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MEMORANDUM

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1. INTRODUCTION

Tetra Tech Coffey was engaged by Marinus Link Pty Ltd (MLPL) to complete additional hydrogeological assessments and reporting for the proposed Heybridge Converter Station and Shore Crossing site, located at Minna Road, Heybridge, Tasmania.

This memorandum provides Environment Protection Authority (EPA) Tasmania with a summary of the pertinent information relating to groundwater impacts and proposed mitigation and management measures to support EPA Tasmania's board with their assessment of the project.

For further information, refer to the following key documents on which this memorandum is based:

- Tetra Tech Coffey, 2024. Heybridge Groundwater Impact Assessment. Doc reference 754-MELEN215878ML_R18. November 2024
- Tetra Tech Coffey, 2025a. Heybridge Hydrogeological Assessment Report. Doc reference 754-MELEN215878ML_R19. 9 September 2025.
- Tetra Tech Coffey, 2025b. Heybridge Preliminary Groundwater Management Plan – Section 4. 25 September 2025.

These reports characterise groundwater behaviour beneath the Heybridge site. The proponent (MLPL) has established a robust baseline monitoring dataset that has informed modelling of potential project impacts on groundwater. The assessments provide EPA Tasmania with confidence that these potential impacts are sufficiently understood to enable appropriate management and mitigation measures during construction and operation to be implemented, thereby minimising impacts so far as reasonably practicable.

The information provided in this memorandum will be incorporated into the updated Groundwater Management Plan that will be finalised following project approval, and align to the structure and scope that has been provided to EPA Tasmania in the *Heybridge Preliminary Groundwater Management Plan* (Tetra Tech Coffey, 2025b).

2. ESTIMATED DEWATERING RATES

The Heybridge Hydrogeological Assessment Report (Tetra Tech Coffey, 2025a) developed a conservative groundwater impact assessment model that has been used to infer groundwater levels, estimate dewatering rates and the resulting groundwater level drawdown during construction and operation of the project. A summary of the predicted dewatering rates is provided in Table 2-1.

Table 2-1: Summary of predicted dewatering rates

Activity	Description	Estimated Dewatering Rate	Estimated Water Volume	Duration/Notes
HDD Launch Pits	2 metres (m) deep, ~20 × 4 m pits.	~1 m^3/day	~12 m^3total	Approx. 14 days; drawdown to ~20 m radius. Northeastern pit may require limited dewatering in winter.
Bored Pile Foundations	16 bored piles, 7.5 m depth (uncased during construction).	~0.5 litres per second (L/s) total (~43 m^3/day)	~1,267 m^3total	Approx 30 days. Largest short-term requirement; no dewatering after concrete poured.
Bulk Earthworks	Southern site boundary excavation; long-term seepage.	Year 1: ~0.5 m^3/day Year 2: ~0.07 m^3/day Year 3: ~0.01 m^3/day	Year 1: 194 m^3 Year 2: 24 m^3 Year 3: 4 m^3	Ongoing seepage, gradually reducing as system stabilises. Potential discharge may contain elevated PFAS and metals.

3. UPDATED GROUNDWATER IMPACT ASSESSMENT

The updated residual impact assessment reviewed all of the risks previously identified in the Groundwater Impact Assessment (GIA – Tetra Tech Coffey 2024) using new baseline monitoring data, refined site investigation data, and numerical modelling. A total of 12 potential risks were reassessed.

