Fitzroy to Gladstone Pipeline Project

Planning Report for Change Application (AP2022/018) – FGP SGIC SDA Alignment

Gladstone Area Water Board

26 March 2024

→ The Power of Commitment

Project name		GAWB FGP Secondary Approvals					
Document title		Fitzroy to Gladstone Pipeline Project | Planning Report for Change Application (AP2022/018) – FGP SGIC SDA Alignment					
Project number		12559247					
File name		12559247-REP-Rev 0_Planning Report Change Application FGP SGIC SDA.docx					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	W. Levitt	A. Smedley GAWB / MBJV	***A.Smedley****	A. Smedley	***A.Smedley****	26/03/2024

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Abbreviations

Abbreviation	Definition
ARI	Average Recurrence Interval
AQO	Acoustic Quality Objectives
CE	Critically Endangered
CEMP	Construction Environmental Management Plan
CH	Chainage
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCDB	Queensland Digital Cadastral Database
DESI	Department of Environment, Science and Innovation (formerly DES)
DRDMW	Department of Regional Development, Manufacturing and Water
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning
E	Endangered
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPP (Noise)	Environmental Protection Policy (Noise) 2019
FGP / the Project	Fitzroy to Gladstone Pipeline
GAWB	Gladstone Area Water Board
GHD	GHD Pty Ltd
GL	Gigalitre
GRC	Gladstone Regional Council
GSDA	Gladstone State Development Area
km	Kilometres
LGAs	Local Government Areas
m	Metres
MCU	Material Change of Use
ML	Megalitre
mm	Millimetre
MNES	Matters of National Environmental Significance
MP	Member of Parliament
MSES	Matter of State Environmental Significance
NML	Noise Management Levels
NC Act	*Nature Conservation Act 1992*
OCG	Office of the Coordinator General
OEMP	Operational Environmental Management Plan
PMST	Protected Matters Search Tool
ROW	Right of Way
RRC	Rockhampton Regional Council
SDA	State Development Area
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SEIS	Supplementary Environmental Impact Statement

Abbreviation	Definition
SGIC SDA	Stanwell-Gladstone Infrastructure Corridor State Development Area
SMP	Species Management Program
VM Act	Vegetation Management Act 1999
TMR	Department of Transport and Main Roads
YCZ	Yellow chat zone

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1. Introduction

1.1 Background

The Department of Regional Development, Manufacturing and Water (DRDMW) has appointed Gladstone Area Water Board (GAWB) as the Delivery Management Proponent for pre-construction activities for the Fitzroy to Gladstone Pipeline (FGP) (previously referred to as the Gladstone to Fitzroy Pipeline) project (the Project).

The Project has the ability to provide greater water security to urban and industrial customers and, potentially provide water for the emerging hydrogen industry in the Gladstone region.

The Project traverses the Rockhampton Regional Council (RRC) and Gladstone Regional Council (GRC) Local Government Areas (LGAs). The 117 kilometres (km) long pipeline will run from the Lower Fitzroy River at Laurel Bank, with the majority of its length within the Stanwell-Gladstone Infrastructure Corridor State Development Area (SGIC SDA), and then connect with GAWB's existing water infrastructure near Yarwun within the Gladstone State Development Area (GSDA).

A large portion of the Project is the pipeline within the SGIC SDA which extends for approximately 80 km. GHD on behalf of GAWB applied for SDA approval for the FGP within the SGIC SDA, with SDA approval being granted 31 July 2023, reference AP2022-018. The Project Construction Environmental Management Plan (CEMP) was also approved on 31 July 2023. Construction works of the FGP SGIC SDA alignment commenced 6 October 2023.

The subject of this Planning Report is a Change Application to the SGIC SDA approval, specifically focusing on the amendment of approved construction hours (Monday to Sunday 6:30am to 6:30 pm) outlined in Condition 7.1 of the SDA approval.

The proposed change aims to facilitate 24-hour time-critical construction works. The modification is intended to support 24-hour trenchless crossing development within the Yellow Chat Zone (YCZ) and other wetland areas within the May to September restricted construction period. Seven trenchless construction sites in the SGIC SDA are proposed to be advanced with 24-hour works.

The potential need for extended hours was noted in Section 4.3.3 of the CEMP as follows:

> *Work may be required outside these hours for critical works such as waterway or infrastructure crossings, concrete pours and/or hydrostatic testing. If work outside routine hours is required, and assessment will be undertaken and affected landholders will be consulted and the activity conducted in accordance with any relevant regulatory notification requirements. Blasting will not occur on Sundays.*

This Planning Report identifies the potential impacts associated with the proposed additional work hours (Monday to Sunday 6:30pm to 6:30am) and the approach to further site-specific assessments.

Construction of the time-critical 24-hour works are proposed to commence on 1 May 2024 and be completed by 30 September 2024 pending change application approval timing (note, remobilisation in 2025 will be required if trenchless crossings are not completed within the approved five month period in 2024).

1.2 About GAWB

GAWB is a Queensland Government statutory Water Authority with the purpose of ensuring the long- and short-term water needs of current and future customers are met in ways that are environmentally, socially and commercially sustainable.

On 1 October 2000, GAWB commenced operations as a Category 1 commercialised Water Authority under the *Water Act 2000* (Qld) (Water Act). From 1 July 2008, GAWB became a registered service provider under the *Water Supply (Safety and Reliability) Act 2008* (Qld). GAWB is responsible to Mr Glenn Butcher, Member of Parliament (MP), Minister for Regional Development and Manufacturing and Minister for Water.

The Project addresses the single source water supply risk from Awoonga Dam, enabling long-term water security for Gladstone's urban and industrial customers in the Gladstone region. The pipeline also has the potential to provide water for the emerging hydrogen industry in the Gladstone region.

Gladstone was officially drought declared between 1 May 2019 and October 2022 due to three consecutive failed wet seasons in 2018-19, 2019-20 and 2020-21. Despite the recent rainfall in the region, Awoonga Dam capacity remains at 54% (as at 21 March 2024), with declining levels since 2018, refer Figure 1.1. The Gladstone region has a long history of drought. Water security and reliability is a key consideration for the region which the FGP will address.

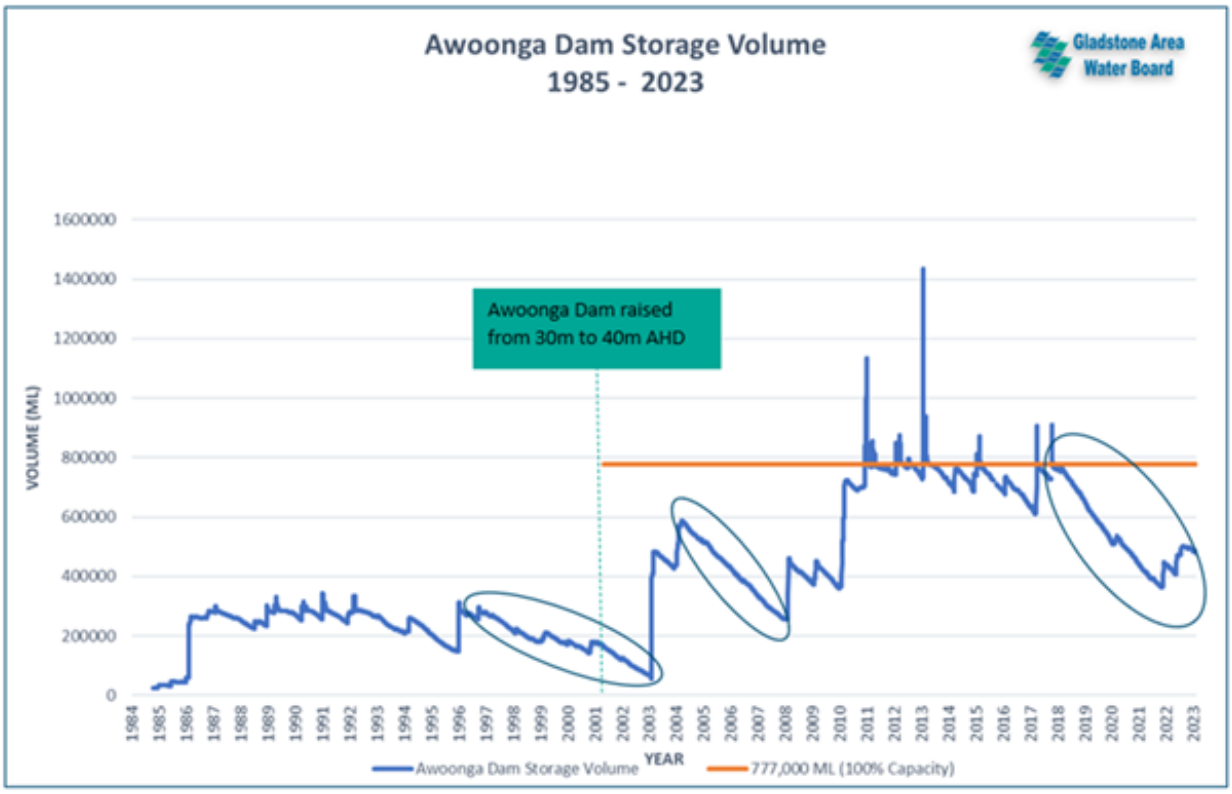

Figure 1.1 Awoonga Dam storage volume history and declining levels since 2018

GAWB has been appointed as the Delivery Management Proponent for pre-construction activities for the Project. The pre-construction activities include:

- Appointing key advisors
- Addressing land tenure, permits and approvals
- Determining long lead time items (if required)
- Determining and commencing the preferred construction procurement strategy

In addition, GAWB has undertaken technical investigations and baseline surveys for the Project to assess the existing environment and the potential impacts. GAWB has developed environmental management plans and procedures to manage potential impacts from the Project. GAWB's key environmental plan the CEMP was approved as part of the SDA approval granted 31 July 2023.

1.3 Purpose of this Report

The purpose of this Planning Report is to provide supporting information required for assessment of the SDA application (Change Application) to existing approval AP2022-0018 within the SGIC SDA. This report pertains to the proposed extension of the approved construction hours (Monday to Sunday 6:30am to 6:30pm) to allow 24-hour trenchless crossing construction work.

This SDA application (Change Application) has been prepared in accordance with the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and the SGIC SDA Development Scheme (September 2012). Its aim is to assist the Office of the Coordinator-General (OCG) and relevant referral agencies in the assessment of the 24-hour trenchless crossing construction work change application. In summary, the following information is provided in this report:

– Background
– Subject land and locality details
– Proposed change
– Potential impacts and mitigation proposed related to the time-critical 24-hour trenchless crossing work
– An assessment of the developments' consistency with the objectives and land use designations of the Development Scheme for the SGIC SDA

This Report is proposed to be read in conjunction with the Planning Report for Material Change of Use – FGP SGIC SDA Alignment (GHD Pty Ltd, 2023). The original Planning Report, prepared to support the SDA approval granted 31 July 2023, contains an assessment of potential impacts and mitigation measures requirements subsequently incorporated into conditions of approval, that remain valid for the proposed 24-hour trenchless crossing construction works.

1.4 Development Application Details

The approved Project is for a use defined as "infrastructure services" within the SGIC SDA Development Scheme. It should be acknowledged that infrastructure installation includes below ground pipelines for services that facilitate economic development.

This SDA application (Change Application) is for a change to approved construction hours for time-critical works to enable 24-hour trenchless crossing construction for the installation of a new underground water pipeline within the YCZ and other wetland areas with a May to September restricted construction period in the SGIC SDA.

The proponent and application details associated with this SDA application (Change Application) are summarised in Table 1.1. In addition, the following is provided as part of the SDA application (Change Application):

– Application form required for this SDA application (refer to the online submission)
– Landowner consents for applicable land tenures (refer to Appendix A)
– Fee of $9,573 (GST exempt) paid by GAWB 15 March 2024

Table 1.1 Proponent and Application Details

Item	Description
Proponent/Applicant	GAWB
Property Details	From west of the decommissioned Port Alma Railway Line, a spur to the North Coast Railway Line at pipeline chainage (CH) 54000, to east of Raglan Creek at pipeline CH 73000. Refer to Table 2.1 for a full list of the impacted properties.
Name of Landowner	Detail of landowners are provided in Section 2.
Current Land Use	Various land uses including: – Rural residences – Grazing – Native vegetation – Transportation
Development Proposal	Construction of infrastructure services, namely an underground water pipeline for time-critical trenchless crossing works occurring 24-hours a day.
Development Assessment	Change Application (AP2022/018) in accordance with the SDPWO Act and the SGIC SDA Development Scheme. The proposed development is identified as infrastructure services that is consistent with the preferred development intents and objectives of the SGIC SDA Development Scheme.
Assessment Manager	OCG
State Interests	Noise and light associated with time-critical 24-hour trenchless crossing construction works – environmental nuisance under the *Environmental Protection Act 1994*.
Contact Details for Application	GHD Pty Ltd – Amanda Smedley (Senior Environmental Consultant) Level 2, 100 Goondoon Street, Gladstone QLD 4680 P: (07) 4973 1613 | E: **Amanda.smedley@ghd.com**
	GAWB – Luke Stalley (Approvals Advisor – Fitzroy to Gladstone Pipeline) 147 Goondoon Street, Gladstone QLD 4680 P: 0418 625 406 | E: **lstalley@gawb.qld.gov.au**

1.5 Use Being Applied For

The use of the land for the FGP SGIC SDA alignment was approved 31 July 2023, reference AP2022-018. The approved use of land is not proposed to be changed.

The SDPWO Act administers the making of a change to an SDA approval. The Change application for an SDA approval Advisory Note (State of Queensland, 2021) state that:

> *A substantial change to an SDA approval will follow the assessment process for an SDA application in accordance with the relevant development scheme*

The Advisory Note further identifies that a substantial change may involve (but is not limited to):

– One that results in different or additional impacts that have not been assessed as part of the process to gain the original SDA approval
– Cause a referral entity to make or alter a referral entity submission about the change

Consultation with the OCG regarding the change presented in this Report (for a change to approved construction hours for time-critical works to enable 24-hour trenchless crossing construction) identified that the change proposed is not minor and therefore substantial due to the change in conditions, previous limited assessment of night-time works and referral to referral agencies.

This Change Application is therefore to be assessed against the intent and objectives of the SGIC SDA Development Scheme.

1.6 Change Proposed

This Change Application Planning Report assesses time-critical trenchless crossing construction works extending the approved construction hours (as per SDA Approval Condition 7.1) to 24-hours a day, within the YCZ and other wetland areas with a May to September restricted construction period in the SGIC SDA.

A summary of the approved infrastructure and construction methodology is detailed within the previous Planning Report (GHD Pty Ltd, 2023). Refer to Section 4 of the previous Planning Report for Material Change of Use – FGP SGIC SDA Alignment (GHD Pty Ltd, 2023) for detailed development information that has been approved, subject to conditions of approval.

1.7 State Interests and Referral Triggers

This application identifies the referral triggers under the *Planning Act 2016* and referral entities for the application in accordance with the SGIC SDA Development Scheme.

The State's interests and referrals associated with the FGP SGIC SDA alignment related to this SDA Change Application are outlined in Table 1.2. The SDA (MCU) application was previously referred to other parties, however those other referral agencies are not considered relevant for this Change Application's time-critical 24-hour trenchless construction works proposed, and therefore have not been listed.

Table 1.2 State Interests and Referral Triggers Applicable to the SDA Application (Change Application)

State Interests	Comments	Referral Triggers Under the *Planning Act 2016*	Agency
Environment	The proposed Change Application varies approved hours of work for trenchless crossing construction works to 24-hours and is related to the *Environmental Protection Act 1994*. 24-hour trenchless crossing construction work has potential for impact upon sensitive receptors (e.g. nearby residences and fauna).	Not applicable under the Planning Act. Referral proposed in relation to environmental nuisance under the *Environmental Protection Act 1994*.	– Department of Environment, Science and Innovation (DESI) – Rockhampton Regional Council (RRC) – Gladstone Regional Council (GRC)

1.8 Public Notification

During the assessment of the SDA application (Change Application), the OCG is to decide if the application requires public consultation in accordance with the Public Consultation Policy State Development Areas (State of Queensland, OCG, 2021), as per Schedule 2 Part 2.3 of the SGIC SDA Development Scheme, Public Consultation Stage.

The decision that no public consultation is required may be made by the OCG because the proposed development has been subject to some other form of public consultation that would satisfy the consultation requirements under the SGIC SDA Development Scheme. Examples outlined within the Public Consultation Policy include if the development has undergone public consultation under a formal environmental impact assessment process where extensive public consultation was undertaken.

The Project has undergone an extensive public consultation process as part of the EIS process. The EIS (Arup, 2008) was on display for a public consultation period of 30 business days (1 November 2008 to 15 December 2008) and invited written comments from any interested stakeholders. The public consultation for the Project included letters to impacted stakeholders, advertising, media, community information sessions, Project update newsletters, EIS document display and presentations, summary of major findings, 1800 number/project email address. During the public consultation period, 27 submissions were received. In accordance with the relevant legislation, a SEIS was issued to the OCG that addressed the issues and comments raised in the submissions received (Arup, 2009).

This process took place over 14 years ago, and due to time passed may not meet the requirements of the Public Consultation Policy, or the SGIC SDA Development Scheme. However, GAWB has actively been consulting with Commonwealth, State and local regulatory agencies, impacted landholders and First Nations' groups over the last two years and has received positive feedback about the progression of the Project.

The project has a dedicated Landowners Liaison Advisor who has a working relationship with each of the landowners adjacent to the pipeline right of way (ROW). The project has secured signed agreements, in the form of Landholder Management Plans (LMPs), with the majority of landowners in the SGIC SDA. For remaining LMPs, these will be secured prior to the commencement of works on the respective property. These will also be issued to the OCG prior to Sunday works commencing on the respective property (as required by Condition 7.1 of the SDA approval). The LMPs agreement sets out the property maps, pipeline design, access, construction, rehabilitation requirements and a photographic record. The landowners know the location and nature of trenchless crossing works proposed.

Subject to approval of the 24-hour trenchless crossing construction work the following additional stakeholder engagement will occur prior to prior to 24-hour work commencement:

– A signed amendment to the LMPs with landholders adjacent to the ROW at trenchless crossing locations
– Notification of 24-hour works to identified potentially sensitive receptors (e.g. residences) at trenchless crossing locations

The Public Consultation Policy outlines additional matters that are to be considered in the public consultation stage to determine if public consultation is required. These are outlined in Table 1.3. Based on the assessment of the Change Application, it is proposed that further public consultation is not required due to the ongoing consultation with State government departments, local governments and affected landholders regarding the Project, with additionally affected parties to receive notification prior to the commencement of 24-hour trenchless crossing construction works.

Table 1.3 Factors for Consideration in Requiring Public Consultation

Factor	Response
The age of the relevant development scheme	The SGIC SDA Development Scheme commenced in 2001 (OCG, 2012). The latest version of the SGIC SDA Development Scheme was approved in September 2012. This SDA application has also been prepared in consideration of the following additional planning legislation: – State interest review against the State Planning Policy (DILGP, 2017) – Review against the Central Queensland Regional Plan (DSDIP, 2013) – Review against the Rockhampton Region Planning Scheme (RRC, 2015) – Review against the GRC Planning Scheme (GRC, 2017)

Factor	Response
	This SDA application (Change Application) has been reviewed against the most up to date versions of relevant State and local planning legislation and is considered to have regard to the current constraints and intent over the FGP SGIC SDA alignment.
Whether the proposed development is likely to adversely impact on sensitive receptors	A number of sensitive receptors as defined by the *Environmental Protection (Noise) Policy 2019* are located within 2 km of the proposed time-critical 24-hour works, refer to Section 2 and Figure 2.1a to Figure 2.1b. There are also natural environmental that are in proximity. These values are discussed in greater detail in Section 3.2. In summary, the proposed time-critical 24-hour works are considered to have short term impacts on surrounding sensitive receptors limited to the construction phase period only. GAWB will implement management measures during construction to mitigate adverse impacts to sensitive receptors. Further detail is provided in Section 3.2 and Appendix B. It is proposed that the LMP process and notification of landholders and other sensitive receptors prior to 24-hour trenchless crossing works, would be a suitable means for any concerns by sensitive receptors to be raised.
Whether the proposed development is likely to adversely impact existing development within the SDA	This is not relevant to the proposed time-critical trenchless crossing 24-hour construction works.
Whether the proposed development is consistent with the preferred development intent for the precinct, or the purpose of the precinct (depending on the development scheme)	The proposed trenchless crossing 24-hour construction works is consistent with the: – The strategic vision for SGIC SDA – The overall objectives for development in the SGIC SDA – The intent and purpose of the SGIC SDA Development Scheme – SGIC SDA Policy 1 Outcomes Compliance has been demonstrated in Section 4.2. (Note, precincts are not defined for the SGIC SDA)
Whether the proposed development would be subject to public consultation under the local RRC and GRC planning scheme	Under the Rockhampton Region Planning Scheme, the FGP SGIC SDA alignment is predominately zoned ‘rural’ and sections of ‘special purpose’ where it intersects existing road and rail networks. Under the GRC Planning Scheme, the FGP SGIC SDA alignment is zoned ‘special purpose’. The previously obtained SDA MCU for a new utility installation in the special purposes zone is subject to accepted development, where undertaken by a public sector entity, and did not require public notification. Similarly, the Change Application for trenchless crossing 24-hour construction works would not require public notification.
Whether the proposed development would be subject to public consultation if the application was made under the *Planning Act 2016*.	In accordance with Chapter 3, Part 2, Division 2, Section 53 of the *Planning Act 2016*, public notification is required if a development application requires impact assessment, or the application includes a variation request. As the proposed development would be accepted development under the both the Rockhampton Region Planning Scheme and GRC Planning Scheme, and does not include a planning scheme variation request, public notification of the 24-hour trenchless crossing construction work would not be required.

1.9 Limitations

This Planning Report was prepared by GHD Pty Ltd (GHD) in performing services under the Service Provider Agreement dated 4 June 2015 between GHD and GAWB (the Contract). This report only presents information altered from the Planning Report Rev 1 dated 13 January 2022. The report does not amend the Contract or take away from the rights or obligations of GAWB and GHD under the Contract or in respect of the standard and quality of the services performed under the Contract. If there is any inconsistency between the Contract and this report, the Contract prevails to the extent of the inconsistency.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report.

GHD has prepared this report on the basis of information provided by GAWB 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.

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.

2. Subject Land and Locality

The Project pertains to the proposed underground water pipeline within the SGIC SDA from Lot 71 on LIV40477 in the RRC through to The Narrows Road in GRC.

The alignment and ROW presented in the Planning Report for Material Change of Use – FGP SGIC SDA Alignment (GHD Pty Ltd, 2023 has not altered, however some land Digital Cadastral Database (DCDB) details have been amended, refer to Table 2.1.

Appropriate landowner consents have been sought to enable lodgement of this SDA application (Change Application), refer to Table 2.1 and Appendix A.

Refer to Section 3.1 of the previous Planning Report for Material Change of Use – FGP SGIC SDA Alignment (GHD Pty Ltd, 2023) for details on Subject Land and Locality for the Project.

The properties directly impacted by the 24-hour trenchless crossing construction works are indicated in Table 2.1 (blue shading). The proposed 24-hour trenchless crossing construction works are proposed to occur at:

– Farmers Dam
– Inkerman Creek
– Port Alma Road
– Twelve Mile Creek
– Marble Creek
– Horrigan Creek
– Raglan Creek

These locations are depicted in Figure 2.1a to Figure 2.1c along with potential sensitive receptors (primarily residences).

