

# MEMORANDUM

**To**  
**From** (Water Technology)  
**Date** 10 September 2025  
**Subject** Responses to council comments for DRAFT report 25010527\_R01V01  
**Our ref** 25010527\_M01V01a.docx

This memorandum has been prepared to document responses to City of Greater Geelong comments (memorandum dated 26/8/2025-4/9/2025) associated with the Water Technology DRAFT report 25010527\_R01V01 (dated 26/08/2025).

The Council comments have been restated below with Water Technology clarifying responses in green.

For consistency the formatting, numbering, and subsections of Council's comments have not been altered this

## WATER TECHNOLOGY RESPONSES

### 1. Documentation missing and superceeded

- a. RORB model and Costings have not been provided  
Provided to council by Creo as per current package (28 July 2025)
- b. The standards listed in both Watertechnology and Neil Cragie reports have been superseded as a basis design and review. i.e. Australian Rainfall and Runoff V4.2 which is detailed in the brief and referenced in most of the documents listed, it has been referenced in some sections of the report though showing an inconsistent approach.  
It is considered that the brief wording has been superseded by the change of the project intent which occurred throughout the RFQ process. It is understood the current brief scope wording is not representative of the current project intent as it maintained portions of the original (superseded RFQ brief/scope).  
Furthermore, SAC expert opinions agreed that the Alluvium assessment was suitable. As such the updated ARR4.2 is not proposed to be adopted as the basis of design, however, only adopted for a sensitivity test against the proposed design freeboard.
- c. These comments cannot be considered final until the missing documents have been reviewed for acceptability and completeness.  
Please clarify any missing information. As noted above for 1.a) it is understood council has been provided a copy of the relevant files.
- d. Report Scope – The scope listed does not include the extent of the consultancy brief. Planning need to review the brief and report to ensure they meet their requirements, SAC recommendations and have value for money.  
As noted above it is understood elements of the brief are not relevant to the current project intent due to the nature of the updated RFQ being amended partway through the submission process.  
Water Technology can discuss directly with Planning to clarify.

### 2. Climate Change Integration

**Critique:** Exclusion of most likely climate change scenario ARR2019 V4.2 and SSP5-2100 .

**Suggestion:**



- a. Mandate ARR2019 V4.2 in all future designs as existing standards.

As noted above, the SAC expert opinions agreed that the Alluvium assessment was suitable (ARR2019 adopted). As such the updated ARR4.2 is not proposed to be adopted as the basis of design, however, only adopted for a sensitivity test against the proposed design freeboard.

Additionally, as outlined to council via email on 14/07/2025 Water Technology's recommendation is SSP3-7.0 be adopted for the sensitivity analysis.

CSIRO Victorian Climate Projections 2024 Technical Report (Nov 2024) adopts SSP3.0 as the likely high-end emissions scenario:

[Victorian Climate Projections 2024 Technical Report](#) (page 22).

Additionally, Victoria's Climate Science Report (DEECA 2024), outlines SSP3-7.0 is adopted as the high-emissions scenario. [Victoria Climate Science Report 2024](#)

- b. Require SSP3-2100 for design capacity including freeboard as the concession for development costs.

As noted above, the SAC expert opinions agreed that the Alluvium assessment was suitable. As such the updated ARR4.2 is not proposed to be adopted as the basis of design.

As noted above SSP3-7.0 (2100) was recommended as the adopted climate change scenario as it considered in line with the current industry approach.

- c. Require SSP5-2100 sensitivity testing for all assets and property to achieve minimum safety requirements.

As noted above SSP3-7.0 (2100) was recommended as the adopted climate change scenario as it considered in line with the current industry approach. As such SSP5-2100 is not recommended to be incorporated in the asset assessment.

- d. Include current standards for climate change floodwater compliance in planning permit applications—this will change the layout and designs in the Creo plans provided.

Clarification required from council as to comment intent, as planning permit applications are a future phase of the development delivery process.

### 3. Freeboard & Flood Risk

**Issue:** Freeboard reductions pose risks to infrastructure and public safety.

**Suggestion:**

- a. Enforce 300 mm freeboard to roads and lots for 2100 event.

As noted above the 1% AEP 2100 (SSP3-7.0) is recommended for adoption as a sensitivity test against the proposed asset design freeboard, however, not proposed to be adopted as the basis of design.

Water Technology peer review report recommends the reassessment of the freeboard based on an updated RORB model (to align the RORB model parameters with the functional design and external post-development catchment).