The following is a summary of the residual risks presented in the Heybridge Hydrogeological Assessment Report (Tetra Tech Coffey, 2025a):

- **New Risks Identified**: One notable new potential impact was identified; the possibility of seasonal groundwater discharge at the southern site margin resulting from proposed site earthworks, requiring consideration of long-term management or revised engineering design options to avoid the impact.
- **Changes in Residual Significance**:
  - **Groundwater Acidification**: The residual significance was revised downwards from moderate to low/very low. Improved characterisation of acid sulfate soils and seasonal groundwater fluctuations showed that the extent of oxidation risk is minor and localised.
  - **Saline Groundwater Intrusion**: Revised from moderate to very low, as monitoring confirmed the site is a groundwater discharge zone with minimal drawdown at the coastline.
  - **Release of Contaminated Groundwater**: Now better characterised. Modelling predicts that groundwater with low-level PFAS and metals may daylight seasonally at the southern boundary. While previously not considered significant, this is now recognised as requiring ongoing management, with residual risks assessed as low.
- **Unchanged Risks**: All other risks, including mobilisation of existing contamination, horizontal directional drilling, and construction-related chemical and fuel use, remain low or very low, consistent with the GIA (Tetra Tech Coffey, 2024) findings

The following sections provide a summary of the proposed environmental controls to be implemented during construction and operation to ensure that the residual impact significance ratings are achieved.

4. ENVIRONMENTAL CONTROL MEASURES

The need for active control measures is based on the assessment of construction works that may result in an unacceptable change in risk to a protected environmental value of groundwater or other segments of the environment. Mitigation and management measures are then implemented to reduce the magnitude of the impact to within acceptable levels, and as far as reasonably practicable.

4.1 GROUNDWATER INFLOW

Inflow control refers to the management of groundwater ingress (such as to excavations and boreholes) or other forms of groundwater discharge resulting from project construction or operation.

The Pre-construction Hydrogeological Assessment (Tetra Tech Coffey 2025a) (completed to address the requirements of the groundwater management and mitigation measure GWMM01) included numerical groundwater modelling to predict the location and volume of groundwater inflow as a result of the following activities expected to generate groundwater:

1. HDD launch pit excavation (temporary construction dewatering)
2. Construction of bored pile foundations (temporary construction dewatering)
3. Bulk earthworks (passive drainage from excavated embankments at southern site boundary, during construction and operation)

Control measures proposed for each construction activity are presented in the following sections.

4.1.1 HDD launch pits

The two HDD launch pits require a battered excavation approximately 20 m wide, 4 m long and approximately 2 m deep. The northeast excavation is not expected to intersect the water table, even during the winter period when groundwater levels are higher, and dewatering is not anticipated.

Limited construction dewatering is expected from the northeastern HDD launch pit, and will likely coincide with higher groundwater levels during winter. An estimated discharge volume of 12 m^3 (approximately 1 m^3/day) conservatively assumes dewatering during the winter period. Under these conditions, groundwater level drawdown extends approximately 20 m from the excavation.

No adverse impacts (such as saline water intrusion, groundwater acidification, or mobilisation of existing contamination) are expected as a result of dewatering of the HDD launch pit(s).

No inflow control measures are proposed to minimise already low groundwater inflows to the HDD launch pit(s). A small sump pump should be installed in the base of the excavations and generated groundwater should be pumped into a water storage tank and analysed before discharge (as described in Section 4.5.1). The sump pump should be connected to the site power supply (or intermittently powered by a 2 kilovolt generator as required).

Where construction scheduling permits, the HDD excavations should occur during drier months when the water table is deepest and the need for dewatering is minimised or avoided.

4.1.2 Bored pile foundations

Bored foundation piles are proposed as part of the engineering design to ensure buildings and structures remain level and stable. Once drilled, the boreholes typically need to be dewatered so that concrete piles can be poured and the concrete is allowed to cure.

The Pre-construction Hydrogeological Assessment (Tetra Tech Coffey 2025a) modelled the effect of simultaneously dewatering 16 uncased, bored piles to a uniform depth of 7.5 metres below the site level. Actual piling depths maybe less if competent bedrock is encountered at shallower depths.

The dewatering rate was estimated to be 0.5 L/s at each the 15 boreholes, with individual dewatering rates generally decreasing from east to west from 0.02 L/s to <0.001 L/s as the depth to groundwater increases. An estimated average daily dewatering rate of 43 m^3/day is anticipated, equating to a total of 1,267 m^3 over the assumed 30-day dewatering period. Once the concrete foundations are poured, no further dewatering is required.