Table 2.1 Properties Traversed by the FGP SGIC SDA Alignment

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
Local Government Area – Rockhampton Regional Council							
46A	71 LIV40477	Freehold	Private	Fairy Bower	Easement A on SP226009	OCG	-
47	143 LN2246	Freehold	Private	Fairy Bower	Easement B on SP226009	OCG	-
47A	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
48	247 R2621	Freehold	Private	Fairy Bower	Easement A on SP226010	OCG	-
49	248 LIV401036	Freehold	Private	Fairy Bower	Easement B on SP226010	OCG	-
50	Road Reserve – Fogarty Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
51	241 LIV401036	Freehold	Private	Fairy Bower	Easement A on SP226011	OCG	-
52	Road Reserve – Titman Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
53	24 RP603312	Freehold	Private	Fairy Bower	Easement A on SP226013	OCG	-
54	Road Reserve – Newman Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
55	238 LIV401036	Freehold	Private	Fairy Bower	Easement A on SP226086	OCG	-
56	237 LIV401036	Freehold	Private	Fairy Bower	Easement B on SP226086	OCG	-
57	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
58	1 SP343809	Freehold	Private	Fairy Bower	Easement C on SP226086	OCG	-
59	11 RP603184	Freehold	Private	Fairy Bower	Easement over the whole of the land EMT RP603184	OCG	-
60	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
61	10 SP343809	Freehold	Private	Fairy Bower	Easement over the whole of the land EMT RP603184	OCG	-
61A	108 SP343809	Freehold	State of Queensland	Fairy Bower	-	OCG	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
			(administered via TMR)				
61B	126 SP343809	Freehold	State of Queensland (administered via TMR)	Fairy Bower	-	OCG	-
62	120 SP319255	Freehold	Private	Fairy Bower	Easement A on SP226015	OCG	-
63	130 SP319255	Freehold	Private	Fairy Bower	Easement B on SP226015	OCG	-
64	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
65	140 SP319254	Freehold	Private	Fairy Bower	Easement C on SP226015	OCG	Easement K on RP836743 to Alinta (Jemena)
66	150 SP319254	Freehold	Private	Fairy Bower	Easement D on SP226015	OCG	-
67	Road Reserve – Capricorn Highway	Road Reserve	TMR	Fairy Bower	-	The State of Queensland (represented by TMR)	-
68	19 RP844281	Freehold	Private	Fairy Bower	Easement A on SP226016	OCG	-
68A	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
69	Road Reserve – Old Capricorn Highway	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
69A	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower		The State of Queensland (represented by DoR/SLAM)	-
70	3 RP605157	Freehold	Private	Fairy Bower	Easement A on SP226017	OCG	-
71	Road Reserve – Unnamed Road	Road Reserve	RRC	Fairy Bower	-	The State of Queensland (represented by DoR/SLAM)	-
72	1 RP603319	Freehold	Private	Fairy Bower	Easement B on SP226017	OCG	-
73	2 RP603319	Freehold	Queensland Rail	Fairy Bower	-	Queensland Rail	-
74	1 SP266123	Freehold	Private	Fairy Bower	Easement B on SP266125	OCG	-
75 / 75A / 75B / 75C	Road Reserve – Bruce Highway	Road Reserve	TMR	Fairy Bower	-	The State of Queensland (represented by TMR)	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
76	1 SP234061	Lands Lease	Aurizon Network Pty Ltd (as sublessee)	Port Curtis	-	The State of Queensland (represented by TMR (Rail))	-
76A	Road Reserve – Unnamed Road	Road Reserve	RRC	Port Curtis		The State of Queensland (represented by DoR/SLAM)	-
77	1 SP266124	Freehold	Private	Port Curtis	Easement B on SP226020	OCG	-
78	Road Reserve – Unnamed Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR SLAM)	-
79	1 SP263972	Freehold	Private	Port Curtis	Easement A on SP226022	OCG	-
80	1 SP263973	Freehold	Private	Port Curtis	Easement B on SP226022	OCG	-
81	Road Reserve – Old Bruce Highway	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
82	10 LN1189	Freehold	Private	Port Curtis	Easement A on SP226087	OCG	-
83	11 LN1189	Freehold	Private	Port Curtis	Easement over the whole of the land	OCG	-
84	17 RP603306	Freehold	Private	Port Curtis	Easement C on SP226024	OCG	-
85	16 RP603306	Freehold	Private	Port Curtis	Easement B on SP226024	OCG	-
86	Road Reserve Unnamed Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
87	42 RP603259	Freehold	Private	Port Curtis	Easement A on SP226025	OCG	-
88	38 RP603259	Freehold	Private	Port Curtis	Easement B on SP226025	OCG	-
89	Watercourse – Scrubby Creek	Watercourse / Unallocated State Land	State of Queensland (administered via DoR)	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
89A	27 PL4017	Freehold	Private	Port Curtis	Easement A on SP226026	OCG	-
89B	Road Reserve – Unnamed Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	
90	28 PL4017	Freehold	Private	Port Curtis	Easement B on SP226027	OCG	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
91	31 PL4017	Freehold	Private	Port Curtis	Easement C on SP226027	OCG	Easement A on RP10347 to Powerlink
92	32 PL4017	Freehold	Private	Port Curtis	Easement A on SP226029	OCG	-
93	33 PL4017	Freehold	Private	Port Curtis	Easement B on SP226029	OCG	-
94	Road Reserve – Unnamed Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
95	34 PL4017	Freehold	Private	Port Curtis	Easement A on SP226030	OCG	-
96	35 PL4017	Freehold	Private	Port Curtis	Easement B on SP226030	OCG	-
97	36 PL4017	Freehold	Private	Port Curtis	Easement A on SP226031	OCG	-
98	37 PL4017	Freehold	Private	Port Curtis	Easement B on SP226031	OCG	-
99	Road Reserve – Whyte Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
100	45 PL4017	Freehold	Private	Port Curtis	Easement A on SP226032	OCG	-
101	Watercourse – Gavial Creek	Watercourse / Unallocated State Land	State of Queensland (administered via DoR)	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
102	1 RP601377	Freehold	Private	Port Curtis	Easement B on SP226032	OCG	-
103	2 RP601377	Freehold	Private	Port Curtis	Easement A on SP226033	OCG	-
104	3 RP601377	Freehold	Private	Port Curtis	Easement A on SP226034	OCG	-
104A	Road Reserve – River Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
105	Road Reserve – Roope Road	Road Reserve	RRC	Port Curtis	-	The State of Queensland (represented by DoR/SLAM)	-
106	76 LN184	Freehold	Private	Midgee	Easement B on SP226035	OCG	-
107	77 LN195	Freehold	Private	Midgee	Easement A on SP226036	OCG	-
108	4 SP103554	Freehold	Private	Midgee	Easement A on SP226037	OCG	-
109	Road Reserve – Unnamed Road	Road Reserve	RRC	Midgee	-	The State of Queensland (represented by DoR/SLAM)	-
110	79 LN195	Freehold	Private	Midgee	Easement A on SP226038	OCG	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
111	31 SP181941	Freehold	Private	Midgee	Easement A on SP226039	OCG	-
112	81 LN183	Freehold	Private	Midgee	Easement A on SP226040	OCG	-
113	Road Reserve – Unnamed Road	Road Reserve	RRC	Midgee	-	The State of Queensland (represented by DoR/SLAM)	-
114	82 LN183	Freehold	Private	Midgee	Easement A on SP226041	OCG	-
116	83 LN183	Freehold	Private	Midgee	Easement B on SP226041	OCG	-
118	160 LN271	Freehold	Private	Midgee	Easement C on SP226041	OCG	-
120	129 LN271	Freehold	Private	Midgee	Easement A on SP226042	OCG	-
121	Road Reserve – Georges Road	Road Reserve	RRC	Midgee	-	The State of Queensland (represented by DoR/SLAM)	-
122	130 LN271	Freehold	Private	Midgee	Easement A on SP226043	OCG	-
123	103 LN182	Freehold	Private	Midgee	Easement B on SP226043	OCG	-
124	Road Reserve – Casuarina Road	Road Reserve	RRC	Midgee	-	The State of Queensland (represented by DoR/SLAM)	-
125	103 LN182	Freehold	Private	Midgee	Easement C on SP226043	OCG	-
126	2 RP605082	Freehold	Private	Midgee	Easement A on SP226044	OCG	-
127	3 RP601896	Freehold	Private	Midgee	Easement B on SP226044	OCG	-
128	2 RP612565	Freehold	Private	Bajool	Easement A on SP226045	OCG	-
129	Watercourse – Bob's Creek	Watercourse / Unallocated State Land	State of Queensland (administered via DoR)	Bajool	-	The State of Queensland (represented by DoR/SLAM)	-
130	5 RP604251	Freehold	Private	Bajool	Easement A on SP226085	OCG	-
131	3 RP600950	Freehold	Private	Bajool	Easement B on SP226046	OCG	-
132	4 RP600951	Freehold	Private	Bajool	Easement C on SP226046	OCG	-
133	1 RL8197	Road licence – surrendered	RRC	Bajool	-	The State of Queensland (represented by DoR/SLAM)	-
134	3 LIV40208	Freehold	Private	Bajool	Easement D on SP226046	OCG	-
135	4 LIV40208	Freehold	Private	Bajool	Easement E on SP226046	OCG	-
136	76 LIV40208	Freehold	Private	Bajool	Easement F on SP226046	OCG	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
137	3 RP603158	Freehold	Private	Bajool	Easement A on SP226047	OCG	-
138	1 RP602706	Freehold	Private	Bajool	Easement A on SP226048	OCG	-
139	2 RP601795	Lands Lease	TMR	Bajool	(note GAWB in process of finalising an easement for the FGP)	The State of Queensland (represented by TMR)	-
140	3 RP601795	Freehold	Private	Bajool	Easement A on SP226050	OCG	-
141	1 AP2418	Unallocated State Land	DoR	Port Alma	(note GAWB in process of finalising an easement for the FGP)	The State of Queensland (represented by DoR/SLAM)	-
142	Watercourse – Inkerman Creek	Watercourse / Unallocated State Land	State of Queensland (administered via DoR)	Bajool	-	The State of Queensland (represented by DoR/SLAM)	-
144	142 DS634	Freehold	Private	Bajool	Easement A on SP226052	OCG	-
145	68 DS141	Freehold	Private	Bajool	Easement B on SP226052	OCG	-
146	69 DS141	Freehold	Private	Bajool	Easement A on SP226054	OCG	-
147	Road Reserve – Bajool Port Alma Road	Road Reserve	TMR	Bajool	-	The State of Queensland (represented by TMR)	-
148	93 DS611	Freehold	Private	Bajool	Easement B on SP226054	OCG	
149	94 DS186	Freehold	Private	Marmor	Easement A on SP226055	OCG	
150	95 DS186	Freehold	Private	Marmor	Easement A on SP226056	OCG	
151	Road Reserve – Toonda Port Alma	Road Reserve	RRC	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-
151A	97 DS186	Freehold	Private	Marmor	Easement B on SP226055	OCG	-
152	98 DS186	Freehold	Private	Marmor	Easement A on SP226057	OCG	-
153	99 DS186	Freehold	Private	Marmor	Easement A on SP226058	OCG	-
154	100 DS185	Freehold	Private	Marmor	Easement A on SP226059	OCG	-
155	101 DS185	Freehold	Private	Marmor	Easement A on SP226060	OCG	-
156 & 157A	102 DS185	Freehold	Private	Marmor	Easement A on SP226061	OCG	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
157	Road Reserve – Unnamed Road	Road Reserve	RRC	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-
158	84 SP316481	Freehold	Private	Marmor	Easement A on SP226062	OCG	-
159	Road Reserve – Unnamed Road	Road Reserve	RRC	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-
160	84 SP316481	Freehold	Private	Marmor	Easement B on SP226062	OCG	-
161	Road Reserve – Twelve Mile Road	Road Reserve	RRC	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-
162	29 DS37	Freehold	Private	Marmor	Easement C on SP226062	OCG	-
163	28 DS37	Freehold	Private	Marmor	Easement A on SP226063	OCG	-
164	27 DS28	Freehold	Private	Marmor	Easement B on SP226063	OCG	-
165	26 DS47	Freehold	Private	Marmor	Easement A on SP226064	OCG	-
166	36 DS47	Freehold	Private	Marmor	Easement B on SP226064	OCG	-
167	Road Reserve – Twelve Mile Road	Road Reserve	RRC	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-
168	1543 DS588	Freehold	Private	Marmor	Easement C on SP226064	OCG	-
169	7 DS53	Freehold	Private	Marmor	Easement A on SP226065	OCG	-
170	Road Reserve – Unnamed Road	Road Reserve	RRC	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-
171	2 RP618935	Freehold	Private	Marmor	Easement A on SP226066	OCG	-
172	1 RP618912	Freehold	Private	Marmor	Easement B on SP226066	OCG	-
173	1 RP618935	Freehold	Private	Marmor	Easement C on SP226066	OCG	-
174	2 RP618913	Freehold	Private	Marmor	Easement D on SP226066	OCG	-
175	5 RP618913	Freehold	Private	Marmor	Easement E on SP226066	OCG	-
176 / 176A	Watercourse – Horrigan Creek	Watercourse / Unallocated State Land	State of Queensland (administered via DoR)	Marmor	-	The State of Queensland (represented by DoR/SLAM)	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
Local Government Area – Gladstone Regional Council							
177	167 CP859402	Racecourse and Recreation Reserve	State of Queensland (represented via DoR)	Raglan	(note GAWB in process of finalising an easement for the FGP)	The State of Queensland (represented by DoR/SLAM)	-
178	Watercourse – Raglan Creek	Watercourse / Unallocated State Land	State of Queensland (administered via DoR)	Raglan	-	The State of Queensland (represented by DoR/SLAM)	-
179	1 PER4653	Lands Lease	State of Queensland (administered via DoR)	Raglan	-	The State of Queensland (represented by DoR/SLAM)	Permit to Occupy (grazing)
180	2 RP618918	Freehold	Private	Raglan	Easement A on SP226070	OCG	-
181	36 DT40169	Freehold	Private	Raglan	Easement B on SP226070	OCG	-
182	37 DT40169	Freehold	Private	Raglan	Easement C on SP226070	OCG	-
183, 184A & 186	124 SP257851	Freehold	Private	Raglan	Easement A on SP226071	OCG	-
184	125 SP257851	Freehold	State of Queensland (administered via GAWB)	Raglan	Easement A on SP226071	OCG	
185	Road Reserve – Unnamed Road	Road Reserve	GRC	Raglan	-	The State of Queensland (represented by DoR/SLAM)	-
189	39 DS688	Freehold	Private	Raglan	Easements E and F on SP264783	OCG	-
188	804 DT407	Freehold	Private	Raglan	Easement B on SP264784	OCG	-
190	Road Reserve – Reedy Creek Road	Road Reserve	GRC	Raglan	-	The State of Queensland (represented by DoR/SLAM)	-
191	40 DS21	Freehold	Private	Raglan	Easement G on SP264783	OCG	-
192	41 DS21	Freehold	Private	Raglan	Easement D on SP226072	OCG	-
193 / 193A	Road Reserve – Unnamed Road	Road Reserve	GRC	Ambrose	-	The State of Queensland (represented by DoR/SLAM)	-

GAWB Property ID #	Lot and Plan	Underlying Tenure	Underlying Landowner	Suburb	Existing Easement to the OCG for the SGIC SDA	Landowners Consent	Other Easements / Permits Intersected
194	162 DS61	Freehold	Private	Ambrose	Easement B on SP226074	OCG	-
195	4 RP614012	Freehold	Private	Ambrose	Easement C on SP226075	OCG	-
196	Road Reserve – Darts Creek Road	Road Reserve	GRC	Ambrose	-	The State of Queensland (represented by DoR/SLAM)	-
197	8 DS11	Freehold	Private	Ambrose	Easement D on SP226075	OCG	Easement A on RP10557 to The Capricornia Regional Electricity Board
198	13 DS10	Freehold	Private	Ambrose	Easement B on SP226076	OCG	Easement A on RP610588 to The Capricornia Regional Electricity Board (intersected)
199	6 RP614228	Freehold	Private	Mount Larcom	Easement B on SP226077	OCG	-
200	Road Reserve – Unnamed Road	Road Reserve	GRC	Mount Larcom	-	The State of Queensland (represented by DoR/SLAM)	-
201	3 RP614228	Freehold	Private	Mount Larcom	Easement A on SP226078	OCG	-
202	2 RP614228	Freehold	Private	Mount Larcom	Easement A on SP226079	OCG	-
203	1 RP614228	Freehold	Private	Mount Larcom	Easement A on SP226080	OCG	-
204	Road Reserve – Popenia Road	Road Reserve	GRC	Mount Larcom	-	The State of Queensland (represented by DoR/SLAM)	-
205	1 SP303543	Freehold	Private	Mount Larcom	Easement A on SP226081	OCG	-
206	5 SP218851	Freehold	Private	Mount Larcom	Easement B on SP226081	OCG	-
207	Road Reserve – Gostevsky Road	Road Reserve	GRC	Mount Larcom	-	The State of Queensland (represented by DoR/SLAM)	-
208	20 DT40124	Freehold	Private	Mount Larcom	Easement A on SP226082	OCG	-
209	22 RP905534	Freehold	Private	Mount Larcom	Easement B on SP226082	OCG	-
210	Road Reserve – The Narrows Road	Road Reserve	GRC	Mount Larcom	-	The State of Queensland (represented by DoR/SLAM)	-
Shading indicates properties directly impacted by the 24-hour trenchless crossing construction works							

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Gladstone Area Water Board

LEGEND

- Pipeline Alignment (P2023_02_231019_Alignment)
- Trenchless Crossings
- Sensitive Receivers
- Community Areas
- Property Boundaries
- Local Government Areas Boundaries

State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

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SCALE **1:100,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS

Figure 2.1a FGP SGIC SDA Alignment and proposed 24-hour construction works

McCONNELL DOWELL CREATIVE CONSTRUCTION™ BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0027 REV: B

DOC REFERENCE: 1151-DL00-MBJV-XLP-MAP-0027_1

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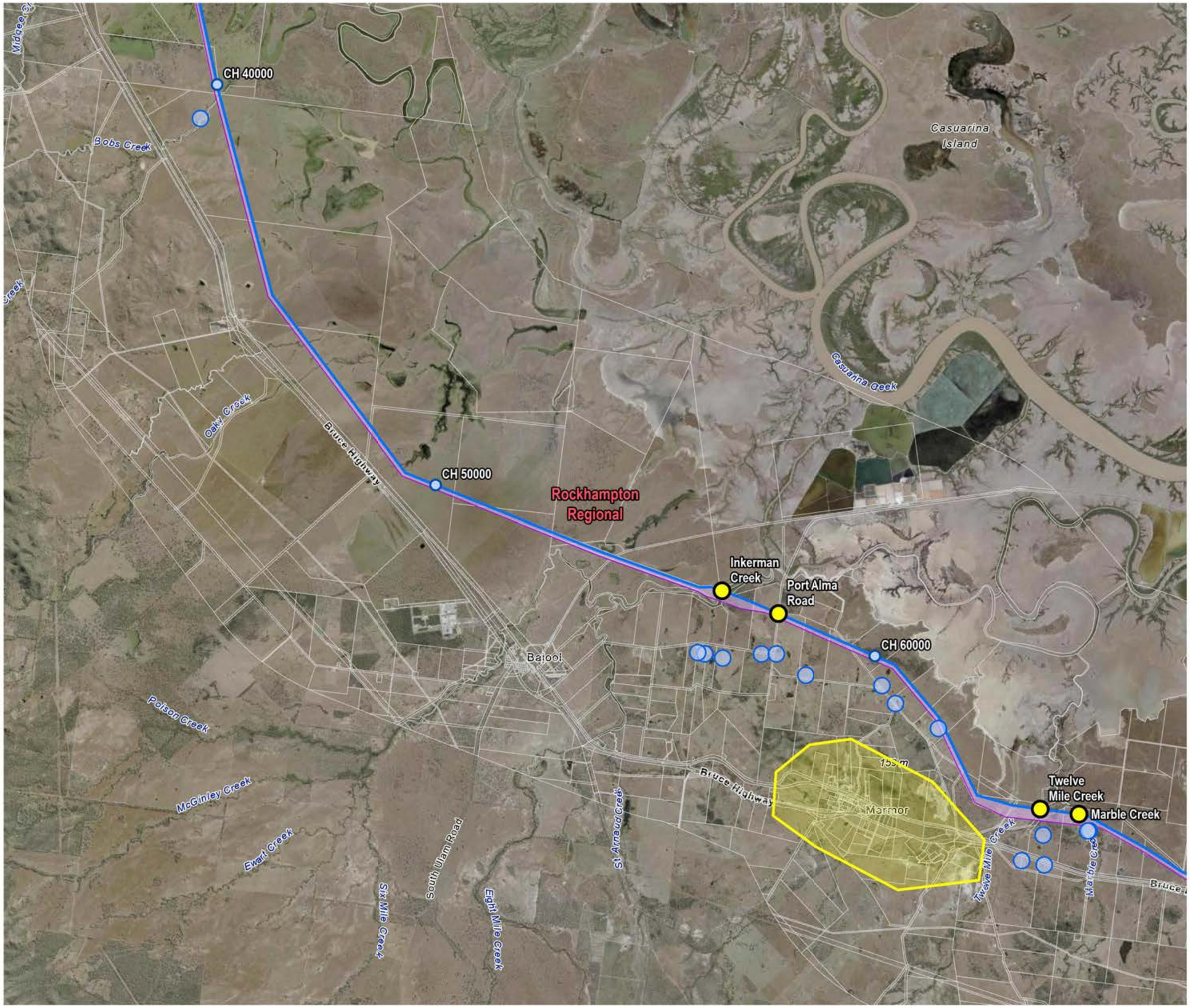

Gladstone Area Water Board

LEGEND

- Pipeline Alignment (P2023_02_231019_Alignment)
- Trenchless Crossings
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State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

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SCALE **1:80,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS

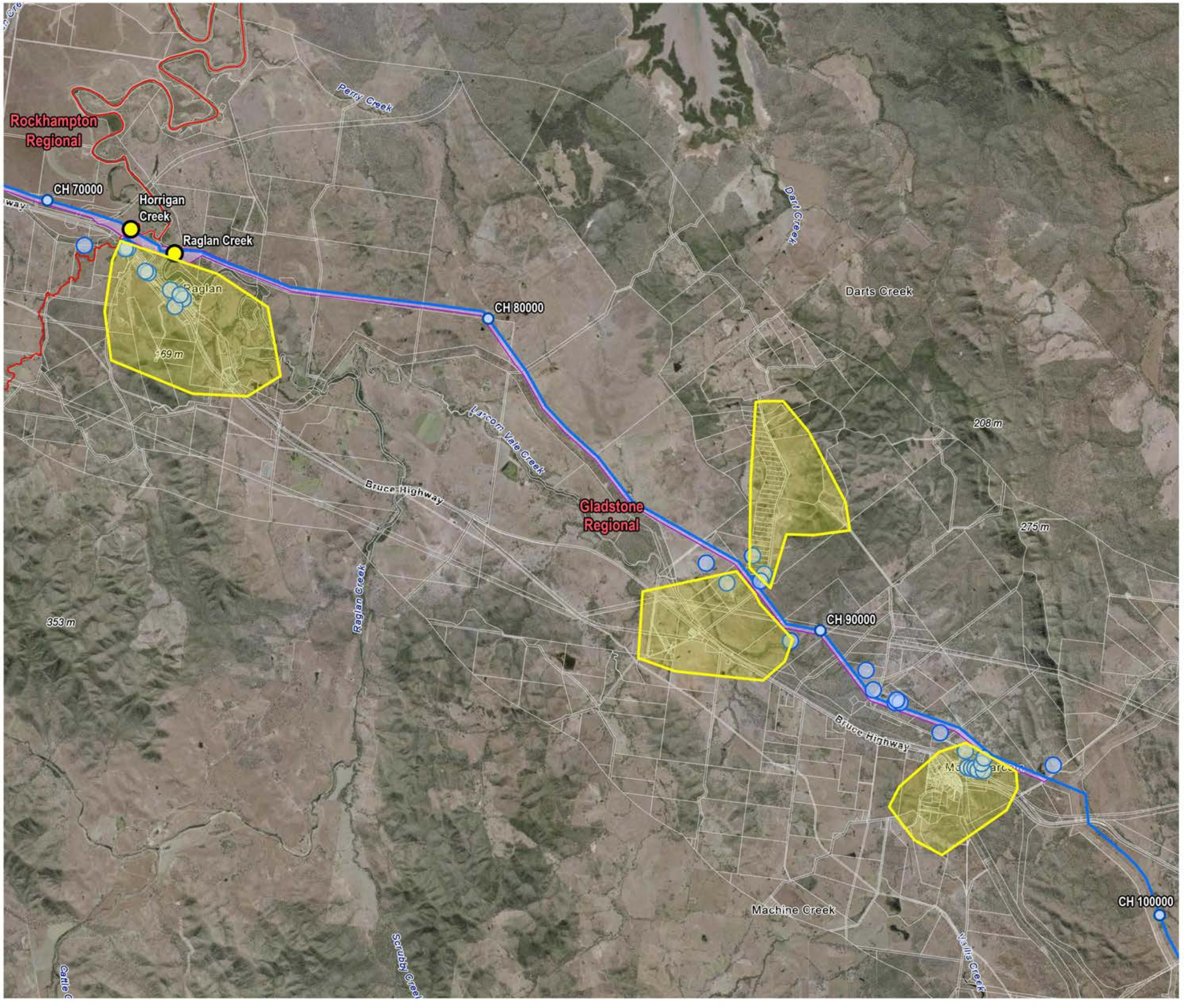
Figure 2.1b FGP SGIC SDA Alignment and proposed 24-hour construction works

McCONNELL DOWELL CREATIVE CONSTRUCTION™

BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0027 REV: B

DOC REFERENCE: 1151-DL00-MBJV-XLP-MAP-0027_1



Gladstone Area Water Board

LEGEND

- Pipeline Alignment (P2023_02_231019_Alignment)
- Trenchless Crossings
- Sensitive Receivers
- Community Areas
- Property Boundaries
- Local Government Areas Boundaries

State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

0 1,000 2,000 3,000 m

SCALE **1:80,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS

Figure 2.1c FGP SGIC SDA Alignment and proposed 24-hour construction works

McCONNELL DOWELL CREATIVE CONSTRUCTION™ BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0027 REV: B

3. Proposed Change

3.1 Description of Change

3.1.1 Overview

The FGP Project has EPBC Approval, the approval conditions refer to the OCG Evaluation Report and associated conditions, which although lapsed, remain relevant for the FGP. Of particular relevance to this SDA Application (Change Application) are the following OCG Evaluation Report conditions:

– *8. Prepare a CEMP to include provision that construction in **wetlands** located within the project's pipeline corridor will **occur only between May and Septembe**r, inclusive. The CEMP is to further indicate that:*
  - *When trenching across part of a wetland, topsoil will be stockpiled, and replaced after works to enable ground layer species to re-establish*
  - *Wetlands will be restored post-construction*

– *12. Prepare a CEMP 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*

Within wetland areas and the YCZ there are a number of trenchless crossings proposed. The trenchless crossings are summarised in Table 3.1. During design development, and in the sourcing of approvals, trenchless crossing methods where selected to minimise impact on existing values:

– Farmers Dam consistently holds water, trenchless crossing results in the wetland not needing to be dewatered and wetland features not impacted
– Inkerman Creek, Horrigan Creek and Raglan Creek are significant creeks in the region, a trenchless crossing here has reduced the requirements for operational works that are tidal works, minimised marine plant and fauna habitat disturbance and avoid the need for significant waterway barrier works
– Port Alma Road, although not environmental sensitive, is an active road where trenchless was required by the regulator
– Twelve Mile and Marble Creeks, although not significant waterways, have sensitive environmental values such as marine plants, trenchless methods reduce the impact on these creeks

3.1.2 Justification

It is proposed that trenchless crossings be permitted to occur over a 24-hour period to minimise the risk of a second mobilisation in 2025 within the YCZ and wetlands of the SGIC SDA, given the restricted construction timeframes permitted (five months or 153 working days only, Monday to Sunday from May to September) and

limited numbers of specialist subcontractors and equipment available. The trenchless crossing construction will be advanced on multiple work fronts subject to subcontractor availability, however, this alone does not guarantee completion in the May to September 2024 period .

Table 3.1 identifies the locations, method and estimated duration of works based on standard hours. Where work is conducted on a 24-hr roster this may reduce the total number of days (although not total work hours). The allowance to undertake 24-hour works will provide contingency to expedite the activity as required and / or provide construction schedule recovery for crossings that may take longer than anticipated (for example due to encountering poor geotechnical conditions).

Table 3.1 Proposed trenchless crossing time-critical 24 hr works locations and details

Chainage (approx.)	Location	Method	Estimated duration – standard work hours
17200	Farmers Dam	Microtunnel	71 days
56800	Inkerman Creek	Microtunnel	81 days
57700	Port Alma Road	Auger bore	32 days
65200	Twelve Mile Creek	Microtunnel	89 days
65900	Marble Creek	Microtunnel	82 days
72340	Horrigan Creek	Microtunnel	110 days
73450	Raglan Creek	Microtunnel	92 days

3.1.3 Works proposed 24-hours (6:30pm to 6:30am)

The works proposed to be undertaken outside 6:30am to 6:30 pm, i.e. in the evening and night, are limited to activities critical to the development of the trenchless crossings, including shaft development and tunnelling. Major equipment to be used includes a 30t excavator, tunnel boring machine, 800 kVA generator and slurry separating equipment as required.

A key consideration when identifying the works proposed between 6:30pm and 6:30am is to minimise the potential for impact upon sensitive receptors. To that end, trenchless crossing construction works activities that will not occur at night time include:

– Site set up
– Mobilisation of plant
– Installation and removal of sheet piles
– Hauling surplus excavated material
– Movement of topsoil or material stockpiles
– Loading or unloading of trucks
– Major deliveries including – concreting trucks, quarry material (e.g., sand)
– Concrete/grout pumping
– Demolition of concrete thrust blocks
– Blasting

3.2 Values, Impacts and Mitigation

The FGP Project within the SGIC SDA has been approved for construction. This change application does not propose to change any works approved to date (for example the ROW alignment has not changed). The change proposed specifically relates to altering condition 7.1 of the SDA Approval to allow 24-hour trenchless crossing construction works. The potential environmental aspects that may be impacted by nighttime works include:

– Noise
– Vibration
– Light

The design and construct contractor, McConnell Dowell BMD Joint Venture (MBJV), has engaged Protest Engineering to provide a Construction Noise and Vibration Assessment (CNVA) for this Change Application. Protest Engineering are a suitably qualified acoustic consultant, and the specialist who has prepared the noise assessments is a Registered Professional Engineer Queensland with more than 30 years' experience in noise impact assessment and modelling. Refer to Appendix B for CNVA report.

