including mangroves and saltmarshes.

In my capacity as Senior Research Officer at Central Queensland University, I have been responsible for supervising and training staff with expertise in terrestrial fauna and flora surveys. I have also developed research proposals and have been successful in gaining several long term research projects evaluating sustainable land use in Central Queensland including:

- using key indicators of soil health such as invertebrates to evaluate grazing land condition, and the progress of woodlands on reconstructed soils following mining (German Creek Mine 2006 to 2013)
- developing vegetation indicators to evaluate the progress of restored woodlands on reconstructed soils following mining (Kunwarara Magnesite Mine 2009 to present)
- evaluation of mangrove condition in response to disturbance (Port Curtis and associated mangroves, 2012, 2015-2016).

Due to my expertise on the ecology of the Capricorn Yellow Chat, I was recently successful in gaining funding for a five year collaborative study with Queensland Parks and Wildlife into the ecology of Capricorn Yellow Chat at Curtis Island.

EDUCATION

Master of Applied Science, Central Queensland University, 2010

Bachelor of Science (Honours 1) - Zoology, University of Queensland, 1978

MEMBERSHIPS & AFFILIATIONS

Member of Ecological Society of Australia

Member of BirdLife Australia

EMPLOYMENT HISTORY (Listed by employer in descending chronological order)

Senior Research Fellow, Central Queensland University, - March 2020 to present; Senior Research Officer, Rockhampton - July 2008 to February 2020; Research Officer - April 1994 to June 2008

Project Officer, Capricorn Conservation Council, Rockhampton - July 1994 to November 1995 (part time)

Entomologist, Department of Primary Industry, Darwin - October 1988 to November 1991

Education Officer, NT Museum, Darwin - May 1988 to September 1988

Research Assistant, NT Museum, Darwin - January 1985 to April 1988

Supervisor and Information Officer, Mosquito Eradication Campaign, Department of Health, Darwin - April 1984 to December 1984

Ecologist (part-time), Marine Conservation Society of Australia, Brisbane - June 1981 to May 1983

Project Officer (part-time), Moreton Island Protection Committee, Brisbane - April 1982 to March 1983

OTHER SKILLS AND QUALIFICATIONS

Extensive experience with using a wide range of PC based computer programmes including MS Office (including Word, Excel, Access and Powerpoint), Primer-e (including an accredited course), Statistica, Endnote and ArcGIS.

Further skills and qualifications include:

- full (manual) drivers licence;
- extensive 4WD experience and training;
- senior first aid certificate;
- current generic safety induction for coal (surface) mines; and
- experience in undertaking risk assessments for both laboratory and field based activities and other associated occupational health and safety requirements.

PUBLICATIONS (listed chronologically)

Thesis

Houston W. A. (2010) *Distribution, breeding ecology, population and habitat use of the critically endangered Capricorn Yellow Chat Epthianura crocea macgregori Keast (Aves: Melaphagidae)*. Master of Applied Science (by Research), Faculty of Sciences, Engineering & Health, Central Queensland University, Rockhampton.

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APPENDIX C:

Trenchless Creek Crossing IFC Drawings – CYC Area

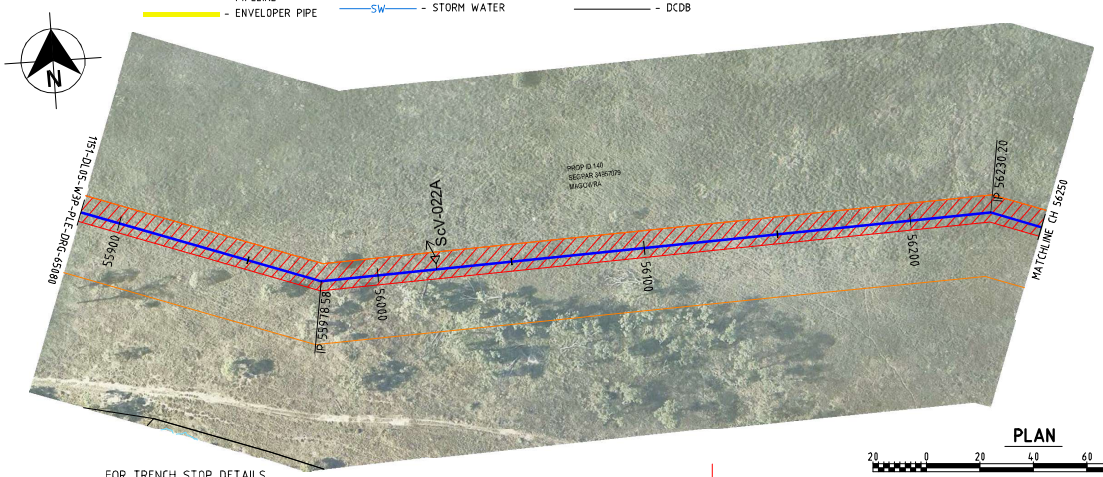
BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm

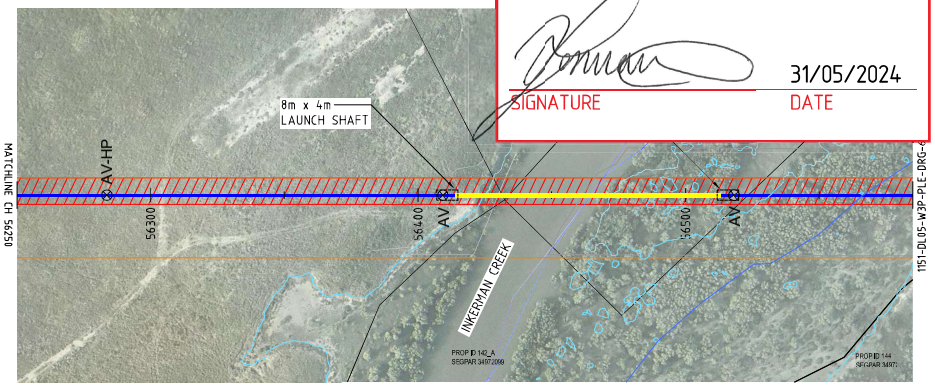
LEGEND:
PROPOSED:
- AIR VALVE
- SCOUR VALVE
- ISOLATION VALVE
- CONTROL VALVE
- PIPELINE
- ENVELOPER PIPE