Modelling results show that temporary drawdown of up 0.5 m to 0.6 m may occur extensively through the central portion of the site around the dewatered piles, under the conservative assumption that all boreholes are drilled and dewatered simultaneously. The predicted 0.6 m drawdown is unlikely to have an adverse effect on groundwater (i.e., negligible risk of saline groundwater intrusion, groundwater acidification, or mobilising existing contamination) and mitigations are not proposed to reduce impacts.

However, in line with GWMM02, which requires the minimisation of groundwater inflow into excavations so far as practicable, bore piles extending below the water table (which are the highest producer of groundwater during construction) should be cased to minimise groundwater ingress (Table 4-1).

Table 4-1: Groundwater inflow control measures – bored piles

Control measure	Description
Cased boreholes	Use Continuous Flight Auger (CFA) piles instead of open-bored piles below the water table to avoid open holes or adopt temporary casing below the water table which limits the dewatering required.

Groundwater generated during piling should be retained in a water storage tank and analysed before discharge (as described in Section 4.5.1).

4.1.3 Bulk earthworks

Bulk earthworks are proposed to further level the site through cutting (excavating) raised sections along the southern site boundary and filling lower elevations in the centre of the site. The Pre-construction Hydrogeological Assessment (Tetra Tech Coffey, 2025a) identified that excavated areas along the southern boundary may, during periods of seasonally high groundwater levels, result in groundwater discharge to the surface (i.e. laterally through the lowered embankment).

Modelling predicts the following maximum, conservative discharge rates from the bulk earthworks (refer to Section 7.3.2.3 of the Tetra Tech Coffey 2025a Hydrogeological Assessment Report):

- Year 1 – 194 m^3/year (~500 litres per day (L/day)
- Year 2 – 24 m^3/year (~ 65 L/day)
- Year 3 – 4 m^3/year (~10 L/day)

Groundwater discharge during Years 1 and 2 will occur during site construction, and are discussed further in Section 4.1.3.1 and will be managed as part of the wider groundwater inflow system outlined in Section 4.5.1.

The small volume of periodic (likely annual seasonal) groundwater discharge is expected to continue from two main points along the southern boundary, which correspond with the two areas where maximum groundwater ingress is shown to occur in Figure 4-1. Discharge from the southeastern corner of the site is in the vicinity of the former fire training area and upgradient of monitoring wells where detectable concentrations of PFAS have been reported along with elevated concentrations of some dissolved metals.

Two monitoring wells currently characterise groundwater in the southeast of the site: HB-MW06 and HB-BH06-C(S). Perfluorooctane sulfonate (PFOS) was detected at one of the two locations (0.15 µg/L at HB-BH06-C(S)), marginally exceeding the 0.15 µg/L 95% marine ecosystem protection criterion. Total per- and poly-fluoro alkyl substances (PFAS) (including PFOS) was reported at concentrations below the laboratory reporting limits at HB-MW06. Concentrations of dissolved metals, including cobalt, copper, nickel and zinc, were reported in excess of their respective ecosystem protection criteria. This is consistent with groundwater quality reported across the site that naturally migrates towards the coastline.

The project operational phase mitigation measures are presented in Section 4.1.3.2.