To prevent future delays associated with proposed time-critical works at the seven trenchless crossings, an assessment approach will be implemented at each location, refer to the CNVA. This approach will include the following key components:

– Conducting site-specific assessments and analysis to be conducted at each location (refer to Appendix B of the CNVA for a template assessment report)
    a. Identification of sensitive receptors
    b. Identification of background noise levels
    c. Calculation of the external construction Noise Management Levels (NMLs), non-standard hours, to be adopted
    d. Noise modelling including preparation of noise contour maps
    e. Works site specific noise mitigation measures
    f. Noise monitoring and model validation requirements
– Lodgement of documentation with the OCG prior to commencement
– Confirming LMP agreements are up to date and current (for direct impacted landholders)
– Proactive community engagement initiatives

These efforts are aimed at ensuring transparency and addressing community concerns. Moreover, risk assessment will be a focal point, involving the evaluation of risk and its contributing factors. By implementing these measures, we aim to streamline the project approval process.

3.2.1 Statutory review

The objectives of the CNVA developed by Protest Engineering are to address MBJV and GAWBs general environmental duty defined in the *Environmental Protection Act 1994*, specifically in relation to environmental harm and nuisance. Appendix A of the CNVA presents a detailed review of the statutory construction noise and vibration criteria. Protest Engineering considered the Acoustic Quality Objectives (AQOs) referenced Environmental Protection (Noise) Policy 2019 (EPP (Noise)), however did not adopt the AQOs for the project noise management levels (NMLs) for those reasons as outlined in Section 3.1 of the CNVA (Appendix B of this Planning Report). Further review of Queensland, NSW and Victorian criteria resulted in the recommendation of Protest Engineering to adopt NMLs of:

– Non-Standard hours Evening (6:30pm to 10pm): background L_{A90}+5 db(A)
– Non-Standard hours Night (10pm to 6:30am): background L_{A90}+5 db(A)

Where L_{A90} is defined as the A-weighted noise level exceeded for 90% of the measurement period, generally referred to as the average minimum sound pressure level or background noise level (refer AS 1055:2018 Acoustics – Description and Measurement of Environmental Noise).

Where background noise levels are not available Protest Engineering will adopt estimated background noise levels from AS1055 plus 5 dB(A).

The CNVA, Section 3.2, provides detail on vibration criteria proposed to be adopted.

3.2.2 Public health and amenity

3.2.2.1 Sensitive Receptors

Sensitive receptors, as defined within the EPP (Noise), encompass various locations such as residences, educational facilities, hospitals, commercial and retail activities, and protected areas. The primary sensitive receptors related to public health and amenity for this Change Application are residences. An initial review of sensitive receptors in proximity to each of the trenchless crossing locations has been undertaken, refer to Figure 3.1a to Figure 3.1d.

The CNVA identifies the nominated approach for the assessment of noise and vibration. Whilst the CNVA does not identify all sensitive receptors for each crossing, it is proposed that Site Specific Assessments (as per Appendix B of the CNVA) will map and describe the area's representative sensitive receptors as appropriate to potential noise and vibration impacts at each location.

3.2.2.2 Potential Impacts from Noise

The EPP (Noise) identifies the qualities of the acoustic environment that are conducive to human health and wellbeing:

Ensuring a suitable acoustic environment for individuals to do any of the following:

- *Sleep*
- *Study or leaning*
- *Be involved in recreation, including relaxation and conversation*

Construction works have the potential to impact upon the acoustic environment on a temporary basis.

3.2.2.3 Potential Impacts from Vibration

Protest Engineering have identified that due to the separate distances between the trenchless crossings and nearest sensitive receptors the risk of vibration impacts is considered to be very low. Nevertheless, a risk assessment for each site will be undertaken to confirm the risk. Should the risk level be higher, the CNVA provides general vibration mitigation measures that will be considered (refer to Section 6 of the CNVA provided in Appendix B).

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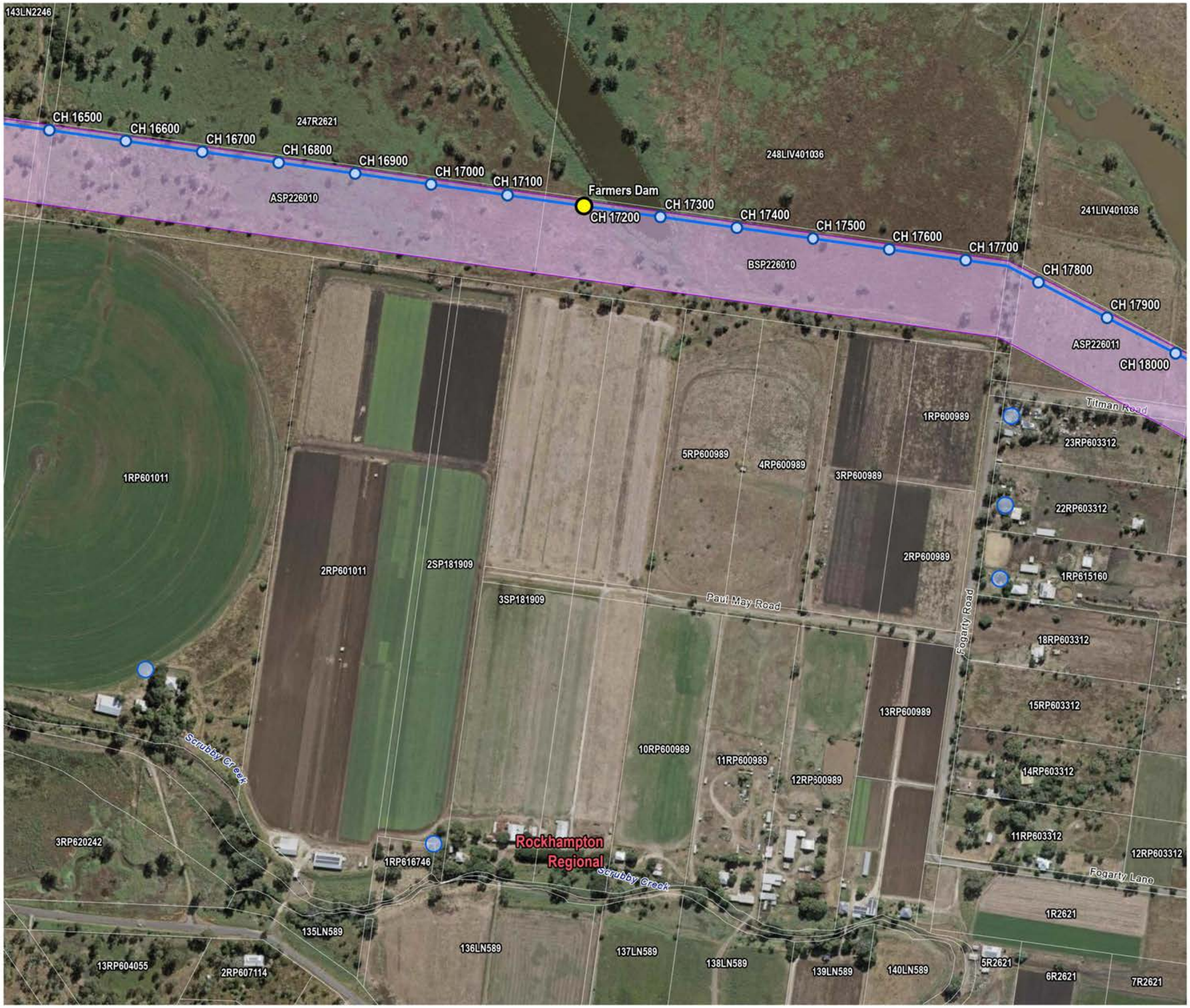

Gladstone Area Water Board

LEGEND

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State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

0 60 120 180 m

SCALE **1:4,900**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS
FARMERS DAM

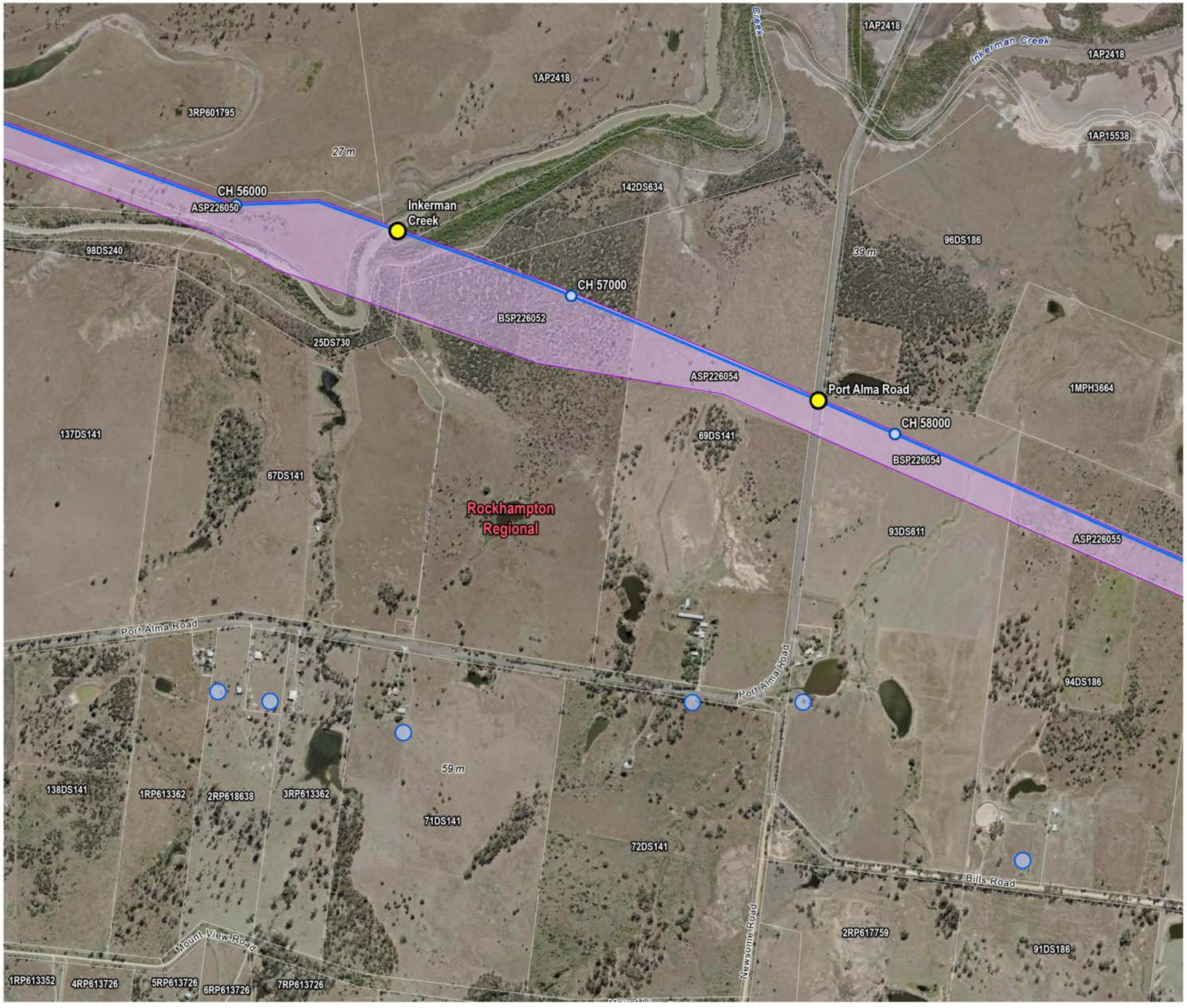
Figure 3.1a Location of proposed 24 hour works

McCONNELL DOWELL CREATIVE CONSTRUCTION™ | BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0029 REV: A

DOC REFERENCE: 1151-DL00-MBJV-XLP-MAP-0029_1

SAVED BY: MARK.SCOBLE



Gladstone Area Water Board

LEGEND

- Pipeline Alignment (P2023_02_231019_Alignment)
- Trenchless Crossings
- Sensitive Receivers
- Community Areas
- Property Boundaries
- Local Government Areas Boundaries

State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

0 140 280 420 m

SCALE **1:10,700**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS
INKERMAN CREEK & PORT ALMA ROAD

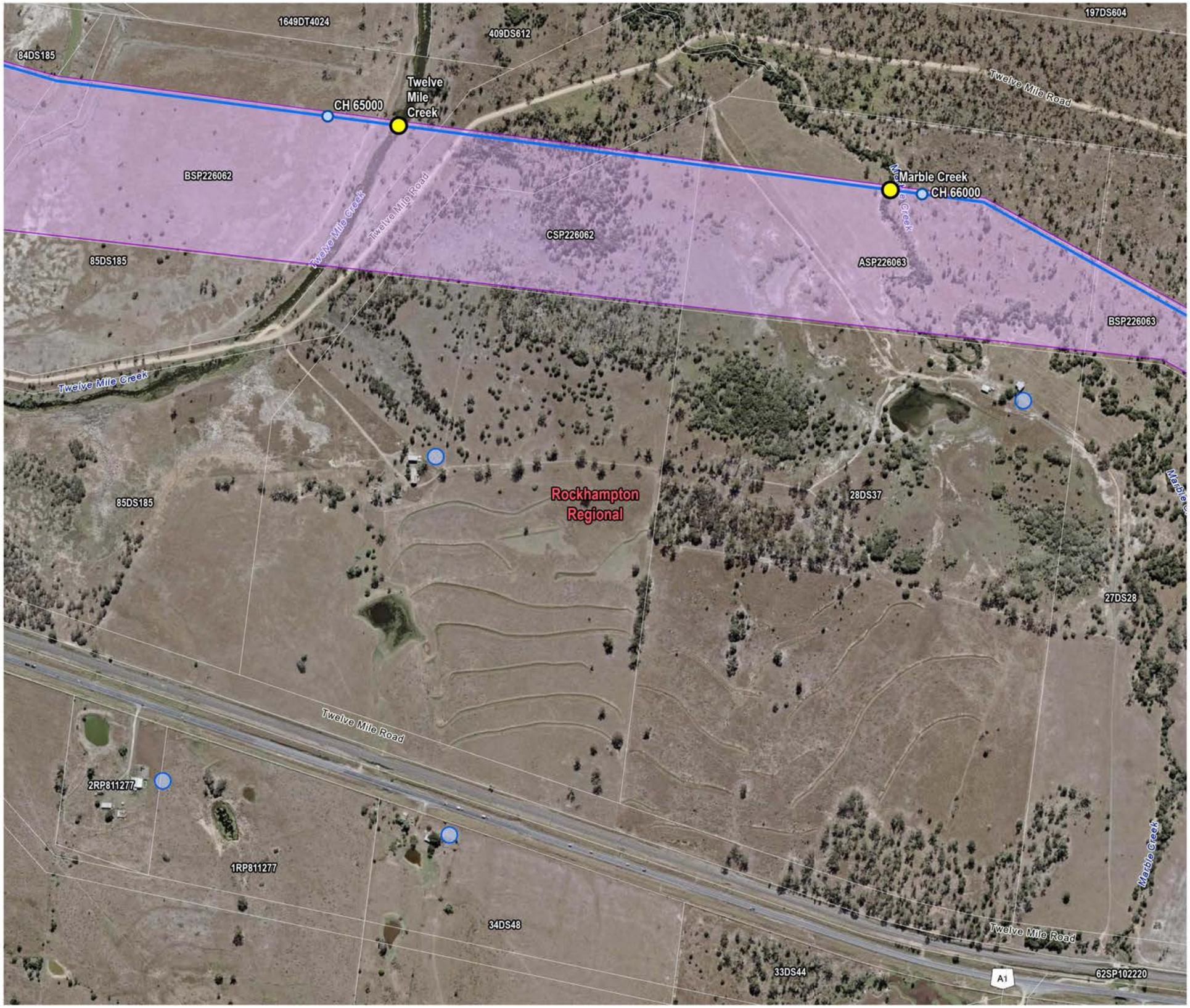
Figure 3.1b Location of proposed 24 hour works

McCONNELL DOWELL CREATIVE CONSTRUCTION™ BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0029 REV: A

DOC REFERENCE: 1151-DL00-MBJV-XLP-MAP-0029_1

SAVED BY: MARK.SCOBLE



Gladstone Area Water Board

LEGEND

- Pipeline Alignment (P2023_02_231019_Alignment)
- Trenchless Crossings
- Sensitive Receivers
- Community Areas
- Property Boundaries
- Local Government Areas Boundaries

State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

0 80 160 240 m

SCALE **1:6,300**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS
TWELVE MILE & MARBLE CREEK

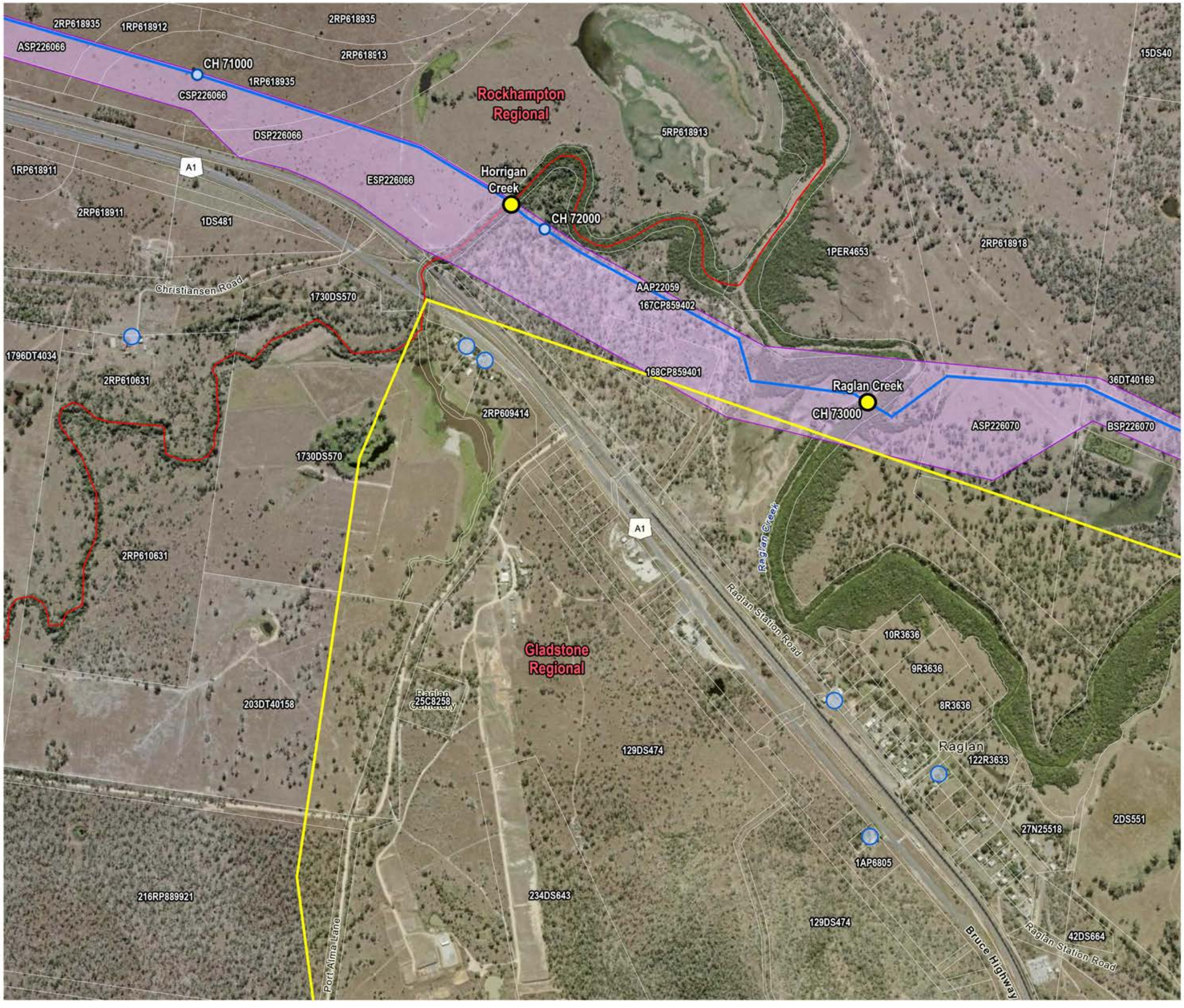
Figure 3.1c Location of proposed 24 hour works

McCONNELL DOWELL CREATIVE CONSTRUCTION™ BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0029 REV: A

DOC REFERENCE: 1151-DL00-MBJV-XLP-MAP-0029_1

SAVED BY: MARK.SCOBLE



Gladstone Area Water Board

LEGEND

- Pipeline Alignment (P2023_02_231019_Alignment)
- Trenchless Crossings
- Sensitive Receivers
- Community Areas
- Property Boundaries
- Local Government Areas Boundaries

State Development Areas

- Gladstone State Development Area
- Stanwell to Gladstone Infrastructure Corridor State Development Area

SOURCE
Pipeline alignment, ROW areas and property boundaries from W3Plus
Aerial imagery from QLD Spatial. (Latest Available when Printed)

0 130 260 390 m

SCALE **1:9,800**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

GLADSTONE AREA WATER BOARD

FITZROY TO GLADSTONE PIPELINE

SENSITIVE RECEPTORS
RAGLAN & HORRIGAN CREEK

Figure 3.1d Location of proposed 24 hour works

McCONNELL DOWELL CREATIVE CONSTRUCTION™ BMD

DATE: 15.03.24 FILE: 1151-DL00-MCD-XLP-MAP-0029 REV: A

DOC REFERENCE: 1151-DL00-MBJV-XLP-MAP-0029_1

3.2.2.4 Noise Mitigation Hierarchy

The CNVA developed by Protest Engineering identifies recommended mitigation measures to be adopted is determined relevant by the site-specific assessments. The general noise and vibration mitigation measures as per the approved CEMP will be implemented. Where noise levels are predicted to exceed the NMLs detailed in the site specific noise and vibration assessments a tiered approach to management and mitigation will be adopted, with site-specific mitigation measures applied in accordance with this tiered mitigation framework.

This tiered approach is detailed in Section 6 of the CNVA in Appendix B of this Planning Report. The NMLs may change for each location / tier based on the background noise adopted for the site, however the tiered mitigation approach is not proposed to alter (unless in response to complaints or consultation the landowners). In summary the tiered mitigation approach is (but is not limited to):

– Mitigation Tier A
  - Avoid using noisy equipment simultaneously and/or time use of noisy equipment
  - Adoption of non-tonal and ambient sensitive reversing alarms
  - Place stockpiles between construction noise sources and receivers (where safe and in accordance with licences)
  - Locate static sources of noise such as the generators as remotely as possible from noise sensitive receivers
  - Notification of sensitive receptors
– Mitigation Tier B
  - If further mitigation is required use localised moveable temporary noise barriers around specific items of plant
  - Model verification monitoring spot checks
– Mitigation Tier C
  - Schedule respite periods
  - Reduce work to two shifts
  - Model verification monitoring spot checks
– Mitigation Tier D
  - Consider ‘at property’ acoustic treatments
– Mitigation Tier E
  - Stop works between 6:30pm and 6:30 am

Throughout the project any complaints will be managed in accordance with the SDA Approval condition 13.1 and the approved CEMP.

3.2.2.5 Light

To reduce the impact of lighting during the proposed time-critical works construction lighting towers will be positioned in a manner where light is directed downwards and not toward a sensitive receptor/s. Lighting shields will be installed to minimise light spill outside of the immediate work areas having consideration for health and safety requirements as per the CEMP. Specifically, condition 16.1 of the SDA Approval will be met:

> *Ensure outdoor lighting installing within the development minimises light spill in the adjacent properties and sensitive receptors in accordance with AS4282:1997 Control of obtrusive effects of outdoor lighting.*

3.2.3 Matters of State Environmental Significance

Base Consulting are a suitably qualified ecology consultant, and the specialist who has prepared the ecology noise and light assessments presented in this section has a PhD in ecology and more than 25 years’ experience in fauna impact assessment.

3.2.3.1 Ecological Values

Aquatic and terrestrial fauna ecological values were outlined in Sections 3.5.3 and 3.5.4, respectively, of the previous Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD, 2023) and the Terrestrial and Aquatic Ecology Assessment Report included as Appendix D in the MCU Planning Report. A summary of these values are outlined in this section with particular reference to the presence (or potential presence) of fauna values at each of the locations where 24-hour trenchless crossing construction activities are proposed. Desktop assessments provided in the original Planning Report were undertaken in 2022.

Listing amendments to MSES were made in February 2024 and included in the current version of the Nature Conservation (Animals) Regulation, 2020 (Regulation). Of the MSES fauna species listed in the Terrestrial and Aquatic Ecology Assessment, only one listing change was made with the Coxen's fig-parrot uplisted from Endangered to Critically Endangered. This species had not been previously identified within the SGIC SDA and potential habitat was not found.

Wetlands and marine plants were identified at several of the crossings outlined in this report and approval has been sought separately for impacts to these areas. As such, vegetation matters are only relevant here to the potential ecological values they provide to fauna. Within the SGIC SDA section of the Project, the only listed aquatic fauna confirmed present were the Green Turtle, which was observed at Inkerman Creek. Potential habitat for this Green Turtle was identified at Raglan Creek (refer to Table 3.2). Although the Estuarine Crocodile and Platypus was not confirmed present within the SGIC SDA, potential habitat for these species was observed at Inkerman Creek, Twelve Milke Creek and Raglan Creek (for the Estuarine Crocodile) and Twelve Mile Creek (for the Platypus). Therefore, these species are likely to occur based on habitat values (refer to Table 3.2).

The Terrestrial and Aquatic Ecology Assessment (GHD, 2022) identified the confirmed presence of four listed terrestrial fauna species within the SGIC SDA section of the Project. The Squatter Pigeon (southern) was confirmed present during the 2022 field surveys and the Ornamental Snake, Yellow Chat (Dawson) and Koala confirmed present during field surveys in 2008. The locations where each species was confirmed present as well as potential habitat is outlined below and in Table 3.2:

The Terrestrial and Aquatic Ecology Assessment also identified several terrestrial fauna species including the Yellow-bellied Glider, Greater Glider, Curlew Sandpiper, Australian Painted Snipe and Grey Snake as having the potential to occur within the SGIC SDA area and locations that correspond to the 24-hour trenchless crossing construction work locations (refer to Table 3.2). A range of migratory species listed under the EPBC Act and classified as MSES also had the potential to occur within the SGIC SDA; however, suitable habitat at or in the vicinity of the 24-hour works areas is limited spatially relative to habitat in the surrounding landscape. Due to limited habitat availability at the 24-hour construction areas and because most migratory species would not be present during the May to September construction window, these species are not likely to be present and are not discussed further.

