

Construction Water Quality Management Plan

Northern Midlands Irrigation Scheme

EPBC Number: 2022/09295



Proponent details

Proponent: Tasmanian Irrigation Pty Ltd
ABN: 95 722 799 075
CAN 133 148 384

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed: 

Full name: Sophie Grace
Organisation: Tasmanian Irrigation Pty Ltd
Date 12/05/2025

Version	Date	Author	Reviewer	Comments
Version 1	12/05/2025	Mandy Flowers (TI)	Charles Livesey (TI)	Changed v0.1 (contractor sub plan) to TI format, updated monitoring requirements based on swan galaxias surveys, added references to green and gold frog.

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Glossary

Abbreviation	Definition
BT	Balance tank
CEF	Construction Environmental Feature (as identified on CEP and CET)
CEMP	Construction Environmental Management Plan
CEP	Construction Environmental Plan
CET	Construction Environmental Table
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
HB	Hazell Bros
HDD	horizontal directional drilling
HSE	health, safety & environment
km	kilometre
ML	megalitre
MNES	Matters of National Environmental Significance
NBES	North Barker Ecosystem Services
NMIS	Northern Midlands Irrigation Scheme
PS	Pump Station
The Project	Northern Midlands Irrigation Scheme
TI	Tasmanian Irrigation Pty Ltd
WC	Watercourse

1. Introduction

Project Background

The Northern Midlands Irrigation Scheme (the Project) involves the construction of a new irrigation scheme to supply 25,500 megalitres (ML) of water per annum from the Poatina Tailrace to 40 landowners located across the suburbs of Cressy, Campbell Town, Epping Forest, and Ross, in the Northern Midlands region of Tasmania.

The Project will allow for the irrigation of approximately 128,400 hectares and consists of the following key components:

- Approximately 155 km of large diameter pipeline
- An offtake dam, to be constructed adjacent to the Poatina Tailrace
- Two balance tanks, the Poatina BT, with an adjacent overflow dam, and the Valleyfield BT.
- Access roads to both the Poatina BT and Valleyfield BT.
- Three pump stations:
 - Valleyfield PS
 - Poatina PS
 - Barton PS

Further information on the Project, including the locations of project elements is provided in Section 3 of Construction Environmental Management Plan (CEMP).

Water Crossings

The proposed construction corridor intersects approximately 200 water crossings. The locations of the crossings are shown in Appendix A1 of this plan and Appendix B of the CEMP.

Swan galaxias was identified in a tributary of Dairy Creek during surveys, therefore all Dairy Creek water crossings that have open or running water will be constructed in accordance with the Dairy Creek Crossing Methodology (Appendix Q of the CEMP).

Remaining project waterway crossings will predominantly be constructed using trenched methodologies, however trenchless methodologies may be considered depending on the time of year, flows, existing infrastructure, pipe size and geotechnical considerations¹.

Purpose

The purpose of the Construction Water Quality Management Plan (CWMP) is to address the relevant conditions of EPBC 2022/09295 (the Permit) and outline clear measures to avoid, minimise, and manage the potential impacts to Matters of National Environmental Significance (MNES). Permit conditions and summary of commitments relevant to the CWQMP are provided in Table 1. The CWQMP also serves to meet the Project's environmental objectives and targets, which have been developed as a means to provide evidence that the environmental objectives have been achieved. The relevant objectives and targets are outlined in Table 2.

¹ The previous version of the CWQMP referred to the use of horizontal directional drilling for all permanent watercourses. This was due to the fact that swan galaxias surveys were undertaken after the Project had been approved. A conservative methodology was subsequently applied to all project watercourses until swan galaxias were confirmed absent, as per Condition 12 of the Permit.

Table 1 Conditions of approval reference table (EPBC 2002/09295) relevant to the Construction Water Quality Management Plan

No.	Condition	Condition requirement	Section of CEMP	Summary of commitment
6	ACTION MANAGEMENT PLANS – Green and Golden Frog Habitat Management and Impact Mitigation Protocol	To mitigate harm to the green and gold frog, within the project area, the approval holder must commence implementing the Green and Gold Frog Habitat Management and Impact Mitigation Protocol no later than the commencement of the Action and continue to implement the Green and Gold Frog Habitat Management and Impact Mitigation Protocol for any construction works until the completion of the Action.	Table 10.1 Appendix B – Construction Environmental Plans and Construction Environmental Tables Appendix G – Green and gold frog habitat management and impact mitigation protocol Appendix J – Weed and hygiene management plan Appendix K – Drainage erosion and sediment control plan Appendix L – Construction water quality management plan	Pre-construction planning and risk minimisation measures will be implemented, including identifying areas of high-quality habitat as exclusion zones, and undertaking active searching prior to construction (including nocturnal searches during the breeding season), to maximise opportunities to detect and clear frogs from the construction area. Contractors will comply with best practice guidelines for construction hygiene to manage the risk associated with the transmission of chytrid fungus. The contractor will adopt appropriate sediment and erosion controls and management of environmentally hazardous materials to minimise potential impacts to the green and gold frog. Watercourses containing green and gold frogs or suitable green and gold frog habitat will be monitored in accordance with the Construction Water Quality Management Plan.
12	SWAN GALAXIAS MITIGATION	To avoid impacts to the swan galaxias, the approval holder must not clear in, dig in, or cause the pipeline to cross any waterway containing running or open water with potential swan galaxias habitat unless the approval holder has had an aquatic fauna expert undertake an aquatic survey of the waterway and the aquatic fauna expert has determined that swan galaxias is absent from the waterway. If the presence of swan galaxias is detected in any waterway the approval holder must submit a proposed waterway crossing method to the department for approval. The approval holder must not clear in, dig in, or cause the pipeline to cross that waterway unless the Minister has approved the method of crossing that waterway. The approval holder must implement the approved waterway crossing method.	Table 10.1 Appendix B – Construction Environmental Plans and Construction Environmental Tables Appendix L – Construction water quality management plan Appendix Q – Dairy Creek Crossing Methodology	Swan galaxias has been identified in a tributary down stream of two Dairy Creek water crossings. If these watercourses are running or contain open water at the time of construction, they will be constructed in accordance with the Dairy Creek Crossing Methodology and monitored as per the Construction Water Quality Management Plan.
16(e)		measures, including directional drilling, to mitigate harm to protected matters at localities in which watercourses intersect the project area,	Table 10.1 Appendix B – Construction Environmental Plans and Construction Environmental Tables Appendix L – Construction water quality management plan Appendix Q – Dairy Creek Crossing Methodology	Swan galaxias has been identified in a tributary down stream of two Dairy Creek water crossings. If these watercourses are running or contain open water at the time of construction, they will be constructed in accordance with the Dairy Creek Crossing Methodology and monitored as per the Construction Water Quality Management Plan.

Table 2 CWQMP Environmental objectives and targets

Environmental Aspect	Objective	Target
Surface Water	Minimise construction impacts on aquatic ecosystems	Occurrences of increase in turbidity due to construction activities of less than 10 NTU between immediately upstream and downstream of construction (per NRE). Occurrences of turbidity less than the nominal natural level of 60 NTU downstream of construction.
Threatened Fauna (Swan galaxias)	Minimise the impact of construction activity on the Swan galaxias	If Dairy Creek watercourses are running or contain open water at the time of construction, they will be constructed in accordance with the Dairy Creek Crossing Methodology (approved by the Minister 3 March 2025) and monitored as per the Construction Water Quality Management Plan.
Threatened Fauna (green and gold frog)	Minimise the impact of construction activity on the green and gold frog	Green and gold frog protocol areas assessed for the presence of green and gold frog and high-quality habitats prior to commencing clearing. Green and gold frogs are relocated in accordance with the green and gold frog protocol (Appendix G of the CEMP). High quality green and gold habitats are avoided, or construction corridor is reduced where possible to minimise impacts on potential green and gold frog habitat. Clearing of green and gold frog protocol areas must be approved by Tasmanian Irrigation (TI) to ensure objectives and targets can be met and work will be undertaken in accordance with the permit. Water quality impacts do not exceed targets described in Surface Water (above).
Other aquatic fauna	Minimise the impact of construction activity on other aquatic fauna	Water quality impacts do not exceed targets described in Surface Water (above). Water crossing methodologies have controls in place to avoid or minimise impacts to other aquatic fauna. Aquatic fauna not impacted by the Project and/or species taken in accordance with a relevant permit.

