



# Review of Environmental Factors Addendum

## Calderwood 3A2 Wastewater Servicing

### Determination

This Review of Environmental Factors Addendum (REFA) assesses potential environmental impacts of the proposed change to Calderwood 3A2 Wastewater Servicing creek crossings. The REFA was prepared under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Sydney Water both the proponent and determining authority.

The Sydney Water Project Manager is accountable for ensuring the proposal is carried out as described in this REFA and the approved REF. Additional environmental impact assessment may be required if the scope of work or work methods described in this REFA change significantly following determination.

### Certification

I certify that I have reviewed and endorsed this REFA and, to the best of my knowledge, it is in accordance with the EP&A Act and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). The proposal has been considered against matters listed in section 171 (Appendix A) and the guidelines approved under section 170 of the EP&A Regulation. The information it contains is neither false nor misleading.

Prepared by:	Reviewed and endorsed by:	Endorsed by:
 Stuart Dawson Senior Environmental Scientist, Sydney Water Date: 26/02/2025	 Sarah Mitchell Environment Representative, Sydney Water Date: 26/02/2025	 Benn Weston Project Manager, Sydney Water Date: 28/02/2025

### Decision Statement

The main potential additional construction environmental impacts of the proposal change include impacts to hydrology, geomorphology and aquatic biodiversity. During operation, impacts are not anticipated. The proposal will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats. Therefore, a Species Impact Statement (SIS) and/or Biodiversity Development Assessment Report (BDAR) is not required.

Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment. Therefore, we do not require an Environmental Impact Statement (EIS) and the proposal may proceed.

<b>Determined by:</b> 	Murray Johnson, Senior Environment and Heritage Services Manager, Sydney Water Date: 11/03/2025
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# 1. Proposal description

Table 1-1 Proposal need, objectives and consideration of alternatives

Aspect	Relevance to proposal
Approved REF	Review of Environmental Factors Calderwood 3A2 Wastewater Servicing, November 2024 (Approved REF)
Proposal need and objectives	<p>Sydney Water is responsible for providing wastewater infrastructure in the Illawarra region and has been progressively delivering services as development occurs within the Calderwood Precinct. Sydney Water proposes to install wastewater infrastructure for the 3A2 area (Calderwood 3A2) which is primarily located at 1 Cattle Road and across adjacent properties. Ultimately, wastewater flows will be transferred to the Shellharbour wastewater system via the existing wastewater pumping station SP1192.</p> <p>The key driver for the proposal is to ensure there is sufficient wastewater system capacity to service the Governments planned development of the West Lake Illawarra Growth Area up to 2048. This proposal is required to meet Sydney Water’s commitment to service continuing growth in Calderwood as stated in the Growth Servicing Plan (2019-2024).</p> <p>The proposal objectives are to:</p> <ul style="list-style-type: none"> <li>• provide the timely delivery of wastewater services to Calderwood 3A2</li> <li>• support the orderly roll out of land release and infrastructure</li> <li>• meet Sydney Waters statutory and regulatory obligations.</li> </ul> <p>The secondary objectives are to provide services that:</p> <ul style="list-style-type: none"> <li>• protect public health</li> <li>• protect catchment and river health</li> <li>• provide affordable and efficient wastewater services</li> <li>• provide resource and energy efficient wastewater services.</li> </ul>
Proposal change description and methodology	<p>The proposal scope in the approved REF involves the installation of:</p> <ul style="list-style-type: none"> <li>• 1.3 km of gravity main (comprising DN300, DN375, DN600 and OD620)</li> <li>• 1.3 km of rising main (comprising OD335 and DN375)</li> <li>• 12 Maintenance Holes (MH) to be constructed along the gravity mains and 1 MH at the termination of the rising main, connecting to MH 11444939 south of Calderwood Road.</li> </ul> <p>As well as the construction of SP1193 and electrical transmission infrastructure.</p> <p>The proposed changes involve:</p> <ul style="list-style-type: none"> <li>• Open cut trenching the two creek crossing sections of Marshall Mount Creek and involves the:</li> </ul>