Table 3.2 Listed fauna species confirmed as present or likely to occur at the 24hr trenchless crossing works locations

MSES	Farmer's Dam	Inkerman Creek	Bajool Port Alma Road	Twelve Mile Creek	Marble Creek	Horrigan Creek	Raglan Creek
Green Turtle	No	Confirmed present	No	No	No	No	Potential habitat
Estuarine Crocodile	No	Potential habitat	No	Potential habitat	No	No	Potential habitat
Platypus	No	No	No	Potential habitat	No	No	No
Squatter Pigeon (southern)	Potential foraging habitat	No	No	Potential foraging habitat	Potential foraging habitat	Potential foraging habitat	Potential foraging habitat
Ornamental Snake	No	Potential habitat ~50m away	No	No	No	No	No
Yellow Chat (Dawson) *	No	Potential habitat >750m away	No	Potential habitat >750m away	No	No	Potential habitat
Koala	Potential habitat ~350m away	No	No	Potential habitat	Potential habitat ~50m away	Potential habitat	Potential habitat
Curlew Sandpiper	Potential habitat	Potential habitat	No	Potential habitat ~350m away	No	Potential habitat	Potential habitat
Grey Snake	No	Potential habitat ~50m away	No	No	No	No	No
White throated Needletail	No	No	No	No	No	No	No
Powerful owl	No	No	No	No	No	No	No
Greater Glider (southern and central)	Potential denning habitat ~350m away	No	No	Potential foraging habitat and potential denning habitat ~50m away	Potential foraging habitat and potential denning habitat ~350m away	Potential denning habitat	Potential denning habitat ~300m away
Yellow-bellied Glider (south-eastern)	Potential denning habitat ~350m away	No	No	Potential denning habitat ~500m away	No	Potential denning habitat	Potential denning habitat ~300m away
Grey-headed Flying Fox	No	No	No	No	No	No	No
Australian Painted Snipe	Potential habitat	No	No	No	No	No	No

*Data is taken from the Terrestrial and Aquatic Ecology Assessment (GHD, 2022) that was included as Appendix D in the previous Planning Report for the initial MCU application.

3.2.3.2 Impacts Associated with 24hr Trenchless Crossing Construction Activities

The most likely potential impacts on fauna from 24-hour trenchless crossing construction works will be associated with increased exposure to light and noise. These can adversely impact native wildlife through the disruption of foraging, breeding and nesting behaviours (Longcore and Rich 2004; Slabbekoorn et al. 2010; Popper and Hawkins 2016).

Noise - Fauna Impact Assessment

Noise impacts from the trenchless crossing construction could lead to involuntary relocation of the local fauna population and potentially negatively impact the health of local fauna, particularly for noise. For noise, the level of impact on fauna depends on the type of noise produced, including loudness, consistency, and duration (Ortega, 2012), the species of animal and other factors such as season, weather, background noise levels and previous noise exposure (Cayford, 1993; Yasue et. al, 2003; Yasue, 2006).

Noise impacts on fauna are generally classified into four main categories including:

– Permanent threshold shift (PTS): a noise-induced threshold shift that persists after removal of the noise impact. PTS can result in permanent loss of hearing in fauna and can occur from loud impulsive noises, or continuous exposure to high intensity noise. This impairs their ability to detect predators and communicate with other fauna.
– Temporary threshold shift (TTS): similar to PTS but any hearing loss is only temporary. The degree of temporary hearing loss depends on the type of noise, and the species of fauna.
– Masking the interference with the detection of one sound by another (e.g. mating calls masked by traffic noise). Masking can impair the ability to communicate effectively and detect predators. However, this only occurs when noise is being generated and does not cause any damage to the hearing ability of fauna.
– Behavioural response as noise that causes any kind of altered response in fauna (avoidance of an area).

There is limited information on the sensitivity of fauna groups to noise impacts and as such, there are no government of otherwise widely accepted guidelines. However, Dooling and Popper (2007) outlined interim guidelines for bird species, and these are likely to be relevant to other fauna groups including mammals and reptiles.

Continuous noise levels above 110 dB(A) or impulsive noise levels over 140 dB for a single pulse or 125 dB for multiple pulses, have the potential result in (PTS). This is most likely to occur at the actual location of the noise source and within the immediate surroundings (i.e. within approximately 50m). As distance from the noise source increases (i.e;. >50m), PTS impacts are unlikely, but TTS impacts may occur when noise levels exceed 93 dB(A). As distance from the construction area further increases, masking impacts may occur where continuous noise levels that are lower than 93 dB(A), but higher than ambient noise levels (Appendix B). This has the potential to impact on species behaviour such as recognising mating calls.

As outlined in the CNVA (Protest Engineering 2024) included in Appendix B, noise levels are not expected to reach PTS levels. However, TTS noise levels are likely to occur within the immediate construction zone with higher levels of masking predicted to occur up to 70m from the trenchless crossing construction area with low level masking impacts occurring between 70m – 750m. Beyond 750m from the trenchless crossing construction area, no impacts are expected.

The only listed MSES that was confirmed present at the locations where 24-hour trenchless crossing construction activities will be undertaken was the Green Turtle (refer to Table 3.2). This species is primarily a marine species that is known to migrate widely between a range of habitats. As such, there is a low likelihood that individual Green Turtles would persist at the Inkerman Creek location, particularly when trenchless crossing construction activities are being undertaken. The trenchless crossing construction method will avoid disturbance to the bed and banks of waterway crossings and there is low risk that 24-hour trenchless crossing construction would impact individual green turtles. Of the remaining species outlined in Table 3.2, only potential habitat was observed, and some was identified adjacent to the trenchless crossing construction sites.

All of the species that have the potential to occur based on habitat, have home ranges and spatial movement patterns that are much larger than 70 m radius from the construction area. As such and given daytime construction is being undertaken, it is expected that if individuals were present prior to construction commencing, they would move of their own accord to other areas within their home range. Hence, any potential impacts to MSES at each of the 24-hour trenchless crossing construction areas are expected to be low risk. Nevertheless, specific mitigation

measures are proposed in Section 3.2.3.1 to minimise any potential risk to fauna that may occur at each construction area.

Light – Fauna Impact Assessment

Animals perceive light differently from humans and artificial light and increased light (DoEE, 2020), can alter the behaviour of individual animals and affect interactions between individuals as well as potentially altering predator and prey interactions (Ecosure, 2021). Artificial lighting required for safety and to facilitate trenchless crossing construction night works has the potential to disturb wildlife and will likely result in the temporary movement of some nocturnal fauna away from the construction area. Nocturnal fauna can be particularly sensitive to light disturbance, causing more sensitive species to avoid areas exposed to artificial lighting (Longcore and Rich 2004).

Of the species thought to be primarily impacted by artificial light, only the Green Turtle has been confirmed present and that was at Inkerman Creek. As mentioned above in relation to noise impacts, Green Turtles can range widely and the continued presence of turtles at this location is unlikely given the daytime construction activities. Further, it is likely any individuals at this location are foraging and not nesting or hatching. Hence, light impacts to this species are thought to be low.

Longcore and Rich (2004) mention nocturnal fauna may be particularly sensitive to lighting impacts. The nocturnal species that have the highest potential to occur adjacent to the 24-hour trenchless crossing construction areas are the Yellow-bellied Glider and Greater Glider. Potential denning habitat for both species is located at the Horrigan Creek construction area and foraging habitat at Twelve Mile Creek (and Marble Creek for the Greater Glider). Foraging and/or denning for both species is also approximately 350 m from Raglan Creek and the Farmers Dam. Given the home range size of both species, it is expected that if 24-hour trenchless crossing construction activities disrupted their behaviour, they would be able to relocate to other suitable habitat within their home range. Hence, potential impacts of 24-hour trenchless crossing construction activities are expected to be of low risk to these species.

The Commonwealth Government released National Light Pollution Guidelines for Wildlife in 2020 (DoEE, 2020). Whilst no lighting criteria are outlined in the guideline, management actions are included for each of the three fauna groups. Although the management actions are primarily related to marine turtles, seabirds and migratory shorebirds, they have relevance to all fauna groups including the species that have the potential to occur at each of the 24-hour trenchless crossing construction areas. As such, relevant management actions from the guideline are proposed to minimise potential impacts to those species that may occur at each construction area (refer to Section 3.2.3.1).

3.2.3.1 Mitigation Measures Associated with 24hr Activities Trenchless Crossing Construction

Management and mitigation measures to minimise impacts to fauna from noise and artificial light were outlined in the initial MCU SGIC Planning Report and the approved Fitzroy to Gladstone Pipeline CEMP previously provided to the Office of the Coordinator General. Mitigation measures from these documents that have relevance to the 24-hour trenchless crossing construction areas are included in this section along with additional measures derived from relevant literature and the National Light Pollution Guidelines for Wildlife (DoEE, 2020).

- Using noise dampening devices on machinery wherever practical and all equipment will be maintained and serviced in accordance with manufacturer’s instructions to reduce noise levels.
- Develop a Traffic Management Plan for the construction sites to control vehicle movements and speeds at night to reduce the unnecessary generation of vehicular noise.
- Minimise the number of vehicles used and vehicle movements.
- Limit noise intensive construction activities to daylight hours wherever possible to minimise the need for lighting and resultant light spill into adjacent habitat and to reduce noise and vibration impacts on nocturnal fauna species.
- Install directional lighting and shields to minimise light spill outside of the immediate work areas having consideration for health and safety requirements (noting the works will ensure compliance with Condition 16.1 of the SDA approval).

4. Development Assessment

4.1 State Development and Public Works Organisation Act 1971

The main purpose of the SDPWO Act is to facilitate co-ordinated and environmentally responsible infrastructure planning and development in Queensland. The SGIC SDA Development Scheme, which relates to the FGP SGIC SDA alignment, is created under Section 79 of the SDPWO Act.

The following provides an assessment for a Change Application assessment of the FGP SGIC SDA alignment against the SGIC SDA Development Scheme.

4.2 SGIC SDA Development Scheme

In 2005 the OCG identified the need for a multi-user infrastructure corridor for the installation of below ground pipes between Rockhampton and Gladstone areas. The SGIC SDA was declared in 2008 and links the Stanwell Energy Park and the GSDA. The SGIC SDA Development Scheme is the relevant categorising instrument, with the OCG as the assessment manager. The current SGIC SDA Development Scheme is dated September 2012.

In accordance with Section 8(4) of the SGIC SDA Development Scheme, the OCG shall have regard to the purpose, intent and objectives of the development scheme in assessing an application for a Change Application, as outlined in Table 4.1.

Table 4.1 SGIC SDA Assessable Development Assessment Framework

Development Assessment Framework	Relevant Section of Report
Purpose of the SGIC SDA	Refer to Section 4.2.1
Intent of the SGIC SDA Development Scheme	Refer to Section 4.2.2
Objectives of the SGIC SDA	Refer to Section 4.2.3
Policy 1 – Outcomes for the SGIC SDA	Refer to Section 4.2.4

The majority of the assessment against the SGIC SDA Development Scheme presented in the Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023) does not alter as a result of the proposed change for 24-hour trenchless crossing construction works. Where the assessment / responses have been amended to reflect the 24-hour trenchless crossing construction works the cells have been shaded blue.

Further, Policy 1 (outcomes for the SGIC SDA) outlines the requirement for construction adjacent to the Yellow chat breeding area to occur between May and September. This is a requirement of these construction works as outlined in Section 3.1.1.

4.2.1 Purpose of the SGIC SDA

Section 6(1) of the SGIC SDA Development Scheme identifies:

> *The purpose of the SGIC SDA is to provide an efficient and effective route for materials transportation and services infrastructure, between Rockhampton and Gladstone areas.*

The FGP SGIC SDA alignment meets the purpose of the SDA as the Project is for the transportation of water between Rockhampton and Gladstone. Schedule 1 of the SGIC SDA Development Scheme identifies that material transportation and services infrastructure is highly likely to meet the purpose of the SGIC SDA if it meets the outcomes contained in Policy 1 of the SGIC SDA Development Scheme. An assessment of the FGP SGIC SDA alignment against Policy 1 – Outcomes for the SGIC SDA is presented in Section 4.2.4.

4.2.2 Intent of the SGIC SDA

An assessment of the FGP SGIC SDA alignment against the development intent of the SGIC SDA is provided in Table 4.2.

Table 4.2 Assessment Against the Intents for the SGIC SDA

Development Intent	Proposal Response
1. Establish a set of objectives for the orderly development of the Stanwell – Gladstone Infrastructure Corridor State Development Area.	**Complies** Compliance with the SGIC SDA Development Scheme objectives has formed the foundational basis for the strategic approach of the proposed works in the SGIC SDA.
2. Provide guidance and a framework for the orderly development of the Stanwell – Gladstone Infrastructure Corridor State Development Area.	**Complies** The SGIC SDA Development Scheme provides guidance and an orderly framework for development. The placement, design and construction of the FGP SGIC SDA alignment has been strategically planned to consider environmental factors and identified sensitive values and receptors. Installation has been customised to specific areas to mitigate disruption an impact to specific areas. During planning, the FGP SGIC SDA has identified and engaged with known future developments to implement measures to reduce the anticipated impact between the developments. The standard ROW construction allows for orderly and efficient installation works within the SGIC SDA for the majority of the construction, with the ability to modify construction techniques such as underground boring etc, where necessary.
3. Protect the interests of users within the Stanwell – Gladstone Infrastructure Corridor State Development Area to ensure the corridor's long-term viability.	**Complies** The FGP SGIC SDA alignment is consistent with the background objectives within the SGIC SDA Development Scheme. The alignment location has been determined based on consultation with the OCG to minimise impacts to future infrastructure uses within the SGIC SDA and to maintain the SGIC viability.
4. Identify land uses considered appropriate for the Stanwell – Gladstone Infrastructure Corridor State Development Area	**Complies** The SGIC SDA Development Scheme identifies land uses that are considered suitable. The FGP SGIC SDA alignment is an underground pipeline and is therefore suitable as per the Development Scheme. Refer to Sections 4.2.3 and 4.2.4 for further information.
5. Establish a procedure for determination by the Coordinator-General of the suitability of uses in the Stanwell-Gladstone Infrastructure Corridor State Development Area	**Complies** Consultation has been undertaken with the OCG and is continuing. Consultation to date has determined this project may proceed to applying for a Change Application having complied the objectives for works within the SGIC SDA (this report).
6. Recognise the Coordinator-General has primary carriage of the development, operation and management of the Stanwell – Gladstone Infrastructure Corridor State Development Area	**Complies** Consultation has been undertaken with the OCG and will continue throughout the design and construction of the development.
7. Assist in achieving ecological sustainability of activities within the Stanwell – Gladstone Infrastructure Corridor State Development Area	**Complies** Assessment from the Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023): The design of the FGP SGIC SDA alignment has minimised environmental impacts where practical. The construction methods, particularly at waterway crossings, will vary depending on the environmental values of the area. For example, at major waterway crossings, trenchless techniques will be used so that these environmentally sensitive areas will be subject to less disturbances relative to the standard ROW installation sections. A sustainability assessment has been undertaken in accordance with the Infrastructure Sustainability Council (ISC) requirement, which considers ecological values.

Development Intent	Proposal Response
	Construction will also be undertaken in accordance with a CEMP. Assessment of change for 24-hour trenchless crossing construction works: Site specific noise and vibration impact assessments will be prepared by a suitably qualified acoustic consultant to assess potential impacts upon sensitive receptors (i.e. nearby residents). Recommendations from each noise assessment will be implemented as mitigation measures to avoid or minimise the potential noise nuisance associated with evening and night construction works. An assessment of potential impacts of noise and light upon conservation significant fauna habitat at the trenchless crossing has been conducted by a suitably qualified ecologist (refer to Section 3.2.3). The mitigation measure recommended will be implemented to avoid or minimise potential impacts upon fauna associated with evening and night construction works.

4.2.3 Overall Objectives for Development in the SGIC SDA

An assessment of the FGP SGIC SDA alignment against the objectives of the SGIC SDA is provided in Table 4.3.

Table 4.3 Assessment Against the Overall Objectives of the SGIC SDA

Overall Objectives	Proposal Response
1. Provide land for underground infrastructure purposes to facilitate economic development in the Rockhampton and Gladstone area	**Complies** The city of Gladstone is currently being serviced by a single raw water source. Gladstone was officially drought declared on 1 May 2019 and has had three consecutive failed wet seasons in 2018-19, 2019-20 and 2020-21. The Installation of the FGP within the SGIC SDA meets the objects of the designated land by using the corridor to install an underground water pipeline from the Fitzroy River to Gladstone to provide an alternate water source. Water security facilitates the expansion capability for existing industry, the ability to develop new and emerging industry in the area and to expand with associated population growth and development as required.
2. Provide a dedicated and efficient means of access for materials, products, wastes and services between Rockhampton and Gladstone	**Complies** A large portion of the FGP is proposed to be constructed underground within the SGIC SDA to provide water for the Gladstone region. The FGP was a preferred approach after detailed considerations by DRDMW. GAWB is committed to providing greater certainty of water reliability to support business investment in the emerging hydrogen industry.
3. Provide planned development that recognises environmental values and community values	**Complies** Assessment from the Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023): Although impacts to environmental and community values are unavoidable, the design phase has aimed to minimise impacts by reducing the project footprint (i.e. ROW) in sensitive areas, utilising a range of construction methods including trenchless methods and implementing a CEMP and specific management plans as required. Cultural heritage impacts and management plans associated with the underground water pipeline has also been addressed and discussed. Assessment of change for 24-hour trenchless crossing construction works: Site specific noise and vibration impact assessments will be prepared by a suitably qualified acoustic consultant to assess potential impacts upon sensitive receptors (i.e. nearby residents). Recommendations from each noise assessment will be implemented

Overall Objectives	Proposal Response
	as mitigation measures to avoid or minimise the potential noise nuisance associated with evening and night construction works. An assessment of potential impacts of noise and light upon conservation significant fauna habitat at the trenchless crossing has been conducted by a suitably qualified ecologist (refer to Section 3.2.3). The mitigation measure recommended will be implemented to avoid or minimise potential impacts upon fauna associated with evening and night construction works. Additional stakeholder engagement will occur prior to prior to 24-hour trenchless crossing work commencement, including: • A signed amendment to the LMPs with landholders adjacent to the ROW at trenchless crossing locations. • Notification of 24-hour works to identified potentially sensitive receptors located near to trenchless crossing locations.
4. Establish a development framework that provides for long-term orderly development of the provision of infrastructure in the Rockhampton and Gladstone area	**Complies** The FGP SGIC SDA Development Scheme and CQ Regional Plan provides established development frameworks that promotes long-term orderly development of infrastructure within the regions. The FGP is considered infrastructure itself and is consistent with the overall outcomes sought by the SGIC SDA Development Scheme through the provision of a secure water supply.
5. Ensure that the integrity and functionality of the Stanwell–- Gladstone Infrastructure Corridor State Development Area is maintained and protected from land uses and activities that may be incompatible with, or adversely affect, the continued use of the State Development Area	**Complies** It is considered that the FGP will maintain functionality of the SGIC SDA as the infrastructure supports industrial development and is compatible with the intended purpose of the corridor. As such, the FGP does not introduce incompatible uses or adversely impact the SGIC SDA.

4.2.4 Assessment Against SGIC SDA Policy 1– Outcomes

An assessment of the Project against the Outcomes defined in Policy 1 of the SGIC SDA Development Scheme is provided in Table 4.4.

Table 4.4 Assessment Against SGIC SDA Policy 1–- Outcomes

Outcome	Probable Solution	Proposal Response
The habitat and wildlife corridor functions of riparian vegetation are retained.	– Infrastructure is located underground when crossing creeks and wetlands. – The pipeline is constructed using directional drilling, thrust boring or similar techniques when crossing watercourses with habitat value or intact riparian vegetation.	**Complies** Assessment from the Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023): The design and placement of the underground water pipeline has considered existing habitat and wildlife corridors and identified areas containing riparian vegetation. Wherever possible, the pipeline footprint will avoid sensitive environments and ecological communities by trenchless construction methods. The key locations identified for trenchless methods include: – Gavial Creek – Bob's Creek – Inkerman Creek – Twelve Mile Creek – Marble Creek – Horrigan Creek – Raglan Creek Further, there is potential for the ROW footprint to be reduced in key environmental areas where trenchless methods are not feasible. All areas affected by construction will be cleaned up and rehabilitated to pre-construction conditions as far as practicable (noting any reasonable landholder requirements). Assessment of change for 24-hour trenchless crossing construction works: Further, 24-hour works may enable work fronts at these locations to be completed in a shorter timeframe, reducing the duration for temporary impact upon these wildlife corridors.
Potential and known yellow chat habitats are retained.	**Natural Hydrology** – The pipeline is constructed using directional drilling, thrust boring or similar techniques. – No fill is used to construct accessways to service the underground pipelines located in the 100-year average recurrence interval (ARI) and tidal areas. – In areas with acid sulfate soils, acidic drainage does not occur. **Construction** – Construction adjacent to yellow chat breeding areas occurs between May and September. – Pipeline construction does not adversely impact on surface and subsurface waterflows or impact on habitat through modification of water quality.	**Complies** Natural hydrology: – The use of trenchless methods, i.e. directional drilling or thrust boring, is being prioritised for key waterways (refer above) and other waterbodies where practical. – No permanent access tracks are proposed for the FGP SGIC SDA alignment, therefore no fill is to be used for access in the 100 year ARI. A permanent access to Raglan Pump Station and Reservoir is required. This access is outside the 100-year ARI. – The Construction Contractor will be responsible for undertaking ASS investigation where land is below 5 m AHD, or land is below 20 m AHD and requires excavation to depths of below 5 m AHD. If ASS are identified, the Construction Contractor will develop and implement a site-specific ASS Management Plan(s). Construction: – The FGP SGIC SDA alignment will be constructed in accordance with a CEMP which includes surface and groundwater quality mitigation measures and monitoring.

Outcome	Probable Solution	Proposal Response
		– Construction in or adjacent to identified Yellow chat habitat areas will occur between May and September. – The EPBC Approval requires the OCG to approve all management plans, this includes a Special Area Plan for areas where Yellow chat habitat occurs, or where works are adjacent to habitats. The Plan will include aspects such as timing, surveys and water / hydrology impacts and mitigation. – Conditions within the EPBC Approval, condition 2, and OCG evaluation report, condition 10, related to provision of funding for research. GAWB has been able to complete this condition and outcomes of the research have been published.
The ecological values of wetlands are retained.	– Avoid construction in wetlands wherever feasible and practical. – If it is not feasible or practical to avoid construction in wetlands, construction shall occur between May and September. – The freshwater pools are not drained due to pipeline construction. – Disturbed areas are rehabilitated and revegetated so they retain their ecological value.	**Complies** The Project has been designed to minimise impacts to wetlands by avoiding wetland habitats where possible. This has largely been achieved through the utilisation of previously disturbed areas; however, it is not possible to avoid all areas that support wetland environmental values. In areas where wetlands cannot be avoided the trench method will be used and will be confirmed by the Construction Contractor. The CEMP will be implemented and natural profiles will be reinstated following construction. This will include relevant controls such as works in wetland areas to occur between May and September and no draining of freshwater pools. The findings of the Ecology Assessment Report (GHD, 2022) will be utilised in planning for rehabilitation.
Infrastructure is able to operate during and immediately after a natural hazard event.	– No above ground assets are located within the 100-year ARI flood area. – Pipelines are located underground within the 100-year ARI area.	**Complies** The development will be in accordance with best practice in consideration of natural hazards. Additionally, given the pipeline will be buried, it is considered that it will not increase the severity of a natural hazards in the area. Above ground infrastructure along the pipeline includes valves. The location of these valves will be determined during detailed design; however, these valves will continue to operate in flood conditions. Other above ground infrastructure, namely the Raglan Pump Station and Reservoir access, is outside the 100-year ARI flood area.
The existing flood risk in tidal areas and within the flood area is unaffected by the corridor.	– No fill is placed in the floodway for permanent access to service the underground pipelines located in the 100-year ARI and tidal areas. – Temporary access during construction does not alter overland flows.	**Complies** The development will be in accordance with best practice in consideration of natural hazards. Additionally, given the pipeline will be buried, it is considered that it will not increase the severity of flood risk in tidal areas is not proposed. The FGP SGIC SDA alignment does not include provision for any permanent accesses in floodplains or tidal areas. No permanent access or fill, including the Raglan Pump Station and Reservoir access, is required in 100-year ARI or tidal areas. Temporary access during construction will be undertaken in accordance with regulatory requirements and the CEMP. There is potential for temporary overland flow impacts during construction due to temporary access. Where appropriate consideration of overland flow will be undertaken by the Construction Contractor.

Outcome	Probable Solution	Proposal Response
Infrastructure is not visually intrusive and does not create a physical barrier which unreasonably restricts the existing use of the land.	– Infrastructure is located underground, with the exception of limited locations where it is either impractical or operationally necessary for the proper functioning of the infrastructure (for example pump station and balance tank locations).	**Complies** The pipeline will be buried for its entire length and as such, it will not be visually intrusive, nor would it create a physical barrier which would unreasonably restrict the existing use of land. Any access to the pipeline easement will be in accordance with the easement agreement. Minor above ground infrastructure, such as valves and the Raglan Pump Station and Reservoir access are required. The aboveground infrastructure is not expected to create a physical barrier or to be visually intrusive.
Animal husbandry/grazing are able to use the land.	– Infrastructure is located underground, with the exception of limited locations where it is either impractical or operationally necessary for the proper functioning of the infrastructure (for example pump station and balance tank locations).	**Complies** The pipeline will be buried, and the ROW rehabilitated to pre-disturbance levels, where possible. As such, ongoing use for animal husbandry or grazing can occur.

4.3 State Planning Policy

Refer to Section 5.3 of the previous Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023) for details on State Planning Policy.

4.4 Central Queensland Regional Plan

Refer to Section 5.4 of the previous Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023) for details on the Central Queensland Regional Plan.

4.5 Statutory Considerations

Refer to Section 6 of the previous Planning Report for Material Change of Use - FGP SGIC SDA Alignment (GHD Pty Ltd, 2023) for details on the Statutory Considerations.

5. Conclusion

This Planning Report has been prepared in accordance with the provisions of the SGIC SDA Development Scheme, and the proposed SDA application requirements for a Change Application for 'services infrastructure' in accordance with the *State Development and Public Works Organisation Act 1971*.

The subject of this Planning Report is a Change Application specifically focussed on the amendment of construction hours (6:30am to 6:30 pm) in Condition 7.1 of the current SDA approval. The proposed change aims to facilitate 24-hour time-critical trenchless crossing construction works within the Yellow Chat Zone and other wetland areas within the May to September restricted construction period. Seven trenchless construction sites in the SGIC SDA are proposed to be advanced with 24-hour works.

Site specific noise and vibration impact assessments will be prepared to assess 24-hour trenchless crossing construction night time noise potential impacts upon sensitive receptors i.e. nearby residents. Also, an assessment of potential impacts of night-time noise and lighting upon fauna species listed at the trenchless crossings locations has been conducted. Recommendations from these assessments will be implemented as mitigation measures to avoid or minimise the potential noise nuisance to residents and potential impacts upon fauna.