LEGEND:
EXISTING:
- FENCE
- GAS
- ELECT'L POWER (OH or UG)
- TELSTRA CABLE
- DRAIN
- STORM WATER
- WATER OTHER
- SEWER PIPE
- 100 ARI FLOOD LEVEL
- SURVEYED CADASTRE
- RIGHT OF WAY
- DCDB
- CONSTRUCTION ZONES
- LICENSED AREAS

RPEQ CERTIFICATION

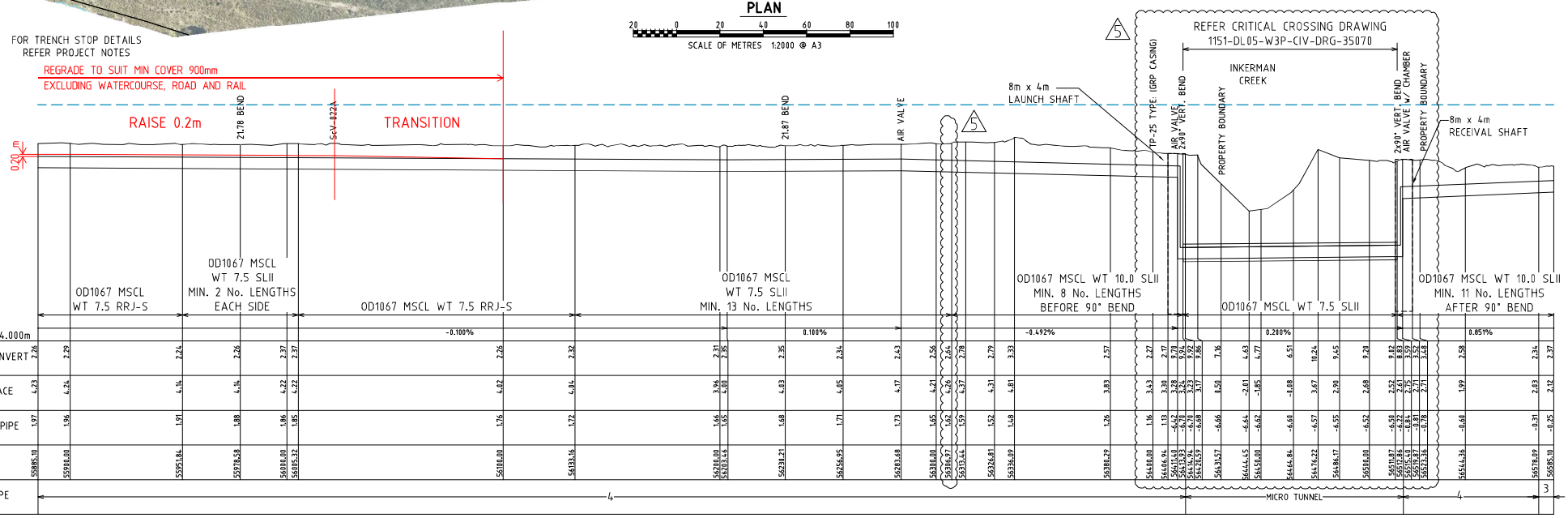
PETER SEMIANIW	15957
NAME	RPEQ No.
SIGNATURE	31/05/2024 DATE





PLAN

SCALE OF METRES 1:2000 @ A3



LONGITUDINAL SECTION

VERTICAL SCALE OF METRES 1:400 @ A3

HORIZONTAL SCALE OF METRES 1:2000 @ A3

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND
NAME: PETER SEMANIW
RPEQ NO.: 15975
DIVISION: CIVIL
SIGNATURE: DATE: 17 / 07 / 24

ISSUED FOR CONSTRUCTION

REV	DATE	REVISION DESCRIPTION	DRN	CHKD	EXT. APP.	GAWB ACC.	REFERENCE DRAWINGS	NUMBER
5	17/07/24	TP DETAILS UPDATED & VERTICAL BEND UPDATED TO 90 DEGREE	TA	MM	PS		-	
4	22/05/24	MEAN HIGH WATER SPRINGS LABEL ADDED	TA	MM	PS		-	
3	15/12/23	CP DESIGN UPDATED	TA	MM	PS		-	
2	13/10/23	DETAILS UPDATED	TA	MM	PS		-	
1	26/09/23	LEGEND CHANGED & AV's ADDED	TA	MM	PS		-	
0	05/09/23	ISSUED FOR CONSTRUCTION	TA	MM	PS		-	

W3 Plus Consulting world wide water plus
McCONNELL DOWELL CREATIVE CONSTRUCTION
BMD

DO NOT SCALE

INITIALS SHOWING (#) ASTERISK INDICATE ORIGINAL SIGNATURE HAS BEEN SIGNED OFF AS PER DATE INDICATED

Gladstone Area Water Board
136 Goondoon Street Gladstone Q 4680 | PO Box 446 Gladstone Q 4680 | Tel: (07) 4976 3000 | ABN: 88 409 667 181

DRAWN BY	TED ALVARADO	26/09/23
DESIGNED BY	MICHAEL MARIES	26/09/23
REVIEWED BY	PETER SEMIANIW	26/09/23
ACCEPTANCE BY		
RPEQ APPROVAL		
GAWB ACCEPTANCE		