2. Potential Impacts and Risks

Rivers and creeks within the project are classified as cobble and gravel-based rivers. The main risk to this watercourse type is coarse sediment and silt entering the watercourse. The result of these incursions could result in reduced water quality, direct impacts to flora and fauna, and altered hydrology and stream bed composition.

Potential impacts to MNES from altered water quality are discussed in detail below.

Swan galaxias

A prioritisation study and electrofishing survey were completed by an aquatic fauna expert from August to September 2024. Approximately 200 watercourses in the project area were considered unsuitable habitat for swan galaxias. Five watercourses with potential habitat were electro fished in accordance with Survey guidelines for Australia's threatened fish: Guidelines for detecting fish listed as threatened under the EPBC Act (2011), and swan galaxias was found at one location downstream of the Project area in Dairy Creek (survey site 4b, shown in Figure 1). The species was not found in any other watercourses.

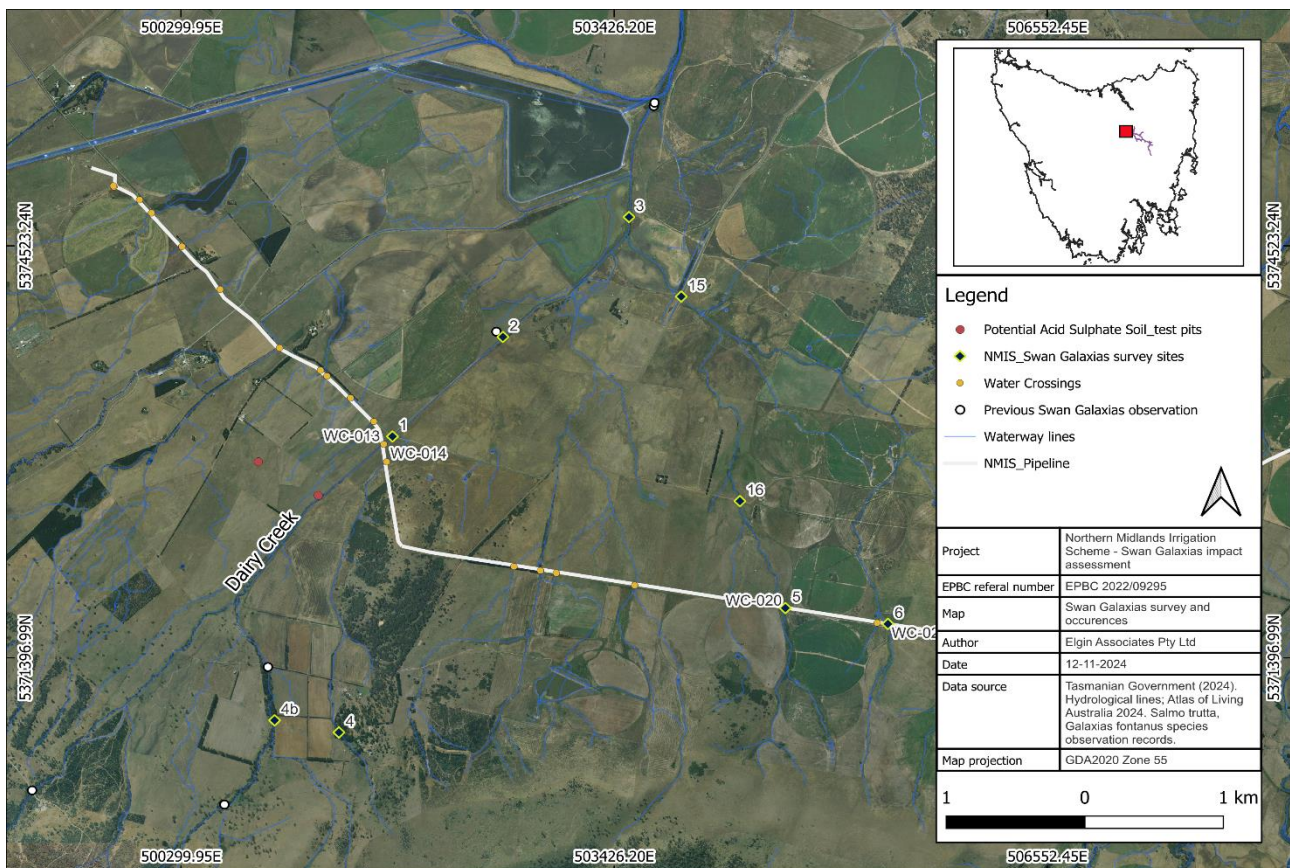


Figure 1 Dairy Creek pipeline crossing and previous swan galaxias occurrences

Potential Impacts

Potential impact pathways for swan galaxias in relation to the construction of waterway crossings are limited to the introduction of predator species, alteration of water flow, and the removal of streamside vegetation (which may alter water flow and quality), all of which will be mitigated with the appropriate controls for waterway crossings in accordance with condition 12 of EPBC 2022/09295 (see Section 1) (NBES, 2024).

The most likely and consequential impacts from the Dairy Creek crossing are related to construction works, rather than operational impacts. These include:

1. Cessation or reductions in water flow.
2. Degradation of water quality (sediment mobilisation, acidification, spillage or leakage of chemicals).
3. Temporary barriers to fish passage.
4. Permanent changes to riverbed profiles and instream habitat.
5. Permanent damage to riparian vegetation.
6. Direct entrainment and harm in work area.

Green and Gold Frog

No known populations of the green and gold frog will be impacted by the Project and it is considered unlikely that this species will occur. However, the potential absence of this species has not been definitively confirmed. Some potential breeding habitat may be present in the Project area, however the likelihood of green and gold frogs occurring is considered to be very low based on the paucity of records from the Northern Midlands region over the past 30 years (highlighted in Figure 2), as well as their noted decline in the region (NBES, 2024).

Potential Impacts

The primary threat to the green and gold frog is habitat loss, fragmentation, and degradation. The pipeline alignment crosses a number of minor waterways and drainage lines that provide potential connectivity habitat for this species. Destruction of habitat and individuals are the most likely avenues for impacts to occur, although direct impacts to individuals is considered extremely unlikely given the mobile nature of the species.

Impacts to habitat will be limited to linear strips which are likely to rapidly rehabilitate following construction and therefore are unlikely to affect the overall habitat quality in the area (NBES, 2024). The Green and Gold Frog Habitat Management and Impact Mitigation Protocol has been implemented to mitigate the potential for harm to this species, in accordance with condition 6 of EPBC 2022/09295.

While the green and gold frog can tolerate a degree of poor water quality (NRE, 2025), the Significant Impact Guidelines for the Vulnerable Growling Grass Frog (*Litoria raniformis*) state that a reduction in water quality represents a threat to the species (DCCEEW, 2009). The CWQMP has been subsequently updated to address potential impacts and ensure mitigation measures are in place to minimise potential impacts on the green and gold frog based on pre-clearance survey outcomes².

² Targeted green and gold frog surveys were not undertaken during the preliminary assessment due to (1) absence of optimal breeding habitat in the Project area, (2) low likelihood of the species occurring in the Project area, and (3) if present, habitats would likely be transient or used on a temporary basis and that surveys should be done prior to construction to identify species and mitigate potential impacts in accordance with the Green and Gold Habitat Management & Impact Mitigation Protocol (NBES, 2024).