Aspect	Relevance to proposal
	<ul style="list-style-type: none"><li>○ construction of instream structures such as dams, working platforms and shoring boxes to provide a protected work area within the waterway</li><li>○ diversion of creek flows via a pump from upstream of the dams to downstream of the work area</li><li>○ installation of concrete encased wastewater mains</li><li>○ construction of a rip rap consisting of graded rock and of a thickness of about 500 mm</li><li>○ reinstatement of creek bed flush with the existing creek bed level.</li><li>● minor adjustment of sections of gravity main within the existing construction corridor.</li></ul>
Justification for proposal change	<p>Following detailed geotechnical investigations microtunnelling across Marshall Mount Creek was considered unfeasible due to the insufficient clearance to the creek invert level. Greater clearance to the creek invert would be required to suitably manage the risk of drilling fluid migrating into the creek. The additional depth required to mitigate this risk would have compounding impacts on the depths of downstream elements of the proposal including the final depth required for the SP1193. The resulting expenditure associated with the deepening of these assets became prohibitively high and was not in line with the efficient use of financial resources. Therefore, it was decided that the installation of the gravity main sections across Marshall Mount Creek would be open cut trenched.</p> <p>Minor adjustments to the gravity main alignment are proposed to accommodate changes to the developers plans for the precinct. Further adjustments to the location of the western creek crossing are proposed to move the construction area further from the nearby coastal wetlands and help reduce potential impacts.</p>
Location and land ownership	<p>The location of the proposal and land ownership remains as presented in the approved REF.</p> <p>The proposal change is within 1 Cattle Road, Calderwood (33/-/DP1233491)</p>



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 NSW Department of Planning, Industry & Environment  
 NSW Spatial Services  
 Australian Government Department of Environment  
 Date Created: 5/12/2024



**Figure1-1 Location of proposal change**



<b>Legend</b>		<b>Gravity main (amended scope)</b>	<b>Validated PCTs</b>	<b>R&amp;H SEPP</b>
Construction corridor	Microtunnel	3330: South Coast Lowland Woollybutt Grassy Forest (Good)	Planted exotic	<small>Copyright © 2025          Sydney Water          NSW Department of Planning, Industry &amp; Environment          NSW Spatial Services          Australian Government          Department of Environment          Date Created: 21/02/2025</small>
SP1193	Trench	3330: South Coast Lowland Woollybutt Grassy Forest (Poor)	Planted native/exotic	
Site compound	<b>Unchanged</b>	3962: Coastal Floodplain Phragmites Reedland	Coastal wetlands	
Access tracks	Rising main	4051: South Coast Lowland Red Gum-Swamp Oak Forest	Proximity area	
		4084: Southern Escarpment River Oak Forest		

**Figure 1-2 Proposal change and environmental constraints.**

## 2. Consultation

Additional consultation matters above those already assessed in the approved REF are detailed below.

### 2.1 Consultation required under State Environmental Planning Policies and other legislation

Sydney Water must consult with councils and other authorities for work in sensitive locations or where the work may impact other agencies infrastructure or land (specified in the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)).

No formal consultation was required under the TISEPP. Further detail is provided in Appendix B.

The Department of Primary Industry (DPI Fisheries) was notified under section 199 of the *Fisheries Management Act 1994* during REF and REFA preparation, as the work involves crossing or dredging in a waterway classified as 'Key Fish Habitat'. Fisheries were notified when it became apparent to Sydney Water that the original methodology was no longer feasible. Sydney Water consulted and sought input from fisheries on the updated methodology. Fisheries communicated their preference for the creek to be returned to its original condition following the works. Balancing the need to protect the underground asset, prevent scouring and restore the creek, Sydney Water's design includes a concrete encasement around the asset which will be protected by rip rap. The rip rap will extend about 2.1 m either side of the concrete encased sewer and incorporate edge thickening to prevent undermining. It will be keyed into the existing natural silty clay subgrade. Creek bed material will then be placed over the rip rap returning the creek bed to its original condition. Post construction, the contractor will also revegetate and stabilise the creek banks. Fisheries acknowledged Sydney Water's design and provided support for the works on 30th November 2024 with direction to ensure that:

- the top of the reinstated creek bed is placed flush with the adjacent bed of the creek and that it is set at a grade that is aligned with the natural creek bed, so that it does not result in a blockage of fish passage at lower water levels
- best practice erosion and sediment controls are used during construction.