Additionally, the Water Technology review report recommends the redevelopment of WLRB2 to provide additional freeboard and further consideration for the immunity of the CCC 'spillway' for the asset life to 2100 under SSP3.0.

The required immunity for WLRB1 road spillway has also been recommended to be reviewed for the asset life to 2100 under SSP3.0.

- b. Require updated RORB models reflecting actual basin volumes and climate scenarios.

Water Technology peer review report recommends the RORB model to be updated to reflect the actual basin volumes.



However, as noted above, the recommended 1% AEP adopted as the basis of design (and sensitivity check) deviates from councils' preference.

#### 4. 4. MUSIC Model Inconsistencies

**Issue:** Functional designs don't match MUSIC parameters.

**Suggestion:**

- a. Update MUSIC models to reflect actual asset sizing.

Water Technology peer review report currently recommends the MUSIC modelling be updated to address this item.

- b. Include MUSIC Auditor results as per Design Note 3.

Recommended to be included as part of the Villawood team updated MUSIC assessment.

- c. Clarify sediment pond sizing and macrophyte zone areas.

Water Technology peer review report currently requests calcification on the sediment pond sizing and macrophyte zone area.

#### 5. 5. GGF Habitat Risks

**Issue:** Connectivity and pollutant exposure risks to GGF.

**Suggestion:**

- a. Include EPBC referral and maintenance plans in design documentation.

As discussed during a meeting between Council and Water Technology (Wednesday 3<sup>rd</sup> September 2025), it is understood that council does not require this additional documentation as outlined by Peter Smith.

It is considered that this documentation is not required to process the refinement of the stormwater asset design, capital costing, and land take.

- b. Ensure setbacks and buffers meet DELWP standards.

The proposed GGF asset is considered to meet the relevant (50m) buffer to major infrastructure and development as per Growing Grass Frog Habitat Design Standards (DELWP, 2017). Please confirm section of the standards within the DELWP documentation otherwise. Vegetation and specific habitat elements (i.e. rock piles) are considered to be suitably addressed post-permit at the detail design phase.

- c. Discourage GGF movement into sediment ponds via design interventions.

Increase tree/shrub & as outlined in table 9-4 can be adopted to aid in mitigating GGF colonisation. It is considered suitable to refine the specific landscape solutions post-permit at detail design.

#### 6. 6. Costing & Scope Alignment

**Issue:** Creo cost estimates lack alignment with functional plans and drainage asset scope.

**Suggestion:**

- a. Require Loetis recommendations to be implemented.



Noted. Added to the report.

- b. The PDF costings are flat images which are not searchable or readable – this does not meet accessibility requirements

Noted, understood .xlsx file has also been provided to council.

- c. To meet industry expectation of costs and consistency of rates based on DSS schemes use rates [Reimbursements 1.8 | Melbourne Water](#) 2024-2025 rates these are in some cases lower than Creos rates and will deliver a considerable cost saving.

Melbourne Water notes that adoption of this rate schedule should be utilised for no more than \$20,000 projects/contacts. As such it is recommended that the schedule is utilised as a reference, and updated costing should be undertaken inline with the Leotis recommendations. Additionally, it is understood Melbourne Water assets are regularly under costed. Under costing DCP assets is not recommended as this can become a disincentive for the ultimate delivery of the assets. Civil firms and contractors are generally in a position to provide more accurate current market rates for infrastructure delivery.

- d. Validate scope vs cost alignment before DCP adoption.

Noted. The asset modelling (RORB and MUSIC) and functional designs are to be updated prior to the costings being redeveloped and subsequently reassessed.