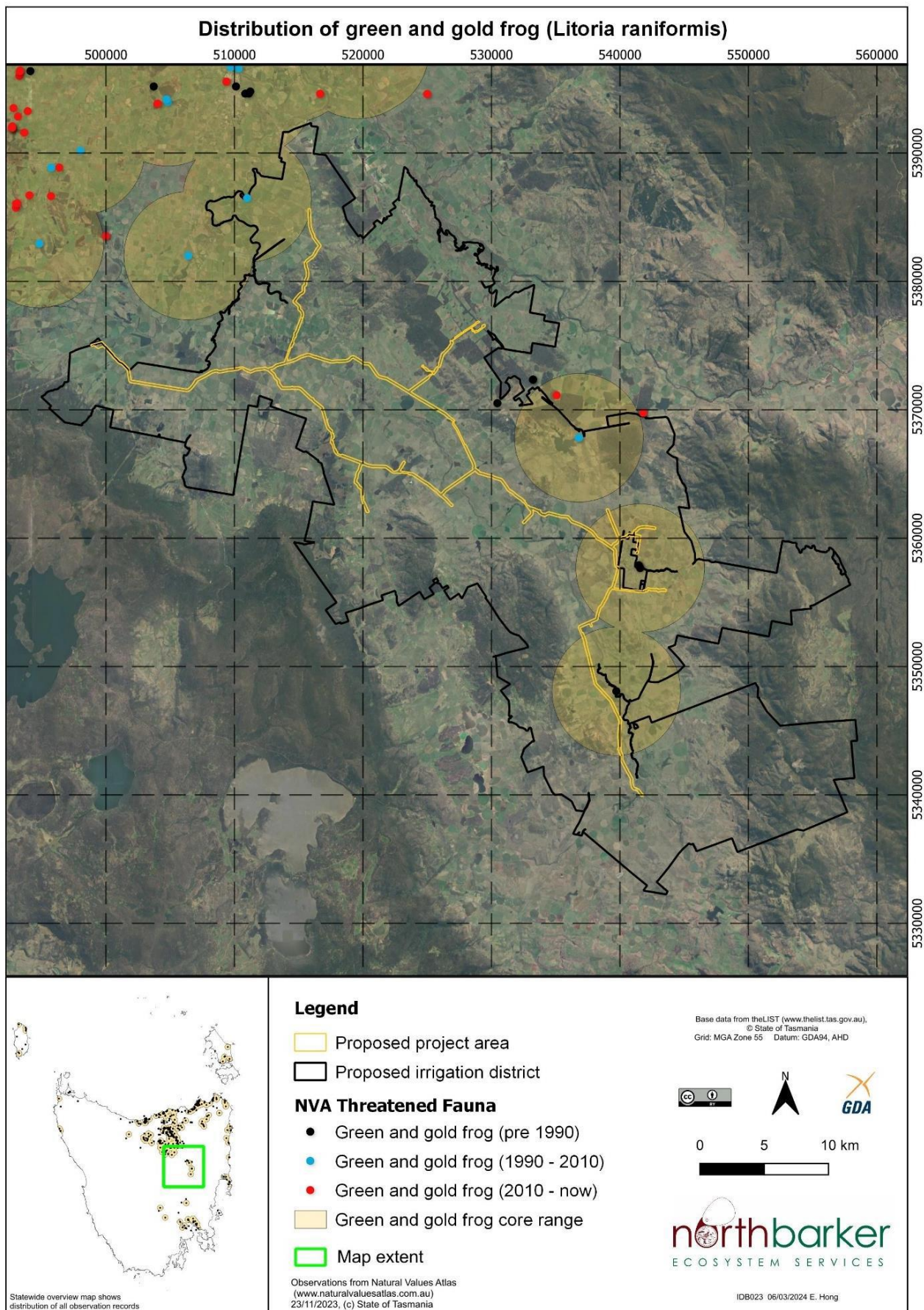


Figure 2 Distribution and core range of the green and gold frog (as defined within the Tasmanian Natural Values Atlas and shown in Section 3.2.7 of the Project's Preliminary Documentation)

Summary of Impacts and Risks

Construction of water crossings has the potential to impact water quality and subsequently impact aquatic fauna. Overall, the residual risk rating of impacts to water quality to MNES is considered low (Table 3) following the application of management and mitigation measures outlined in Table 1, Table 2 and Section 3.

Table 3 Risk assessment for potential water quality impacts to relevant MNES following application of management and mitigation measures

MNES	Potential impact	Project phase	Residual likelihood	Residual consequence	Residual risk
Green and gold frog	Downstream impacts of water quality	Construction	Unlikely	Moderate	Low
Swan galaxias	Modification of environment (e.g. introduction of predator species, alteration of water flow, removal of streamside vegetation, water quality impacts)	Construction	Unlikely	Moderate	Low

Table 4 Risk rating (DCCEEW, 2024)

	Consequence				
	Minor	Moderate	High	Major	Critical
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

3. Environmental Management Measures

Potential impacts to MNES during construction will be managed and mitigated through the following measures:

1. Implementing the Dairy Creek Crossing Methodology.
2. Implementing water crossing methodologies (approved by TI).
3. Undertaking green and gold frog pre-clearance surveys.
4. Undertaking water quality monitoring.
5. Monitoring and auditing compliance.

Dairy Creek Crossing Methodology

In accordance with Condition 12 of the Permit, there will be no clearing, digging in or causing the pipeline to cross any waterway containing running or open water with potential Swan Galaxias habitat unless an aquatic fauna expert has undertaken an aquatic survey of the waterway, and the aquatic fauna expert has determined that Swan Galaxias is absent from the waterway. If the presence of Swan Galaxias is detected in any Waterway, a proposed waterway crossing method will be submitted to the

Department for approval. The approved waterway crossing method will be implemented in accordance with the approval given by the Minister.

Swan galaxias was found in a Dairy Creek tributary, so a crossing methodology was submitted to the Department for approval. The methodology (Appendix Q of the CEMP) was approved by the Minister 6 March 2025.

All Dairy Creek crossings with open or running water must be constructed in accordance with the Dairy Creek Crossing Methodology.

Water Crossing Methodologies

Water crossing methodologies will be developed for each water crossing to ensure adequate controls are in place prior to commencing works. Methodologies must be submitted to TI for approval to ensure requirements have been met and outcomes of environmental surveys have been considered as part of the methodology.

Examples of water crossing methodologies for watercourses are provided in Appendix A2 and A3. It should be noted that the maps provided in these appendices are indicative only and are not construction methodologies. Methodologies may be refined prior to each water crossing commencing depending on weather conditions (pre-, during and post-), existing infrastructure, environmental surveys, flow, geotechnical conditions and other site constraints.

Green and Gold Frog Surveys

As per the Green and Gold Frog Habitat and Impact Mitigation Protocol (Appendix G of the CEMP), pre-clearance surveys are undertaken approximately 7 days prior to commencing clearing activities. The purpose of the surveys is to confirm if green and gold frogs (or suitable habitat) are present in the construction corridor and to relocate frogs in accordance with the protocol if required.

As part of the surveys, ecologists also confirm if other species are present to ensure adequate measures are in place to mitigate impacts to other species and the contractor is aware of relevant permit requirements.

If green and gold frogs (or other frog species) are identified in transient watercourses during surveys, impacted habitats will be monitored in accordance with monitoring requirements for permanent watercourses.

Water Quality Monitoring

Required Parameters

Water quality monitoring will at a minimum require assessment of the following:

- Visual observations (flow, clarity, water level, current weather)
- Turbidity reading (NTU)
- Consideration of factors that may be influencing high turbidity readings (e.g. surrounding land use).

Dairy Creek requires additional water quality parameters. These are outlined in the Dairy Creek Crossing Methodology (Appendix Q of the CEMP).

Appendix A4 is an example of a water quality monitoring checklist and the information that may be used for monitoring (excluding Dairy Creek which will have a separate monitoring checklist that meets the requirements of the Dairy Creek Crossing Methodology).

Tasmanian Irrigation will set up a water quality monitoring inspection checklist prior to construction commencing.

Timing & Frequency

The timing and frequency of monitoring depends on watercourse hydrology and the outcomes of environmental surveys.

Watercourses under construction will be inspected daily to ensure monitoring requirements are met when flow changes.

Permanent Watercourses (flowing)

A turbidity meter will be used to monitor all flowing permanent watercourse crossings (listed in Table 5) in accordance with the following:

1. Upstream and downstream readings taken prior to construction commencing.
2. Minimum three upstream and downstream readings taken daily once construction has commenced:
 - Prior to the commencement of daily works
 - During daily works
 - At the completion of daily works
 - At any other time that there is a visible change in turbidity downstream resulting from site activities.
3. All readings are to be checked against the NMIS Turbidity Management Framework (Figure 3) and actions taken as necessary.

Transient Watercourses (flowing)

All flowing transient watercourses containing suitable frog habitat³ and/or aquatic species identified during pre-clearance surveys will have the same monitoring requirements as permanent (flowing) watercourses.

For all other flowing transient watercourses, monitoring will be undertaken using a turbidity meter as follows:

1. Upstream and downstream readings taken prior to construction commencing.
2. Upstream and downstream readings taken minimum once daily once construction has commenced.
3. All readings are to be checked against the NMIS Turbidity Management Framework (Figure 3) and actions taken as necessary.

Other watercourses (not flowing)

If a watercourse is not running, evidence of no flow must be recorded in the water quality monitoring checklist prior to construction commencing. Flows must be reviewed by supervisors and captured in the pre-clearance checklist to ensure watercourse methodologies are consistent with current flows and sediment and erosion controls have been considered prior to commencing works.