### **3. Legislative requirements**

There are no additional legislative requirements above those already assessed in the approved REF

## 4. Environmental assessment

The environmental impacts checklist (SWEMS0019.01) was considered for the proposal change. Table 4-1 includes only the potentially impacted/ changed aspects and Table 4-2 lists additional mitigation measures. All other environmental impacts in the approved REF remain the same and will be incorporated into the contractor's CEMP.

**Table 4-1 review of environmental aspects**

Aspect	Potential additional impacts
<p><b>Topography, geology and soils</b></p>	<p>The proposal involves the open cut trenching of Marshall Mount Creek and an adjustment of the gravity main alignment.</p> <p><b>Potential impacts - Construction</b></p> <p>Potential impacts from the gravity main adjustment would be covered by the activities assessed in the approved REF.</p> <p>Open-cut trenching of Marshall Mount Creek will require the excavation of the creek bed and bank and will result in additional ground disturbance. Additional stockpiling may be required.</p> <p>Additional excavation and stockpiling activities, if not adequately managed, could result in increased:</p> <ul style="list-style-type: none"> <li>• erosion of exposed soils and stockpiled materials</li> <li>• dust generation during excavation and vehicle movements over exposed soil</li> <li>• increased sediment loads entering Marshall Mount Creek reducing water quality and increasing turbidity.</li> </ul> <p>Excavation of the creek bed and bank has the potential to increase the risk of future scouring, if not appropriately restored. To minimise this, Sydney Water will use restoration methods, such as revegetation, to stabilise the soil and creek bank.</p> <p><b>Potential impacts – Operation</b></p> <p>Disturbed areas will be reinstated and restored following the completion of works, resulting in negligible impacts to the local topography.</p> <p>Sydney Water will maintain operational assets which may involve excavation for access. As the wastewater mains will be concrete encased, damage to, or the breakage of these assets is considered unlikely. Maintenance of these assets would likely be via the maintenance holes which will be accessible from the surface and are unlikely to require any excavation.</p> <p><b>Mitigation measures</b></p> <p>Potential impacts can be adequately managed by the application of mitigation measures from the approved REF and additional mitigation measures in Table 4-2.</p>
<p><b>Water and drainage</b></p>	<p>The proposal includes open-cut trenching in a 3<sup>rd</sup> order stream and temporary instream structures to provide a protected work area within the waterway. These structures include dams, working platforms and shoring boxes. Following construction, components of the proposal (wastewater mains) that cross the waterway will be beneath the creek bed.</p>

**Potential impacts - Construction**

Excavations will require the extraction of groundwater to provide accessible and safe working conditions. Excessive dewatering could potentially result in the drawdown of the groundwater table, potentially impacting nearby groundwater dependent vegetation (GDEs).

An additional drawdown assessment was undertaken to account for the open cut trenching of Marshall Mount Creek and for dewatering along the gravity main (D4C, 2025).

A conservative approach was taken in the calculation of groundwater inflows and take. Hydraulic conductivities utilised in the modelling and the water take calculations were representative of the highest values found at the site. Furthermore, the calculations included an additional 30 days above the expected time frame for each section of excavation to account for any issues that may extend the time excavation may be open. Modelling did not specifically consider that excavations would be progressively backfilled as work progresses, reducing the period excavations are open and thus groundwater inflow.

Based on the conservative nature of the numerical modelling undertaken, and the low maximum drawdown values, it is unlikely that there will be impacts to the GDEs, especially those located near the upstream creek alignment, where water will be pumped and recharged into the groundwater system.

If not adequately managed, the open-cut trenching of waterways has the potential to cause increased scouring and erosion which can lead to sedimentation impacting water quality and aquatic fauna. Temporary instream structures have the potential to impact the hydrologic and geomorphic function of a watercourse affecting flows, bed and bank stability.

As a Public Authority, Sydney Water does not require approval for works on waterfront land. However, the Guidelines for Controlled Activities on Waterfront Land – Instream works have been considered for the proposal. This guideline focuses on maintaining natural functions of the stream. Marshall Mount Creek is a perennial waterway which has had most of the native riparian vegetation cleared. As a result, broad scale erosion has occurred across the course of the waterway. Despite the modified condition of Marshall Mount Creek, the works will maintain the current stream characteristics as much as possible, and will avoid further degradation of the natural condition and function of the stream.

