Our Job Number: 250302
1 July 2025

Council Ref: DA2025/0573

Attn: Maxwell Duncan
Northern Beaches Council

c/- Walsh Architects: Michael Hatch michael@walsharchitects.com.au

ENGINEERING REFERRAL RESPONSE (DA2025/0573)

RE: PROPOSED RESIDENTIAL DEVELOPMENT WITH BASEMENT CARPARK AT 94-96 PARK STREET AND 4 KUNARI PLACE, MONA VALE NSW

Thank you for your review as outlined in the engineering information request dated 25 June 2025. Please refer below for our additional response to the outstanding items.

1. Stormwater and Flooding

Following review of the referral comments provided of 25 June 2025, we wish to provide supporting justification for the exemption of On-Site Detention (OSD) for the proposed development at 94–96 Park Street and 4 Kunari Place, Mona Vale, in accordance with Clause 9.2 of the *Water Management for Development Policy*.

1.1 Catchment and Flood Conditions

The subject site is located at the lower end of the Cahill Creek catchment, approximately 40 m upstream of Kunari Place, which is flood-affected during the 1% AEP event. While the site itself is not flood-affected, Council flood mapping confirms that downstream areas are impacted during major storm events, and this zone functions as a natural detention area due to downstream culvert constraints and tailwater conditions.

This part of the catchment is considered downstream controlled, meaning local flood levels are dictated more by downstream backwater effects than by peak inflows from the site or immediate surrounds. Conceptual TUFLOW flood modelling prepared for this assessment reflects similar results to Council's adopted flood study, confirming that the adjacent golf course and culvert draining Cahill Creek below Pittwater Road act as a detention system, temporarily storing and attenuating upstream flows during flood events. Refer to Figure 1 attached.

1.2 Combined Hydrographs

As requested, we have undertaken hydrological and hydraulic analysis of the development site's runoff hydrograph, compared to that of the broader Cahill Creek catchment and Mona Vale Main Drain system. Refer to Figures 2 to 4 attached.

These results clearly demonstrate the following:

a. The site contributes less than 1% of the peak flow within the downstream system in the 1% AEP, 5% AEP, and 20% AEP storm events.
b. Runoff from the development site is predicted to peak before the downstream catchment hydrograph, reducing any potential for timing-based flood impact.
c. Application of OSD at the development site would offer negligible benefit and possibly introduce misalignment with catchment peak flows.
d. Council's policy seems to recognise that in such cases, OSD may not be appropriate or required.

1.3 Water Balance Modelling

To further reduce effective runoff and improve site hydrology, a 15,000 L rainwater harvesting system connected to 1,035 m² of roof area has been provided. This exceeds the 10,000 L minimum BASIX requirement. The remaining 225 m² roof area includes green roof components, which further reduce runoff volume and delay peak flow, complementing the rainwater harvesting system.

The rainwater harvesting system provides reuse for toilets, laundry, and landscaping across the development, and MUSIC modelling results indicate:

a. Roof Catchment (1,035 m² connected to 15,000 L rainwater tank)
   - Annual inflow volume (roof runoff): 671 kL/year
   - Annual reuse supplied (toilets, laundry, landscaping): 447 kL/year
   - Reuse efficiency: 67%
   - Reuse demand met: 26%
   - Volume discharged to system (pipe out): 224 kL/year
   - No overflow via weir or bypass routes recorded.
b. Development Site Summary
   - Total site runoff (post-development): 1.89 ML/year (from 2.33 ML/year pre-dev)
   - Runoff volume reduction: 19%
   - Reuse applied only to roof areas; remaining site flows discharged via standard drainage.

The results show a high reuse efficiency, with the rainwater harvesting system meeting a significant portion of the development's non-potable water demand. Specifically, the 15,000 L rainwater harvesting system receives approximately 671 kL/year of roof runoff from 1,035 m² of roof area, of which 447 kL/year is reused internally, equating to a 67% reuse efficiency. The volume discharged from the rainwater harvesting system to the downstream system is limited to 224 kL/year, with no overflow via weir or bypass.