FITZROY TO GLADSTONE PIPELINE PROJECT
DL05 PIPELINE CH 55885.10-56585.10

1151-DL05-W3P-PLE-DRG-65081

PROJECT No.	SIZE	DRAWING No.	SCALE	REV
GAWB #	A3	XXX-X-XXXX	AS NOTED	5.1

BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm

LEGEND:
PROPOSED:
- AIR VALVE
- SCOUR VALVE
- ISOLATION VALVE
- CONTROL VALVE
- PIPELINE
- ENVELOPER PIPE

LEGEND:
EXISTING:
- FENCE
- GAS
- ELECT'L POWER (OH or UG)
- TELSTRA CABLE
- DRAIN
- STORM WATER
- WATER OTHER
- SEWER PIPE
- 100 ARI FLOOD LEVEL
- SURVEYED CADASTRE
- RIGHT OF WAY
- DCDB
- CONSTRUCTION ZONES
- LICENSED AREAS

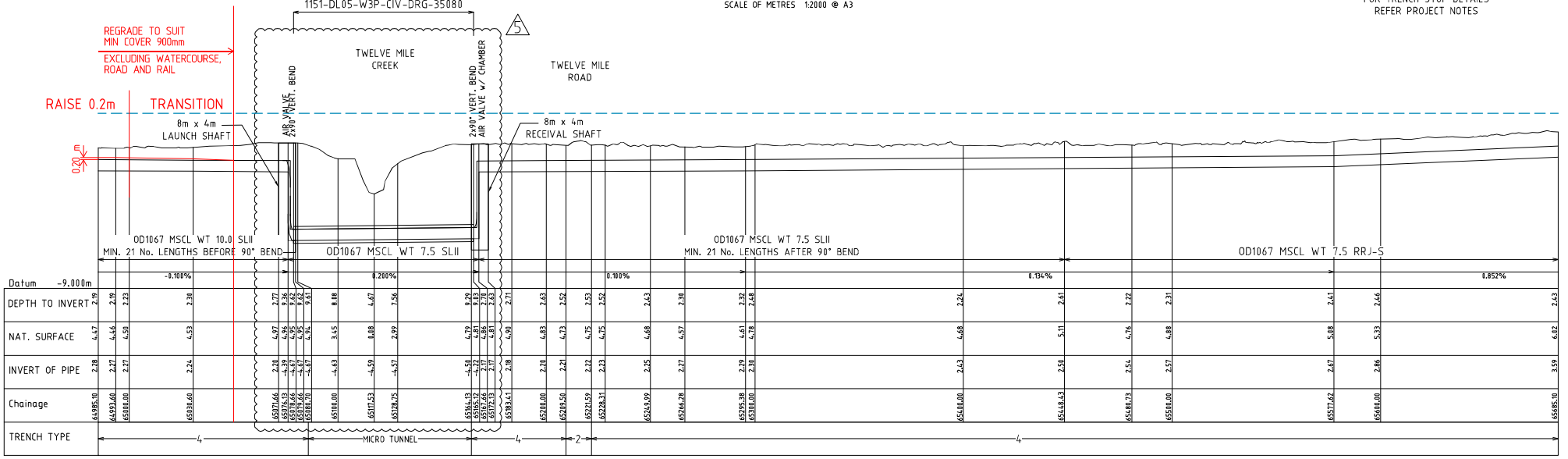
RPEQ CERTIFICATION

PETER SEMIANIW — NAME
15957 — RPEQ No.
SIGNATURE
31/05/2024 — DATE

PLAN
SCALE OF METRES 1:2000 @ A3

REFER CRITICAL CROSSING DRAWING
1151-DL05-W3P-CIV-DRG-35080

FOR TRENCH STOP DETAILS
REFER PROJECT NOTES



LONGITUDINAL SECTION
VERTICAL SCALE OF METRES 1:400 @ A3
HORIZONTAL SCALE OF METRES 1:2000 @ A3

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND
NAME: PETER SEMANIW
RPEQ NO.: 15975
DIVISION: CIVIL
SIGNATURE: DATE: 17/07/24

ISSUED FOR CONSTRUCTION

REV	DATE	REVISION DESCRIPTION	DRN	CHKD	EXT. APP.	GAWB ACC.	REFERENCE DRAWINGS	NUMBER
5	17/07/24	TP DETAILS UPDATED & VERTICAL BEND UPDATED TO 90 DEGREE	TA	MM	PS		-	
4	22/05/24	MEAN HIGH WATER SPRINGS LABEL ADDED	TA	MM	PS		-	
3	15/12/23	CP DESIGN UPDATED	TA	MM	PS		-	
2	13/10/23	DETAILS UPDATED	TA	MM	PS		-	
1	26/09/23	LEGEND CHANGED & AV's ADDED	TA	MM	PS		-	
0	05/09/23	ISSUED FOR CONSTRUCTION	TA	MM	PS		-	

W3 Plus Consulting — world wide water plus
McCONNELL DOWELL — CREATIVE CONSTRUCTION
BMD

DO NOT SCALE

INITIALS SHOWING (#) ASTERISK INDICATE ORIGINAL SIGNATURE HAS BEEN SIGNED OFF AS PER DATE INDICATED

Gladstone Area Water Board
136 Goondoon Street Gladstone Q 4680 | PO Box 446 Gladstone Q 4680 | Tel: (07) 4976 3000 | ABN: 88 409 667 181

DRAWN BY	TED ALVARADO	26/09/23
DESIGNED BY	MICHAEL MARIES	26/09/23
REVIEWED BY	PETER SEMIANIW	26/09/23
ACCEPTANCE BY		
RPEQ APPROVAL		
GAWB ACCEPTANCE		