The potential noise nuisance to nearby residents from modifying the construction hours to 24-hour trenchless crossing construction activities is considered to be low risk. The risk will be managed by the implementation of site-specific tiered mitigation measures and additional stakeholder engagement activities.

The potential disturbance of fauna from noise and lighting associated with modifying the trenchless crossing construction hours to 24-hour, combined the with mitigation measures recommended in Section 3.2.2.3, is considered to be low risk.

The conclusion of this assessment is that the proposed 24-hour trenchless crossing construction works remains consistent with the FGP objectives and achieves compliance with the relevant strategic vision, objectives and intents of the SGIC SDA Development Scheme.

It is recommended that the OCG supports this SDA Change Application to facilitate 24-hour trenchless crossing construction, where required to assist construction completion in the SGIC SDA Yellow chat and wetland protection areas in the May to September 2024 period to meet the growing need to provide a reliable supply of water for the current customers and future demand in Gladstone.

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Appendices

Appendix A

Landowners Consent

Landowner	Status	Date Provided
Office of the Coordinator-General	Granted Provided in this Report	22/03/2024
The State of Queensland represented by Department of Resources (State Land and Asset Management)	Expired Application lodged 12/03/24	
The State of Queensland represented by Department of Transport and Main Roads	Granted Provided in this Report	2/11/2022
The State of Queensland represented by Department of Transport and Main Roads (Rail)	Granted Provided in this Report	1/11/2022
Queensland Rail	Expired Application lodged 12/03/24	

Queensland Government

Office of the
Coordinator-General

Our ref: DEPC24/290

Your ref: 12559247

22 March 2024

Ms Amanda Smedley
Senior Environmental Scientist
Team Leader – Environment, Gladstone
GHD Pty Ltd
amanda.smedley@ghd.com

Dear Ms Smedley

Request for landowner's consent for lodgement of an application on 115 lots in the Stanwell - Gladstone Infrastructure Corridor State Development Area

I refer to your correspondence dated 15 March 2024 requesting, on behalf of the proponent Gladstone Area Water Board, landowner's consent for lodgement of a development application with the Office of the Coordinator-General over the lots specified in Table 1 below, which are located within the Stanwell - Gladstone Infrastructure Corridor State Development Area (SDA).

The proposed development application is for the construction and operation of a water pipeline in the Stanwell - Gladstone Infrastructure Corridor SDA.

As delegate of the Coordinator-General, the registered easement holder over the lots specified in Table 1 below, I consent to the lodgement of the abovementioned application by GHD Pty Ltd on behalf of Gladstone Area Water Board.

By consenting to the lodgement of the application, the Coordinator-General does not:

- waive any of the Coordinator-General's rights as owner of the land under any law, or
- give or warrant any representation that the Coordinator-General, State of Queensland, or any other person has granted or will grant the proponent or any other person rights to occupy or use any part of the land in future.

1 William Street
Brisbane Queensland 4000
PO Box 15517
City East Queensland 4002
Telephone 13 QGOV (13 74 68)
Website www.statedevelopment.qld.gov.au
ABN 29 230 178 530

Furthermore, nothing in this letter:

- restricts or fetters the exercise by the Coordinator-General, the State of Queensland, or any other relevant authority of any rights, powers or discretions, or any planning, resumptive or other regulatory power, or
- acts as an estoppel, warranty or representation or creates an agreement of any kind.

This consent is valid for a period of six months from the date of this letter.

If you require any further information, please contact Ms Wendy Paton, Principal Project Officer, Office of the Coordinator-General, on 3452 7549, who will be pleased to assist.

Yours sincerely

Kerry Smeltzer
Assistant Coordinator-General
Project Evaluation and Facilitation
(as delegate of the Coordinator-General)

Table 1

GAWB Property ID #	Lot of Plan	OCG Easement
46A	Lot 71 on CP LIV40477	Easement A on SP226009
47	Lot 143 on CP LN2246	Easement B on SP226009
48	Lot 247 on CP R2621	Easement A on SP226010
49	Lot 248 on CP LIV401036	Easement B on SPSP226010
51	Lot 241 on CP LIV401036	Easement A on SP226011
53	Lot 24 on RP603312	Easement A on SP226013
55	Lot 238 on CP LIV401036	Easement A on SP226086
56	Lot 237 on CP LIV401036	Easement B on SP226086
58	~~Lot 13 on RP617197~~ Lot 1 on SP343809	Easement C on SP226086
59	Lot 11 on RP603184	EMT on RP603184 – easement over the whole of the land
61	~~Lot 10 on RP603184~~ Lot 10 on SP343809	EMT on RP603184 – easement over the whole of the land
62	~~Lot 12 on RP844280~~ Lot 120 on SP319255	Easement A on SP226015
63	~~Lot 13 on RP844280~~ Lot 130 on SP19255	Easement B on SP226015
65	~~Lot 14 on RP844281~~ Lot 140 on SP319254	Easement C on SP226015
66	~~Lot 15 on RP844281~~ Lot 15- on SP319254	Easement D on SP226015
68	Lot 19 on RP844281	Easement A on SP226016
70	Lot 3 on RP605157	Easement A on SP226017
72	Lot 1 on RP603319	Easement B on SP226017
74	Lot 1 on SP266123	Easement B on SP266125
77	Lot 1 on SP266124	Easement B on SP226020
79	Lot 1 on SP263972	Easement A on SP226022
80	Lot 1 on SP263973	Easement B on SP226022
82	Lot 10 CP LN1189	Easement A on SP226087
83	Lot 11 CP LN1189	Easement over the whole of the land
84	Lot 17 on RP603306	Easement C on SP226024
85	Lot 16 on RP603306	Easement B on SP226024
87	Lot 42 on RP603259	Easement A on SP226025
88	Lot 38 on RP603259	Easement B on SP226025
90	Lot 28 on CP PL4017	Easement B on SP226027
91	Lot 31 on CP PL4017	Easement C on SP226027

GAWB Property ID #	Lot of Plan	OCG Easement
92	Lot 32 on CP PL4017	Easement A on SP226029
93	Lot 33 on CP PL4017	Easement B on SP226029
95	Lot 34 on CP PL4017	Easement A on SP226030
96	Lot 35 on CP PL4017	Easement B on SP226030
97	Lot 36 on CP PL4017	Easement A on SP226031
98	Lot 37 on CP PL4017	Easement B on SP226031
100	Lot 45 on CP PL4017	Easement A on SP226032
102	Lot 1 on RP601377	Easement B on SP226032
103	Lot 2 on RP601377	Easement A on SP226033
104	Lot 3 on RP601377	Easement A on SP226034
106	Lot 76 on CP LN184	Easement B on SP226035
107	Lot 77 on CP LN195	Easement A on SP226036
108	Lot 4 on SP103554	Easement A on SP226037
110	Lot 79 on CP LN195	Easement A on SP226038
111	Lot 31 on SP181941	Easement A on SP226039
112	Lot 81 on CP LN183	Easement A on SP226040
114	Lot 82 CP LN183	Easement A on SP226041
116	Lot 83 CP LN183	Easement B on SP226041
118	Lot 160 CP LN271	Easement C on SP226041
120	Lot 129 on CP LN271	Easement A on SP226042
122	Lot 130 on CP LN271	Easement A on SP226043
123	Lot 103 on CP LN182	Easement B SP226043
125	Lot 103 on CP LN182	Easement C on SP226043
126	Lot 2 on RP605082	Easement A on SP226044
127	Lot 3 on RP601896	Easement B on SP226044
128	Lot 2 on RP612565	Easement A on SP226045
130	Lot 5 on RP604251	Easement A on SP226085
131	Lot 3 on RP600950	Easement B on SP226046
132	Lot 4 on RP600951	Easement C on SP226046
134	Lot 3 on CP LIV40208	Easement D on SP226046
135	Lot 4 on CP LIV40208	Easement E on SP226046
136	Lot 76 on CP LIV40208	Easement F on SP226046
137	Lot 3 on RP603158	Easement A on SP226047
138	Lot 1 on RP602706	Easement A on SP226048
140	Lot 3 on RP601795	Easement A on SP226050
144	Lot 142 on CP DS634	Easement A on SP226052

GAWB Property ID #	Lot of Plan	OCG Easement
145	Lot 68 on CP DS141	Easement B on SP226052
146	Lot 69 on CP DS141	Easement A on SP226054
148	Lot 93 on CP DS611	Easement B on SP226054
149	Lot 94 on CP DS186	Easement A on SP226055
150	Lot 95 on CP DS186	Easement A on SP226056
151A	Lot 97 on CP DS186	Easement B on SP226055
152	Lot 98 on CP DS186	Easement A on SP226057
153	Lot 99 on CP DS186	Easement A on SP226058
154	Lot 100 on CP DS185	Easement A on SP226059
155	Lot 101 on CP DS185	Easement A on SP226060
156	Lot 102 on CP DS185	Easement A on SP226061
158	~~Lot 84 on CP DS185~~ Lot 84 on SP316481	Easement A on SP226062
160	~~Lot 85 on CP DS185~~ Lot 84 on SP316481	Easement B on SP226062
162	Lot 29 on CP DS37	Easement C on SP226062
163	Lot 28 on CP DS37	Easement A on SP226063
164	Lot 27 on CP DS28	Easement B on SP226063
165	Lot 26 on CP DS47	Easement A on SP226064
166	Lot 36 on CP DS47	Easement B on SP226064
168	Lot 1543 CP DS588	Easement C on SP226064
169	Lot 7 CP DS53	Easement A on SP226065
171	Lot 2 RP618935	Easement A on SP226066
172	Lot 1 RP618912	Easement B on SP226066
173	Lot 1 RP618935	Easement C on SP226066
174	Lot 2 RP618913	Easement D on SP226066
175	Lot 5 RP618913	Easement E on SP226066
180	Lot 2 RP618918	Easement A on SP226070
181	Lot 36 CP DT40169	Easement B on SP226070
182	Lot 37 CP DT40169	Easement C on SP226070
183	Lot 124 SP257851	Easement A on SP226071
184	Lot 125 SP257851	Easement A on SP226071 (GAWB owned freehold lot)
186	Lot 124 SP257851	Easement B on SP226071
187	Lot 39 CP DS688	Easement E on SP264783
188	Lot 804 CP DT407	Easement B on SP264784
189	Lot 39 CP DS688	Easement F on SP264783

GAWB Property ID #	Lot of Plan	OCG Easement
191	Lot 40 CP DS21	Easement G on SP264783
192	Lot 41 CP DS21	Easement D on SP226072
194	Lot 162 CP DS61	Easement B on SP226074
195	Lot 4 RP614012	Easement C on SP226075
197	Lot 8 CP DS11	Easement D on SP226075
198	Lot 13 CP DS10	Easement B on SP226076
199	Lot 6 RP614228	Easement B on SP226077
201	Lot 3 RP614228	Easement A on SP226078
202	Lot 2 RP614228	Easement A on SP226079
203	Lot 1 RP614228	Easement A on SP226080
205	Lot 1 SP303543	Easement A on SP226081
206	Lot 5 SP218851	Easement B on SP226081
208	20 CP DT40124	Easement A on SP226082
209	Lot 22 RP905534	Easement B on SP226082

Queensland Government

Our ref 500/1219
Your ref
Enquiries Jason Giddy

Department of
Transport and Main Roads

8 November 2022

Amanda Smedley
Level 2 100 Goondoon Street
Gladstone QLD 4680
Via email: Amanda.Smedley@ghd.com

LANDOWNER'S CONSENT – GLADSTONE SDA APPLICATION FOR WATER PIPELINE CROSSINGS UNDER VARIOUS STATE CONTROLLED ROAD

Dear Amanda

Reference is made to your request for landowner's consent in relation to the Fitzroy to Gladstone Pipeline Project dated 12 October 2022. As indicated in your submission at Table 1, the pipeline crosses three separate state-controlled roads, being Capricorn Highway (Rockhampton – Duaringa) Ch. 1.29km, Bruce Highway (Benaraby – Rockhampton) Ch. 16.3km and Bajool Port Alma Road Ch. 6.23km.

It is understood that the consent is required in order to submit an application within a State Development Area (SDA). It is also understood that in order to construct the pipeline crossings under state-controlled roads, approvals from TMR under section 50 of the *Transport Infrastructure Act 1994* are required. This separate application has been received by TMR under Permit to Access the Road Corridor reference 2022-23605.

The department advises that is consents to the making of this SDA application for the road crossings referred to in Table 1 of your submission. Please note that any crossings of railway corridors will need to obtain a separate landowner's consent from the TMR Rail Corridor Management team via rcm@tmr.qld.gov.au.

Should you wish to discuss the matter further, please contact Jason Giddy (Senior Town Planner) on 49311686 or at Jason.B.Giddy@tmr.qld.gov.au.

Yours sincerely

Faruk Hossain
Manager (Project Planning & Corridor Management)

Telephone **+61 7 49311686**
Website www.tmr.qld.gov.au
Email **Jason.B.Giddy@tmr.qld.gov.au**
ABN 39 407 690 291

Queensland Government

Our ref 485/00391, e62700
Your ref
Enquiries Patrick Leys

Department of
Transport and Main Roads

1 NOV 2022

Ms Amanda Smedley
Senior Environmental Scientist
GHD
100 Goodoon Street
Gladstone Qld 4680

Dear Ms Smedley

REQUEST TO OBTAIN OWNER'S CONSENT – DETERMINATION NOTICE

This notice is in response to your request of 12 October 2022 to obtain owner's consent from the Department of Transport and Main Roads (TMR) to lodge a development application completely or partially over land held or administered by the department.

Pursuant to section 9.2, item (2)(d)(ii) of the *Stanwell-Gladstone Infrastructure Corridor State Development Area Development Scheme,* the consent of the owner of land that is the subject of a development application is required in order for the development application to be considered as "properly made". For the purposes of the SGIC SDA Development Scheme, the Chief Executive of the Department of Transport and Main Roads is taken to be the owner of the land. The department has considered your request and **provides owner's consent** for the making of the following application:

Material change of use for infrastructure services, which involves the following rail and non-rail corridor land;

- Lot 1 on SP234061; and
- Lot 2 on RP601795.

This consent only applies to the applications lodged by GHD Pty Ltd on behalf of the Gladstone Area Water Board.

TMR's owner's consent is only provided for the purposes of making the application and does not:

- constitute TMR's approval of, or support for, the development application for the purpose of the Development Assessment System (DAS);
- provide permission to undertake works on land held or administered by the department associated with a development approval without the permission of TMR;

Strategic Property Management
Rail Corridor Management
Level 17, 61 Mary Street
Brisbane Qld 4000
GPO Box 1412 Brisbane Qld 4001

Telephone +61 7 3066 7430
Website www.tmr.qld.gov.au
Email RCM@tmr.qld.gov.au
ABN 39 407 690 291

- remove the requirement to obtain any other approvals from TMR or another government department;
- constitute owner's consent for any other development application over land owned or administered by the department; or
- constitute approval for any person to enter a rail corridor.

TMR regulates structures, works and activities that occur within land administered or owned by the department. It may be necessary to obtain TMR or Railway Manager approval prior to accessing or undertaking works within an existing or future transport corridor.

If you have any queries or wish to seek clarification about any of the details in this response, please contact Patrick Leys on 3066 7430.

Yours sincerely

Craig England
Manager, Rail Corridor Management
Authorised Delegate of the Chief Executive

Appendix B

Construction Noise & Vibration Assessment

PROTEST ENGINEERING

Construction Noise & Vibration Assessment

Gladstone to Fitzroy Pipeline

March 2024 | Version 05 Draft

Fitzroy to Gladstone Pipeline, Construction Noise & Vibration Assessment

www.protestengineering.com

TABLE OF CONTENTS

REPORT DETAILS

Unique Document Identification	
Document Title	Gladstone to Fitzroy Pipeline Construction Noise & Vibration Assessment
Project Number	A011 / PTP J13572
Document ID	pr_A011_J13572_05JM_Template
Client	McConnell Dowell BMD Joint Venture (MBJV)
Client Contact	Cathee Miller

Protest Office Details	
Location	Brisbane
Address	Level 3, 159 Coronation Drive, Milton, QLD 4064
Telephone	07 5568 1800
Email	acoustics@protestengineering.com
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Revision No.	Date	Comments
Draft 01	9 February 2024	Draft for Internal Review
Draft 02	20 February 2024	Draft for Internal Review
Draft 03	22 February 2024	Draft for OCG Review
Draft 04	28 February 2024	Draft for Internal Review
Draft 05	5 March 2024	Draft for OCG / DESI Review

Document Approval

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Reviewed By

Liam McDonagh
Senior Acoustic Engineer

Julie McDonagh MIEAust CPEng RPEQ RPEV NER
Associate Director - Acoustics

EXECUTIVE SUMMARY

This construction noise and vibration assessment was conducted on behalf of the McConnell Dowell BMD Joint Venture (MBJV) and the Gladstone Area Water Board (GAWB) to support an application for extended work hours to those currently approved by the Coordinator General for the Fitzroy to Gladstone Pipeline. This report discusses and adopts appropriate noise and vibration management levels for construction works during non-standard hours and documents reasonable and practical noise and vibration mitigation measures where required.

This report has been prepared to provide a noise and vibration assessment and mitigation plan for time-critical works (in particular trenchless crossings), for the purposes of amending a material change of use (MCU) approval to allow for such works to occur outside of standard working hours, for construction of the Fitzroy to Gladstone Pipeline (FGP).

Noise

Whilst this report provides the overarching information, justification for the adopted assessment noise management levels (NMLs), and details of a proposed noise trigger level mitigation framework to ensure a consistent approach to mitigation of noise throughout the project, separate site specific technical reports will be prepared for each site and submitted separately as required. An example site specific technical report has been appended to this report for information.

In each site specific report, construction noise impacts will be assessed for the associated works activities and compared to the adopted NMLs, and mitigation trigger levels detailed in this report. A review of available statutory criteria and recommended NMLs for the project has been included in Appendix A and Section 3 respectively, and details of the proposed noise mitigation framework have been included in Section 6.

Predicted noise levels will be presented in each site specific report. In addition, noise contour maps will be included indicating how the noise is predicted to affect the site and surrounding areas. Where exceedances of the adopted project NMLs have been identified, mitigation measures will be presented, along with a noise trigger level framework to ensure that a consistent approach to mitigation is applied throughout the project. Noise contour maps with mitigation and showing the effectiveness of the mitigation will also be included in the site specific report.

Vibration

Given the separation distance between the proposed works and nearest sensitive receivers, the risk of adverse vibration impacts from the works on either human comfort or building damage is considered to be very low. For each site a risk assessment will be carried out to determine whether detailed vibration prediction will be required.

Vibration limits and supporting information have been included in this report for information, should the expected risk increase, and vibration will be addressed where required on a case by case basis in the site specific reports. General vibration mitigation measures have been included in this report to be considered for receivers where predicted vibration levels exceed the relevant limits. Refer to Section 6 for details.

GLOSSARY OF TERMS

Technical Term	Description
Adverse Weather	Weather effects that enhance noise (that is, wind and rain that occur at a site for a significant period of time (that is, wind exceeding 5 m/s and rain exceeding 0.5 mm per hour during any measurement period). Refer to the QLD Noise Measurement Manual 2020.
A-weighted Level	As per dB(A) defined below.
Ambient Sound	Of an environment: the all-encompassing sound associated with that environment, being a composite of sounds from many sources, near and far.
ABL	Adjusted Background Noise Level is the 10th percentile of the L_{90} background noise level calculated for the relevant time period (day, evening or night).
Background Sound Level	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted external ambient noise sources.
EPB TBM	Earth Pressure Balance Tunnel Boring Machine
CNVMP	Construction Noise & Vibration Management Plan
dB(A)	Unit of acoustic measurement electronically weighted to approximate the sensitivity of human hearing to sound frequency.
Decibel, dB	Unit of acoustic measurement. Measurements of power, pressure and intensity may be expressed in dB relative to standard reference levels.
FGP	Fitzroy to Gladstone Pipeline
FGPNVA	Fitzroy to Gladstone Pipeline, Construction Noise & Vibration Assessment, Protest Engineering, February 2024
GAWB	Gladstone Area Water Board
GSDA	Gladstone State Development Area
L90, L10 etc.	A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, i.e., L90 is the level which is exceeded for 90 percent of an observation period. L90 is commonly referred to as a basis for measuring the background sound level.
LAbg, T	The A-weighted background sound level measured over a time interval T.
LAMax	The A-weighted maximum noise level measured during the measurement period.
LAeq, T	Equivalent continuous A-weighted sound pressure level. This is the value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.
MCU	Material Change of Use
MBJV	McConnell Dowell BMD Joint Venture
NMG	Transport for NSW Noise Mitigation Guideline
NML	Noise Management Level

Technical Term	Description
PPV	Peak particle velocity, a measure of vibration in mm/s
RBL	Rating Background Noise Level which applies to each of the day evening and night-time periods and is the median of the ABLs over a 7 day period.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
SGIC SDA	Stanwell to Gladstone Infrastructure Corridor State Development Area
Sound Pressure Level, Lp, dB, of a sound	A measurement obtained directly obtained using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure of 20 microPascals.
Sound Power Level, Lw, dB of a source	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power level is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt.
TfNSW CNVG	Transport for NSW Construction Noise & Vibration Guideline
TMR	Queensland Department of Transport and Main Roads
TNM CoP Vol. 2	Transport Noise Management Code of Practice Volume 2, Construction Noise & Vibration (TMR 2016)

1 INTRODUCTION

This construction noise and vibration assessment report has been conducted on behalf of MBJV in relation to the proposed Fitzroy to Gladstone Pipeline (FGP) time critical works, particularly trenchless crossings.

The FGP project is to provide a 117-kilometre pipeline connecting the Lower Fitzroy River into the Gladstone Area Water Board's existing network at Yarwun, including provision of a water treatment plant, reservoirs, and pumping stations at locations along its alignment at Laurel Bank, Alton Downs and Aldoga.

The project is currently under construction within the Stanwell to Gladstone Infrastructure Corridor State Development Area (SGIC SDA), with working times permitted under Coordinator-General conditions as follows:

> *SGIC Conditions of Approval, Construction Hours, Condition 7.1*
>
> *Construction works will be limited to between 6:30am to 6:30pm Monday to Saturday. Construction works will be permitted on Sunday between 6:30am to 6:30pm where consultation has occurred and written agreement by the sensitive receptor received where construction impacts on a sensitive receptor/s' property. A copy of the written agreements with sensitive receptor/s must be submitted to the Coordinator-General two days prior to construction occurring on a Sunday that impacts a sensitive receptor/s' property that adjoins the right of way.*

Works will soon commence on the Gladstone State Development Area (GSDA) pipeline, with approval of this MCU expected in the coming days. It is understood the MCU imposes similar working times restrictions, also requiring an amendment for out of standard hours work.

MBJV are seeking to secure an amendment to Condition 7.1 of the SGIC SDA MCU to enable 24-hour operation of time-critical works within the SGIC SDA, subject to compliance with appropriate environmental noise and vibration criteria. Therefore, noise and vibration services during construction are required to assess and enable extended work hours for critical activities such as trenchless crossings on the project.

This report provides the overarching information, justification for the adopted assessment NMLs, and details of a proposed noise trigger level mitigation framework to ensure a consistent approach to mitigation of noise throughout the project, to support the application. Separate site specific technical reports will also be prepared for each site to be read in conjunction with this report and submitted separately as required. An example site specific technical report is included in Appendix B.

A discussion of available statutory criteria and recommended NMLs for the project has been included in Appendix A and Section 3, and general details of the proposed noise mitigation framework have been included in Section 6.

In each site specific report, construction noise impacts will be assessed for the specific work activities and compared to the adopted NMLs, and mitigation trigger levels adopted for that site.

Predicted noise levels will be presented in each site specific report. In addition, noise contour maps will be included indicating how the noise is predicted to affect the site and surrounding areas. Where exceedances of the adopted project NMLs have been identified, mitigation measures will be presented, along with a noise trigger level framework to ensure that a consistent approach to mitigation is applied throughout the project. Noise contour maps with mitigation and showing the effectiveness of the mitigation will also be included in the site specific report.

Given the separation distance between the proposed works and nearest sensitive receivers, the risk of adverse vibration impacts from the works on either human comfort or building damage is considered to be very low.

However, vibration limits and supporting information have been included in this report for information, should the expected risk increase, and vibration will be addressed where required on a case by case basis in the site specific reports, as required. General vibration mitigation measures have been included in this report to be considered for receivers where predicted vibration levels exceed the relevant limits. Refer to Section 6 for details.

1.1 Assessment Objectives

MBJV and GAWB have a general environmental duty defined in the Environmental Protection Act 1994 with respect to environmental harm and nuisance. In order to minimise environmental harm and nuisance in

accordance with the Act, in the absence of QLD Department of Environment and Science (DES) statutory quantitative construction noise and vibration criteria, the objectives of this assessment report are:

- To determine suitable assessment noise and vibration management levels in line with the intent of the EPP (Noise) 2019 and EPA Act 1994.
- To determine the predicted levels of construction noise and vibration impact on sensitive receivers located near to the project, for each general construction scenario.
- To review potential impacts associated with construction noise and vibration and based on the information available,
- Recommend all reasonable and practical measures, to minimise any environmental harm (or nuisance)
- Document the results of the above objectives to support an application for extended work hours for the construction of the trenchless crossings or other relevant works associated with this project.

1.2 Project Description

The FGP project is to provide a 117-kilometre pipeline connecting the Lower Fitzroy River into the Gladstone Area Water Board's existing network at Yarwun, including provision of a water treatment plant, reservoirs, and pumping stations at locations along its alignment at Laurel Bank, Alton Downs and Aldoga.

A plan of the project is presented in Figure 1-1.

Figure 1-1: Proposed Pipeline Alignment

2 EXISTING NOISE ENVIRONMENT

2.1 Baseline Noise Monitoring

Supplementary baseline noise monitoring has not been carried out for this assessment for the following reasons:

- A monitoring program was carried out for the EIS in 2008. Whilst a significant time has elapsed since monitoring was carried out, due to the rural nature of are surrounding the project, the background noise levels are not likely to have changed significantly and are unlikely to be quieter than in 2008.
- Provision of baseline monitoring at this time of year may not be representative of that during May to September when construction is proposed due to increased insect activity.
- There is a high risk of delay with any monitoring program due to the current weather patterns and resulting weather conditions expected in the area at this time of year.

For the above reasons, a desktop study has been carried out based on the EIS baseline noise data supplemented with typical background noise level data from available literature for rural areas.

On this basis this assessment should be considered as conservative.

2.1 Measurement Parameters

As noise varies with time, the use of statistical descriptors is necessary to understand and describe these variations. For environmental noise, the assessment period for daytime is split into daytime (7am – 6pm), evening (6pm – 10pm) and night-time (10pm – 7am). The common descriptors used to describe road traffic noise are described as follows:

L_{Amax}: the A-weighted maximum noise level measured during the measurement period.

L_{A1}: the A-weighted noise level exceeded for 1% of the measurement period.

L_{A10}: the noise A-weighted level exceeded for 10% of the measurement period, generally referred to as the average of the maximums.