The total post-development runoff is 1.89 ML/year, representing a 19% reduction from pre-development conditions.

These measures provide volume reduction and reuse, support compliance with Council's water quality targets, and align with water-sensitive urban design (WSUD) principles, thereby negating the need for OSD. Through reuse storage and throttled discharge, passive detention of small-to-moderate storm events is inherently provided, further supporting exemption from formal OSD requirements.

1.4 Best Practice Principles

While not quoted here, current engineering guidance such as ARR Book 9, QUDM, and Rainwater Tank Design for Water Supply & Stormwater Management (Coombes & Kuczera 2001), recognise that:

a. Rainwater harvesting systems can effectively reduce peak stormwater flows,

b. Detention systems at the lower end of catchments often have minimal flood mitigation benefit, and

c. In flood-affected, tailwater-controlled areas, OSD may exacerbate local flooding by mistiming discharge into a critical system already under load.

These principles support a strategic application of OSD, not a blanket requirement, and promote hydrologically appropriate solutions based on full catchment context and timing.

We respectfully request Council's acceptance of the proposed approach. Based on the hydrologic and hydraulic analysis, runoff timing, downstream flood context, and the additional on-site reuse and treatment measures implemented, OSD provides no tangible flood benefit in this case and may be counterproductive. The recommended strategy proposed on the submitting stormwater management plan, addresses the intent of Clause 9.2 of Council's Water Management for Development Policy and reflects both policy alignment, sound engineering judgement and adoption of best practice principles.

2. Site Access

Council's comment regarding AS/NZS 2890.1:2004 prescribing to a maximum 5% gradient for the first 6 m of driveway within the property boundary is noted. The proposed driveway levels were established with careful consideration of site-specific constraints and overall design objectives, including:

a. Flood Protection: The proposed grades provide protection up to the Probable Maximum Flood (PMF) at the site frontage. Reducing the driveway gradient to comply strictly with this standard would potentially compromise flood resilience and increase risk of floodwater ingress during extreme events.

b. Steep Verge Constraints: The adjacent public verge exhibits a steep crossfall, limiting opportunities to achieve compliant grades without substantial modifications to Council's infrastructure. Such regrading was assessed as disproportionate given the minimal benefit in this context.

c. Traffic Engineering Consideration: Section 5 of the Traffic Impact Assessment prepared by Genesis Traffic (Job No. 25072, dated 15 May 2025) acknowledges the proposed gradient variation and considers it acceptable. The report confirms this does not compromise safety or access functionality and is unlikely to cause operational issues for residents or visitors.

In light of the above, the proposed design is considered reasonable and balanced given the site conditions and design constraints.

Should further clarification or supplementary information be required, please do not hesitate to contact the undersigned.