FITZROY TO GLADSTONE PIPELINE PROJECT
DL05 PIPELINE CH 64985.10-65685.10

1151-DL05-W3P-PLE-DRG-65094

PROJECT No.	SIZE	DRAWING No.	SCALE	REV
GAWB #	A3	XXX-X-XXXX	AS NOTED	5.1

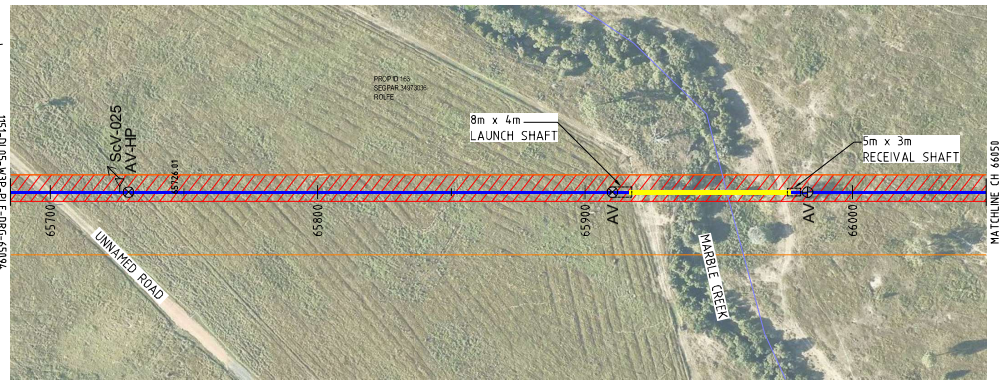
BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm

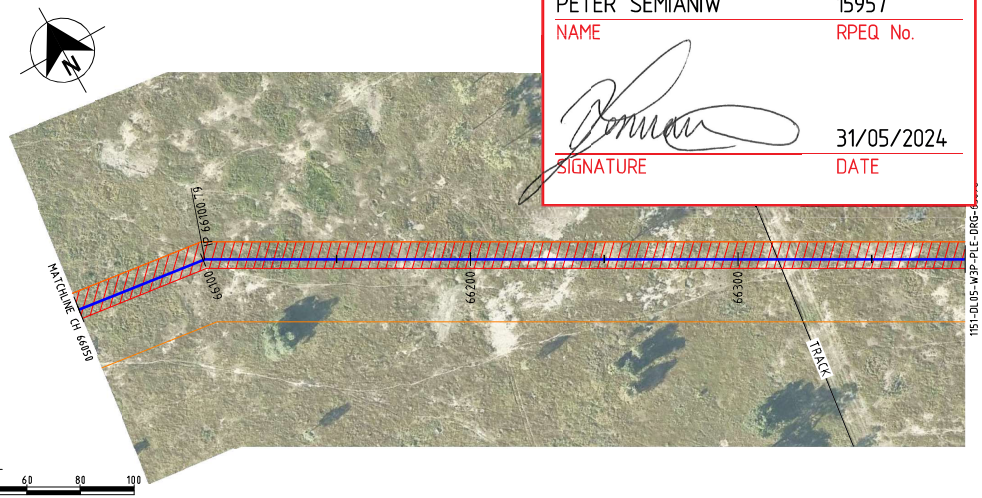
LEGEND:
PROPOSED:
- AIR VALVE
- SCOUR VALVE
- ISOLATION VALVE
- CONTROL VALVE
- PIPELINE
- ENVELOPER PIPE

LEGEND:
EXISTING:
- FENCE
- GAS
- ELECT'L POWER (OH or UG)
- TELSTRA CABLE
- DRAIN
- STORM WATER
- WATER OTHER
- SEWER PIPE
- 100 ARI FLOOD LEVEL
- SURVEYED CADASTRE
- RIGHT OF WAY
- DCDB
- CONSTRUCTION ZONES
- LICENSED AREAS

RPEQ CERTIFICATION

PETER SEMIANIW — NAME
15957 — RPEQ No.
SIGNATURE
31/05/2024 — DATE





PLAN
SCALE OF METRES 1:2000 @ A3

FOR TRENCH STOP DETAILS
REFER PROJECT NOTES

REFER CRITICAL CROSSING DRAWING
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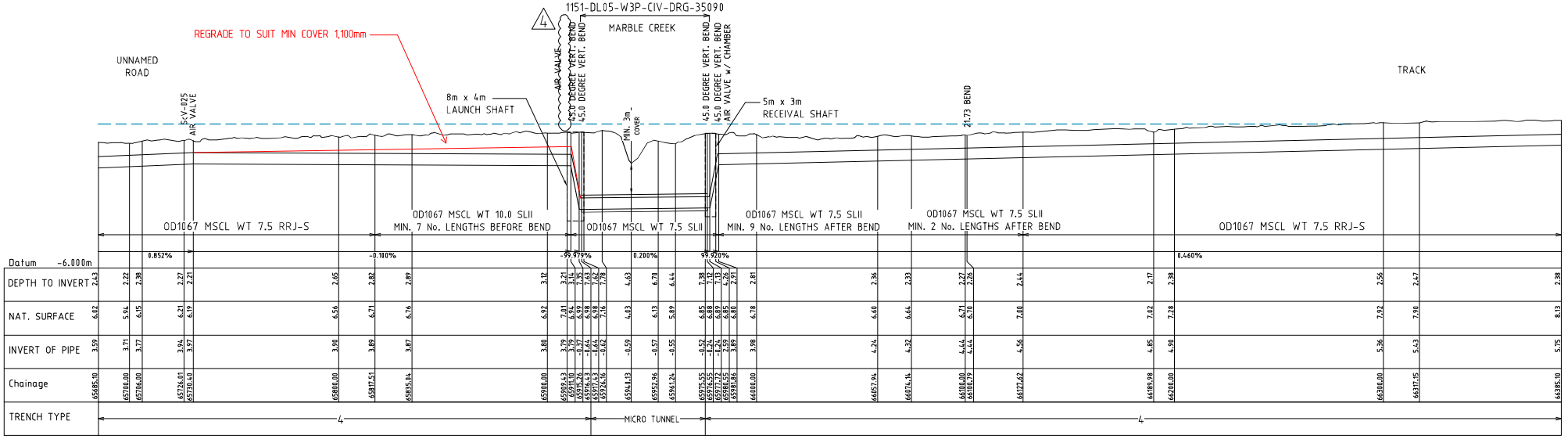

LONGITUDINAL SECTION
VERTICAL SCALE OF METRES 1:400 @ A3
HORIZONTAL SCALE OF METRES 1:2000 @ A3

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND
NAME: PETER SEMANIW
RPEQ NO.: 15957
DIVISION: CIVIL
SIGNATURE: DATE: 17 / 07 / 24