Controls that will be implemented during construction to preserve watercourse conditions include:

- the proposed works are designed to avoid riparian vegetation and areas of higher value aquatic habitat such as gravel bed riffles
- minimising disturbed areas and rehabilitating areas by topsoiling, revegetation, mulching or weed control
- the diversion of creek flows that will minimise impact to hydrology of Marshall Mount Creek
- the retention of excavated creek bed material and its reinstatement following the completion of works
- establishment and use of silt curtains and other sediment control devices to avoid sediment from entering the stream

Aspect	Potential additional impacts
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- minimising the duration of works to reduce construction impacts to Marshall Mount Creek.

**Potential impacts – Operation**

Instream installations have the potential to exacerbate erosion and scouring and impact the hydrological and geomorphic function of the waterway. Other potential impacts include reduction in water quality (increased nutrients and bacterial concentrations) in the event of wastewater overflows, or leakage.

The proposed design, considering the guidelines for instream works, aims to preserve current watercourse conditions and minimise potential degradation with controls such as:

- installing the wastewater mains at least 500 mm below the creek bed
- matching the reinstated level of the creek bed with the existing bed upstream and downstream of the works
- creek bed stabilisation, including lining the bed above the mains pipe with geotextile and rock rip rap to prevent bottom scouring
- extending the rip rap about 2.1 m either side of the concrete encased mains, incorporating an edge thickening to prevent undermining of the rip rap and keying it into the existing natural silty clay subgrade.

The rip rap size will be finalised based on an assessment of the 1% AEP velocity in the creek. The rip rap will be 150 mm below the existing bed with the existing bed level reinstated and retained.

The risk of leaking wastewater has been minimised by encasing the mains with a 200 mm thick concrete encasement. The concrete will minimise the risk of geomorphology causing a leak while also containing any leaks should they occur.

Under Section 199 of the FM Act, notification and consultation with DPI Fisheries was undertaken as the proposal involves crossing and dredging KFH waterways (see Section 3). DPI Fisheries provided recommendations which have been included in the mitigation measures.

The works are short-term and temporary. Obstruction to flows would be limited to construction of creek crossings and once completed natural flow would be restored.

**Mitigation measures**

Potential impacts can be adequately managed with the application of mitigation measures from the approved REF and additional mitigation measures in Table 4-2.

<b>Flora and fauna</b>	<p>An Aquatic Ecology Assessment was undertaken by Eco Logical Australia (2025, Appendix D). This assessment considered the areas surrounding the proposal (the study area) and is summarised below.</p> <p>No threatened species of fish or aquatic plants are expected to occur. A burrow was observed during the site visit near to the proposal location, north of SP1193. No fauna was observed utilising the burrow, and there was no evidence of recent use, such as tracks or slide marks.</p>
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## Aspect

## Potential additional impacts

Marshall Mount Creek is identified as Key Fish Habitat. It is heavily modified with large scale clearing of vegetation. Both banks are heavily eroded at the proposal locations.

### Potential impacts - Construction

#### Flora and fauna

Potential impacts to flora and fauna include:

- erosion and sedimentation which can increase turbidity and reduce water quality and potentially smoother benthic community habitats
- reduction of habitat through impacts to vegetation and burrows in the creek bank and to species utilising these resources
- obstruction of fish passage
- aquatic fauna species becoming stranded following dam construction
- dispersal of weeds.

Potential impacts to benthic community habitats can be managed as part of the mitigation measures associated with topography, geology and soils.

The proposal has been located to avoid vegetation removal that is significant to ecological function. Ground disturbance will result in a minor impact to terrestrial grasses. This impact is considered negligible. It is likely that terrestrial grasses will passively recover after the completion of works.

An existing concrete crossing between the proposal locations currently acts as a barrier to fish passage due to the crossing not being level with the creek bed. As a result, passage is restricted to periods following heavy rainfall when there is adequate flow. The presence of this existing barrier to fish passage would minimise the potential impacts from the proposal which is a temporary obstruction.

While there is no indication that the burrow observed was being utilised, platypus sightings in Marshall Mount Creek have been recorded. Prior to the commencement of works, any burrow in the study area should be excavated by hand to its end to check for any species utilising it.

Potential impacts to GDE's are discussed above. Significant impacts to GDEs are not anticipated.