L_{A90}: the A-weighted noise level exceeded for 90% of the measurement period, generally referred to as the average minimum sound pressure level or background noise level (refer *AS 1055:2018 Acoustics – Description and Measurement of Environmental Noise*.

L_{Aeq}: the equivalent continuous noise level over the measurement period, generally referred to as the energy averaged sound pressure level over the measurement period.

ABL: the Adjusted Background Noise Level is the 10th percentile of the L90 background noise level calculated for the relevant time period (day, evening or night).

RBL: the Rating Background Noise Level which applies to each of the day evening and night-time periods and is the median of the ABLs over a 7 day period.

2.2 EIS Background Noise Monitoring

2.2.1 Existing Noise Environment

Based on a review of the EIS, the existing noise environment in August 2008 comprised of the following:

- Generally quiet rural areas
- Distant traffic noise at some locations
- Farm activity / livestock noise
- Noise of vegetation rustling in the breeze.
- Wildlife noise
- Some industrial noise in more built up areas.

2.2.2 Noise Monitoring Locations

Unattended noise monitoring was carried out at the following locations:

Table 2-1: Description of Unattended Noise Monitoring Locations (referenced from EIS Table 12.8)

Location Number	Location	Description of Noise Environment
U1	45 Ski Gardens Laurel Bank	This residence is located near the Sunwater operated water intake site, which only operates during night-time hours. This location is on the flight path of aeroplanes entering/exiting Rockhampton airport – planes fly over approximately every 15 minutes during the day.
U2	Nelson Street, Fairy Bower	The pipeline route runs through part of this property. The main noise sources audible at this site was a low drone from the highway, some livestock noise, and noise of vegetation rustling in the breeze.
U3	Corner of Norton Street and Langmorn Street, Raglan	This location is close to the formerly planned booster station for the project. The main noise audible at this location was road noise, however there was some noise from birdlife and grasses and trees in the breeze. A local resident indicated that train passes were a main source of noise. Trains run day and night.
U4	Lot 1 RP861430 Aldoga	The main source of noise at this residence was mainly highway noise, however there was also birdlife and leaves rustling audible.

Attended noise monitoring was carried out at the following locations:

Table 2-2: Summary of Attended Noise Monitoring Locations (referenced from EIS Table 12.9)

Location Number	Location	Description of Noise Environment
A1	Laurel Bank	Attended noise measurements were conducted at the Rockhampton Waterskiing and Powerboat Club located at the end of Ski Gardens Road, on the banks of the Fitzroy River. This location is on the flight path of aircraft entering/exiting Rockhampton airport – planes fly over approximately every 15 minutes during the day.
A2	Gracemere	Attended noise measurements were conducted on the shoulder of the Bruce Highway, approximately 1 km south of the roundabout at the entrance to Rockhampton. The main noise source was road traffic, approximately 10% heavy vehicles. Trains passed approximately once every 20 minutes.
A3	Archer	Attended noise measurements were conducted on the shoulder of the Bruce Highway near Station Creek, 1.5 km south of Archer Station. The main noise source was road traffic, approximately 10% heavy vehicles.
A4	Mt Larcom	Attended noise measurements were conducted on the corner of the Bruce Highway and Mt Larcom Gladstone Road, approximately 50 m east of the intersection. The main source of noise was traffic noise, with approximately 20% heavy vehicles.
A5	Lot 1 RP861430 Aldoga	The main source of noise at this residence was mainly highway noise, however there was also birdlife and leaves rustling audible. An attended measurement was also conducted at this site.
A6	Yarwun	Attended noise measurements were conducted on the corner of Mt Larcom Gladstone Road, approximately 10 m from roadside. Road noise was the dominating source, with approximately 30% heavy vehicles.

A summary of the results from unattended and attended monitoring for each of these periods is provided in Table 2-3 and Table 2-4 respectively.

2.2.3 Summary of Background Noise Monitoring Results

The measured noise levels are presented in Table 2-3 and Table 2-4 below:

Table 2-3: Measured Noise Levels – Unattended Monitoring Locations

Location Number	Location	Parameter	Average Measured Noise Levels Between 21 and 24 August 2008	
			6pm to 10pm	10pm to 7am
U1	Laurel Bank	L_{Aeq}	47	51
		L_{A90}	34	37
U2	Fairy Bower	L_{Aeq}	58	44
		L_{A90}	47	38
U3	Raglan	L_{Aeq}	54	56
		L_{A90}	40	38
U4	Aldoga	L_{Aeq}	43	39
		L_{A90}	36	35

Table 2-4: Relevant Measured Noise Levels – Attended Monitoring Locations

Location Number	Location	Parameter	Average Measured Noise Levels Between 21 and 24 August 2008	
			6pm to 10pm	10pm to 7am
A1	Laurel Bank	L_{A10}	-	36
		L_{Aeq}	-	38
		L_{A90}	-	31

2.3 Additional Background Noise Level Information

Estimated background noise levels are provided in Australian Standard *AS 1055:1997: Acoustics – Description and Measurement of Environmental Noise*. This standard has now been superseded by AS1055.3:2018, which doesn't include recommended background noise levels. However, Appendix A of the 1997 version of the standard provides useful information with respect to expected background noise levels based on surrounding land uses. Table 2-5 summaries this information below.

Table 2-5: Estimated Average Background A-Weighted Sound Pressure Levels ($L_{A90,T}$) for Different Areas Containing Residences in Australia

Noise Area Category (Notes 1 & 2)	Description of Neighbourhood	Average background A-Weighted sound pressure Level ($L_{A90,T}$					
		Monday to Saturday			Sundays & Public Holidays		
		0700-1800	1800-2200	2200-0700	0900-1800	1800-2200	2200-0900
R1	Areas with Negligible Transportation	40	35	30	40	35	30
R2	Areas with Low Density Transportation	45	40	35	45	40	35
R3	Areas with Medium Density	50	45	40	50	45	40

Noise Area Category (Notes 1 & 2)	Description of Neighbourhood	Average background A-Weighted sound pressure Level ($L_{A90,T}$					
		Monday to Saturday			Sundays & Public Holidays		
		0700-1800	1800-2200	2200-0700	0900-1800	1800-2200	2200-0900
	Transportation or Some Industry						
R4	Areas with Dense Transportation or With Some Commerce or Industry	55	50	45	55	50	45

Notes:

1. The division into noise area categories is necessary in order to accommodate existing sound levels encountered at residential sites in predominantly commercial or industrial districts, or in areas located close to mainland transport routes, i.e. road and rail.
2. The most appropriate noise area category should be selected irrespective of metropolitan or rural zoning and will vary from location to location.

3 SUMMARY OF RECOMMENDED PROJECT NOISE & VIBRATION MANAGEMENT LEVELS

3.1 Airborne Construction Noise

Initially, adoption of the Acoustic Quality Objectives (AQOs), referenced from the EPP (Noise) 2019, was considered for use as project noise management levels (NMLs) for this project. However, after consideration, these were not adopted for the following reasons:

- The EPA Act 1994 or the EPP (Noise) 2019 do not refer to use of the AQOs for assessment of construction noise in any section.
- The AQOs are generally applied to permanent continuous or operational noise sources and construction noise is temporary and generally transient.
- The level of impact is likely to be variable on this project as the background noise levels will vary considerably when the receivers are located closer to roads and in particular the Bruce Highway. This is supported by a review of the background noise monitoring carried out for the project EIS. Therefore, adoption of a "background +" criteria was considered to provide a more realistic / appropriate assessment basis.
- External AQOs are not provided for night-time in the EPP (Noise) 2019, and it would be impractical to adopt internal noise limits as measurement to determine compliance would be very difficult, if impossible.
- Another Queensland guideline for assessment of construction noise impacts from major projects exists in QLD, namely the "Qld Department of Transport & Main Road Transport Noise Management Code of Practice, Volume 2 – Construction Noise & Vibration", which includes specific criteria for assessment and management of construction noise.

Therefore, a review of the available statutory construction criteria in QLD, NSW and Victoria was carried out to determine suitable noise management levels (NMLs) for this project. The reviewed policies and guidelines are detailed in Appendix A. The review indicated that most of the other statutory documents for airborne construction noise have similar requirements as follows.

Table 3-1: External Construction NMLs, Non Standard Hours – Residential Receivers

Time of Day	External Noise Level, $L_{Aeq\ (15\ min)}$, dB(A)
Non-Standard hours Evening (6.30pm to 10pm)	Background L_{A90}+5 dB(A)
Non-Standard hours Night (10pm to 6.30am)	Background L_{A90}+5 dB(A)

Note: + 5dB(A) has been adopted based on the requirements of the TMR CoP. Refer to Section A1.1.3 for more detail regarding the TMR requirements.

It should be noted that the Rating Background Noise Level (RBL – refer to Section 2.1 for a definition of this parameter)) is used instead of L_{A90} in some of the reviewed documents. However, as RBLs are not available for this project, as 7 days of background noise data was not recorded at all sites, the $L_{A90,T}$ has been adopted. The likelihood is that the difference between the $L_{A90,T}$ for the evening and night time periods will not vary significantly from the RBL due to the quiet rural nature of the area. For this reason, adoption of the average $L_{A90,T}$ from the measured EIS background data was considered to be acceptable, along with adoption of the estimated background noise data from AS 1055 to supplement any missing EIS data.

NMLs for each specific site will be calculated based on the monitoring data included in Section 2, where available and the NML definition for each time period detailed above in Table 3-1. On this basis, a summary of the proposed NMLs is detailed below in Table 3-2.

Table 3-2: Project Specific External Construction NMLs, Non Standard Hours – Residential Receivers

Works Location	Background Noise Level Source	External NML	
		Evening	Night
1	EIS Location U2	52	43
2	EIS Location U3	45	43
3	AS 1055 for Land Use Category R1 to R3	40-50	35-45
4	EIS-Location U4	48	44

Notes:

Work Location 1 = e.g. Watercourse CH17200

Work Location 2 = e.g. Horrigan and Raglan Creek

Work Location 3 = e.g. Inkerman, 12 Mile, Marble and Larcom Creeks and Bajool Port Alma Road

Work Location 4 – e.g. Aldoga

R1 = adopted for residences located away >100 metres from local roads

R2 = adopted for residents within 100 metres of local roads

R3 = adopted for residents within 100 metres of the highway, rail corridor or 24 hour industry

The 100 metre cut off distance above has been developed using CoRTN for the Bruce Highway (AADT 6007, 20% HV), and making adjustments to the calculated LA10,18hr to obtain a typical LA90 (by comparison to the EIS data) for areas within 100 metres of the highway. Based on the EIS data, these assumptions appear to be reasonable.

The specific NMLs and background noise data adopted to calculate these will be included in each site specific report. Refer to Appendix B for an example of this.

3.1.1 Airborne Construction Noise Impacts on Fauna

Not a lot is known about potential noise impacts to fauna. However, it is thought that noise is most likely to impact nocturnal species as this is when they are most active. The Yellow chat is not nocturnal, and therefore, impacts are thought to be minimal.

The Yellow chat action plan (*https://www.qld.gov.au/__data/assets/pdf_file/0036/447948/capricorn-yellow-chat-recovery-action-plan-2023.pdf*) states that the species predominately breeds in spring and summer, so the May to September construction window for this project already minimises impacts on breeding.

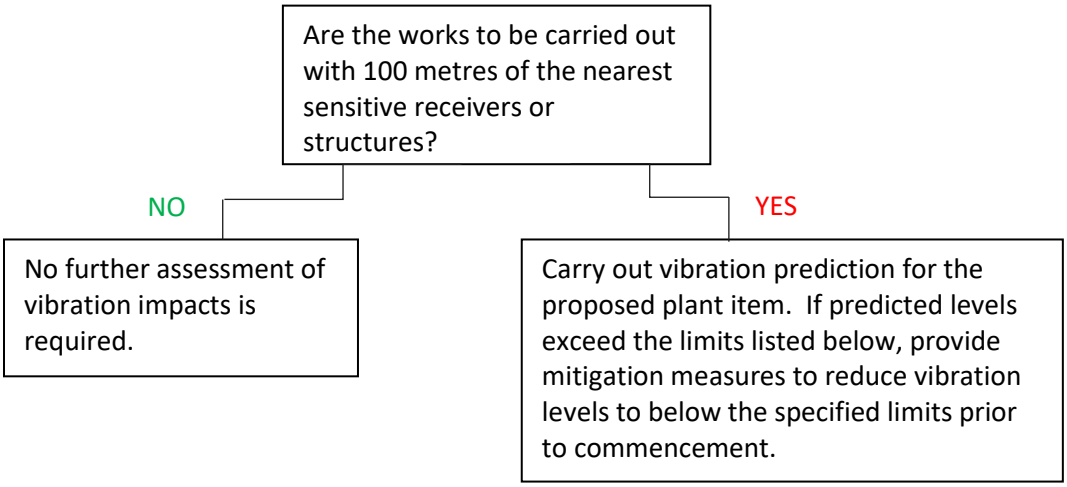
There are no statutory noise criteria available for assessment of construction noise impacts on birds, however (based on a paper prepared by prepared by Bottalico, Spoglianti et al, presented at Internoise 2015), noise impacts from the work sites are generally expected to be within the lower half of the zone of masking if the proposed NMLs for impacts on humans are adopted (refer to Appendix A, Section A1.2 for more information).

Further, mitigation and management actions outlined in the ecological assessment, the SGIC MCU application and the CEMP will minimise potential impacts on the Yellow chat. In addition, 24hr construction will enable works to be completed sooner, avoiding the need to return to these areas a year later.

3.2 Construction Vibration

3.2.1 Vibration Impacts - Risk Assessment

The following risk assessment procedure is proposed:



3.2.2 Criteria for Detailed Vibration Assessment

Based on a review of the available statutory criteria described in Appendix B the following vibration limits have been adopted for vibration impacts associated with plant operations at the proposed site:

Table 3-3: Vibration Limit Criteria (Peak Particle Velocity (PPV), mm/s) – Human Comfort

Time of Day	Work Period	Resultant PPV, mm/s	
		Lower Limit	Upper Limit
Dwellings (including hotels & motels)	Standard Hours	1.0	2.0
	Non - Standard Hours - evening	0.3	1.0
	Non - Standard Hours – night-time		

Note: The above criteria do not apply to blasting.

Table 3-4: Vibration Limit Criteria (mm/s) – Building / Structural Damage

Type of Structure		Vibration Level PPV Limit At the foundation of the building (mm/s)
1	Structures that, because of their particular sensitivity to vibration, cannot be classified under line 2 below (e.g., heritage buildings,)	2.5
2	Houses and low rise residential buildings, unreinforced commercial buildings and those not included in Item 4.	[(1)]7.5
3	Non-Reinforced Culverts and tunnels	5
4	Commercial and industrial buildings or structures of reinforced concrete or steel construction including bridges.	10
5	Reinforced Culverts and tunnels	10
6	Bridges	25
7	Underground Assets	As per Asset Owners Specification
8	Underground Assets where limit not provided by asset owner	10

Notes:

1. *Section 7.4.3 of BS 7385.2 states that: The guide values in Table 1 [of the standard] relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table 1 may need to be reduced by up to 50 %. Therefore, conservative limits have been adopted initially, (50% of the recommended limit of 15 mm/s) based on the above notes, to be confirmed with trial vibration measurements prior to commencement of construction.*

4 CONSTRUCTION NOISE ASSESSMENT & MODELLING

4.1 Construction Noise Assessment Methodology

An assessment on the potential construction noise impacts for evening and night works will be carried out for each site to determine the expected impacts of each proposed construction stage, whether noise mitigation measures are likely to be required, and to determine a framework for appropriate management controls. The results will be included in a site specific assessment for each site. An example of the site specific report is included in Appendix B.

Construction staging, provided by the construction team including the type and number of plant proposed for construction for each stage and area location will be reviewed. Plant and equipment noise data will be sourced from previously measured site data as well as Australian Standard AS 2436:2010 – Guide to Noise Control on Construction, Maintenance and Demolition Sites.

4.1.1 Noise Propagation Modelling

A 3D noise model of the worksite and surrounds will be constructed for each site using acoustic prediction software SoundPLAN Version 9.0. SoundPLAN is used internationally and recognised by regulators and authorities throughout Australia.

The noise model takes the following information into account:

- Digital terrain contours of existing topography, and future road alignment,
- Construction noise source level and location,
- Receiver locations,
- Screening effects due to topography,
- Attenuation due to ground absorption

4.2 Noise Modelling Inputs and Assumptions

4.2.1 General Modelling Input Data

The following modelling inputs and assumptions will be adopted for the site specific noise modelling:

Table 4-1: Modelling Assumptions

Modelling Element	Input/Assumption/Source Reference
Ground Elevation Geometry	Provided by QSpatial
Construction Location	Provided by MBJV
Ground Absorption	75% over soft ground
Assessment Standard	ISO 9613-2:1996 – Acoustics – Attenuation of Sound During Propagation Outdoors (Part 2: General Method of Calculation)
Weather conditions	Receiver is downwind of the source, as per the assumptions of ISO 9613.
Receiver Height	Assumed to be 1.8 m above ground for prediction models for ground floor. Subsequent floor level receiver heights have been modelled at + 2.8 m above the floor below.

4.2.2 Construction Timing

Modelling will be carried out for the evening and night time periods.

4.2.3 Site Specific Modelling Inputs

The modelled construction scenarios and plant and equipment will be detailed in each site specific report (refer to Appendix B for an example of the site specific report).

4.3 Predicted Construction Noise Levels

The predicted construction noise levels will be detailed in each site specific assessment report.

5 CONSTRUCTION VIBRATION ASSESSMENT

5.1 Vibration Risk Assessment Methodology

Initially for each site, the separation distance between the worksite and the closest sensitive receiver will be reviewed and compared to the Transport for NSW Construction Noise & Vibration Guideline (CNVG) minimum separation distances as detailed below in Table 5-1 for the range of plant to be used for the works.

5.1.1 TfNSW CNVG Safe Working Distances

The CNVG provides recommended minimum separation distances between vibration intensive plant and sensitive receivers for minimising the risk of cosmetic damage. The CNVG further states that the minimum working distance for cosmetic damage must be complied with at all times, unless otherwise approved by Transport for NSW or under the environmental licence as relevant.

Table 5-1: Recommended Minimum Working Distances for Vibration Intensive Plant from Sensitive Receivers

Plant Item	Rating / Description	Minimum Working Distance		
		Cosmetic Damage (BS 7385)	Cosmetic damage (DIN 4150) Heritage and other sensitive structures	Human Response (NSW OH&E Vibration Guideline)
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	14 m	15 -20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	16 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	33 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	41 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	54 m	100 m
	> 300 kN (> 18 tonnes)	25 m	68 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	19 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	60 m	73 m
Vibratory Pile Driver	Sheet Piles	2 m to 20 m	50 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	40 m	4 m
Jackhammer	Handheld	1 m (nominal)	2 m	2 m

If the site separation distances approach the minimum separation distances listed above, further detailed vibration assessment will be carried out to determine predicted vibration levels and associated mitigation measures where required. If separation distances are greater than those listed above, the works will be considered low to nil risk for vibration impacts and no further assessment of vibration will be carried out.

6 RECOMMENDED MITIGATION MEASURES

6.1 General Mitigation Measures

The project will implement general mitigation measures involving plant, management and monitoring controls in accordance with the Noise and Vibration Control Plan in the approved Construction Environmental Management Plan (GAWB, July 2023).

A site-specific assessment will be conducted for out of hours work likely to generate noise and / or vibration impacts (refer to Appendix B).

General management strategies based on a tiered approach will be applied dependent on the assessment outcomes, to further minimise impacts on sensitive receptors (refer to Section 6.2 and Appendix B).

This approach is aligned with Australian Standard AS 2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites, the TMR TNM CoP Vol. 2 (2023) and industry best practice measures.

The work practices / management tier will be modified where an unacceptable impact is identified.

6.2 Site Specific Mitigation Measures

The feasibility and effectiveness of a range of site specific mitigation measures will be investigated for each site and detailed in the site specific reports.

Refer to Appendix B for an example of site specific mitigation measures.

Where noise levels are predicted to exceed the NMLs detailed in the site specific noise and vibration assessments, additional mitigation measures will be applied in accordance with a tiered mitigation framework as detailed in Section 6.2.1 and each site specific report. Refer to Appendix B for an example of the site specific report.

6.2.1 Additional Tiered Noise Mitigation Measures

This section provides the proposed tiered mitigation measures that will be implemented for each of the site specific trigger levels identified in the site specific reports where the NMLs (Refer Appendix B for an example of a site specific report) are expected to be exceeded.

The proposed tiered mitigation measures that will be implemented for the determined trigger levels are provided below.

The NMLs associated with each tier may change for each worksite, as they are specific to the measured background noise level data for that area, but the group of mitigation measures to be triggered for each tier, will not change to ensure a consistent approach throughout the project is maintained.

Note that the effectiveness and practicality of implementing each of the below tiered mitigation measures within the adopted tier(s), will be assessed individually on a case by case basis for each noise modelling package, based on circumstances specific to the receptor.

Based on this, mitigation works developed in consultation with potentially affected residents may differ from the below tiered mitigation measures, depending on each case.

Where noise levels are predicted to exceed the NMLs detailed in Section B1.5, the following additional mitigation measures are recommended to manage the expected impacts:

6.2.1.1 Proposed Tiers of Mitigation

6.2.1.1.1 Mitigation Tier A

- Avoid using plant and equipment simultaneously adjacent to sensitive receptors where reasonably practical. The combined noise/vibration levels could be noticeably less when sources operate separately.

- Set site entry and egress points as far from sensitive receptors as practically possible.
- Time equipment use to minimise noise impacts.
- Utilise main roads for site vehicle access wherever possible.
- Adoption of non-tonal and ambient sensitive reversing alarms including, non-tonal reversing beepers (or an equivalent mechanism) fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. All vehicle horns and reversing alarms to be operated at minimum volume as far as is practicable.
- Place stockpiles between construction noise sources and receivers where possible to creating natural shielding.
- Locate static sources of noise such as the generators as remotely as possible from noise sensitive receivers.
- Consider the use of ambient sensitive reversing alarms that adjust output relative to the ambient noise level.
- Minimise the use of exhaust braking on and around the worksite, particularly at night.
- Model verification monitoring - attended spot checks.
- Letter drops and or door knocks, where appropriate, to notify receivers of potentially noisy upcoming works, and to discuss, proposed mitigation, where applicable, in accordance with MBJV landholder / stakeholder consultation and complaints processes and based on the trigger levels determined in each site specific noise assessment (refer to Appendix B for an example).
- Investigate whether "at plant" mitigation or muffled plant is available for plant with high source noise levels and plant emitting continuous noise such as generators.

6.2.1.1.2 Mitigation Tier B

- After Implementation of A, if complaints occur, and noise levels are measured to be higher than the NML, consideration will be given to scheduling works during time periods of low impact, including halting night time work, in consultation with the affected receivers,
- Use of localised movable temporary noise barriers around specific items of plant, particularly stationary noisy plant. Noise screening (blankets, acoustic barriers) controls will be implemented based on noise modelling in combination with verification site monitoring, site discussions and community consultation to indicate controls required to manage noise to the required level. The need for this control will be assessed on a site by site basis.
- Model verification monitoring - attended spot checks to confirm effectiveness of barriers and other mitigation measures.

6.2.1.1.3 Mitigation Tier C

- Respite periods (generally 1 continuous hour in every 4 hours of construction) from the operation of particularly noisy items of plant, or;
- Reducing work to two shifts (day and evening)
- After implementation of A & B if complaints occur, and noise levels are measured to be higher than the NML, consideration will be given to scheduling works during time periods of low impact, in consultation with the affected receivers.
- Model verification monitoring - attended spot checks to confirm effectiveness of barriers and other mitigation measures, and unattended longer term monitoring.

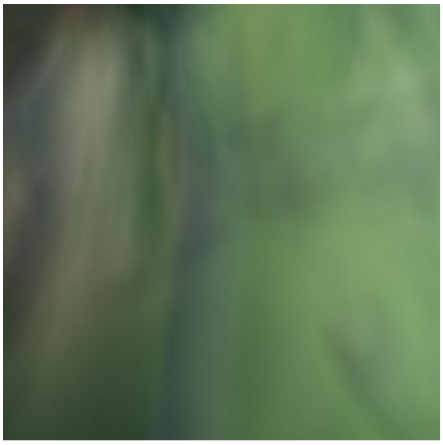
6.2.1.1.4 Mitigation Tier D

- Consideration of "*At Property*" acoustic treatments on a case by case basis.

6.2.1.1.5 Mitigation Tier E

- Stop works outside Monday to Sunday 6:30am to 6:30pm

A



APPENDIX A

Review of Statutory Construction Noise & Vibration Criteria

Appendix A: Review of Available Statutory Construction Noise & Vibration Criteria

A1 Introduction

A1.1 Airborne Construction Noise

A1.1.1 Environmental Protection Policy Noise

In Queensland, the assessment of commercial or industrial activity noise to noise sensitive receivers is regulated by the Environmental Protection Act 1994 and subordinate legislation the Environmental Protection (Noise) Policy 2019 (EPP (Noise) 2019). The EPP (Noise) 2019 establishes environmental values to be enhanced or protected including:

a) the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and

b) the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following—

   i. sleep;

   ii. study or learn;

   iii. be involved in recreation, including relaxation and conversation; and

c) the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

In order to achieve the environmental values, the EPP (Noise) 2019 establishes Acoustic Quality Objectives as detailed in Section A1.1.1.1.

A1.1.1.1 Acoustic Quality Objectives

The acoustic quality objectives are addressed in Section 7 of the EPP (Noise) 2019 as shown in the below excerpt:

7 Acoustic quality objectives for sensitive receptors

1) This section and schedule 1 state the acoustic quality objectives to be achieved and maintained under this policy.

2) For a sensitive receptor stated in schedule 1, column 1, the value stated in schedule 1, column 3 is the acoustic quality objective for the time of day mentioned in schedule 1, column 2 for the sensitive receptor.

3) The environmental value to be enhanced or protected by the acoustic quality objective is stated in schedule 1, column 4 for the sensitive receptor.

4) An acoustic quality objective stated in schedule 1 is expressed as a measurement of an acoustic descriptor.

5) If it is reasonable in the circumstances, an acoustic quality objective may be progressively achieved and maintained as part of achieving the object of this policy over the long term.

6) This section does not apply to a noise— (a) mentioned in schedule 1, part 1, section 1 of the Act; or (b) experienced within a residence or a workplace if the noise is made within the residence or workplace.

7) In this section— acoustic descriptor means any of the following measures—

- *LAeq,adj,1hr;*
- *LA10,adj,1hr;*
- *LA01,adj,1hr;*

workplace see the Workplace Health and Safety Act 2011, section 8.

The acoustic quality objectives from Schedule 1 of the EPP (Noise) 2019, with respect to proposed onsite uses are presented in Table A 1.