³ As determined by the Project Environmental Consultant in accordance with the relevant survey guidelines

Table 5 Permanent Water Crossings in the Project Area

Line and Chainage	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Name	Swan galaxias present
N1a_01800	501011	5373748	WC-008	WC-007	Major Stream	Woodside Rivulet	No
N1a_02850	501763	5373017	WC-013	WC-012	Stream	Dairy Creek	Yes
N1b_04650	506467	5371580	WC-023	WC-023	Minor River		No
N1b_05000	506709	5371819	WC-024	WC-024	Minor River	Lake River	No
N1b_07550	508844	5372971	WC-028	WC-028	Major Stream		No
N2_01600	515475	5374224	WC-038	WC-038	Major River	Macquarie River	No
N2_09450	522398	5372102	WC-057	WC-055	Major Stream		No
N3_02650	525775	5370010	WC-061	WC-059	Minor Stream		No
N3_07640	528507	5366038	-	WC-070	Major Stream	Blanchards Creek	No
N3_08000	528640	5365730	WC-073	-	Major Stream	Blanchards Creek	No
N3_08150	528647	5365557	WC-074	WC-071	Major Stream		No
N5_03900	537156	5360928	-	WC-081	Farm Dam		No
N5_08450	539843	5357692	WC-089	WC-086	Minor River	Elizabeth River	No
N5_09800	539530	5356422	WC-090	WC-087	Farm Dam		No
N6_01850	537544	5353417	WC-096	WC-093	Major River	Macquarie River	No
N7_09000	541410	5340373	WC-118	WC-114	Major River	Blackman River	No
N7_09150	541495	5340269	WC-119	WC-115	Major River		No
N7_09200	541539	5340208	WC-120	WC-116	Major River		No
N7_09250	541566	5340171	WC-121	WC-117	Minor Tributary		No
NA_01400	532535	5361280	WC-123	WC-119	Major River	Macquarie River	No
NB_01850	541219	5355915	WC-124	WC-120	Minor River		No
B1_04400	515850	5370964	WC-129	WC-125	Stream		No
B1_07600	517502	5368383	WC-136	WC-132	Minor Stream		No
B1_11800	520045	5365800	WC-141	WC-137	Stream	Kingstone Rivulet	No
B1_11950	520219	5365734	WC-142	WC-138	Tributary		No
B1_12000	520241	5365725	WC-143	WC-139	Major Stream	Isis River	No
B2_00250	526238	5363518	WC-153	WC-150	Major River	Macquarie River	No
BA_00150	519845	5365732	WC-163	WC-155	Tributary	Kingstone Rivulet	No
BA_04200	520344	5362090	WC-175	WC-166	Major Stream	Isis River	No
P1_04550	515032	5377873	WC-196	WC-169	Major River	Macquarie River	No
P1_10200	516481	5382566	WC-206	WC-178	Tributary		No

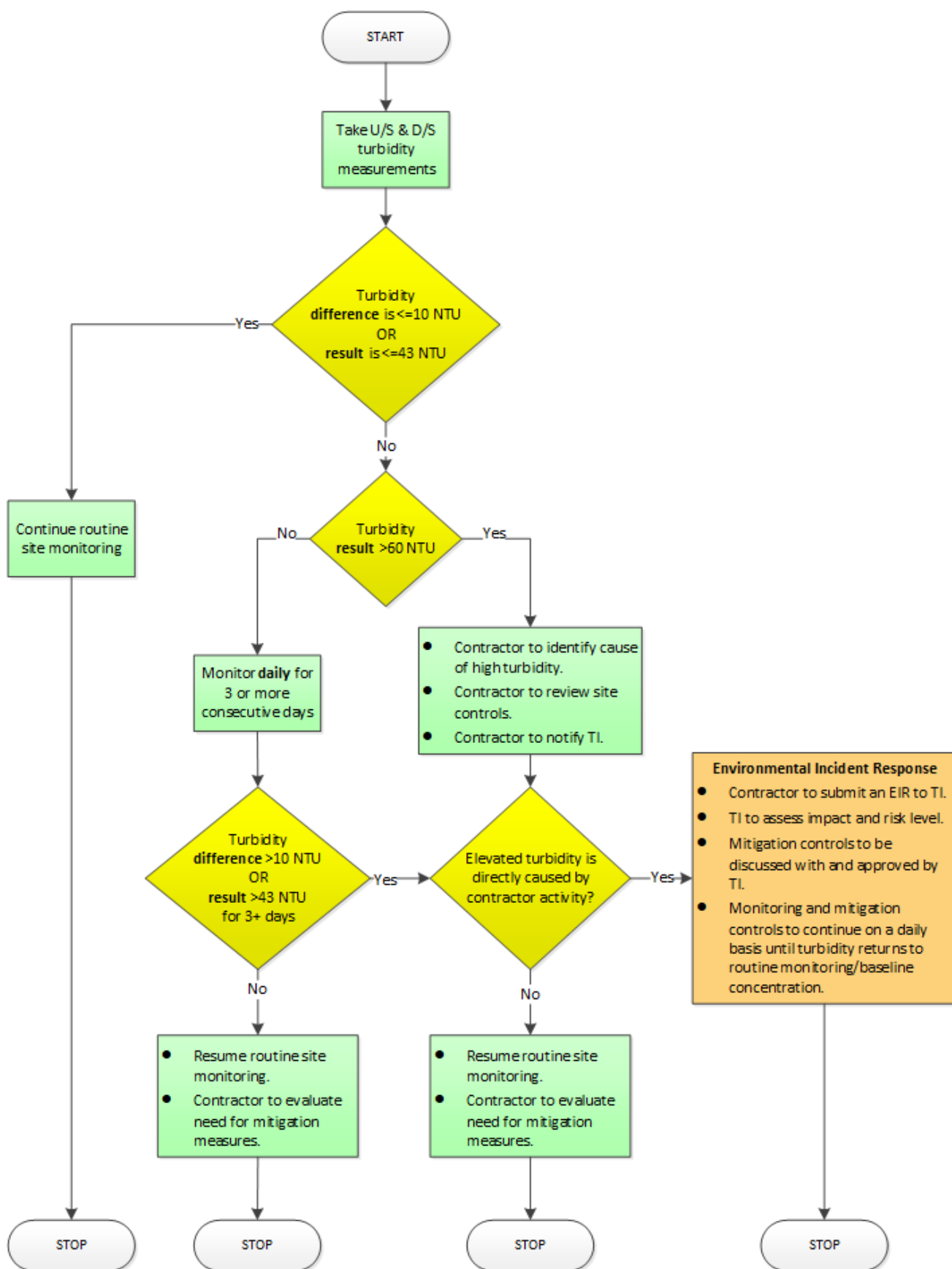


Figure 3 Northern Midlands Irrigation Scheme - Turbidity Management Framework

Monitoring Locations

All water crossings in Appendix A1 must be monitored in accordance with the CWQMP.

Water monitoring locations will be implemented as follows, noting that exact monitoring locations will be determined based on various factors, such as surrounding land use, property boundaries, drainage lines and other potential inputs that could affect monitoring.

Upstream:

- Located upstream of all watercourse crossing works and potential sedimentation inputs from the site
- Downstream of any confluences with significant creeks, streams or rivers
- Not to be undertaken less than 10m or further than 200 m upstream from the site.

Downstream:

- Located downstream of all construction sediment inputs (from both point and diffuse sources)
- Upstream of any confluences with significant creeks, streams or rivers
- Not be undertaken less than 20m or further than 200 m downstream of the construction site.

All water crossing monitoring locations will be recorded in a Survey123 form that will be provided by Tasmanian Irrigation prior to construction.

Auditing and Compliance

Reporting

Compliance with the CWQMP will be outlined in:

- Daily Site Diary.
- Water Quality Monitoring Checklist.
- Dairy Creek Water Quality Monitoring checklist.
- Weekly HSE inspection checklists.
- Monthly reports summarising outcomes of weekly inspections (provided monthly to TI).

Auditing

The CWQMP will be reviewed as part of CEMP audits to determine appropriateness of controls and if additional controls or updates to the CWQMP are required. The frequency of audits is outlined in Section 11 of the CEMP.

Incidents

An environmental incident will include, but will not necessarily be limited to the following events for reporting and investigation purposes:

- Hazardous material spills to ground or water
- A notifiable incident that results in actual or potential environmental nuisance or harm
- Exceedances in turbidity:
 - Where the downstream turbidity is more than 10 NTU higher than the upstream turbidity, but less than 43 NTU, current work activities are to be suspended until an

assessment of existing controls can be completed and further action is taken to minimise turbidity on-site and downstream.

- Where the downstream turbidity is more than 10 NTU higher than the upstream turbidity, and greater than 43 NTU, investigation and reporting is to be completed per the *NMIS Turbidity Management Framework* (Figure 3).