ISSUED FOR CONSTRUCTION

REV	DATE	REVISION DESCRIPTION	DRN	CHKD	EXT. APP.	GAWB ACC.	REFERENCE DRAWINGS	NUMBER
4	17/07/24	TP DELETED	TA	MM	PS		-	
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2	13/10/23	DETAILS UPDATED	TA	MM	PS		-	
1	26/09/23	LEGEND CHANGED & AV's ADDED	TA	MM	PS		-	
0	05/09/23	ISSUED FOR CONSTRUCTION	TA	MM	PS		-	

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McCONNELL DOWELL — CREATIVE CONSTRUCTION
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INITIALS SHOWING (#) ASTERISK INDICATE ORIGINAL SIGNATURE HAS BEEN SIGNED OFF AS PER DATE INDICATED

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DRAWN BY	TED ALVARADO	26/09/23
DESIGNED BY	MICHAEL MARIES	26/09/23
REVIEWED BY	PETER SEMIANIW	26/09/23
ACCEPTANCE BY		
RPEQ APPROVAL		
GAWB ACCEPTANCE		

FITZROY TO GLADSTONE PIPELINE PROJECT
DL05 PIPELINE CH 65685.10-66385.10

1151-DL05-W3P-PLE-DRG-65095

PROJECT No.	SIZE	DRAWING No.	SCALE	REV
GAWB #	A3	XXX-X-XXXX	AS NOTED	4.1

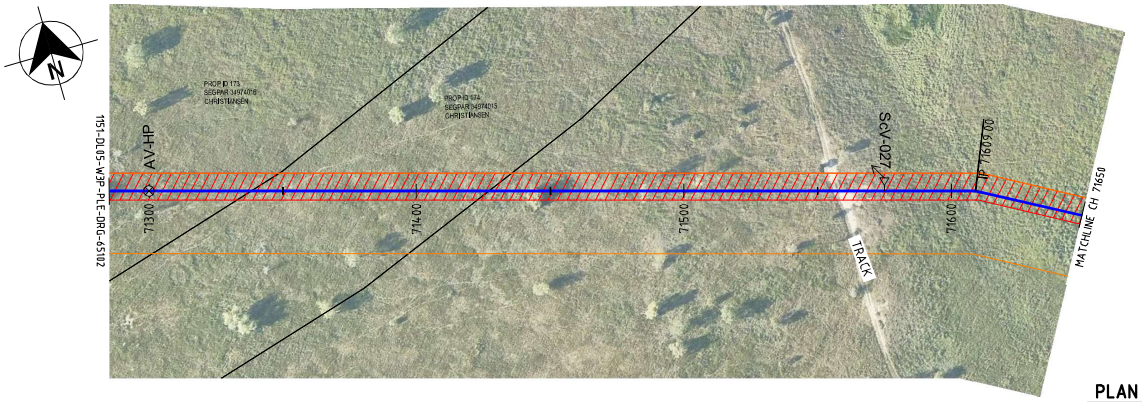
BEFORE YOU DIG
www.byda.com.au
Zero Damage - Zero Harm

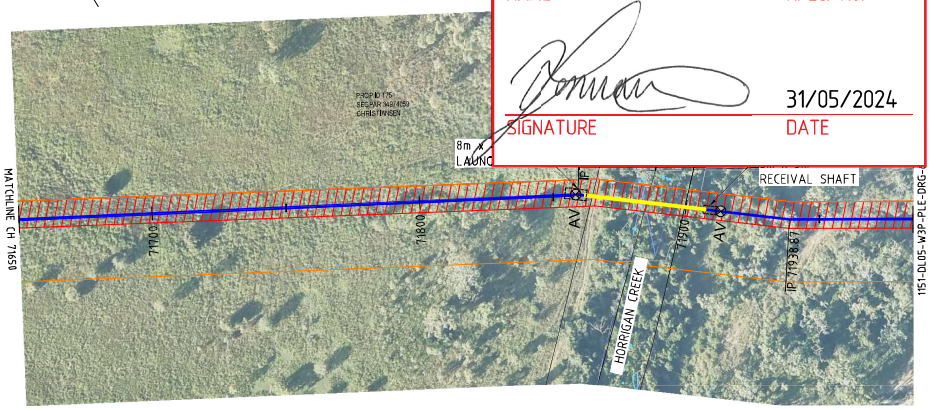
LEGEND:
PROPOSED:
- AIR VALVE
- SCOUR VALVE
- ISOLATION VALVE
- CONTROL VALVE
- PIPELINE
- ENVELOPER PIPE

LEGEND:
EXISTING:
- FENCE
- GAS
- ELECT'L POWER (OH or UG)
- TELSTRA CABLE
- DRAIN
- STORM WATER
- WATER OTHER
- SEWER PIPE
- 100 ARI FLOOD LEVEL
- SURVEYED CADASTRE
- RIGHT OF WAY
- DCDB
- CONSTRUCTION ZONES
- LICENSED AREAS