Yours sincerely

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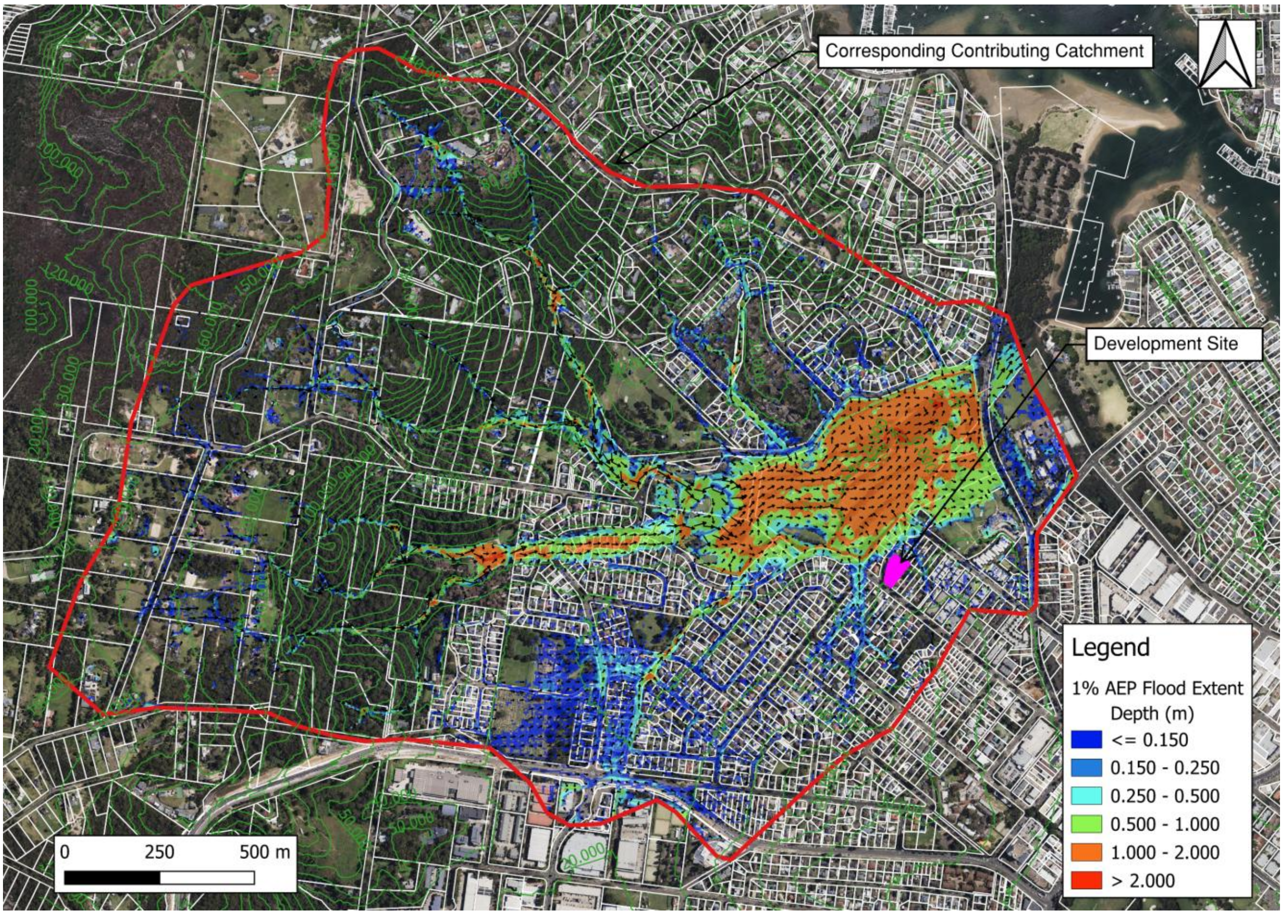
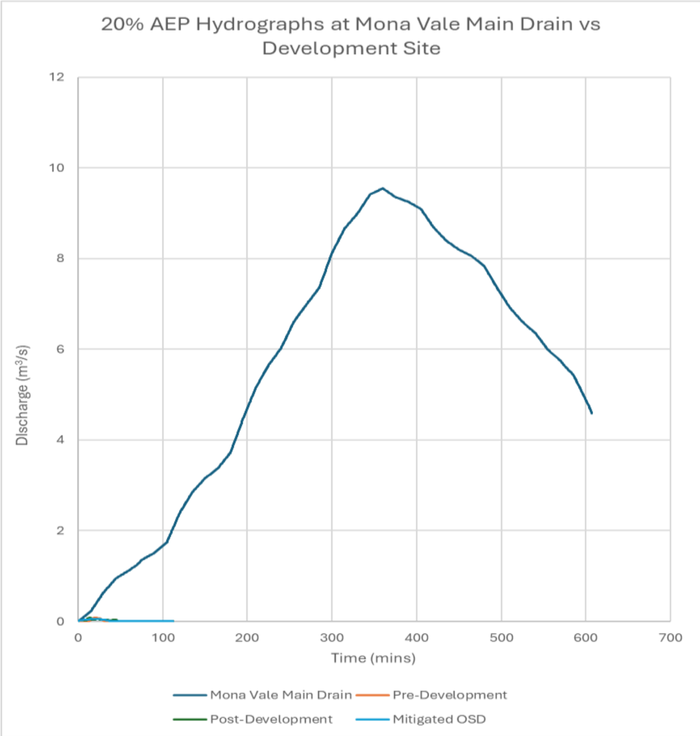