- e. Remove Landscaping elements from drainage such as seats and footpath

Noted

- f. Remove clay liner specs from plans and include in scopes Geotechnical design required including permeability, emerson class >4, calcium carbonate etc
- g. Topsoil specification is required for wetlands and terristal areas – respreading site won reactive clay topsoil is not acceptable.
- h. Inclusion of costs associated with geotechnical supervision of fill for connection road/drainage basin with engineered structural fill in the areas of landslip suseptability – increased costs to the DIL by approximatley \$3-\$5M .
- i. Costs for engineered fill in land slip zone and testing
- j. ANCOLD assessment and implementation \$150K application to WLRB8 adjacent to Cowies creek in Villawoods proposed first development front is a decitful inflation of Villawoods WIK Credit at the expense of other DIL contributors. In contrast WLRB 7 with planned residential area down hill does not have ANCOLD or 1%AEP retardation design level in the cross section. Online assets WLRB1 & WLRB2 don't have ANCLOD assessment either and have substantial risk associated with them.
- k. The Growling Grass Frog ponds and Culvert crossings are not Drainage assets, should not be included in Drainage DCP scope.
- l. Include costing line items for;
  - i. First clean out of sediment ponds post 95% of catchment development
  - ii. CCTV inspection of all pipes should be added approx \$6/m
  - iii. Survey setout & Interim survey during construction
  - iv. Implementation and maintenance of CEMP controls
  - v. Stormwater management during construction (big one in valley)
  - vi. Quality Assurance admin and recording (earthworks geotech, concrete,pits and pipelines )
  - vii. Geotechnical design( compaction, triaxial grid etx) and Level 1 supervision for structural fill in land slip areas.



- viii. Temporary fencing until plant establishment as impenetrable for safety

The Water Technology assessment has been undertaken independently for other stakeholders (including council). Where the above council comments (6a through 6l) align with Water Technologies assessment they have been reemphasized within the Water Technology review report.

## 7. Conflict of Interest

**Concern:** Water Technology's multiple roles (initial developer study?, SAC representative for Council, peer reviewer of their own recommendations).

**Suggestion:** Council should formally document conflict resolution and ensure transparency.

Council Project Manager to address internal comment as necessary in conjunction with Warwick Bishop if/as required.

### Comments on Water tech report

4.4 – Freeboard should be 1% AEP plus climate change and sensitivity check to 2100. Stormwater planning disagree with how this has been interpreted by Water technology and in our Creamery Road meetings. As a new growth area inclusion of climate change is a given. Excluding it from design requirements significantly impacts the planned community with overtopping lik

As noted above the 1% AEP 2100 (SSP3-7.0) is recommended for adopted for a sensitivity test against the proposed asset design freeboard, however, not proposed to be adopted as the basis of design. This approach is considered to be consistent with the expert opinions provided as part of the SAC process.

5.1 What is this meant to mean, is it 4 Exceedences per Year flow =

*“The design of the asset arrangement intends to ensure the treatment asset remains hydraulically offline during storm events greater than the vegetated treatment asset design flows.”*

Water Technology DRAFT report wording to be amended for clarity.

6.3 I thought a revised RORB model was part of the scope which addressed the issues of the multiple conflicting proposed DSSs.

The scope of work is understood to be a review of the Villawood project team package. Updated RORB modelling was excluded from the Water Technology submission based on this understanding.

The Water Technology report recommends updated RORB modelling to encompass the sizing/design of updated assets proposed by Creo.

It is not clear in the report maps what the catchment labeling, sizes and outfall are in the final design. The design of detention and water quality makes clarity here paramount. See 6.3.2 regarding upstream catchment

WLRB1 MUSIC shows 28

WLRB2 MUSIC shows 33k m<sup>3</sup>

The Water Technology report recommends the Villawood project team update the design package to ensure the RORB and MUSIC modelling catchments are suitably aligned. Subsequently the catchment plan can be confirmed and finalised.

WLRB1 paragraph repeated on (pg 28)



Water Technology DRAFT report wording to be amended.

6.3.3.1 Results Climate Change – A specific section of the road must be designed as a spillway in major events. 2030 SSP7 represents a 1.5°C increase in temperature – this is now the base case of existing, not a sensitivity test. The 2100 SSP7 represents the design life of assets, hazard in accessways and freeboard to buildings. Noting the maximum is an additional 250mm of fill to create the 300mm freeboard to the top of the embankment it is neglectful to professional conduct not to design to meet the requirements set by the Citys Infrastructure team.

Updated RORB required.

The sensitivity test must be to the SSP5- 2100 which is widely accepted as the most likely scenario.

Noting services and infrastructure is proposed as part of the embankment the 300mm freeboard requirement applies to the road .

The presumptions made for WLRB1 Creo design are not acceptable or fit for this purpose based on ;

- the design puts assets and pedestrians at risk.
- The conclave has not provided any professional evidence to disprove or counter requirements in the ARR2019 V4.2 for freeboard.

As noted above, the SAC expert opinions agreed that the Alluvium assessment was suitable (ARR2019 adopted). As such the updated ARR4.2 is not proposed to be adopted as the basis of design, however, only adopted for a sensitivity test against the proposed design freeboard.