#### Coastal wetlands

Both crossings are within areas mapped as proximity area of coastal wetland, a coastal management area under Chapter 2 of the RHSEPP. In accordance with section 2.8 of this SEPP considerations of impacts are provided in the table below:

Consideration	Action
(a) the biophysical, hydrological or ecological integrity of the adjacent coast wetland or littoral rainforest,	The installation of the wastewater mains by open cut trenching and watercourse diversion will impact the hydrology of Marshall Mount Creek. However, this impact has been minimised by diverting the creek during the installation works in place of temporarily damming the creek and

Aspect	Potential additional impacts
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excluding all flows downstream. The diversion will allow downstream wetlands to continue to access water from upstream of the works. Furthermore, the proposed installation works, including the dams and watercourse diversion, would be temporary and therefore would not have ongoing impacts.

(b) the quantity and quality of surface and groundwater flows to and from the adjacent coastal wetland or littoral rainforest

The works will likely have a temporary impact on the quantity of surface water flows. The proposed watercourse diversion would minimise this impact by maintaining the flow of Marshall Mount Creek, however the natural fluctuations of flow will likely be temporarily impacted. It would be unlikely that the downstream wetlands would be negatively impacted by a more consistent flow rate for a temporary duration.

The quality of surface water also has the potential to be impacted. The works have potential to increase the turbidity of the waters downstream. The works are to include silt curtains immediately downstream of the works as well as other sediment and constructional mitigation measures outlined in Table 4-2, that will minimise and mitigate impacts to water quality.

No significant impacts are expected. Direct impacts to proximity areas and indirect impacts to both coastal wetlands and proximity areas can be adequately managed with the application of mitigation measures from the approved REF and additional mitigation measures in Table 4-2.

**Potential impacts – Operational**

The potential for any impacts on fauna or flora during operation is considered unlikely. Creek scouring from strong flows could expose wastewater mains and create a minor barrier to fish passage. As discuss above, the inclusion of a rip-rap would minimise the risk of scouring and the creek bed will be reinstated flush to the existing creek bed level.

**Mitigation measures**

Potential impacts can be adequately managed with the application of mitigation measures from the approved REF and additional mitigation measures in Table 4-2.

**Noise**

The change in construction methodology for the crossings of Marshall Mount Creek has the potential to increase noise impacts to nearby receivers. A Construction Noise and Vibration Assessment memo was undertaken as part of the approved REF. The assessment utilised the Transport for NSW (TfNSW) Construction and maintenance noise estimator tool. The memo assessed multiple activities including:

- Activity 1: standard construction hours (day work), Bulk earthworks
- Activity 2: OOHW evening and night, Drainage infrastructure

Aspect	Potential additional impacts
	<ul style="list-style-type: none"> <li>Activity 3: OOHW evening and night, Generator.</li> </ul> <p>The assessment of Activity 2 was undertaken as a conservative approach. The Activity captures the types of equipment and construction activities that would be undertaken for the creek crossing. Therefore, the changes proposed to the construction methodology can be captured by the approved REF, under Activity 2. Due to the limited number of receivers and their position relative to the proposal, the change in the position of elements of the gravity main are also captured in the approved REF.</p> <p><b>Mitigation measures</b></p> <p>Potential impacts can be adequately managed with the application of mitigation measures from the approved REF.</p>
<p><b>Waste and hazardous materials</b></p>	<p>The proposed change in construction methodology may result in the additional generation of spoil and waste material. There is also potential for material and/or the waterway to be contaminated from minor leaks or spills.</p> <p><b>Mitigation measures</b></p> <p>Potential impacts can be adequately managed with the application of mitigation measures from the approved REF.</p>
<p><b>Social and visual</b></p>	<p>Open-cut trenching through Marshall Mount Creek will have a short-term visual impact on the creek during construction. Being within private property, this section of Marshall Mount Creek is not considered to have any recreation value to the public. Considering the location and limited number of receivers in the area, and the short-term, temporary nature of the works, additional impacts to visual and social amenity are considered minor.</p> <p><b>Mitigation measures</b></p> <p>Potential impacts can be adequately managed with the application of mitigation measures from the approved REF.</p>

**Table 4-2 Additional mitigation measures**

Mitigation measures
<p>Stabilise and rehabilitate all disturbed areas including topsoiling, revegetation, weed control or maintenance in order to adequately restore and improve the integrity of the riparian corridor.</p>
<p>Excavated creek bed is to be stockpiled and reinstated upon completion.</p>
<p>Any material which needs to be temporarily stockpiled during works must be located outside the riparian zone.</p>
<p>The top of the reinstated creek bed should be flush with the adjacent bed of the creek and be set at a grade that is aligned with the natural creek bed.</p>
<p>Avoid excavation of burrows during platypus breeding season (October to March).</p>

## Mitigation measures

Where a burrow has been identified, hand excavate to the end of the burrow under the supervision of an ecologist to determine if it is in use prior to any excavation by machinery.