RPEQ CERTIFICATION

PETER SEMIANIW — NAME
15957 — RPEQ No.
SIGNATURE
31/05/2024 — DATE





PLAN

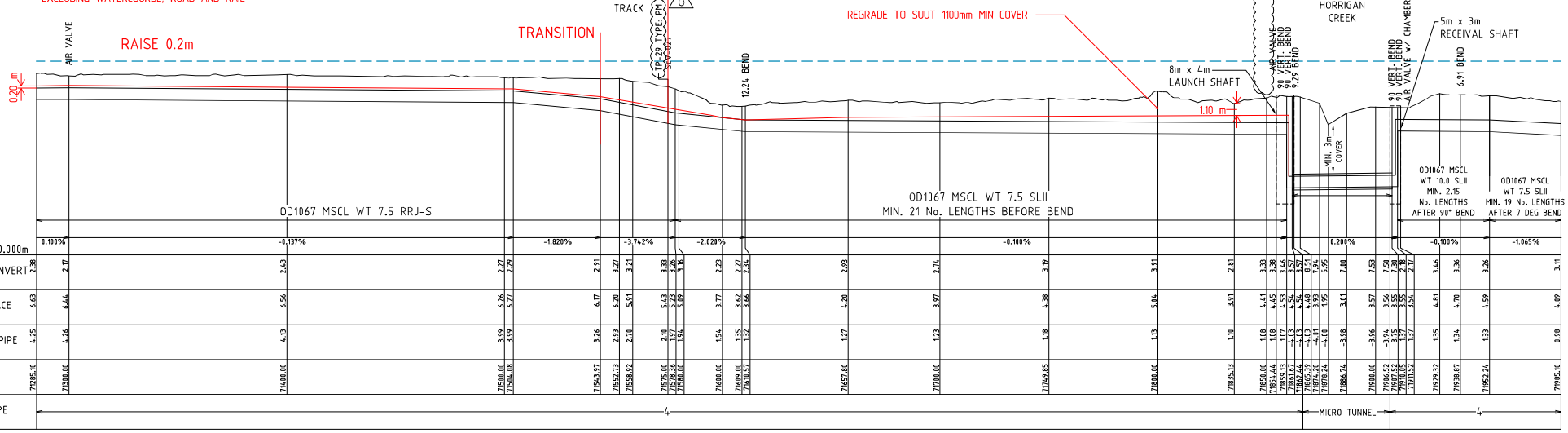
SCALE OF METRES 1:2000 @ A3

FOR TRENCH STOP DETAILS
REFER PROJECT NOTES

REGRADE TO SUIT MIN COVER 900mm
EXCLUDING WATERCOURSE, ROAD AND RAIL

REGRADE TO SUUT 1100mm MIN COVER

REFER CRITICAL CROSSING DRAWING
1151-DL05-W3P-CIV-DRG-35100



LONGITUDINAL SECTION

VERTICAL SCALE OF METRES 1:400 @ A3
HORIZONTAL SCALE OF METRES 1:2000 @ A3

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND
NAME: PETER SEMANIW
RPEQ NO.: 15975
DIVISION: CIVIL
SIGNATURE: DATE: 17 / 07 / 24

ISSUED FOR CONSTRUCTION

REV	DATE	REVISION DESCRIPTION	DRN	CHKD	EXT. APP.	GAWB ACC.	REFERENCE DRAWINGS	NUMBER
6	17/07/24	TP DETAILS UPDATED	TA	MM	PS		-	
5	22/05/24	MEAN HIGH WATER SPRINGS LABEL ADDED	TA	MM	PS		-	
4	06/04/24	PIPELINE AT AIR VALVE CHAMBER RAISED	TA	MM	PS		-	
3	15/12/23	CP DESIGN UPDATED	TA	MM	PS		-	
2	13/10/23	DETAILS UPDATED	TA	MM	PS		-	
1	26/09/23	LEGEND CHANGED & AV's ADDED	TA	MM	PS		-	
0	05/09/23	ISSUED FOR CONSTRUCTION	TA	MM	PS		-	

W3 Plus Consulting — world wide water plus
McCONNELL DOWELL — CREATIVE CONSTRUCTION
BMD

DO NOT SCALE

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Gladstone Area Water Board
136 Goondoon Street Gladstone Q 4680 | PO Box 446 Gladstone Q 4680 | Tel: (07) 4976 3000 | ABN: 88 409 667 181

DRAWN BY	TED ALVARADO	26/09/23
DESIGNED BY	MICHAEL MARIES	26/09/23
REVIEWED BY	PETER SEMIANIW	26/09/23
ACCEPTANCE BY		
RPEQ APPROVAL		
GAWB ACCEPTANCE		