Table A 1: EPP (Noise) 2019, Schedule 1 Acoustic Quality Objectives

Sensitive Receptor	Time of Day	Acoustic Quality Objectives (Measured at the Receptor) dBA			Environmental Value
		$L_{Aeq,adj,1h}$	$L_{A10,adj,1h}$	$L_{A1,adj,1h}$	
Residence (outdoors)	Daytime and Evening	50	55	65	Health and wellbeing
Residence (indoors)	Daytime and Evening	35	40	45	Health and wellbeing
	Night-time	30	35	40	Health and wellbeing, in relation to the ability to sleep
Hospital, surgery or other medical institution (indoors)	Visiting hours	35	-	-	Health and wellbeing
	Anytime, other than visiting hours	30	-	-	Health and wellbeing, in relation to the ability to sleep
Commercial and retail activity (for indoors)	When the activity is open for business	45	-	-	Health and wellbeing, in relation to the ability to converse

However, after consideration, the acoustic quality objectives listed above were not considered to be the optimum criteria for assessment of construction noise for this project. Refer to Section 3.1 for further details.

Therefore, a review of other available statutory guidelines for assessment of construction noise in QLD, NSW and VIC was carried out. The following section includes a description and discussion of the available statutory criteria relating to construction noise and vibration in QLD, NSW and VIC, along with the superseded criteria adopted in the project EIS. These criteria have been reviewed and project specific noise and vibration management levels adopted. Justification for this is provided in Section 3.1.

A1.1.2 EIS Noise Criteria

The noise criteria discussed in the EIS for construction is based on the Qld Government EcoAccess Planning for Noise Control document that has now been repealed. This document did not contain specific noise criteria for construction noise; however, sleep disturbance criteria was included, and this forms the basis of construction noise criteria adopted in the EIS as follows:

Table A 2: Adopted EIS Construction Noise Criteria

Time Period	Noise limit, LAmax, dB(A)
Monday to Saturday	
06:30 to 18:30 hrs	No limit
18:30 to 22:00 hrs	Background + 10
22:00 to 06:30 hrs	45 internal*
Sunday (and public holidays)	

Time Period	Noise limit, LAmax, dB(A)
All day	45 internal*

**This is the Ecoaccess sleep awakening criterion, based on the superseded Ecoaccess: Planning for Noise Control Guideline, which recommends that the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dBLAmax more than 10 to 15 times per night, in order to achieve a good sleep over eight hours. Using the general construction noise limits provided in Table 12.15 [of the EIS, Chapter 12, Noise & Vibration], and the background noise levels measured during the unattended noise monitoring, the specific noise limits that apply to construction of the project are provided in Table 12.16 [of the EIS, Chapter 12, Noise & Vibration]. The noise limits presented are maximum noise levels at a noise sensitive receiver. The night-time limit is based on the sleep disturbance criteria of 45 dBLAmax internal and the corresponding external noise level to achieve this is 52 dBLAmax.*

A1.1.3 QLD Transport & Main Roads Transport Noise Management Code of Practice, Volume 2 - Construction Noise & Vibration (2023) (CoP)

TMR provides guidance for assessing construction noise impacts from road construction projects throughout QLD in the CoP.

The level of noise impact and the requirement for mitigation measures is generally determined by the timing and duration of the noise emissions and the perceived impact of the noise above existing background noise levels.

A1.1.3.1 Applicable Quantitative Noise Criteria – Residential Premises

The noise criteria for potentially affected residential properties, as taken from Section 3.2.1 of the CoP, is detailed in Table A 3.

Table A 3: Applicable Construction Noise Criteria (Source: TMR, 2023)

Time of Day		External Noise Level [4] [5] $L_{Aeq\ (15\ min)}$, dB(A)	
		Lower Limit	Upper Limit
Standard Hours		[1] [2] [3] RBL + 10	75 Where RBL > 55
			70 Where 40 < RBL ≤ 55
			65 Where RBL ≤ 40
Non-Standard Hours	Day/Evening	[3]RBL + 5	RBL + 5
	Night time		

Notes:

(1) RBL + 5 dB(A) should be considered where a facility, equipment and long-term earthworks are required in an area for greater than 6 months.

(2) Where the lower limit value exceeds the upper limit value, the lower limit is taken to equal the upper limit value.

(3) Minimum lower limits are 50 dB(A) for Standard hours and 45 dB(A) for Non-Standard hours. A maximum lower limit of 75 dB(A) applies to Non-Standard hours.

(4) Noise contribution from construction activity. determined as the component level (that is, noise from construction activity only)

(5) The noise level from construction includes adjustment factors in Table 2.1.2.1(b) (for example, low frequency noise, impulsivity, tonality, intermittency and modulation).

(6) RBL is the Rating Background Noise Level, refer to Section 2.1 or the Glossary for a definition of this parameter.

A1.1.4 NSW Construction Noise & Vibration Guidelines

In addition to the above, two Guidelines exist in NSW for the assessment and management of construction noise where it occurs outside of standard hours. The following sections describe the information and criteria applicable to this project.

A1.1.4.1 Transport for NSW (TfNSW) Construction Noise and Vibration Guideline

The *Construction Noise and Vibration Guideline* (TfNSW, 2016) (CNVG) provides a framework for the assessment of noise during the construction phase of the project. The CNVG references the *NSW Interim Construction Noise Guideline (DECC, 2009) (ICNG)* to provide the criteria for the assessment of construction noise and vibration impacts.

A1.1.4.2 Interim Construction Noise Guideline

A1.1.4.2.1 Airborne Construction Noise

The *NSW Interim Construction Noise Guideline* (DECC, 2009) (ICNG) provides guidance for assessing construction noise impacts.

Section 4 of the guideline outlines the quantitative assessment method, which establishes NMLs and assessment requirements for proposed construction activities over three weeks duration.

The NML for potentially affected residential properties, as taken from Section 4.2 of the ICNG, is detailed in Table A 4.

Table A 4: Criteria for Construction Noise at Residences Using Quantitative Assessment (Source: DECC, 2009)

Time of day	Management level $L_{Aeq\ (15\ min)}$*	How to apply
Recommended standard hours: Monday to Friday: 7am to 6pm Saturday 8am to 1pm: No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise

Time of day	Management level $L_{Aeq\ (15\ min)}$*	How to apply
		affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2.

Notes:

1) *For Residential receivers - Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30 metre from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.*
2) *Other sensitive use receivers - Internal noise levels are to be assessed at the centre of the occupied room. External noise levels are to be assessed at the most affected point within 50 m of the area boundary.*

For work outside of standard hours, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The definition of feasible and reasonable work practices is outlined in Section 1.4 of the ICNG, with the following excerpts providing a brief description:

"A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements."

"Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure."

A1.1.5 VIC EPA Publication 1834, November 2020 – Civil Construction Building and Demolition Guide (EPA 1834)

The NMLs applicable to construction noise in Victoria are provided in the *EPA Publication 1834, November 2020 – Civil Construction Building and Demolition Guide (EPA 1834))* which falls under the Environment Protection Act 2017.

NMLs apply to works to be carried out outside of normal working hours (ONWH). Construction noise impacts for ONWH are categorised in Table A 5.

Table A 5: Work Type Impact Categories – Outside of Normal Working Hours

Works Type	Description
Low-noise impact works	▪ Works that are inherently quiet or unobtrusive, for example, manual painting, internal fit-outs, and cabling. Low-noise works do not have intrusive characteristics such as impulsive noise or tonal movement alarms.
Managed-impact works	▪ Works where the noise emissions are managed through actions specified in a noise and vibration management plan, to minimise impacts on sensitive receivers. Managed-impact works do not have intrusive characteristics such as impulsive noise or tonal movement alarms
Unavoidable Works	▪ Works which pose an unacceptable risk to life or property, would cause a major traffic hazard or work which once commenced cannot be stopped. A Project Contractor must demonstrate that planned Unavoidable Works cannot be reasonably moved to Normal Working Hours. ▪ Examples of Unavoidable Works include: - The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads.

Works Type	Description
	- Emergency work to avoid loss of life or damage to property, or to prevent environmental harm. - Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours. - Rail occupations or works that would cause a major traffic hazard. - Works where a proponent demonstrates and justifies a need to operate outside Normal Working Hours such as work that once started cannot practically be stopped until completed such as concrete pouring or construction of diaphragm walls

The applicable EPA 1834 NMLs (acceptable effects) for the project are provided in Table A 6.

Table A 6: Noise Management Levels

Applicable Hours	Applicable Hours	Noise Requirements	
		Up to 18 months after project commencement	18 months or more after project commencement
Normal Working Hours (NWH)	7am to 6pm Monday to Friday 7am to 1pm Saturday	No specified Noise Level -- noise reduction measures apply	
Weekend / Evening work	6pm to 10pm Monday to Friday 1pm to 10pm Saturday 7am to 10pm Sunday and Public Holiday	Noise level at any residential premises not to exceed background noise by 10 dB(A) or more	Noise level at any residential premises not to exceed background noise by 5 dB(A) or more
Night	10pm to 7am Monday to Sunday	Noise is to be inaudible within a habitable room of any residential premises	

A1.2 Airborne Construction Noise Impacts on Birds

A1.2.1 Construction Noise Impacts on Birdlife

Based on a technical paper by Bottalico, Spoglianti et al, presented at Internoise 2015, 4 zones of noise impact were identified to summarise the effect of construction noise on birds, which are outlined in Section A1.2.2. The zones of noise impact are described as follows:

A1.2.2 Zones of Noise Impact

A1.2.2.1 Zone 1 - Zone of Permanent Hearing Damage:

If a bird is in this region, traffic noise and construction noise can potentially result in hearing loss, threshold shift, masking, and/or other behavioural and/or physiological effects. An area is in Zone 1 if the following condition is verified:

Continuous noise levels above Leq 110 dB(A) or impulsive noise levels over Leq 140 dB for a single pulse or Leq 125 dB for multiple pulses, will likely result in permanent threshold shift (PTS).

A1.2.2.2 Zone 2 - Zone of Temporary Hearing Damage:

At greater distances from the construction zone, where noise levels have dropped below 110 dB(A), PTS is unlikely to occur. However, continuous noise levels higher than 93 dB(A) may cause temporary threshold shift (TTS), mask important communication signals, and possibly lead to other behavioural and physiological effects.

A1.2.2.3 Zone 3 - Zone of Low to High Level Signal Masking:

At even greater distances from construction zone, where continuous noise levels are lower than 93 dB(A), but noise spectrum levels are higher than the ambient noise spectrum levels at frequencies critical for bird communication (2 to 8 kHz), noise will increase masking of communication signals beyond that which already occurs from natural ambient noise. This in turn may also result in other behavioural and/or physiological effects. Regarding the natural ambient noise, as has been stated, the spectral component around 8kHz is negligible compared to the energetic component in 2k and 4k Hz octave bands.

A1.2.2.4 Zone 4 - Zone of No Response:

Once noise levels fall below the natural ambient noise environment at the critical communication frequencies for birds, masking of communication and other biologically important sounds is no longer an issue. Faintly heard sounds falling outside the frequency region of bird vocalisations, such as the low frequency noise from a truck, may still cause behavioural and / or physiological effects.

A1.2.3 Construction Noise Targets for Impacts on Birds

Based on the information listed above in Section 3.3.1, the noise levels for the nominated Zones of Noise Impact (in terms of construction noise LAeq,15 minute noise level) are as follows:

Table A 7: Summary of Zones of Noise Impact for Birds

Zone	Indicative Distance from Worksites, if noise levels are manged to comply with proposed NMLs	Description	Continuous Noise Level
1	n/a	Zone of permanent hearing damage	LAeq ≥110 dB(A)
2	Within the site only	Zone of temporary hearing damage	LAeq 93-110 dB(A)
3a	0 to 70m	Zone of high level masking	LAeq <93 dB(A) and LAeq > 68 dB(A)
3b	70 to 750m	Zone of low level masking	LAeq <68 dB(A) and LAeq > Ambient levels
4	>750 m	Zone of no responsiveness	LAeq ≤ Ambient Background Level (at critical communication frequency) dB LCeq ≤ Ambient Background Level

Existing Yellow Chat habitats are expected to be within Zones 3a and 4. However, because the work areas occur within their habitat, it is expected that they would temporarily move away from the work areas to reside in Zones 3b to 4.

A1.3 Ground Borne Construction Noise

A1.3.1 TMR CoP

Section 2.1.2.2 of the TMR CoP Volume 2 states:

Ground borne noise may be caused by underground works such as road headers and tunnel boring machines (TBM), as well as construction traffic, conveyors and ventilation fans within tunnels.

Tunnelling is not proposed close to any sensitive receivers for this project, so risk of ground borne noise impacts from tunnelling are considered to be low to nil.

Other construction sources that may cause audible ground borne noise are rollers rock breakers. In the case of rock breakers, the airborne noise component would be far higher than the ground borne noise component. This would be less so for the vibratory roller but likely to be low risk unless large rollers are operated very close to the sensitive receivers which is unlikely to occur to mitigate structural damage and meet human comfort vibration limits. The risk of ground borne noise exceeding airborne noise at a property is very low for construction plant operated above ground where multiple plant sources are operating. For this reason, ground borne noise has not been assessed.

A1.4 Construction Vibration

Vibration criteria for both human comfort and building damage due to ground borne vibration caused by construction activities (e.g., pile driving, compaction and blasting) are provided in this section. It should be noted that compliance in most cases with the human comfort criteria would also achieve the building damage criteria.

Vibration from construction activities associated with the project could potentially impact on the amenity of the occupants of dwellings or buildings located close to the construction works. Generally, vibration impact can be summarised into two categories:

- Effect on human comfort
- Structural or cosmetic damage to buildings.

TMR prescribes vibration limits in relation to human comfort based on the British Standard BS6472-1992 Evaluation of human exposure to vibration in buildings (1-80Hz). The British Standard BS 5228-2:2009 provides an alternative approach to those historically used to assess human comfort presented in the British Standard BS 6472-1:2008. While BS 6472-1 provides guidance on human response to vibration in buildings in terms of VDV, BS 5228-2 Table B.1 provides guidance on the use of PPV which is typically measured to determine potential building damage.

In relation to structural damage, there is currently no Australian Standard that provides criteria for the assessment of structural damage to buildings. However, the British Standard BS7385 Part 2 can be used to assess structural damage to buildings. It defines damage in several categories including, for example, "cosmetic", "minor" and "major" damage. Alternatively, the German Standard DIN4150 Part 3 provides maximum vibration levels, which are assessed over a frequency range.

It is recommended that both British Standard BS 7385-2:1993 and German Standard DIN 4150-3:1999 be used for construction projects to determine the likely building/structural damage impacts. The results of the assessment should be used to inform the need for conditions surveys.

A1.4.1 Human Comfort

The TMR CoP outlines the vibration limits associated with human comfort levels, based on those recommended in the above British standards. These guidelines provide peak particle velocity (PPV) levels as shown in Table A 8. The lower limits are generally considered to be just perceptible. The upper limits are considered to cause significant annoyance if exceeded.

It should be noted that these limits are intended to relate to vibrations within buildings.

Table A 8: Human Comfort limits to Minimise Annoyance

Building	Work Period	Resultant PPV (mm/s)	
		Lower Limit	Upper Limit
Dwelling (including hotels and motels)	Standard hours	1.0	2.0
	Non-Standard hours – evening	0.3	1.0

Building	Work Period	Resultant PPV (mm/s)	
		Lower Limit	Upper Limit
	Non-Standard hours – night-time		

Note: Extracted from the Transport and Noise Management Code of Practice 2023 (Table 3.3.1.1(a)). Standard and Non-Standard hours for construction activities are outlined in Section 4.1.

A1.4.2 Buildings & Structures

Table A 9 below outlines the recommended limits set out in British Standard BS7385-2.1993: *Evaluation and Measurement for Vibration in Buildings; Part 2 - Guide to Damage Levels from Ground borne Vibration* to prevent building damage for short term vibration such as driven piling.

Table A 9: Transient Vibration Guide Values for Cosmetic Damage (BS7385-2.1993)

Group	Type of Building	Peak component particle velocity in frequency range of predominant pulse	
		4Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4Hz and above	
2	Unreinforced or light Framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

Notes:

1. *Values referred to are at the base of the building (see 6.3).*
2. *For line 2, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.*

The long term vibration limits described in DIN 4150.3 are also provided below in Table A 10.

Table A 10: Guideline Values for Vibration Velocity to be Used When Evaluating the Effects of Long-Term Vibration on Structures

Type of Structure	Guideline values for velocity in mm/s, of vibration in the horizontal plane of the highest floor at all frequencies
Buildings used for commercial purposes, industrial buildings, and buildings of similar design	10
Dwellings and buildings of similar design and/or occupancy	5
Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g., listed buildings under preservation order).	2.5

The TMR Guideline, "TN03 Guidelines for construction induced ground vibration on structures" provides guidelines on safe vibration threshold limits due to construction induced ground vibration and on structures, namely buildings, bridges, pavements and other structures.

Table A 11 provides the maximum permitted ground vibration on TMR owned structures due to construction activities in terms of peak component particle velocity (PCPV), where PCPV is the maximum value of any one of three orthogonal component particle velocities measured during a given interval.

Table A 11: TMR TN03 recommended Peak Component Particle Velocity (PCPV) Vibration Limits

Structures	Max PCPV (mm/s)
Bridges	25
Reinforced concrete industrial and heavy commercial buildings	15
Light framed structure, residential or light commercial type buildings	10
Un-reinforced concrete or masonry building	5
Heritage Listed Structure	2.5
Reinforced Culverts	10
Cut and Cover tunnel	10
Driven and Mined tunnel	10
Un-reinforced concrete tunnel	5

A1.4.3 Local Assets

DIN 4150.3 also provides guideline values for evaluating the effects of vibration on buried pipework (refer Table A 12.

Table A 12: Guideline Values for Evaluating the Effects of Short-term Vibration on buried Pipework (DIN 4150.3 1999)

Pipe Material*	Guideline values for velocity measured on the pipe in mm/s**
Steel (including welded pipes)	100
Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80
Masonry, plastic	50

In addition to the above, vibration criteria should be sought from the local asset owners prior to commencement of works to confirm appropriate vibration limits.

It is noted that vibration emitting works are not proposed in close proximity to existing underground assets. Therefore, predicted vibration impacts on underground assets are not expected to require assessment for this project.

A1.4.4 Blasting

Based on the proposal design, we understand that blasting will not be required for this project and, therefore, impact from blasting has not been considered in this report.

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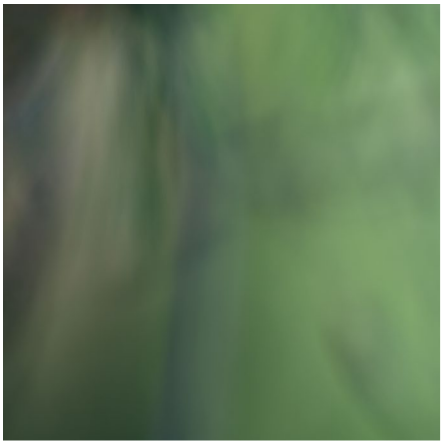
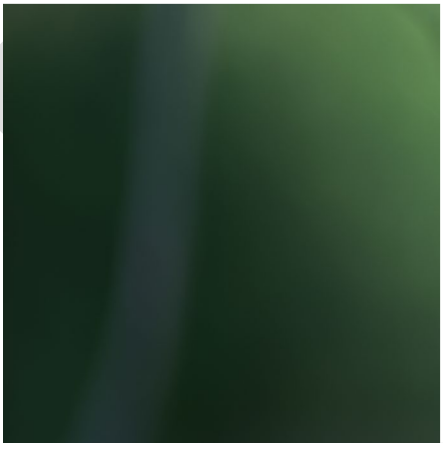


APPENDIX B

Site Specific Noise & Vibration Assessment – Example



Appendix B: Site Specific Assessment – Example

B1 Introduction

This site specific noise and vibration assessment applies to the [XXXXX Trenchless Crossing] works and should be read in conjunction with the overarching "*Fitzroy to Gladstone Pipeline, Construction Noise & Vibration Assessment, (Protest Engineering February 2024)*" (FGPNVA).

This assessment has been prepared to identify the locations of where exceedances of the evening and night-time NMLs detailed in Section 3.1 of the FGPNVA may be expected, and to determine the level of mitigation that may be required. Detailed noise modelling for the identified scenarios has been carried out using SoundPLAN 9.0 noise modelling software to determine the expected level of impact.

Works at the [XXXXX Trenchless Crossing] involve [summary of works].

Refer to Section B1.3 below for the locations and details of the proposed works.

B1.1 Subjective Noise

This section provides general information on subjective perception of noise to provide context to the noise monitoring results provided in Section B1.7 of this report and the adopted NMLs for this project.

Table B 1 shows a range of typical noise levels along with a typical subjective description.

Table B 1: Range of Typical Noise Levels, decibels (dBA) relative to 20 microPascals

Condition	Approximate noise Level, dB(A)	Subjective Description
Painful	120	Jet take-off at runway edge
	110	Rock concert
	100	225mm angle grinder at 1 metre
	90	Heavy industrial factory interior
Noisy	80	Shouting at 1 metre
	70	Busy Highway at 20 metres
	60	Normal conversation at 1 metre
	50	A running refrigerator
Quiet	40	Background noise level in a standard place of worship or rural residential living area
	30	Typical suburban bedroom background noise level
Very Quiet	25	Whisper, rural bedroom at night, broadcast studio, drama theatre.
	10	Human breathing at 3 metres
	0	Threshold of typical hearing

B1.2 Nearest Sensitive Receivers

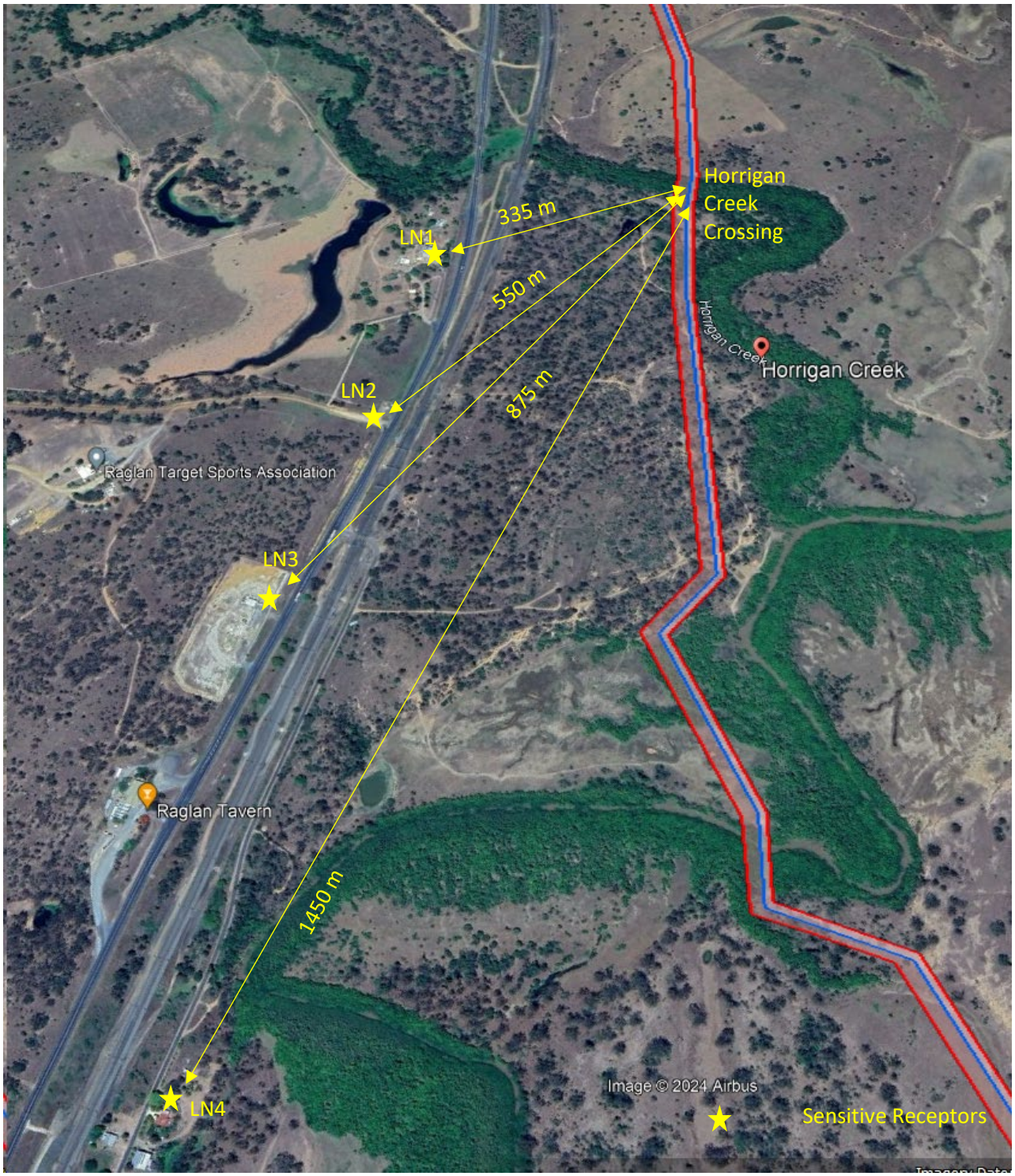
A plan of the proposed work area and nearest sensitive receptors is presented in Figure B 1.

Details of the nearest sensitive receptors are detailed below in Table B 2.

Table B 2: Description of Nearby Sensitive Receptors – EXAMPLE ONLY

Location Number	Location	Description of Receptor	Distance form Proposed Horrigan Crossing Worksite, metres
LN1	55799 and 55807 Bruce Highway, Raglan	Residential	335
LN2	55791 Bruce Highway, Raglan	Residential	550
LN3	55767 Bruce Highway, Raglan	Residential	875
LN4	1726 Raglan Station Road. Raglan	Residential	1450

Figure B 1: Proposed Pipeline Alignment & Sensitive Receivers – [XXXXX at CHXXXXX] – EXAMPLE ONLY



B1.3 Proposed Works

Proposed construction work areas have been assessed at the locations shown in Figure B 2 for this site.

Based on the location of the work area and its proximity to sensitive receivers, the assessment identified that noise modelling was required for the proposed construction scenarios detailed below in Table B 3.

Table B 3: Modelled Scenarios

Location / Scenario	Construction Activity / Scenario Description	Noise modelling Required?	
		Evening	Night
1	(1)Construction of Shafts	√	√
2	Construction of concrete floor and thrust block.	√	√
3	Installation of Jacking frame, TBM and electric Train	√	√
4	Construction of Tunnel utilising BBT TBM	√	√
5	(2)Grouting of overcut and pipe annulus	X	X
6	Water filling of pipes, demolition of shafts and demobilisation	√	√

Notes:

1. Sheet piling is also proposed for this construction activity but will only occur during standard hours and has therefore not been included in this assessment.
2. Proposed for standard hours only therefore has not been included in this assessment.

B1.4 Proposed Works Locations

The above construction activities include use of multiple plant which may or may not be used separately or in groups. Therefore, modelling has been carried out with all construction noise sources operating in the areas as shown below in Figure B 2 to provide an indication of the expected worst case impacts for each scenario.