Stop works immediately if a platypus or platypus burrow is located in the works area and notify suitably qualified ecologist.

Works should be started gradually to allow time for aquatic fauna to remove themselves from the area while works occur. This may involve preparing the works site one day (increasing human activity), moving equipment to the works site the following day then starting works the day after.

Minimise duration of instream work to prevent fish passage from being impacted for prolonged periods of time.

The upstream dam is to be built first allowing water to naturally drain downstream and permitting aquatic fauna to relocate themselves while the waterway is still connected.

If required, engage a suitably qualified ecologist to relocate any remaining fauna from pooled water left in the work area.

Pump water from upstream of the dam to downstream of the works, maintaining creek flow.

Cage all pump inlets to protect aquatic fauna.

Place a silt curtain immediately downstream of the works and upstream of the creek diversion outlet.

Monitor sedimentation down slope of excavated areas.

Works should be scheduled outside of predicted heavy rain periods and works should stop during heavy rainfall to reduce risk of mobilising sediment.

Include the construction of shallow monitoring bores (1-2 m below the invert level) ahead of construction to assess localised conditions. If larger than expected volumes of water are encountered during excavation, an additional monitoring site is recommended to the north of the creek, near the north-east crossing.

## 5. Conclusion

Sydney Water has prepared this REFA to assess the potential environmental impacts of the proposed changes to Calderwood 3A2 Wastewater Servicing. This proposal change was required due to insufficient clearance to the creek invert level and the risk this posed to impacting the waterway in addition to changes in the precinct plans.

The main potential additional construction environmental impacts of the proposal change include impacts to hydrology, geomorphology and aquatic biodiversity. During operation, the wastewater mains will operate in compliance with the existing EPL. Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REFA and the approved REF, the proposal is unlikely to have a significant impact on the environment. Therefore, an environmental impact statement is not required under Division 5.1 of the EP&A Act.

The REF considers how the proposal aligns with the principles of ESD. The proposal change will not result in the degradation of the quality of the environment and will not pose a risk to the safety of the environment.

## 6. References

D4C (January 2025) Calderwood Growth Package 3A2 – Dewatering Impact Modelling and Groundwater ‘take’ estimation for Proposed Gravity Main alignment– Technical Memo

# Appendix A – Section 171 checklist

Requirements in addition to the approved REF are considered in the table below.

Section 171 checklist	REF finding
Any transformation of a locality	There will be a temporary impact on the locality during construction. Following completion of the works all components of the proposal will be below ground and the creek will be reinstated to its prior condition. Therefore, the proposal will not result in the transformation of a locality.
Any environmental impact on the ecosystems of the locality	The proposal change will not result in environmental impacts to ecosystems of the locality. The impacts to the creek have been minimised by proposing a temporary creek flow diversion around the installation works. The diversion will allow flow to be maintained while works occur. Furthermore, there would likely be minimal operational impacts to Marshall Mount Creek of the wastewater mains. Controls will be implemented to ensure construction of the proposal change does not impact on the coastal wetland or the hydrology and ecology of Marshall Mount Creek. There will be environmental improvements by ensuring a reliable wastewater service will collect and treat wastewater, minimising any impacts on the ecosystem.
Any impact on the habitat of any protected animals (within the meaning of the <i>Biodiversity Conservation Act 2016</i> )	<p>The proposal from the approved REF initially attempted to avoid impact to aquatic habitat by using underboring to install the wastewater mains. The updated methodology has been designed to avoid harm to riparian vegetation by situating the works outside of vegetated areas as much as possible. The impact to sensitive key fish habitat within Marshall Mount Creek has been minimised by proposing works in areas that have pools with fine sediment substrate and avoiding gravel bed riffles.</p> <p>Controls will be implemented to minimise any impact on the habitat of any protected animals.</p>

# Appendix B – Consideration of Ecologically Sustainable Development

ESD consideration are covered in the table below.