Additionally, as outlined to council via email on 14/07/2025 Water Technologies recommendation is SSP3-7.0 has adopted for the sensitivity analysis.

CSIRO Victorian Climate Projections 2024 Technical Report (Nov 2024) adopts SSP3.0 as the likely high-end emissions scenario:

[Victorian Climate Projections 2024 Technical Report](#) (page 22).

Additionally, Victoria's Climate Science Report (DEECA 2024), outlines SSP3-7.0 is adopted as the high-emissions scenario. [Victoria Climate Science Report 2024](#)

Recommended discussion between Water Technology, inclusive of Warwick Bishop, and Council project manager.

WLRB2 – The Creo design is not acceptable for the PSP.

Council opinion noted, however, no specifics provided (assumed to be a comment of the adoption of ARR4.2 2100 as the design basis).

WLRB5 and Waterway design note 2019 not 2100.

Council opinion noted. Refer above response to section 6.3.3.1 council comment.

6.4 Provide a MUSIC Auditor result as per Design Note 3

The functional designs do not conform to Councils requirements and are not reflected in the MUSIC model – this needs to be updated.

Batesford North ,WLRB1 & WLRB2 don't have sediment ponds

Area and parameter issues with MUSIC model – I thought a revised model was part of the scope.

Sediment nodes are treating N & P

There is no sediment basin for Batesford North.

Clarify WLRB 1 & 2 10% required increase in Macrophyte zone required in the Functional design

The Water Technology report recommends the Villawood project team updates the MUSIC modelling assessment, including MUSIC Auditor, these recommendations cover the above noted items.

The scope of work is understood to be a review of the Villawood project team package. Updated RORB modelling was excluded from the Water Technology submission based on this understanding.



7.1. .

Finalise first line. The intent of the proposed asset arrangement is generally considered suitable. In line with the [redacted]

Water Technology DRAFT report wording to be amended.

The Creo designs do not meet the Concept or Functional deemed to comply design criteria with too many issues are raised to duplicate.

MZ9 details of velocity across sediment pond and wetland.

The Water Technology report recommends the Villawood project team updates the MUSIC modelling, RORB modelling, and Functional designs. No specifics are outlined in this Council comments so a detailed response cannot be provided.

It is noted that the Melbourne Water Deemed to Comply Criteria is a design risk management tool and a fully compliant asset is not anticipated to be delivered considering the context of the proposed assets. A non-compliant 'DTC' asset can still be adopted as a suitable design. The Water Technology report recommends that the updated Functional Designs are compliant with the Melbourne Water DTC criteria where possible.

8 & 9

Environment team should comment on GGF requirements aswell.

Ponds including wetlands and sediment ponds which can become refuges and habitat for Growling Grass frog must have the designers maintenance requirements included to ensure water quality objectives and GED can be achieved. This must be part of the accompanying EPBC referral and actions which allow for enduring maintenance and renewal and define times when works will not impact GGF breeding and spawning activities.

As discussed during a meeting between Council and Water Technology (Wednesday 3<sup>rd</sup> September 2025), it is understood that council does not require this additional documentation as outlined by Peter Smith. Table 9.4 of the Water Technology report provides recommendation on the scheduling of sedimentation removal or other maintenance activity in relation to GGF breeding seasons (August through May).

9.5

Any design here encourages movement between the permemant sediment ponds and wetlands via the waterway and piped network. These area provide attractive habitat which is also the collection point of pollutants from the urbanised catchment such as herbicides and pesticides. The setback to roads from the vegetated zones is also not sufficient.

It is essential to the existing GGF population that the water quality is maintained at acceptable levels and the population is discouraged from moving into the sediment ponds and wetlands to avoid sick populations.

The proposed GGF asset (downstream of WLRB9) is considered to meet the relevant buffer to major infrastructure and development (i.e. 50m to Roads). Please confirm the intent of this comment otherwise.

It is not considered practicable to fully disconnect the proposed GGF pond habitat from the constructed treatment wetlands. Table 9-4 of the Water Technology report outlines vegetation planting regimes which can be utilised to discourage GGF colonisation of non-GGF assets. It is considered suitable to refine the specific landscape solutions, and any additional habit arrangements aimed to discourage population movement towards sedimentation basins and wetlands, at the post-permit detail design phase.



10 - Villawood revised costs from design Rev E 24/7/25 not provided to check.