Figure 1 – TUFLOW Model of Contributing Catchment (RTS)



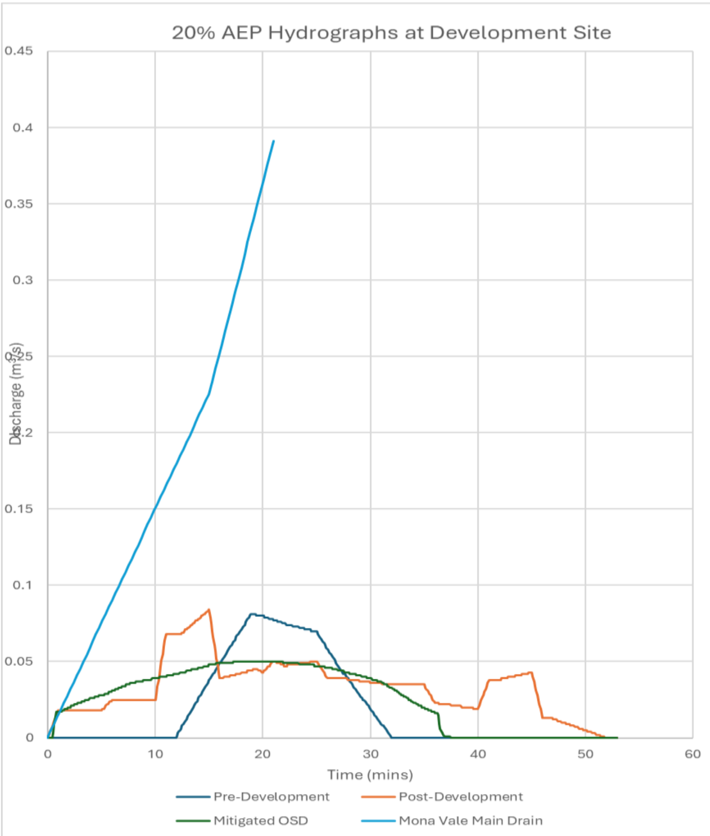
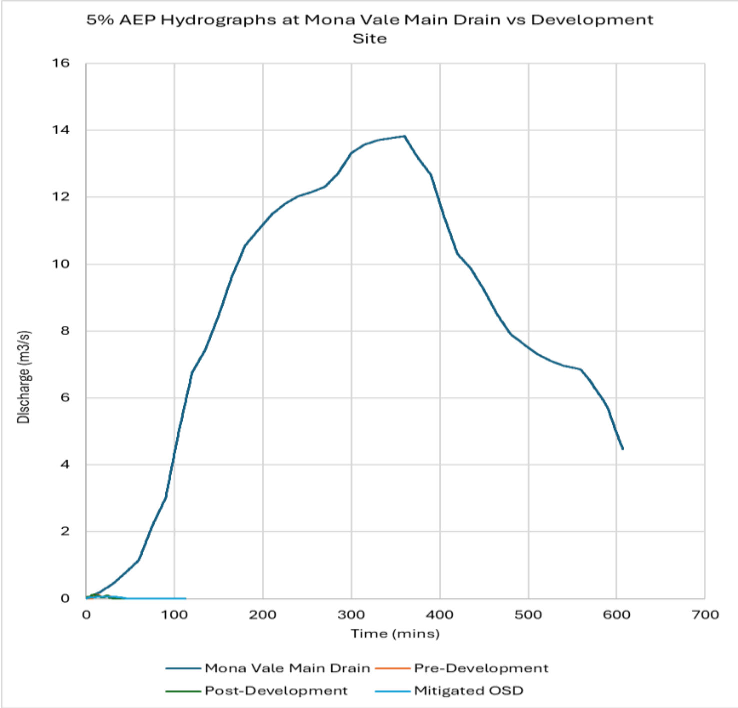