Principle	Proposal alignment
<p><b>Precautionary principle</b> – <i>if there are threats of serious or irreversible environmental damage, lack of scientific uncertainty should not be a reason for postponing measures to prevent environmental degradation. Public and private decisions should be guided by careful evaluation to avoid serious or irreversible damage to the environment where practicable, and an assessment of the risk-weighted consequences of various options.</i></p>	<p>The proposal change will not result in serious or irreversible environmental damage and mitigation measures have been designed to reduce scientific uncertainty relating to the proposal.</p>
<p><b>Inter-generational equity</b> – <i>the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.</i></p>	<p>The proposal change will help to meet the needs of future generations by providing a reliable wastewater service.</p>
<p><b>Conservation of biological diversity and ecological integrity</b> – <i>conservation of the biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes.</i></p>	<p>The proposal change will not significantly impact on biological diversity or impact ecological integrity. The proposal location has been selected to avoid impacts to vegetation and minimise impacts to the ecology of Marshall Mount Creek.</p>
<p><b>Improved valuation, pricing and incentive mechanisms</b>— <i>environmental factors should be included in the valuation of assets and services, such as ‘polluter pays’, the users of goods and services should pay prices based on the full life cycle costs (including use of natural resources and ultimate disposal of waste) and environmental goals</i></p>	<p>The proposal change will provide cost efficient use of resources and provide optimum outcomes for the community and environment.</p>

# Appendix C – Consideration of TISEPP consultation

TISEPP section	Yes	No
<b>Section 2.10, council related infrastructure or services – consultation with council</b>		
Will the work:		
Potentially have a substantial impact on stormwater management services provided by council?		✓
Be likely to generate traffic that will strain the capacity of the road system in the LGA?		✓
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		✓
Connect to, and use a substantial volume of water from a council owned water supply system?		✓
Require temporary structures on, or enclose, a public space under council's control that will disrupt pedestrian or vehicular traffic that is not minor or inconsequential?		✓
Excavate a road, or a footpath adjacent to a road, for which the council is the roads authority, that is not minor or inconsequential?		✓
<b>Section 2.11, local heritage – consultation with council</b>		
Is the work likely to affect the heritage significance of a local heritage item, or of a heritage conservation area (not also a State heritage item) more than a minor or inconsequential amount?		✓
<b>Section 2.12, flood liable land – consultation with council</b>		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and will works alter flood patterns other than to a minor extent?		✓
<b>Section 2.13, flood liable land – consultation with State Emergency Services</b>		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and undertaken under a relevant provision*, but not the carrying out of minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance?  * (e) Div.14 (Public admin buildings), (g) Div.16 (Research/ monitoring stations), (i) Div.20 (Stormwater systems)?		✓
<b>Section 2.14, development with impacts on certain land within the coastal zone– council consultation</b>		
Is the work on land mapped as coastal vulnerability area and inconsistent with a certified coastal management program?		✓
<b>Section 2.15, consultation with public authorities other than councils</b>		

TISEPP section	Yes	No
Will the proposal be on land adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or land acquired under Part 11 of that Act? <i>If so, consult with DPE (NPWS).</i>		✓
Will the proposal be on land in Zone C1 National Parks and Nature Reserves or on a land use zone that is equivalent to that zone? <i>If so, consult with DPE (NPWS).</i>		✓
Will the proposal include a fixed or floating structure in or over navigable waters? <i>If so, consult TfNSW.</i>		✓
Will the proposal be on land in a mine subsidence district within the meaning of the <i>Coal Mine Subsidence Compensation Act 2017</i> ? <i>If so, consult with Subsidence Advisory NSW.</i>		✓
Will the proposal be on land in a Western City operational area specified in <i>the Western Parkland City Authority Act 2018</i> , Schedule 2 and have a capital investment value of \$30 million or more? <i>If so, consult the Western Parkland City Authority.</i>		✓
Will the proposal clear native vegetation on land that is not subject land (ie non-certified land)? <i>If so, notify DPE at least 21 days prior to work commencing. (Requirement under s3.24 Chapter 3 Sydney Region Growth Centres - of the SEPP (Precincts – Central River City) 2021).</i>		✓

# **Appendix D – Calderwood Package 3A2 Wastewater Servicing: Aquatic Ecology Assessment, Eco Logical Australia (2025)**

SW146 01/26

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