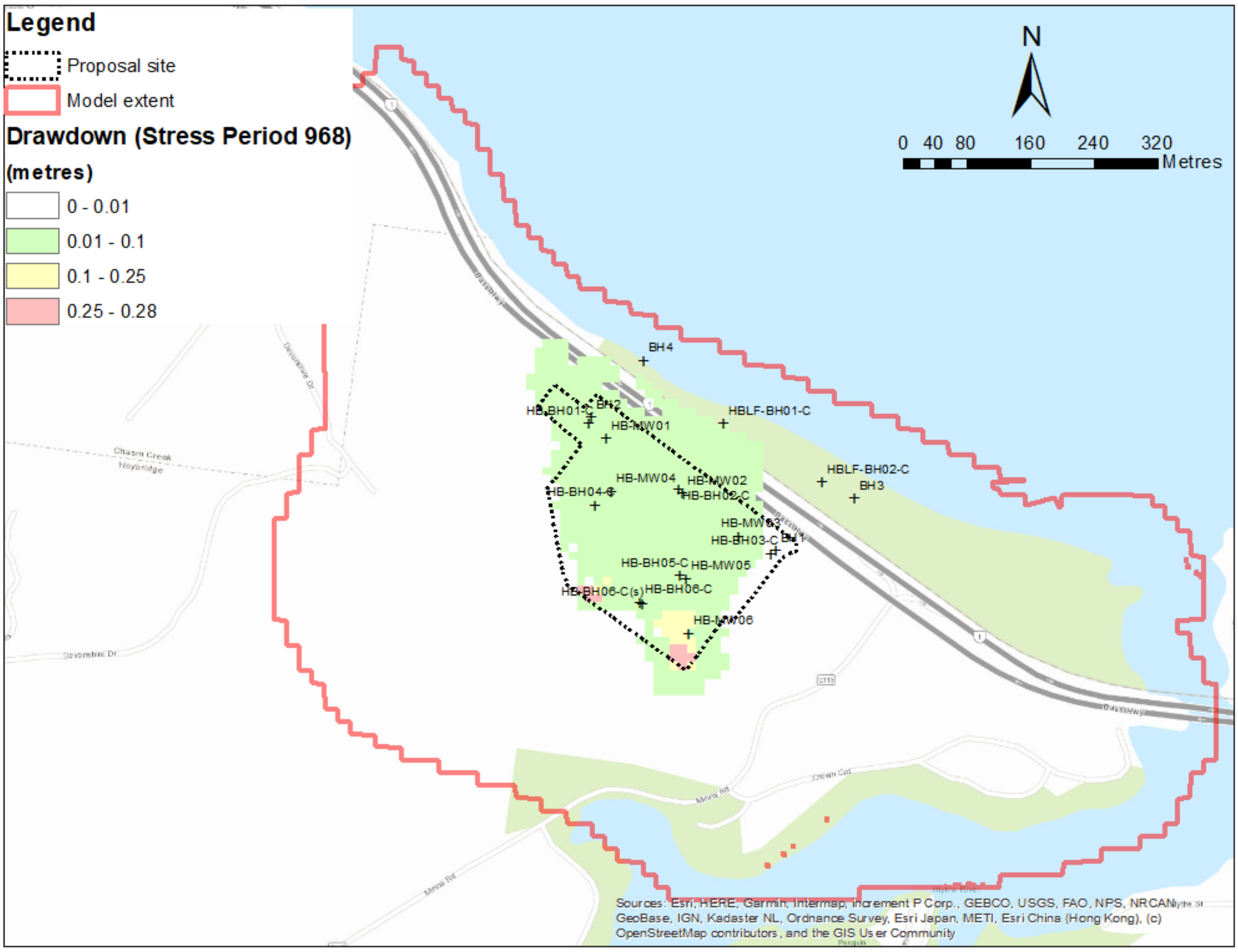

Figure 4-1 Groundwater level 2 years after maximum drawdown of bulk earthworks leveling

Table 4-2 summarises the additional measures proposed to inform the final design and engineering mitigations that may be required to address the risks associated with potential long-term discharge of low volumes of contaminated groundwater during operation.