Deliverable 14 -

Appendix

- It is recommended in the Loetis report that the Creo Civil cost estimates be refined to reflect the actual costs, the risk is that if Council agree to a scope that can't meet infrastructure quality at this point in the planning that it will be carried through to the final asset.
- The review did not check to see if the scope of works (costs) aligned with the functional plans (works), this wouldn't meet the scope or the point of the review and should be followed up with Watertech.

Recommendations are to be followed with additional work as commented on.

The Water Technology report recommends the Villawood project team updates the MUSIC modelling, RORB modelling, and Functional designs, and subsequently costings inline with the Loetis assessment.

Creo Plans Rev E review - incomplete review of plans noting timeframes.

The Water Technology assessment has been undertaken independently for other stakeholders (including council). Where the below council comments align with Water Technologies assessment they have been reemphasized within the Water Technology review report.

- Remove Clay Liner specifications on all basins.
- Please provide Geotechnical investigation report from work conducted onsite in early August.
- Show 2100 SSP5 & 3 1% AEP level on basin design.
- Amend Q reference to %AEP i.e. Q5 = 20%AEP
- Note the flows Q, Velocities etc on plans.
- Inlets directly to the MZ.
- Pit schedule with ILs and design levels.
- Bypass for piped flows above EY4 - 20% AEP pipe flows around basins not in designs.
- Flow paths for >20%AEP should be shown.
- Detained outflows to be shown at Retarding Basin outlets (confirm weir and outlet calculations)
- WLRB6 outfall required (to Cowies creek?), also consider how small adjoining residential area to north will have treatment if a combined outfall is proposed.

DSS review Creamery Road V7 Neil Cragie Pty Ltd. -Incomplete review of strategy.

The Water Technology assessment has been undertaken independently for other stakeholders (including council). Where the below council comments align with Water Technologies assessment they are have been reemphasized within the Water Technology review report.

- Geotechnical testing and review required.
- Refers to superseded rainfall in ARR (2016) not 2019 V4.2.

As noted above it is considered inline with the SAC expert opinion that ARR4.2 is adopted for a sensitivity check, not as the design basis for these assets.



- MUSIC modelling not consistent with descriptions

The Water Technology report recommends the Villawood project team updates the MUSIC modelling, as per the specific modelling recommendations outlined within the report.

- Have the stage storage discharge calculations been verified/checked?

Water Technologies assessment included a review of the adopted H-S relationships within the MUSCI and RORB modelling and found there to be discrepancies with the documentation Functional Design plans. The Water Technology report therefore recommends the Villawood project team updates the storage relationships and reprocess the RORB and MSUIC assessments.

- Is 300mm freeboard to lots.
- Lots of superfluous commentary not required in a DSS i.e. Geelong is not Melbourne Water. that has a **sole purpose** to discredit industry accepted standards and promote .

## Recommendations

- Mandate ARR2019 V4.2 and SSP5-2100 in all drainage designs.

The Water Technology report recommendations do not reflect this finding. It is recommended internal discussion within council are undertaken as to the alignment of the internal stakeholder's recommendations and confirmation of the intent of the Water Technology review.

As noted in above responses, a discussion between Water Technology, including Warwick Bishop, and the Council project manager is recommended to clarify this item and the decision of the SAC experts.

- Require updated RORB and MUSIC models and costing be supplied.

The Water Technology report recommendations reflect this finding.

- Ensure GGF potential habitats include EPBC response for maintenance and capital renewal.

The Water Technology report recommendations do not reflect this finding. It is recommended internal discussion within council are undertaken as to the alignment of the internal stakeholder's understanding of the EPBC referral requirements as part of this scope of work.

- Audit functional designs for compliance with Melbourne Water guidelines.

The Water Technology report recommends the Villawood project team updates the MUSIC modelling, RORB modelling, and subsequently Functional Designs. The updated functional design will be required to be rereviewed for compliance to Melbourne Water guidelines.

As noted in the above responses, the Melbourne Water Deemed to Comply Criteria is a design risk management tool and fully compliant asset(s) are not anticipated to be delivered considering the context of various proposed asset(s). It is important to note that a 'non-compliant' asset under the Melbourne Water DTC process can still be adopted as a suitable design.

- Reassess cost estimates and ensure alignment with scope and quality expectations.

The Water Technology report recommends the Villawood project team updates the MUSIC modelling, RORB modelling, Functional Designs, and subsequently costing. The updated functional design costings will be required to be rereviewed.

- Clarify Water Technology's role and resolve any conflict-of-interest concerns.

Council Project Manager to address and liaise with Water Technology for confirmation.