Figure 2 – 20% AEP Event Hydrographs Comparisions (DRAINS – RORB)



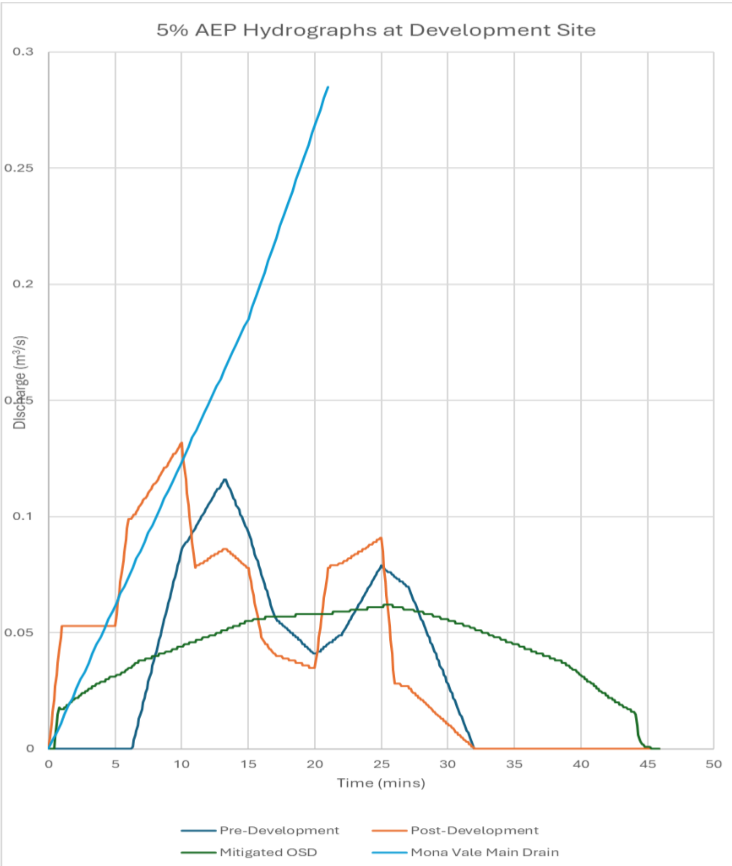
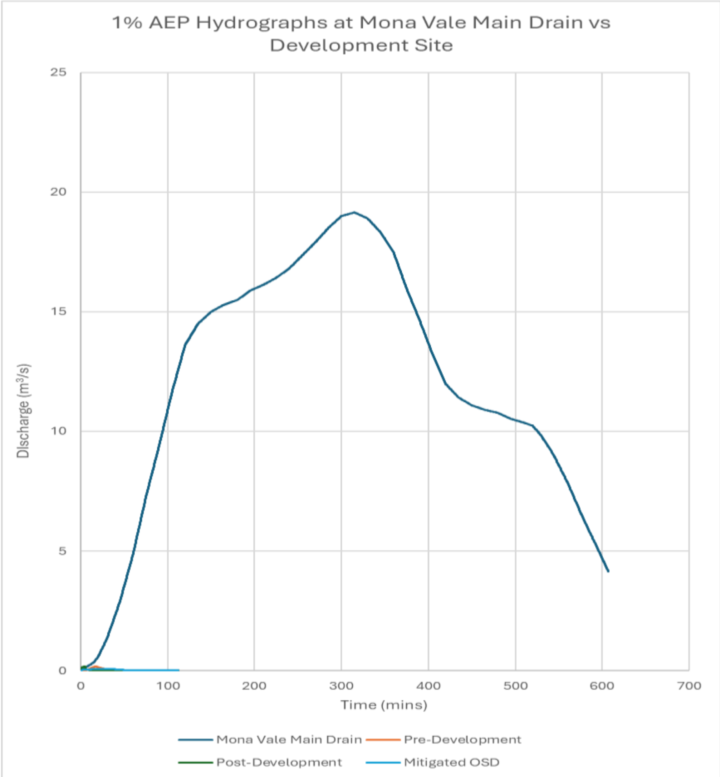