Table 4-2: Groundwater inflow control measures – additional level and quality monitoring (pre-construction)

Control measure	Description
Additional monitoring level and quality assessment	Install three new groundwater monitoring wells along the up-gradient boundary of the proposed bulk earthworks area (HB-BH-A, and HB-BH-B) and site boundary (HB-BH-C) in the southeastern corner of the site to characterise groundwater level and quality (shown on Figure 4-2). Quality results from (HB-BH-A, and HB-BH-B) will allow direct assessment of the representative contaminant concentration in groundwater at the location where discharge is anticipated. This will inform the likely quality of wastewater requiring onsite retention, testing and offsite disposal. Quality results from (HB-BH-C) will allow direct assessment of upgradient, background quality entering the site and will support assessment of risk to the marine ecosystem should further mitigation via an up-gradient drain be adopted as a mitigation for operation phase (Section 4.1.3.2).
Baseline groundwater monitoring	Quarterly groundwater level and quality monitoring from the existing groundwater monitoring wells to continue to characterise seasonal groundwater level range and quality.

Figure 4-2: Proposed new groundwater monitoring locations and approximate extent of bulk earthworks cut (green) (PFAS source areas – Synnot & Wilkinson, 1996)

4.1.3.1 Construction phase

Bulk earthworks during construction may result in groundwater discharge to the ground surface and may have contaminant concentrations that are elevated above marine ecosystem protection criteria. Groundwater discharge will be captured in temporary drains cut along the toe of the southern boundary excavation face to collect groundwater discharge and direct it via sump pumps and enclosed pipes to the groundwater management system for testing and offsite disposal (described in Section 4.5.1).

Groundwater quality is comparable to groundwater sourced at other proposed areas where construction areas are dewatered, such as the HDD launch pits and bored piles.

4.1.3.2 Operation phase

The potential for long term, low volume (~10 L/day) groundwater discharge during operation represents an increased potential for adverse impacts particularly to the marine environment should unmitigated discharge be permitted to enter the site stormwater system.

Two potential mitigations are proposed, with the final option to be decided during detailed design:

- Upgradient groundwater drains
- Raised ground levels to avoid intersecting high groundwater

These options are described further in Table 4-3. Both options are considered appropriate and would avoid contaminated groundwater from being generated during operation and avoids the need for ongoing, active management. The additional groundwater investigations outlined in Table 4-2 will assess the suitability of the proposed upgradient groundwater drains as a mitigation measure.

Table 4-3: Groundwater inflow control measures – bulk earthworks (operation)

Control measure	Description
Upgradient groundwater drains	If groundwater quality and subsequent risk assessment determines that groundwater quality on the upgradient site boundary is unlikely to pose a risk to the marine ecosystem based on dissolved metals and PFAS concentrations at proposed well HB-BH-C, an upgradient groundwater drain will be used to manage groundwater levels. Groundwater quality results from HB-BH-C will be analysed for comparison to: • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018). • Heads of EPA Australia and New Zealand (HEPA). PFAS National Environmental Management Plan Version 3.0 (HEPA, 2025). • National Environment Protection (Assessment of Site Contamination) Measure 1999. If further groundwater investigations indicate that groundwater quality produced by the drain is likely to be suitable for discharge to stormwater, the detailed design will include an up-gradient, SE-NW trending tile drain to be installed at a depth of approximately 8.7 m Australian height Datum (AHD) along the southern site boundary (up gradient of the proposed bulk earthwork embankment). The drain will lower groundwater levels in the southeastern corner of the site and transport unimpacted groundwater from upgradient of the site to stormwater (or passively reinfiltrate to groundwater downgradient) at a maximum rate of ~10 L/day. Quarterly monitoring of drain discharge will be conducted during construction and compared to the guidelines listed above. This further monitoring will be used to provide confidence that ongoing discharge during operation will be suitable for direct discharge to the site stormwater system (and ultimately the marine ecosystem). At the completion of the construction phase it is expected the groundwater discharge rate and chemical variability will have stabilised. A further 24 months of quarterly operational monitoring will occur to ensure the drain discharge quality has reached equilibrium. Consideration would be given to naturally occurring solutes, including dissolved metals, with naturally elevated concentrations above adopted guideline values considered representative of the regional groundwater discharge to the marine environment. Naturally elevated solutes would not preclude discharge to the site stormwater system.
Raised ground level to avoid intersecting high groundwater	If groundwater quality along the upgradient boundary indicates an unacceptable risk to the marine environment based on the dissolved metals and/or PFAS concentrations (determined by further work outlined in Table 4-2 or from results of construction monitoring of the drain discharge), the proposed site levels would be raised (or locally benched in the