Where the downstream turbidity is less than 10 NTU higher than the upstream turbidity, but upstream and/or downstream is greater than 43 NTU, an investigation will be undertaken to identify the likely reason for high turbidity e.g. recent rainfall, adjacent paddocks being cultivated.

Incidents and/or non-conformances with the CWQMP, will be managed as follows:

- Contractor to control all spills in accordance with the Emergency Response Plan.
- Contractor to immediately notify the TI Project Manager of incidents and non-conformances.
- Contractor to complete an incident investigation and follow TI instructions (a suitably qualified person may need to be engaged to determine whether harm has occurred or if there is an ongoing threat to the flora and fauna in or near the impact area).
- TI to notify regulators (e.g. EPA, DCCEE) in accordance with legislative reporting requirements (where required).

References

- Australian Government. (2009). *Significant impact guidelines for the vulnerable growling grass frog (Litoria raniformis)*. Retrieved from Department of the Environment, Water, Heritage and the Arts: <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.dcceew.gov.au/sites/default/files/documents/litoria-raniformis.pdf>
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- NRE. (2025). *Threatened species management for Litoria raniformis, Green and Gold Frog*. Retrieved from Department of Natural Resources and Environment Tasmania: <https://www.threatenedspecieslink.tas.gov.au/Pages/Green-and-Gold-Frog.aspx>
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- NBES. (2024). *Northern Midlands Irrigation Scheme Preliminary Documentation (Revision 6, 8 March 2024)*. North Barker Ecosystem Services.
- Tasmanian Irrigation. (2024). *Northern Midlands Irrigation Scheme Construction Environmental Management Plan*. Tasmanian Irrigation Pty Ltd.

Appendix A1 – Water Crossing Schedule

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
B1_00100	Barton 1	512690	5373089	WC-126	WC-122	Tributary	No	No
B1_00650	Barton 1	513075	5372732	WC-127	WC-123	Tributary	No	No
B1_02550	Barton 1	514265	5371691	WC-128	WC-124	Minor Tributary	No	No
B1_04400	Barton 1	515850	5370964	WC-129	WC-125	Stream	No	No
B1_05050	Barton 1	516359	5370528	WC-130	WC-126	Minor Tributary	No	No
B1_05900	Barton 1	516873	5369939	WC-131	WC-127	Minor Tributary	No	No
B1_05950	Barton 1	516898	5369855	WC-132	WC-128	Minor Tributary	No	No
B1_06450	Barton 1	517036	5369391	WC-133	WC-129	Tributary	No	No
B1_07100	Barton 1	517225	5368753	WC-134	WC-130	Minor Tributary	No	No
B1_07300	Barton 1	517292	5368595	WC-135	WC-131	Minor Tributary	No	No
B1_07600	Barton 1	517502	5368383	WC-136	WC-132	Minor Stream	No	No
B1_09350	Barton 1	517854	5366753	WC-137	WC-133	Minor Tributary	No	No
B1_09450	Barton 1	517909	5366692	WC-138	WC-134	Minor Stream	No	No
B1_10100	Barton 1	518466	5366392	WC-139	WC-135	Minor Stream	No	No
B1_10750	Barton 1	519063	5366168	WC-140	WC-136	Tributary	No	No
B1_11800	Barton 1	520045	5365800	WC-141	WC-137	Stream	No	No
B1_11950	Barton 1	520219	5365734	WC-142	WC-138	Tributary	No	No
B1_12000	Barton 1	520241	5365725	WC-143	WC-139	Major Stream	No	No
B1_13050	Barton 1	521247	5365589	WC-144	WC-140	Minor Tributary	No	No
B1_15650	Barton 1	523700	5365025	WC-145	WC-141	Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
B1_16350	Barton 1	524341	5364676	WC-146	WC-142	Minor Stream	No	No
B1_16550	Barton 1	524486	5364577	WC-147	WC-143	Minor Tributary	No	No
B1_17950	Barton 1	525637	5363745	WC-148	WC-144	Minor Tributary	No	No
B1_18250	Barton 1	525845	5363573	WC-149	WC-145	Minor Tributary	No	No
B1_18400	Barton 1	525949	5363464	WC-150	WC-146	Tributary	No	No
B1_18650	Barton 1	526156	5363287	WC-151	WC-148	Minor Tributary	No	No
B1_19050	Barton 1	526438	5363052	WC-151	WC-147	Tributary	No	No
B1_19300	Barton 1	526628	5362846	WC-152	WC-149	Minor Tributary	No	No
B2_00250	Barton 2	526238	5363518	WC-153	WC-150	Major River	No	No
B2_00500	Barton 2	526394	5363694	WC-154	-	Unknown	No	No
B2_01050	Barton 2	526843	5364020	WC-155	WC-151	Minor Tributary	No	No
B2_01150	Barton 2	526945	5364092	WC-156	WC-152	Minor Tributary	No	No
B2_01400	Barton 2	527155	5364241	WC-157	WC-153	Minor Tributary	No	No
B2_03000	Barton 2	528444	5365154	WC-159	WC-154	Minor Tributary	No	No
B2_03050	Barton 2	528479	5365202	WC-160	-	Unknown	No	No
B2_03200	Barton 2	528580	5365273	WC-161	-	Unknown	No	No
B2_03300	Barton 2	528674	5365338	WC-162	-	Unknown	No	No
BA_00150	Barton A	519845	5365732	WC-163	WC-155	Tributary	No	No
BA_01500	Barton A	519419	5364476	WC-164	WC-156	Tributary	No	No
BA_01600	Barton A	519399	5364368	WC-165	WC-157	Minor Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
BA_01850	Barton A	519583	5364193	WC-166	WC-158	Minor Tributary	No	No
BA_03300	Barton A	520015	5362908	WC-167	WC-159	Tributary	No	No
BA_03700	Barton A	520152	5362551	WC-168	-	Tributary	No	No
BA_03750	Barton A	520168	5362514	WC-169	WC-160	Tributary	No	No
BA_03800	Barton A	520196	5362448	WC-170	WC-161	Minor Tributary	No	No
BA_03900	Barton A	520232	5362365	WC-171	WC-162	Minor Tributary	No	No
BA_04000	Barton A	520266	5362283	WC-172	WC-163	Minor Tributary	No	No
BA_04100	Barton A	520297	5362157	WC-173	WC-164	Minor Tributary	No	No
BA_04200	Barton A	520344	5362090	WC-175	WC-166	Major Stream	No	No
BA_4175	Barton A	520321.6	5362097.393	WC-173	WC-165	Minor Tributary	No	No
CB_00550	Campbell Town B	541517	5360080	WC-189	WC-196	Minor Tributary	No	No
CB_01000	Campbell Town B	541443	5359631	WC-190	WC-197	Minor Tributary	No	No
CB_01500	Campbell Town B	541360	5359122	WC-191	WC-198	Minor Tributary	No	No
CB_01600	Campbell Town B	541349	5359058	WC-192	WC-199	Minor Tributary	No	No
E1_00650	Epping Forest 1	524051	5371784	WC-176	WC-182	Tributary	No	No
E1_01800	Epping Forest 1	524971	5372447	WC-177	WC-183	Minor Tributary	No	No
E1_02600	Epping Forest 1	525569	5372967	WC-178	WC-184	Tributary	No	No
E1_03650	Epping Forest 1	526059	5373895	WC-179	WC-185	Minor Tributary	No	No
E1_04450	Epping Forest 1	526421	5374558	WC-180	WC-186	Major Stream	No	No
E1_04850	Epping Forest 1	526696	5374838	WC-181	WC-187	Minor Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
E1_05850	Epping Forest 1	527254	5375598	WC-182	WC-188	Minor Tributary	No	No
E1_06400	Epping Forest 1	527690	5375909	WC-183	WC-189	Minor Stream	No	No
E1_07200	Epping Forest 1	528381	5376363	WC-184	WC-190	Stream	No	No
E1_7620	Epping Forest 1	528717	5376585.99	-	WC-191	Tributary	No	No
EA_00950	Epping Forest A	524710	5373334	WC-185	WC-192	Minor Tributary	No	No
EA_00950	Epping Forest A	524698	5373346	WC-186	WC-193	Minor Tributary	No	No
EA_01000	Epping Forest A	524654	5373386	WC-187	WC-194	Minor Tributary	No	No
N1a_00050	Northern Midlands 1A	499812	5374978	WC-001	WC-001	Minor Tributary	No	No
N1a_00050	Northern Midlands 1A	499815	5374970	WC-002	WC-002	Minor Tributary	No	No
N1a_00250	Northern Midlands 1A	500000	5374872	WC-003	WC-003	Tributary	No	No
N1a_00400	Northern Midlands 1A	500087	5374772	WC-005	WC-004	Stream	No	No
N1a_00750	Northern Midlands 1A	500306	5374518	WC-006	WC-005	Minor Stream	No	No
N1a_01150	Northern Midlands 1A	500582	5374192	WC-007	WC-006	Tributary	No	No
N1a_01800	Northern Midlands 1A	501011	5373748	WC-008	WC-007	Major Stream	No	No
N1a_02000	Northern Midlands 1A	501203.7	5373645	-	WC-008	Minor Tributary	No	No
N1a_02100	Northern Midlands 1A	501307	5373579	WC-009	-	Minor Tributary	No	No
N1a_02200	Northern Midlands 1A	501353	5373535	WC-010	WC-009	Tributary	No	No
N1a_02450	Northern Midlands 1A	501523	5373368	WC-011	WC-010	Minor Tributary	No	No
N1a_02650	Northern Midlands 1A	501691	5373190	WC-012	WC-011	Minor Tributary	No	No
N1a_02850	Northern Midlands 1A	501763	5373017	WC-013	WC-012	Stream	Yes	Yes