FITZROY TO GLADSTONE PIPELINE PROJECT
DL05 PIPELINE CH 71285.10-71985.10

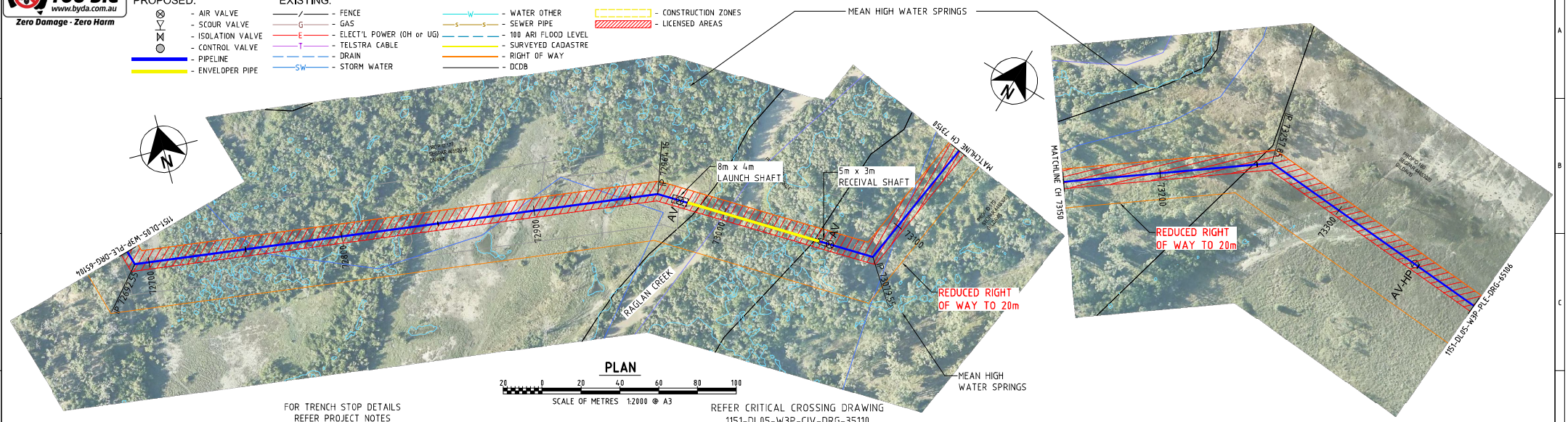
1151-DL05-W3P-PLE-DRG-65103

PROJECT No.	SIZE	DRAWING No.	SCALE	REV
GAWB #	A3	XXX-X-XXXX	AS NOTED	6.1

BEFORE YOU DIG
www.byda.com.au
Zero Damage - Zero Harm

LEGEND:
PROPOSED:
- AIR VALVE
- SCOUR VALVE
- ISOLATION VALVE
- CONTROL VALVE
- PIPELINE
- ENVELOPER PIPE

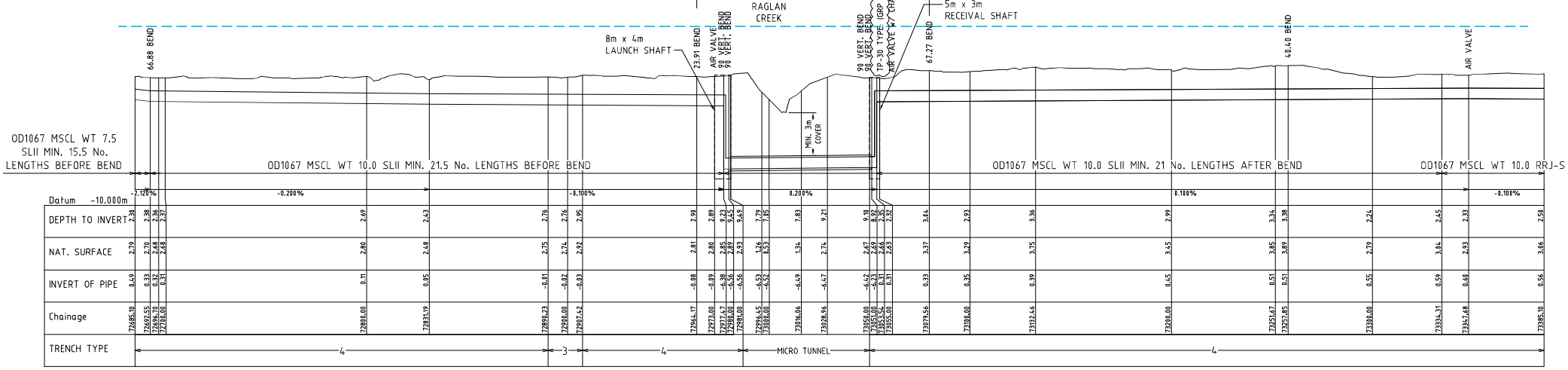
LEGEND:
EXISTING:
- FENCE
- GAS
- ELECT'L POWER (OH or UG)
- TELSTRA CABLE
- DRAIN
- STORM WATER
- WATER OTHER
- SEWER PIPE
- 100 ARI FLOOD LEVEL
- SURVEYED CADASTRE
- RIGHT OF WAY
- DCDB
- CONSTRUCTION ZONES
- LICENSED AREAS



PLAN
SCALE OF METRES 1:2000 @ A3

FOR TRENCH STOP DETAILS
REFER PROJECT NOTES

REFER CRITICAL CROSSING DRAWING
1151-DL05-W3P-CIV-DRG-35110



LONGITUDINAL SECTION
VERTICAL SCALE OF METRES 1:400 @ A3
HORIZONTAL SCALE OF METRES 1:2000 @ A3

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND
NAME: PETER SEMIANIW
RPEQ NO.: 15975
DIVISION: CIVIL
SIGNATURE: DATE: 17 / 07 / 24

ISSUED FOR CONSTRUCTION

REV	DATE	REVISION DESCRIPTION	DRN	CHKD	EXT. APP.	GAWB ACC.	REFERENCE DRAWINGS	NUMBER
5	17/07/24	TP NO. UPDATED	TA	MM	PS		-	
4	22/05/24	MEAN HIGH WATER SPRINGS LABEL ADDED	TA	MM	PS		-	
3	15/12/23	CP DESIGN UPDATED	TA	MM	PS		-	
2	13/10/23	DETAILS UPDATED	TA	MM	PS		-	
1	26/09/23	LEGEND CHANGED & AV's ADDED	TA	MM	PS		-	
0	05/09/23	ISSUED FOR CONSTRUCTION	TA	MM	PS		-	

W3 Plus Consulting — world wide water plus
McCONNELL DOWELL — CREATIVE CONSTRUCTION
BMD

DO NOT SCALE

INITIALS SHOWING (#) ASTERISK INDICATE ORIGINAL SIGNATURE HAS BEEN SIGNED OFF AS PER DATE INDICATED

Gladstone Area Water Board
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DRAWN BY	TED ALVARADO	26/09/23	
DESIGNED BY	MICHAEL MARIES	26/09/23	
REVIEWED BY	PETER SEMIANIW	26/09/23	
ACCEPTANCE BY			
RPEQ APPROVAL			
GAWB ACCEPTANCE			

FITZROY TO GLADSTONE PIPELINE PROJECT
DL05 PIPELINE CH 72685.10-73385.10

1151-DL05-W3P-PLE-DRG-65105

PROJECT No.	SIZE	DRAWING No.	SCALE	REV
GAWB #	A3	XXX-X-XXXX	AS NOTED	5

APPENDIX D:

Risk Assessment

Table D1: Trenchless Crossing Works for FGP Post September 2024 - Capricorn Yellow Chat (CYC) Risk Assessment