Control measure	Description
	southeastern corner of the site) to an elevation above groundwater (estimated to be ~9.5 m AHD). This mitigation avoids operational groundwater discharge. The final ground surface elevation would be refined during detailed design and potentially additional refinements to groundwater modelling.

4.1.4 Contingency measures

Contingency inflow controls may be needed where unexpectedly shallow groundwater or high inflow rates are encountered, or where extended periods of dewatering would otherwise be required.

Contingency inflow control measures that will available during construction should unforeseen conditions be encountered are detailed in Table 4-4.

Table 4-4: Potential groundwater inflow control measures

Option	Control Measure
Wellpoints	A series of dewatering wells could be installed around proposed excavations and strategically used to lower the water level.
Sheet piles	If high groundwater inflows are encountered at temporary excavations, retaining structures such as sheet piles may be used to limit inflow.
Re-scheduling excavation works when groundwater levels are at their minimum	By scheduling work when groundwater levels are expected to be at their lowest (such as in drier months when rainfall is lowest), inflow into excavations will be minimised.
Installation of additional/larger capacity sump pumps and water storage tanks as required	The ability to upscale dewatering capability and water storage volume ensures there is capacity for water management

4.2 GROUNDWATER CONTAMINATION

Low level groundwater contamination is present at the site and has been defined by the baseline groundwater monitoring program. The Pre-construction Hydrogeological Assessment (Tetra Tech Coffey 2025a) identified the following:

- Localised exceedances of screening criteria for metals (cobalt, nickel, zinc, copper), consistent with imported fill material and historical industrial operations at the site,
- PFAS concentrations (PFOS up to 0.18 µg/L; Sum of PFHxS[1] + PFOS up to 0.31 µg/L) in excess of the Marine ecosystem screening criteria, and
- Low-level concentrations of total recoverable hydrocarbons (TRH) (Fractions C_{10}–C_{36}) below the adopted screening criteria, consistent with historic site use.

These contaminants are confined to a small number of wells, with no evidence of significant or contiguous contaminant plumes. The proposed dewatering activities would not materially increase the risk to Protected Environmental Values (PEVs) or sensitive receptors, and produced groundwater will be managed as described in Section 4.5.

[1] PFHxS = Perfluorohexane sulfonate

The proposed construction dewatering will not result in an increased risk to PEVs and the risk remains low. Routine monitoring (GWMM04, GWMM05) will provide sufficient controls to manage risk of unforeseen contamination being encountered.

4.3 GROUNDWATER DEPENDENT ECOSYSTEMS

Aquatic groundwater dependent ecosystems (GDEs) have been identified at the Blythe River, approximately 260 m to the south of the site at its closest point. Drawdown from dewatering will not extend to identified GDE areas and active control measures are not required.

4.4 REGISTERED GROUNDWATER USERS

One registered groundwater user of relevance to this assessment has been identified, with a well located approximately 350 m south of the site.

Construction and operational groundwater discharge is not predicted to cause groundwater level or quality changes. Routine monitoring (GWMM04, GWMM05) will provide sufficient controls to manage risk associated with unexpected drawdown extending offsite.

4.5 WASTE WATER MANAGEMENT

4.5.1 Construction

This section outlines the proposed strategy to manage extracted groundwater during construction.

Some dewatering will be required during excavation of HDD launch pits, bored piles and other minor excavations. Groundwater discharge is also expected during the bulk earthworks from points along the southern boundary where excavation extends below the current watertable. Produced groundwater from these activities (and potentially other onsite sources of wastewater) will be retained onsite in tanks for periodic testing and disposal based on reported water quality.