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
N1a_02940	Northern Midlands 1A	501776	5372943	-	WC-013	Tributary	Yes	Yes (if flowing)
N1a_03000	Northern Midlands 1A	501784	5372884	WC-014	WC-014	Minor Tributary	Yes	Yes (if flowing)
N1b_00800	Northern Midlands 1B	502702	5372090	WC-015	WC-015	Minor Stream	No	No
N1b_01000	Northern Midlands 1B	502894	5372058	WC-016	WC-016	Minor Tributary	No	No
N1b_01100	Northern Midlands 1B	503009	5372040	WC-017	WC-017	Minor Stream	No	No
N1b_01700	Northern Midlands 1B	503574	5371947	WC-018	WC-018	Tributary	No	No
N1b_02400	Northern Midlands 1B	504252	5371836	WC-019	WC-019	Minor Tributary	No	No
N1b_02800	Northern Midlands 1B	504664	5371768	WC-020	WC-020	Minor Stream	No	No
N1b_03450	Northern Midlands 1B	505325	5371661	WC-021	WC-021	Minor Tributary	No	No
N1b_03550	Northern Midlands 1B	505403	5371649	WC-022	WC-022	Minor Tributary	No	No
N1b_04650	Northern Midlands 1B	506467	5371580	WC-023	WC-023	Minor River	No	No
N1b_05000	Northern Midlands 1B	506709	5371819	WC-024	WC-024	Minor River	No	No
N1b_06650	Northern Midlands 1B	507984	5372801	WC-026	WC-026	Minor Tributary	No	No
N1b_06820	Northern Midlands 1B	508145.3	5372897	-	WC-027	Minor Tributary	No	No
N1b_07550	Northern Midlands 1B	508844	5372971	WC-028	WC-028	Major Stream	No	No
N1b_08250	Northern Midlands 1B	509550	5373099	WC-029	WC-029	Minor Stream	No	No
N1b_09850	Northern Midlands 1B	511060	5373045	WC-030	WC-030	Minor Tributary	No	No
N1b_10500	Northern Midlands 1B	511701	5373135	WC-031	WC-031	Minor Tributary	No	No
N1b_10950	Northern Midlands 1B	512129	5373183	WC-032	WC-032	Stream	No	No
N1b_11450	Northern Midlands 1B	512587	5373139	WC-033	WC-033	Minor Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
N1b_11700	Northern Midlands 1B	512856	5373220	WC-034	WC-034	Minor Stream	No	No
N1b_12350	Northern Midlands 1B	513416	5373501	WC-035	WC-035	Minor Tributary	No	No
N1b_6360	Northern Midlands 1B	507747.5	5372666	-	WC-025	Minor Tributary	No	No
N2_00500	Northern Midlands 2	514436	5373803	WC-036	WC-036	Tributary	No	No
N2_01250	Northern Midlands 2	515158	5374116	WC-037	WC-037	Tributary	No	No
N2_01600	Northern Midlands 2	515475	5374224	WC-038	WC-038	Major River	No	No
N2_01950	Northern Midlands 2	515810	5374251	WC-039	-	Unknown	No	No
N2_02500	Northern Midlands 2	516316	5374115	WC-040	-	Minor Tributary	No	No
N2_02600	Northern Midlands 2	516410	5374090	WC-041	WC-040	Minor Tributary	No	No
N2_02600	Northern Midlands 2	516424	5374085	WC-042	WC-041	Minor Tributary	No	No
N2_02900	Northern Midlands 2	516716	5373987	WC-043	WC-042	Minor Tributary	No	No
N2_03000	Northern Midlands 2	516790	5373962	WC-044	-	Minor Tributary	No	No
N2_03300	Northern Midlands 2	517087	5373870	WC-045	WC-043	Minor Tributary	No	No
N2_03450	Northern Midlands 2	517229	5373833	WC-046	WC-044	Minor Tributary	No	No
N2_03600	Northern Midlands 2	517405	5373787	WC-047	WC-045	Minor Tributary	No	No
N2_05150	Northern Midlands 2	518897	5373894	WC-048	WC-046	Tributary	No	No
N2_05700	Northern Midlands 2	519371	5374057	WC-049	WC-047	Minor Tributary	No	No
N2_05700	Northern Midlands 2	519384	5374050	WC-050	WC-048	Minor Stream	No	No
N2_05950	Northern Midlands 2	519572	5373948	WC-051	WC-049	Tributary	No	No
N2_06450	Northern Midlands 2	519988	5373647	WC-052	WC-050	Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
N2_06500	Northern Midlands 2	520015	5373631	WC-053	WC-051	Tributary	No	No
N2_06500	Northern Midlands 2	520037	5373619	WC-054	WC-052	Tributary	No	No
N2_06985	Northern Midlands 2	520501.2	5373542	-	WC-053	Tributary	No	No
N2_07050	Northern Midlands 2	520539	5373502	WC-055	-	Minor Tributary	No	No
N2_07650	Northern Midlands 2	520900	5373014	WC-056	WC-054	Minor Stream	No	No
N2_09450	Northern Midlands 2	522398	5372102	WC-057	WC-055	Major Stream	No	No
N2_10300	Northern Midlands 2	523122	5371660	WC-058	WC-056	Tributary	No	No
N2_1995	Northern Midlands 2	515850.9	5374227	-	WC-039	Minor Tributary	No	No
N3_00250	Northern Midlands 3	523725	5371275	WC-059	WC-057	Tributary	No	No
N3_01250	Northern Midlands 3	524569	5370766	WC-060	WC-058	Minor Stream	No	No
N3_02650	Northern Midlands 3	525775	5370010	WC-061	WC-059	Minor Stream	No	No
N3_02750	Northern Midlands 3	525854	5369952	WC-062	WC-060	Minor Tributary	No	No
N3_03000	Northern Midlands 3	526048	5369832	WC-063	-	Minor Tributary	No	No
N3_03850	Northern Midlands 3	526720	5369343	WC-064	WC-061	Minor Tributary	No	No
N3_06500	Northern Midlands 3	528024	5367046	WC-065	WC-062	Minor Tributary	No	No
N3_06800	Northern Midlands 3	528141	5366798	WC-066	WC-063	Minor Tributary	No	No
N3_07000	Northern Midlands 3	528238	5366594	WC-067	WC-064	Minor Tributary	No	No
N3_07100	Northern Midlands 3	528275	5366516	WC-068	WC-065	Minor Tributary	No	No
N3_07150	Northern Midlands 3	528303	5366459	WC-069	WC-066	Minor Tributary	No	No
N3_07300	Northern Midlands 3	528361	5366340	WC-070	WC-067	Minor Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
N3_07600	Northern Midlands 3	528481	5366091	WC-071	WC-068	Minor Tributary	No	No
N3_07640	Northern Midlands 3	528506.9	5366038.029	-	WC-070	Major Stream	No	No
N3_07700	Northern Midlands 3	528523	5366003	WC-072	WC-069	Minor Tributary	No	No
N3_08000	Northern Midlands 3	528640	5365730	WC-073	-	Major Stream	No	No
N3_08150	Northern Midlands 3	528647	5365557	WC-074	WC-071	Major Stream	No	No
N3_08400	Northern Midlands 3	528690	5365357	WC-075	WC-072	Minor Tributary	No	No
N3_08500	Northern Midlands 3	528753	5365318	WC-076	-	Unknown	No	No
N3_8450	Northern Midlands 3	528721	5365322	-	WC-073	Minor Tributary	No	No
N4_01300	Northern Midlands 4	530169	5364742	WC-077	WC-074	Minor Tributary	No	No
N4_01400	Northern Midlands 4	530265	5364708	WC-078	WC-075	Minor Tributary	No	No
N4_02000	Northern Midlands 4	530812	5364487	WC-079	WC-076	Minor Tributary	No	No
N4_02100	Northern Midlands 4	530878	5364408	WC-080	WC-077	Minor Tributary	No	No
N4_02200	Northern Midlands 4	530932	5364339	WC-081	WC-078	Minor Tributary	No	No
N4_04600	Northern Midlands 4	532664	5362731	WC-082	WC-079	Minor Tributary	No	No
N5_03050	Northern Midlands 5	536392	5361254	WC-083	WC-080	Minor Tributary	No	No
N5_03900	Northern Midlands 5	537155.8	5360928.005	-	WC-081	Farm Dam	No	No
N5_05700	Northern Midlands 5	538559	5359824	WC-085	WC-082	Minor Tributary	No	No
N5_06150	Northern Midlands 5	538918	5359582	WC-086	WC-083	Tributary	No	No
N5_06700	Northern Midlands 5	539354	5359281	WC-087	WC-084	Minor Tributary	No	No
N5_06700	Northern Midlands 5	539365	5359282	WC-188	WC-195	Minor Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
N5_07150	Northern Midlands 5	539617	5358943	WC-088	WC-085	Minor Tributary	No	No
N5_08450	Northern Midlands 5	539843	5357692	WC-089	WC-086	Minor River	No	No
N5_09800	Northern Midlands 5	539530	5356422	WC-090	WC-087	Farm Dam	No	No
N5_10500	Northern Midlands 5	539152	5355879	WC-091	WC-088	Minor Tributary	No	No
N5_11400	Northern Midlands 5	538739	5355051	WC-092	WC-089	Tributary	No	No
N6_00200	Northern Midlands 6	538428	5354585	WC-093	WC-090	Minor Tributary	No	No
N6_00550	Northern Midlands 6	538316	5354266	WC-094	WC-091	Tributary	No	No
N6_01450	Northern Midlands 6	537898	5353571	WC-095	WC-092	Stream	No	No
N6_01850	Northern Midlands 6	537544	5353417	WC-096	WC-093	Major River	No	No
N6_05200	Northern Midlands 6	537604	5350636	WC-097	WC-094	Minor Stream	No	No
N6_06050	Northern Midlands 6	537804	5349791	WC-098	WC-095	Tributary	No	No
N6_07000	Northern Midlands 6	538036	5348879	WC-099	WC-096	Stream	No	No
N6_07300	Northern Midlands 7	538142	5348590	WC-100	WC-097	Tributary	No	No
N7_00250	Northern Midlands 7	538629	5348056	WC-101	WC-098	Minor Tributary	No	No
N7_00300	Northern Midlands 7	538669	5348012	WC-102	WC-099	Minor Tributary	No	No
N7_00350	Northern Midlands 7	538686	5347994	WC-103	WC-100	Minor Tributary	No	No
N7_02150	Northern Midlands 7	539662	5346511	WC-104	WC-101	Tributary	No	No
N7_04500	Northern Midlands 7	539939	5344310	WC-105	WC-102	Tributary	No	No
N7_04950	Northern Midlands 7	539963	5343864	WC-106	WC-103	Tributary	No	No
N7_05500	Northern Midlands 7	540017	5343343	WC-107	WC-104	Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
N7_06300	Northern Midlands 7	540198	5342587	WC-108	-	Tributary	No	No
N7_06650	Northern Midlands 7	540366	5342257	WC-109	-	Tributary	No	No
N7_06850	Northern Midlands 7	540443	5342112	WC-110	WC-106	Tributary	No	No
N7_07050	Northern Midlands 7	540549	5341908	WC-111	WC-107	Tributary	No	No
N7_07100	Northern Midlands 7	540573	5341859	WC-112	WC-108	Tributary	No	No
N7_07400	Northern Midlands 7	540708	5341612	WC-113	WC-109	Minor Stream	No	No
N7_07600	Northern Midlands 7	540810	5341430	WC-114	WC-110	Minor Tributary	No	No
N7_08350	Northern Midlands 7	540952	5340714	WC-115	WC-111	Minor Tributary	No	No
N7_08450	Northern Midlands 7	540967	5340642	WC-116	WC-112	Minor Tributary	No	No
N7_08550	Northern Midlands 7	541021	5340552	WC-117	WC-113	Minor Tributary	No	No
N7_09000	Northern Midlands 7	541410	5340373	WC-118	WC-114	Major River	No	No
N7_09150	Northern Midlands 7	541495	5340269	WC-119	WC-115	Major River	No	No
N7_09200	Northern Midlands 7	541539	5340208	WC-120	WC-116	Major River	No	No
N7_09250	Northern Midlands 7	541566	5340171	WC-121	WC-117	Minor Tributary	No	No
N7_6775	Northern Midlands 7	541038.7	5453195	-	WC-105	Tributary	No	No
NA_00400	Northern Midlands A	533152	5362031	WC-122	WC-118	Minor Tributary	No	No
NA_01400	Northern Midlands A	532535	5361280	WC-123	WC-119	Major River	No	No
NB_01850	Northern Midlands B	541219	5355915	WC-124	WC-120	Minor River	No	No
NB_03500	Northern Midlands B	542743	5355985	WC-125	WC-121	Tributary	No	No
P1_00300	Powranna 1	514064	5373947	WC-193	WC-167	Tributary	No	No