The location of the proposed activities associated with the [XXXX trenchless crossing] are shown below:

Figure B 2: Modelled Works Locations

[Figure showing work area and plant locations]

B1.5 Noise Management Levels

Based on the information detailed in Section 2 of the FGPNVA, the following background noise levels have been adopted for the [Worksite] trenchless crossing site.

Table B 4: Adopted Background Noise Levels

Location Number	Location	Parameter	Average Measured Noise Levels Between 21 and 24 August 2008	
			6.30pm to 10pm	10pm to 6.30am
UX	XXXXX	L_{A10}	TBC	TBC
		L_{Aeq}	TBC	TBC
		L_{A90}	TBC	TBC

The above levels are based on EIS measured levels for XXXXX, supplemented with estimated background levels for the appropriate R Category from Table 2-5 of the FGPNVA.

A review of the available statutory noise criteria described in Section 3.1 of the FGPNVA and the measured background A-weighted sound pressure levels for XXXX (referenced from Section 2.2.3 of the FGPNVA), indicates that most of the statutory requirements are similar with the exception of a sleep disturbance criteria in NSW. However, the LA1 parameter can be very variable and easily affected by ambient noise sources.

Therefore, to allow for more accurate model validation, and management of impacts, the LAeq criteria has been adopted. On this basis, the following NMLs are recommended:

Table B 5: External Construction NMLs, Non Standard Hours – Residential Receivers

Time of Day	External Noise Level $L_{Aeq\ (15\ min)}$, dB(A)
	Lower Limit
Non-Standard hours (Evening)	XXXX
Non-Standard hours (Night)	XXXX

B1.6 Noise Modelling

Noise modelling has been carried out based on the methodology described in Section 4.1 of the FGPNVA and the general modelling assumptions detailed in Section 4.2 of the FGPNVA. The modelling has assumed that all plant is operating simultaneously for each of the modelled construction stages / activities, which is not likely to occur regularly. For this reason, the modelling may be considered as conservative.

B1.6.1 Site & Activity Specific Modelling Assumptions

The following noise sources have been modelled for the proposed works at [XXXXX]:

Table B 6: Modelled Noise Sources – Evening & Night-time

Scenario	Construction Activity / Scenario Description	Duration / Schedule	Plant / Equipment	Sound Power Level (SWL)	
				Per Item	Total SWL, dB(A)
1	Construction of shafts	TBC	30t Excavator	TBC	TBC
			Truck	TBC	
			40t Franna Crane	TBC	
			Generator	TBC	
			Water Truck	TBC	
			Hand Tools	TBC	
2	Construction of concrete floor and thrust block	TBC	Concrete Pump	*TBC	TBC
			Concrete Truck	TBC	
			Hand Tools	TBC	
			Power Tools (105 Tonal)	TBC	
			Generator	TBC	
			Ute	TBC	
3		TBC	40t Franna Crane	TBC	

Scenario	Construction Activity / Scenario Description	Duration / Schedule	Plant / Equipment	Sound Power Level (SWL)	
				Per Item	Total SWL, dB(A)
	Installation of jacking frame, TBM and electric train		Power Tools (105 Tonal)	*TBC	TBC
			Hand Tools	TBC	
			Generator	TBC	
			Ute	TBC	
			Semi-trailer	TBC	
4	Construction of Tunnel Utilising BBT TBM	TBC	40t Franna Crane	TBC	TBC
			30t Excavator	*TBC	
			Vent Fans	TBC	
			TBM/EPB Operating in tunnel	TBC	
			Hydraulic Power Pack 13T	TBC	
			Generator	TBC	
			Truck	TBC	
6	Demolition of shafts	TBC	40t Franna Crane	TBC	TBC
			Truck	*TBC	
			semi-trailer	TBC	
			30t Excavator	TBC	
			Ute	TBC	
			Generator	TBC	
			Hand tools	TBC	

*Items where penalties have been applied for tonality, intermittency or impulsiveness as detailed in Table B 7.

B1.6.2 Adjustments for Noise Emissions Characteristics

Construction noise sources with tonal, intermittent, impulsive or low frequency characteristics can cause nearby sensitive receivers, additional annoyance. Therefore, adjustments have been added to allow for this in the noise modelling. Expected noise emissions from the above construction plant have been reviewed for potential tonality, impulsiveness, intermittency, and low frequency content based on previous observations of the general nature, and measurement of construction plant. Penalties between 0 and +5 dB(A) have been considered for the following plant in the noise modelling, based on the expected severity of any annoyance components, to take account of these characteristics.

Table B 7: Modelled Noise Source Penalties - Example

Plant Item	Characteristic Attracting a Penalty	Applied Penalty, dB(A)
Rock saw	Tonal	+5
Rollers	Low frequency	+2
Excavator with hammer	Impulsive	+5

B1.7 Noise Modelling Results

The SoundPLAN model was used to predict the expected construction noise levels at the most exposed receptors, for each proposed scenario.

A summary of the predicted noise levels and exceedances (if applicable) of the adopted NMLs for non-standard hours at the worst affected noise sensitive receivers for each scenario is detailed below in Table B 8 and Table B 9.

Table B 8: Predicted Construction Noise Levels – Non-Standard Hours – Evening

Label	Receiver Address	Floor	Facade	Predicted Construction Noise Level dB(A)	NML $L_{Aeq\ (15\ min)}$, dB(A)	Predicted Exceedance of NML
Scenario 1: Construction of Shafts						
LN1		TBC	TBC	TBC	49	TBC
LN2		TBC	TBC	TBC	49	TBC
LN3		TBC	TBC	TBC	49	TBC
LN4		TBC	TBC	TBC	49	TBC
Scenario 2: Construction of concrete floor and thrust block						
LN1		TBC	TBC	TBC	49	TBC
LN2		TBC	TBC	TBC	49	TBC
LN3		TBC	TBC	TBC	49	TBC
LN4		TBC	TBC	TBC	49	TBC
Scenario 3: Installation of Jacking frame, TBM and electric Train						
LN1		TBC	TBC	TBC	49	TBC
LN2		TBC	TBC	TBC	49	TBC
LN3		TBC	TBC	TBC	49	TBC
LN4		TBC	TBC	TBC	49	TBC
Scenario 4: Construction of Tunnel utilising BBT TBM						
LN1		TBC	TBC	TBC	49	TBC
LN2		TBC	TBC	TBC	49	TBC
LN3		TBC	TBC	TBC	49	TBC
LN4		TBC	TBC	TBC	49	TBC
Scenario 6: Demolition of Shafts						
LN1		TBC	TBC	TBC	49	TBC
LN2		TBC	TBC	TBC	49	TBC
LN3		TBC	TBC	TBC	49	TBC
LN4		TBC	TBC	TBC	49	TBC

Table B 9: Predicted Construction Noise Levels – Non-Standard Hours – Night

NCA	Receiver	Floor	Facade	Predicted Construction Noise Level dB(A)	NML, $L_{Aeq\ (15\ min)}$, dB(A)	Predicted Exceedance of NML
Scenario 1: Construction of Shafts						
LN1		TBC	TBC	TBC	43	TBC
LN2		TBC	TBC	TBC	43	TBC
LN3		TBC	TBC	TBC	43	TBC

NCA	Receiver	Floor	Facade	Predicted Construction Noise Level dB(A)	NML, $L_{Aeq\ (15\ min)}$, dB(A)	Predicted Exceedance of NML
LN4		TBC	TBC	TBC	43	TBC
Scenario 2: Construction of concrete floor and thrust block						
LN1		TBC	TBC	TBC	43	TBC
LN2		TBC	TBC	TBC	43	TBC
LN3		TBC	TBC	TBC	43	TBC
LN4		TBC	TBC	TBC	43	TBC
Scenario 3: Installation of Jacking frame, TBM and electric Train						
LN1		TBC	TBC	TBC	43	TBC
LN2		TBC	TBC	TBC	43	TBC
LN3		TBC	TBC	TBC	43	TBC
LN4		TBC	TBC	TBC	43	TBC
Scenario 4: Construction of Tunnel utilising BBT TBM						
LN1		TBC	TBC	TBC	43	TBC
LN2		TBC	TBC	TBC	43	TBC
LN3		TBC	TBC	TBC	43	TBC
LN4		TBC	TBC	TBC	43	TBC
Scenario 6: Demolition of Shafts						
LN1		TBC	TBC	TBC	43	TBC
LN2		TBC	TBC	TBC	43	TBC
LN3		TBC	TBC	TBC	43	TBC
LN4		TBC	TBC	TBC	43	TBC

Predicted construction noise level results are shown in Section B1.11 in the form of noise contour maps.

NMLs for each site have been determined based on the background noise level information collected for the project and detailed above. The following assumptions apply to the modelling results:

- Noise contour maps for the proposed scenarios, for **evening** working hours, indicate areas where the NMLs described in Section B1.5 are predicted to be exceeded. These areas will be eligible for the appropriate tiered level of additional mitigation described in Table B 10.
- Noise contour maps for the proposed scenarios for **night-time** working hours, indicate areas where the NMLs described in Section B1.5 are predicted to be exceeded. These areas will be eligible for the appropriate tiered level of additional mitigation described in Table B 11.

The modelling has assumed that all plant is operating simultaneously for each of the activities, which is not likely to occur regularly. For this reason, the modelling may be considered as conservative.

B1.8 Mitigation

B1.8.1 Site Specific Noise Trigger Levels

The tiers of mitigation recommendations described in Section 6.2.1.1 of the FGPNVA apply to the following trigger levels for this site:

Table B 10: Proposed Evening Trigger Noise Levels for Additional Mitigation Measures – Example Only

*Noise Contour Colour	Trigger Level	Noise Level dB(A)	Quantitative Description	Selection Rationale	Recommended Applicable Mitigation Tiers
No Colour	N/A	<49	< NML	Forms the basis for design of reasonable and feasible mitigation measures proposed for the project and meets the NML.	No Additional Mitigation proposed
	1	49 to 59	Between NML & NML+ 10 dB(A)	Referenced from the TfNSW CNVG. Defined as "Clearly Audible" noise.	Tier (A)
	2	59 to 64	Between NML +10 dB(A) & NML+ 15 dB(A)	Referenced from the TfNSW CNVG. Defined as "Moderately Intrusive" noise.	Tier (A) & (B) & Noise Verification Monitoring
	3a	64 to 75	Between NML + 15 dB(A) & 75 dB(A) – to occur over a **short term period** – up to 14 days duration	Defined as "Highly intrusive in the TfNSW CNVG and would result in a significant short term impact on the receiver's existing amenity.	Tier (A) to (C) & Noise Verification Monitoring
	3b	64 to 75	Between NML + 15 dB(A) & 75 dB(A) – to occur over a **long term period** – more than 14 days duration	Defined as "Moderately Intrusive" in the TfNSW CNVG and would result in a significant long term impact on the receiver's existing amenity.	Tier (A) to (C) as applicable in response to complaints & attended noise verification monitoring
	4	>75	Highly Noise Affected	Likely to be highly intrusive	Tier (A) to (E) as applicable in response to complaints & attended noise verification monitoring

**Refer to Noise Contour Maps in Section B1.11. Note that each coloured contour represents one of the trigger levels detailed above. E.g. for any receivers located within the yellow contour, they would be subject to noise levels between 59 and 64 dB(A), trigger level 2 would apply and based on the above table, mitigation tiers A & B apply (refer to Section 6.2.1.1).*

Table B 11: Proposed Night-time Trigger Noise Levels for Additional Mitigation Measures – Example Only

*Noise Contour Colour	Trigger	Noise Level dB(A)	Quantitative Description	Selection Rationale	Recommended Applicable Mitigation Tiers
No Colour	N/A	<43	< NML	Forms the basis for design of reasonable and feasible mitigation measures proposed for the project and meets the NML.	No Additional Mitigation proposed
	1	43 to 53	Between NML & NML+ 10 dB(A)	Referenced from the TfNSW CNVG. Defined as "Clearly Audible" noise.	Tier (A)
	2	53 to 58	Between NML +10 dB(A) & NML+ 15 dB(A)	Referenced from the TfNSW CNVG. Defined as "Moderately Intrusive" noise.	Tier (A) & (B) & Noise Verification Monitoring

*Noise Contour Colour	Trigger	Noise Level dB(A)	Quantitative Description	Selection Rationale	Recommended Applicable Mitigation Tiers
	3a	58 to 63	Between NML + 15 dB(A) & 75 dB(A) – to occur over a **short term period** – up to 14 days duration	Defined as "Highly intrusive in the TfNSW CNVG and would result in a significant short term impact on the receiver's existing amenity.	Tier (A) to (C) & Noise Verification Monitoring
	3b	58 to 63	Between NML + 15 dB(A) & 75 dB(A) – to occur over a **long term period** – more than 14 days duration	Defined as "Moderately Intrusive" in the TfNSW CNVG and would result in a significant long term impact on the receiver's existing amenity.	Tier (A) to (C) as applicable in response to complaints & attended noise verification monitoring
	4	>75	Highly Noise Affected	Likely to be highly intrusive	Tier (A) to (E) as applicable in response to complaints & attended noise verification monitoring

B1.8.2 Example Worksite Specific Noise Mitigation Measures

The following site specific noise mitigation measures have been investigated:

- Provision of solid 1.8 metre high temporary noise barriers (refer to Figure B 3 for an example) located between the works and the nearest receivers as indicated in Section B1.11. The results of implementation of a local temporary noise barriers are shown in Section B1.11.
- Reduction of the number of proposed plant to operate simultaneously.
- TBC

Figure B 3: An Example of a Temporary Noise Barrier

A noise contour map showing the expected noise reduction from the application of the above site specific noise mitigation scenarios has been included in this assessment to indicate their level of effectiveness (Refer to Section B1.11).

The modelling indicates that provision of temporary barriers around local worksites may provide XX dB(A) noise reduction at some locations depending on how close the source or the receiver is to the barrier, and the height of the noise source.

B1.9 Noise Monitoring for Noise Model Validation

Whilst the noise modelling for these works is considered to be conservative, noise monitoring will be conducted in in the field at selected locations to validate the noise modelling assessment findings. Indicative locations for noise monitoring will be marked on each noise contour map if recommended.

These locations will be marked on each noise contour map, where required, as follows:

- Attended spot checks to determine initial compliance and verification of modelling results at the commencement of works and when specific noisy items of plant are operating.
- Unattended noise monitoring to confirm modelling results, and the range of noise levels received over a period of time, for longer term and variable works in an area, and to inform that the level of mitigation being applied is appropriate for the sensitive receivers represented by the monitoring location. The need and location for this monitoring will be confirmed after review of attended monitoring results.

B1.10 Vibration Risk Assessment

The NSW Construction Noise & Vibration Guideline provides recommended minimum separation distances between vibration intensive plant and sensitive receivers for minimising the risk of cosmetic damage. The minimum working distances for a variety of construction plant are summarised in Section 3.2 of the FGPNVA.

A risk assessment was carried out by comparing the minimum separation distances listed above to the minimum separation distance between the works and the nearest receivers. On this basis, vibration levels are not expected to exceed building damage or human comfort limits at any of the nearest receivers as the separation distance is at least 300 metres.

B1.11 Noise Contour Maps

Noise Contour Maps depicting the predicted noise levels for each modelled scenario are detailed below.

Figure B 4: Noise Contour Map — EXAMPLE - Scenario 1 - Shafts Excavation – Evening Work Hours – No Mitigation

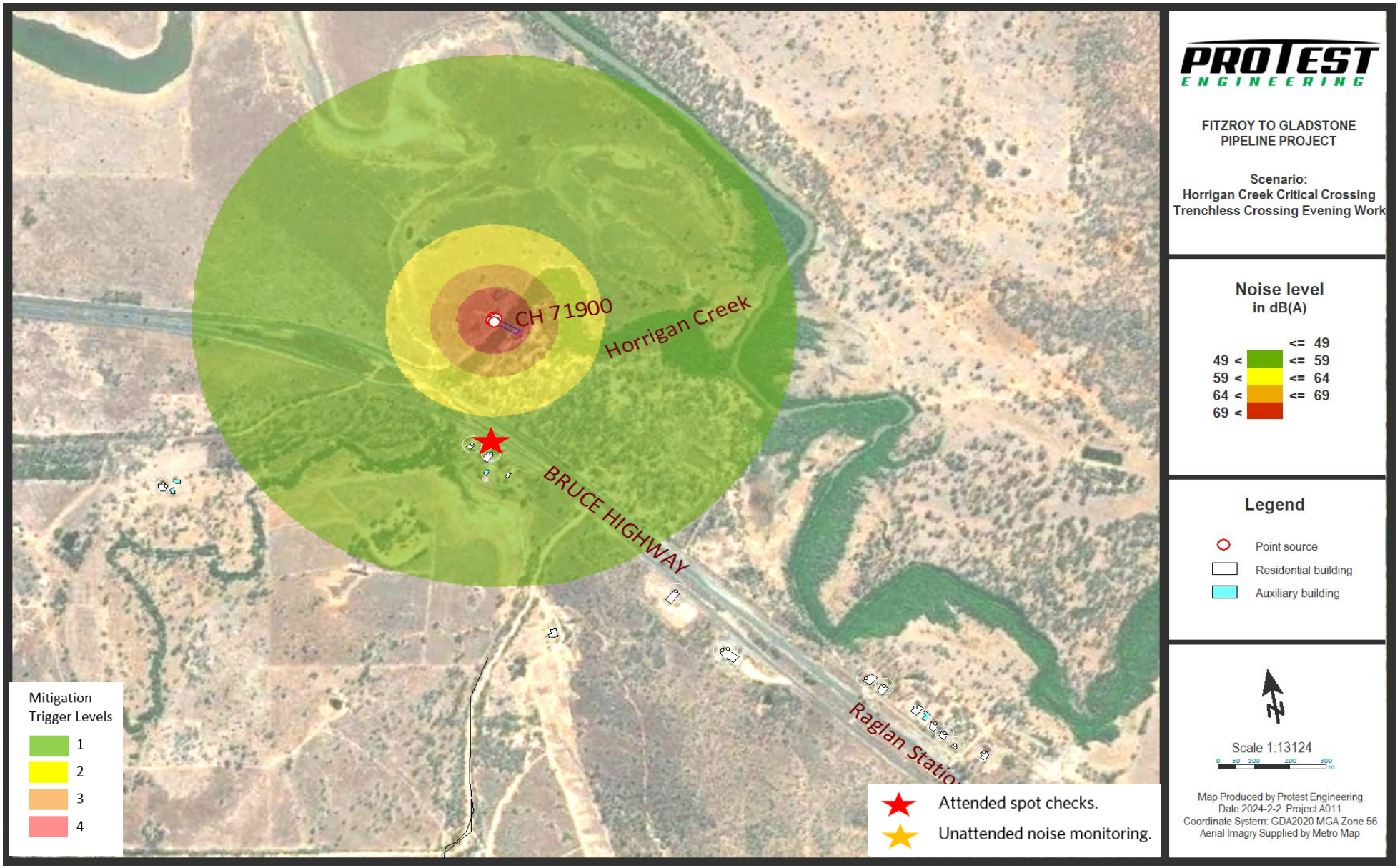


Figure B 5: Noise Contour Map — EXAMPLE - Scenario 1 - Shafts Excavation – Evening Work Hours – With 1.8m Noise Barriers Located Around the Worksite

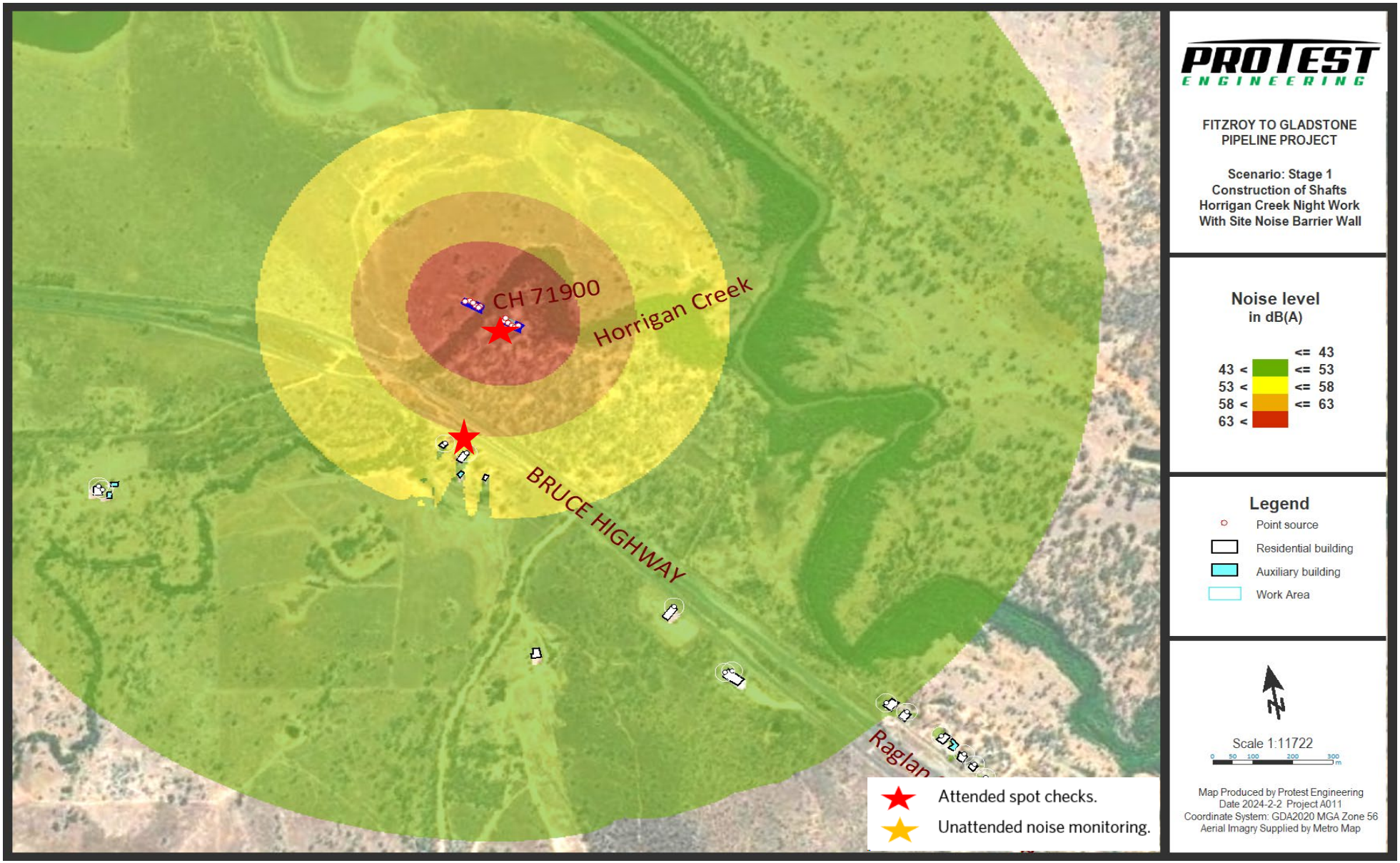


Figure B 6: Noise Contour Map — EXAMPLE - Scenario 1 - Shafts Excavation – Night Time Work Hours – No Mitigation

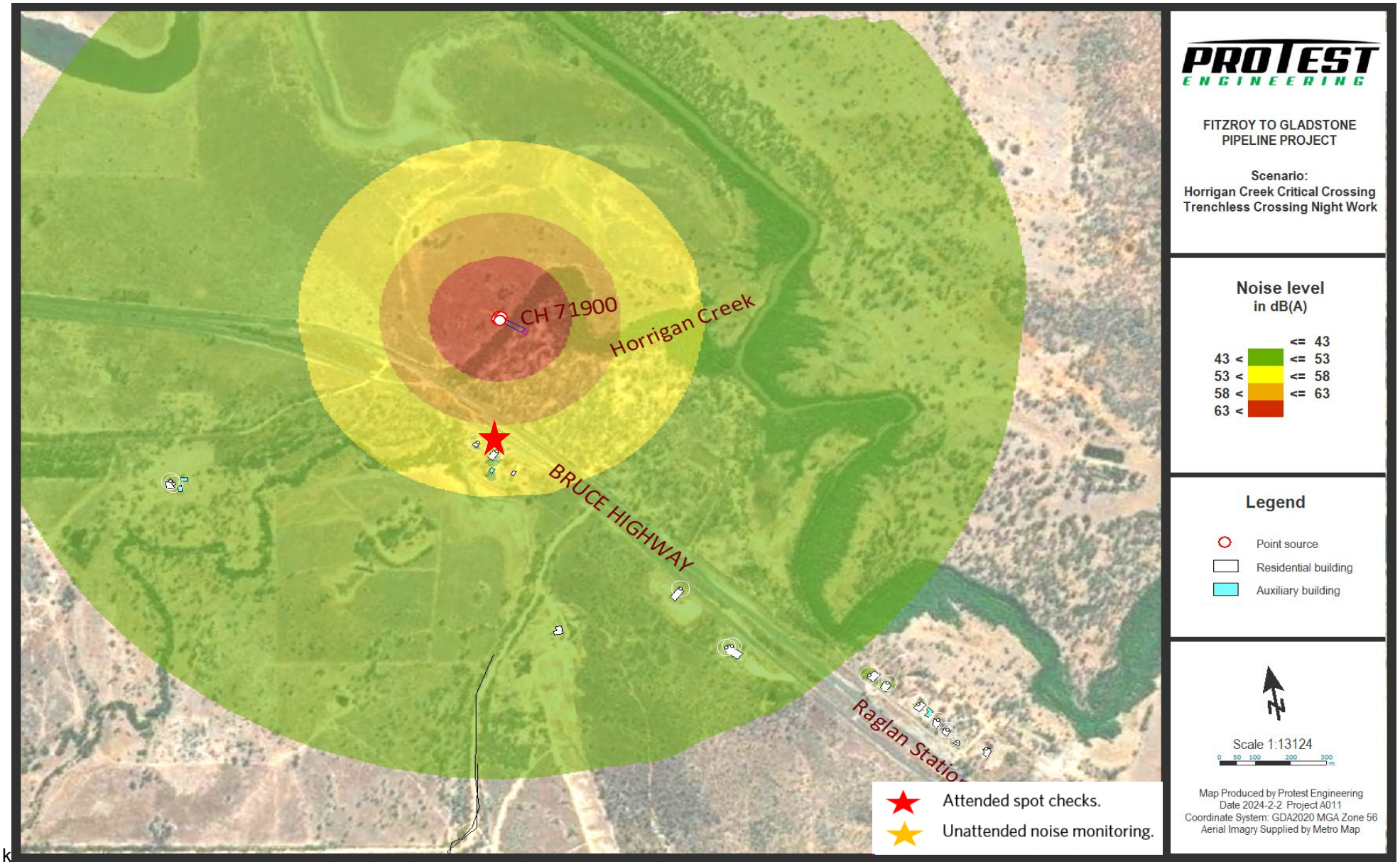


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Figure B 7: Noise Contour Map — EXAMPLE - Scenario 1 - Shafts Excavation – Night Time Work Hours – With 1.8m Noise Barriers Located Around the Worksite


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