Wastewater will be managed by the following methods.

- Install four temporary 45 m^3 above ground water tanks to hold produced groundwater collected during construction dewatering.
    - We note that modelling indicates that only two 45 m^3 tanks would be required, however this is doubled to account for any uncertainty associated with modelling or assumptions made, and to provide redundancy at short notice if required.
- Once two tanks are full, the contents will be analysed for potential contaminants by submitting water samples to a laboratory accredited by NATA for the proposed analyses (Analytical Services Tasmania).
    - Samples will be collected from each tank and analysed for:
        - TDS, pH, total suspended solids (TSS)
        - Nitrogen species
        - Dissolved metals
        - Total petroleum hydrocarbons (TPH) and TRH.
        - Benzene, toluene, ethylbenzene, and xylene (BTEX compounds).
        - Polycyclic aromatic hydrocarbons (PAH) and phenols.
        - PFAS.

- The water would then be disposed of in line with its contamination status (including offsite disposal to a licensed water treatment contractor if required).

Groundwater may be unsuitable for discharge to the environment due to both the naturally elevated concentrations of some metals and also site sourced contaminants, such as PFAS. Therefore, dewatered groundwater is not proposed to be discharged to the environment, including via stormwater.

Therefore, disposal criteria are not currently proposed for consideration. Final disposal criteria will be obtained from waste disposal contractors. None of the reported concentrations of groundwater contaminants at the site would require any onsite treatment prior to offsite disposal.

Stormwater will be managed separately via the site's construction stormwater management system and is not considered further in this memo.

4.5.2 Operation

Active dewatering occurs only during construction. The temporary tanks and periodic analysis and disposal via a licensed waste disposal contractor is not anticipated to be required during operation.

The two proposed mitigation measures to address the potential seasonal discharge of groundwater from the southern site boundary during operation will avoid groundwater from being generated (Table 4-3).

4.6 DEWATERING INFLOW MONITORING

During dewatering of excavations for construction and earthworks, the instantaneous and cumulative volumes pumped from each excavation should be measured and recorded at least daily.

A summary of the expected groundwater inflow into excavations is provided in Section 2 and will be included in the final Groundwater Management Plan.

Recorded extraction rates should be routinely compared against modelled predictions to provide early warning of potential deviations from the modelled drawdown levels and extent.

4.6.1 Dewatering Exclusion Rule Following Rainfall

High rainfall events are expected to generate rainfall runoff and may periodically fill temporary construction excavations with uncontaminated water. This non-groundwater sourced runoff is excluded from the same monitoring and management requirements that are required for produced (dewatered) groundwater.

Following rainfall events greater than 10 millimeters (mm) in 24 hours, standing water that is present in previously dewatered excavations (such as the HDD launch pits) should be pumped out and managed as site sourced stormwater. The intent is to isolate different sources of water based on their contamination status, so as not to result in larger volumes of potentially contaminated water requiring treatment and/or disposal.

The 10 mm rainfall event threshold (measured using the nearest Bureau of Meteorology station) is consistent with the definition of a significant rainfall event in hydrological monitoring and represents the point at which infiltration is likely to disturb groundwater chemistry in shallow systems. Dewatering personal must record the timing and magnitude of rainfall events and confirm compliance with the exclusion rule prior to dewatering diversion and recommence sampling. Any deviation from this rule must be documented and justified in the monitoring records.

For the 24 hours following a rainfall event exceeding 10 mm, groundwater generated during dewatering of open pits (such as the HDD launch pits) should be managed as stormwater, unless field monitoring demonstrates that sump water levels and field water quality parameters have restabilised. Stabilisation is considered to have occurred when inflow is within 50% of the pre-storm dewatering rate and field water quality parameters (such as electrical conductivity) have return to within 50% of the baseline range. These values and triggers would be defined once individual dewatering activities begin and a baseline dataset is available.