Line and Chainage	LineName	Easting	Northing	CEP WC Number	Design WC Number	Waterway Classification	Swan galaxias present	DCCEEW Approved Crossing Methodology Required
P1_03800	Powranna 1	515263	5377245	WC-194	-	Unknown	No	No
P1_03900	Powranna 1	515278	5377348	WC-195	WC-168	Minor Tributary	No	No
P1_04550	Powranna 1	515032	5377873	WC-196	WC-169	Major River	No	No
P1_04600	Powranna 1	515041	5377922	WC-197	-	Unknown	No	No
P1_04900	Powranna 1	514888	5378196	WC-198	WC-170	Minor Tributary	No	No
P1_05750	Powranna 1	514913	5378797	WC-199	WC-171	Minor Tributary	No	No
P1_05850	Powranna 1	514978	5378875	WC-200	WC-172	Minor Tributary	No	No
P1_05950	Powranna 1	515058	5378962	WC-201	WC-173	Minor Tributary	No	No
P1_06750	Powranna 1	515392	5379620	WC-202	WC-174	Minor Tributary	No	No
P1_08200	Powranna 1	515633	5380973	WC-203	WC-175	Minor Tributary	No	No
P1_08450	Powranna 1	515564	5381178	WC-204	WC-176	Minor Stream	No	No
P1_09350	Powranna 1	515964	5381849	WC-205	WC-177	Minor Stream	No	No
P1_10200	Powranna 1	516481	5382566	WC-206	WC-178	Tributary	No	No
P2_01000	Powranna 2	515942	5384035	WC-207	WC-179	Tributary	No	No
P2_01050	Powranna 2	515933	5384073	WC-208	WC-180	Stream	No	No
P2_01800	Powranna 2	515844	5384801	WC-209	WC-181	Minor Stream	No	No
P2_02000	Powranna 2	515833	5385017	WC-210	-	Tributary	No	No