SITE	ACTIVITY	HAZARD	IMPACTS on	PROPOSED MITIGATION	COMMENTS ON LIKELIHOOD	LIKELIHOOD #	CONSEQUENCE	RISK RATING*
Inkerman Creek CH 56406	Completion of trenchless crossing works post September 2024	Disturbance to possible CYC breeding due to construction works - habitat loss, noise, vibration, dust, spills, contamination	Possible loss of breeding opportunity	Implementation of Special Area Plan & CEMP. Surveys to be conducted for CYC at adjacent potential breeding sites at weekly intervals during works. If nesting birds detected (low likelihood) works to cease until fledglings leave the nest.	Extremely low-CYC breeding areas at least 2 km from crossing site, subject to regular disturbance from adjacent Port Alma Road and Saltworks.	Rare (Extremely Unlikely)	Moderate	Low (Extremely low risk)
		Disturbance to possible CYC breeding due to changes to hydrological / surface overland flows impacting downstream breeding places	Breeding place habitat impacted	Impact negated through design - trenchless crossing which will result in no changes to the hydrological processes in the waterways.	No potential for this to occur	Rare	Moderate	Low
		Siltation of CYC habitat due to disturbed sediments from construction works	Reduced quality (habitat condition) of wetland impacting on breeding sites	Implementation of Special Area Plan & CEMP. Established erosion control protocols, with prevention of spoil materials / soil from entering the creek. In accordance with the CEMP implement additional controls when rainfall events are predicted.	Very low-CYC breeding areas are in highly modified habitat with saltworks banks and the road corridor. The saltmarsh breeding area is subject to increasing tidal incursion and subsequent saline sediments.	Unlikely (Extremely Unlikely)	Minor	Low (Extremely low risk)
Twelve Mile Creek CH 65071	Completion of trenchless crossing works post September 2024	Disturbance to possible CYC breeding due to construction works - habitat loss, noise, vibration, dust, spills, contamination	Possible loss of breeding opportunity	Implementation of Special Area Plan & CEMP. Surveys to be conducted for CYC at adjacent potential breeding sites at weekly intervals during works. If nesting birds detected (low likelihood) works to cease until fledglings leave the nest.	Very low-CYC breeding areas at least 900 m from crossing site.	Unlikely (No likelihood if CYC not present, very unlikely if present)	Moderate	Low (Very low risk)
		Disturbance to possible CYC breeding due to changes to hydrological / surface overland flows impacting downstream breeding places	Breeding place habitat impacted	Impact largely negated through design - trenchless crossing. Due to the importance of the downstream breeding habitat at this site, the trenchless crossing shafts have been located to avoid changes to hydrological / surface overland flows. Prioritise completion of the works at this location.	Very low potential for this to occur	Unlikely	Moderate	Low
		Siltation of CYC habitat due to disturbed sediments from construction works	Reduced quality (habitat condition) of wetland impacting on breeding sites	Implementation of Special Area Plan & CEMP. Established erosion control protocols, with prevention of spoil materials / soil from entering the creek. In accordance with the CEMP implement additional controls when rainfall events are predicted to avoid loss of destablised disturbed sediments downstream. Prioritise completion of the works at this location.	Low-CYC breeding areas are in braided distributary channels at least 900 m from the creek crossing. Trenchless crossings and spoil control protocols should minimise sediment flows.	Unlikely	Moderate	Low

SITE	ACTIVITY	HAZARD	IMPACTS on	PROPOSED MITIGATION	COMMENTS ON LIKELIHOOD	LIKELIHOOD #	CONSEQUENCE	RISK RATING*
Marble Creek CH 65909	Completion of trenchless crossing works post September 2024	Disturbance to possible CYC breeding due to construction works - habitat loss, noise, vibration, dust, spills, contamination	Possible loss of breeding opportunity	Implementation of Special Area Plan & CEMP. Conduct surveys for CYC at adjacent potential breeding sites at weekly intervals during works. If nesting birds detected (low likelihood) works to cease until fledglings leave the nest.	Very low-CYC breeding areas at least 900 m from crossing site.	Unlikely (No likelihood if CYC not present, very unlikely if present)	Moderate	Low (Very low risk)
		Disturbance to possible CYC breeding due to changes to hydrological / surface overland flows impacting downstream breeding places	Breeding place habitat impacted	Impact largely negated through design - trenchless crossing. Due to the importance of the downstream breeding habitat at this site, , the trenchless crossing shafts have been located to avoid changes to hydrological / surface overland flows. Prioritise completion of the works at this location.	Very low potential for this to occur	Unlikely	Moderate	Low
		Siltation of CYC habitat channels due to disturbed sediments from construction works	Reduced quality (habitat condition) of wetland impacting on breeding sites	Implementation of Special Area Plan & CEMP. Established erosion control protocols, with prevention of spoil materials / soil from entering the creek. In accordance with the CEMP implement additional controls when rainfall events are predicted to avoid loss of destablised disturbed sediments downstream. Prioritise completion of the works at this location.	Very low-CYC breeding areas are in braided distributary channels at least 900 m from the creek crossing. Marble Creek is a tributary of Twelve-Mile, with a smaller catchment.	Unlikely	Minor	Low (Very low risk)
Horrigan Creek CH 71854	Completion of trenchless crossing works post September 2024	Disturbance to possible CYC breeding due to construction works - habitat loss, noise, vibration, dust, spills, contamination	Possible loss of breeding opportunity	Implementation of Special Area Plan & CEMP. Surveys to be conducted for CYC at adjacent potential breeding sites at weekly intervals during works. If nesting birds detected (low likelihood) works to cease until fledglings leave the nest.	Very low-CYC breeding areas at least 700 m from crossing site	Unlikely (No likelihood if CYC not present, very unlikely if present)	Moderate	Low (Very low risk)
		Disturbance to possible CYC breeding due to changes to hydrological / surface overland flows impacting downstream breeding places	Breeding place habitat impacted	Impact negated through design - trenchless crossing which will result in no changes to the hydrological processes in the waterways.	No potential for this to occur	Rare	Moderate	Low
		Siltation of oxbow due to disturbed sediments from construction works	Reduced quality (habitat condition) of wetland impacting on breeding sites	Implementation of Special Area Plan & CEMP. Established erosion control protocols, with prevention of spoil materials/ soil from entering the creek. In accordance with the CEMP implement additional controls when rainfall events are predicted.	Very low-Horrigan Creek flows into Raglan before sites. Horrigan Oxbow is separated from tidal Raglan Creek by levee banks, so sediments are not likely to be deposited in Oxbow.	Unlikely (extremely unlikely)	Minor	Low (Extremely low risk)

CYC Specialist comments #*

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