5. OTHER ITEMS

5.1 ADDITIONAL GROUNDWATER ASSESSMENT

Three additional monitoring wells are proposed to support the final mitigations adopted to manage groundwater management resulting from bulk earthworks.

The objective of installing additional groundwater monitoring wells is to characterise the quality of groundwater that would discharge:

- At the southern boundary earthworks cut face
- Via the proposed up-gradient cut off drain

The groundwater level is of less importance for the design or feasibility of these scenarios but would support the detailed design following approval.

5.2 COMMENTS ON MODELLING UNCERTAINTY

The Heybridge groundwater model did not undertake uncertainty analysis as part of the model impact scenarios. Composite sensitivity analysis of calibratable model parameters was undertaken. Here, groundwater recharge was identified as the most sensitive parameter to impact the objective function as described in figures 7 to 9 of the Heybridge Hydrogeological Assessment (Tetra Tech Coffey, 2025a). At the onset of calibration, groundwater recharge was applied to the groundwater model as a percentage of rainfall at a starting value of 5 %, and a calibratable range between 1 to 10 %. As a general rule of thumb, groundwater recharge is generally estimated in the order of 5% of rainfall (Zhang et al. 2003). Upon calibration, 2 % of rainfall was determined to be the most likely-fitting ratio based on the range and other calibration parameters ranges (as per the PEST ensemble approach described in Doherty, 2025). The 2 % value was lower than expected but it did not reach the 1 % boundary. The 2 % value lies within the estimated recharge rates while graphing rainfall and available groundwater level data.

The relationship between groundwater recharge rate and estimated dewatering volume is not 1:1. That is, if groundwater recharge rates were higher, groundwater evaporation would be higher and aquifer parameters values would also differ, thereby if the recharge was doubled, the modelled scenario dewatering rates would not also double. An assessment of what the relationship is would require detailed uncertainty analysis of the groundwater scenarios; this has not been undertaken to date.

Despite groundwater recharge and estimated dewatering volumes not being a 1:1 relationship, if a conservative approach was undertaken, this 1:1 ratio could be assumed. Thereby if groundwater recharge was doubled (i.e. 4% of rainfall) dewatering rates would also require doubling. As such contingency for larger volumes of wastewater storage has been assumed (Section 4.5.1).

5.3 TIOXIDE TUNNEL INFLUENCE AND MANAGEMENT

The August 2025 groundwater monitoring results inferred localised drawdown around the Tioxide tunnel may influence groundwater levels locally during a period of raised groundwater levels. This implies that the tunnel may be at most a seasonal discharge point.

The following points are made in this regard:

- The rate of groundwater discharge to the tunnel is likely to be limited by the hydraulic conductivity of the surrounding aquifer rather than degree of damage to the tunnel. This is supported by the fact that the tunnel is already potentially causing drawdown of local groundwater to approximately the tunnel elevation (i.e., greater drawdown is unlikely to occur).
- In the numerical model, the tunnel was represented as a passive drain feature with conservative hydraulic conductivity assumptions (very high relative to the surrounding sand aquifer), and results did not identify it as a significant groundwater discharge pathway.
- The proposed earthworks, and specifically the planned removal of geotechnically unsuitable fill material and replacement with compacted soils, will likely reduce the hydraulic conductivity in the area surrounding the tunnel, and reduce the rate that groundwater may discharge to it.
- Water quality in the tioxide tunnel is already comparable to that of the surrounding groundwater on site. Increased discharge of groundwater to the tunnel would not increase the contaminant concentration in the water within the tunnel.

Placement of engineered fill and movement of construction plant and activities is not expected to reduce the tunnel's integrity as guided by an engineering assessment, however this will be further considered during detailed design. If deterioration were to occur, this would be unlikely to materially increase groundwater discharge given the aquifer-controlled system behaviour. On this basis, no changes to impact assessment or water management measures are considered necessary, and no active management of tunnel water is proposed.