Appendix A2 – Typical Horizontal Directional Drilling Environmental Controls Map

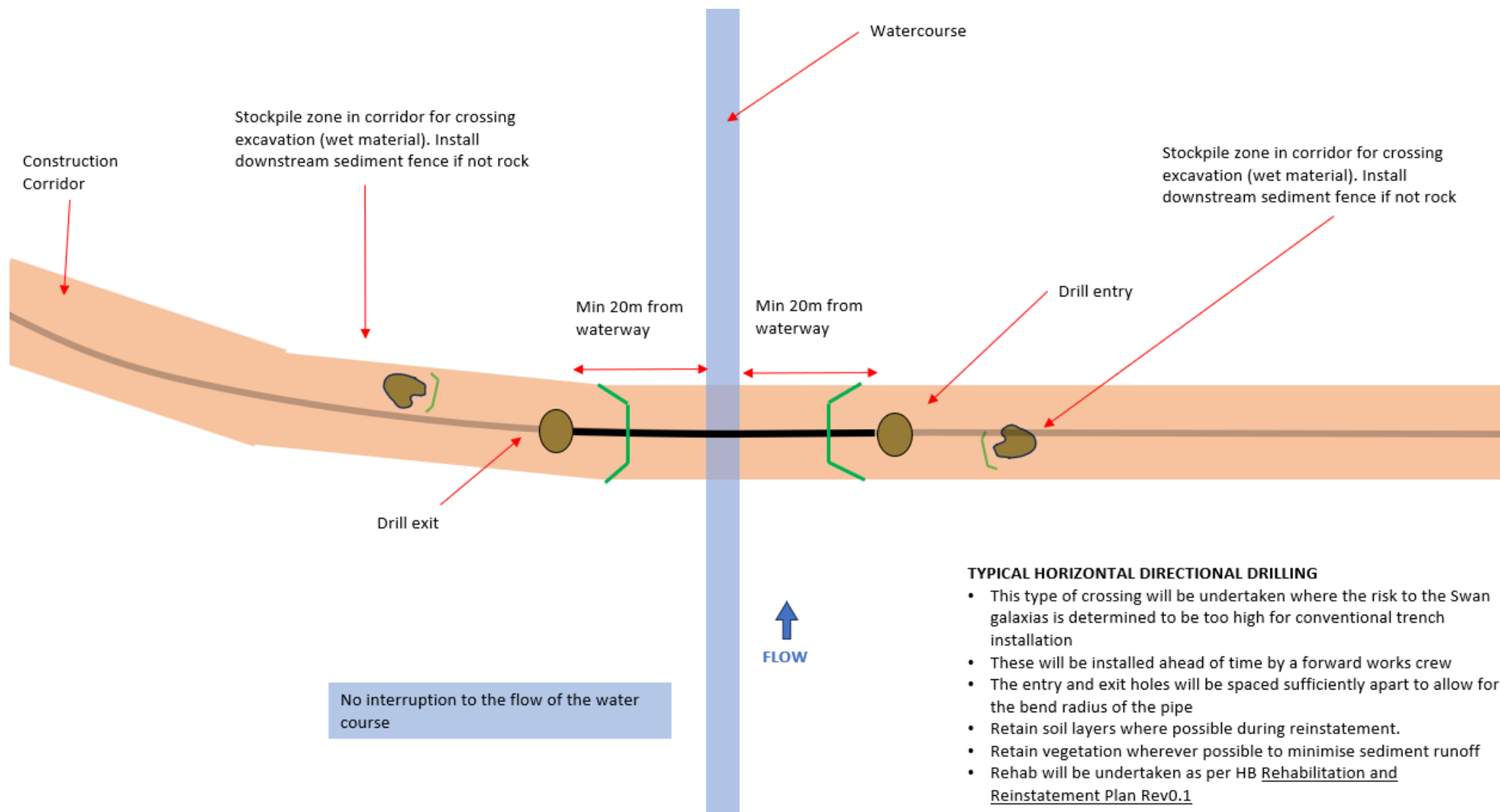


Figure 4 Typical horizontal directional drilling environmental controls map

Appendix A3 – Typical Transient (Flowing) Environmental Controls Map

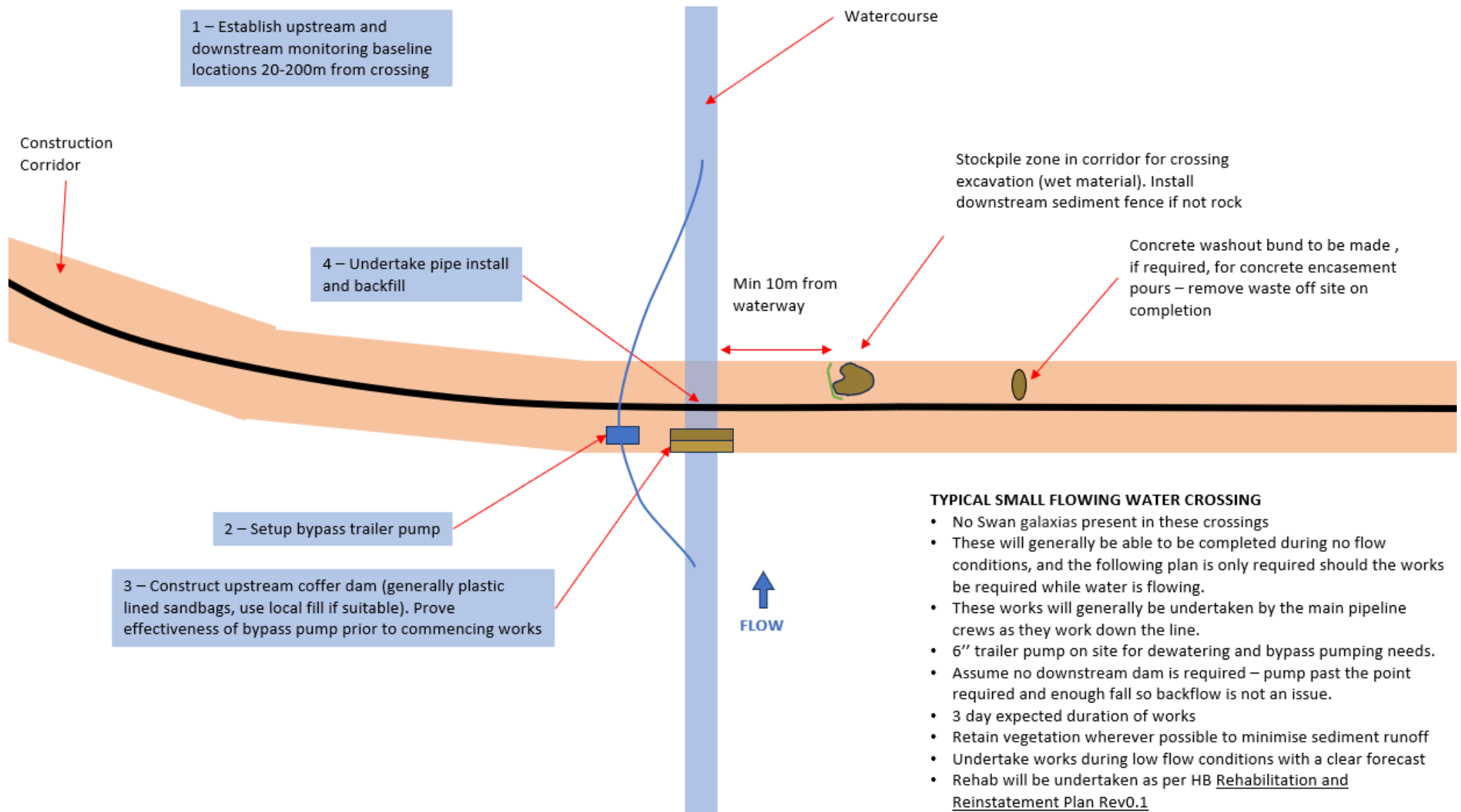


Figure 5 Typical transient (flowing) environmental controls map

Appendix A4 – Water Quality Monitoring Checklist (Example)

- Date/time (automatic)
- Sampler name (automatic)
- Site/Crossing No. (from list in Turbidity Management Framework - Table 1 Pipeline watercourse crossing locations with permanent flows)
- Construction phase
- PRE-construction ==> daily measurements required for at least one day before construction
- DURING construction ==> 3+ daily measurements required
 - before daily works
 - during daily works
 - after daily works
 - at any time of a visible change D/S from site activities
- POST-construction ==> daily measurements required for at least one day after construction
- Site Conditions
- Wind - nil, light, moderate, strong, gale
- Cloud cover - nil, 1-25%, 25-75%, 75-99%, 100%
- Current rainfall - nil, drizzle, showers, steady, downpour
- Visual Observations - U/S and D/S of construction works site, including adjacent to and in the stream bed of the watercourse
- Flow - no flow, slow, medium, fast, rapid, storage/dam
- No flow = no turbidity measurements required; visual observation only. Appropriate E&SC must still be implemented. Check these.
- Water level - falling, stable, rising
- Water surface - smooth, choppy, rough
- Clarity - clear, some sediment, moderate sediment load, high sediment load
- Comments
- Site photo – if anything unusual is observed
- Field Turbidity Measurements (NTU)
- Upstream result

(10 - 200 m upstream from water crossing works or potential sedimentation inputs from the site; D/S of any confluences with significant waterways)

- Downstream result

(20 - 200 m downstream of all construction sediment inputs (point and diffuse sources); U/S of any confluences with significant waterways)