Figure 3 – 5% AEP Event Hydrographs Comparisions (DRAINS – RORB)



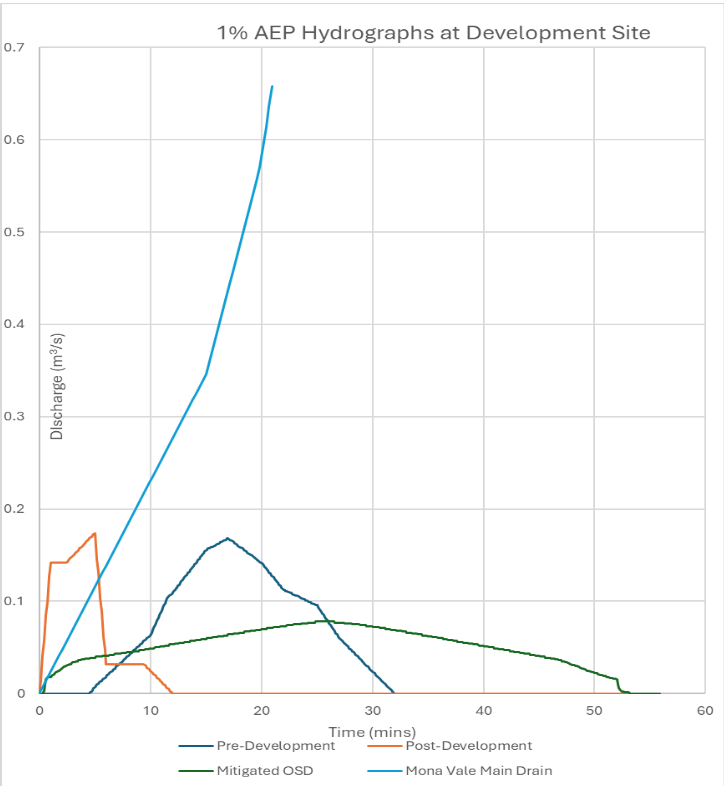


Figure 4 – 1% AEP Event Hydrographs Comparisions (DRAINS – RORB)

Node Water Balance - 15kL RWT - TBC

	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	0.671	17.562	0.103	1.474	17.430
ET Loss	0.000	0.000	0.000	0.000	0.000
Infiltration Loss	0.000	0.000	0.000	0.000	0.000
Low Flow Bypass Out	0.000	0.000	0.000	0.000	0.000
High Flow Bypass Out	0.000	0.000	0.000	0.000	0.000
Pipe Out	0.224	5.019	0.034	0.477	0.000
Weir Out	0.000	0.000	0.000	0.000	0.000
Transfer Function Out	0.000	0.000	0.000	0.000	0.000
Reuse Supplied	0.447	7.540	0.062	0.929	0.000
Reuse Requested	1.748	0.000	0.000	0.000	0.000
% Reuse Demand Met	25.586	0.000	0.000	0.000	0.000
% Load Reduction	66.643	71.418	67.438	67.642	100.000

Decimal Places 3

Figure 5 – Rainwater Tank Water Balance (MUSIC)

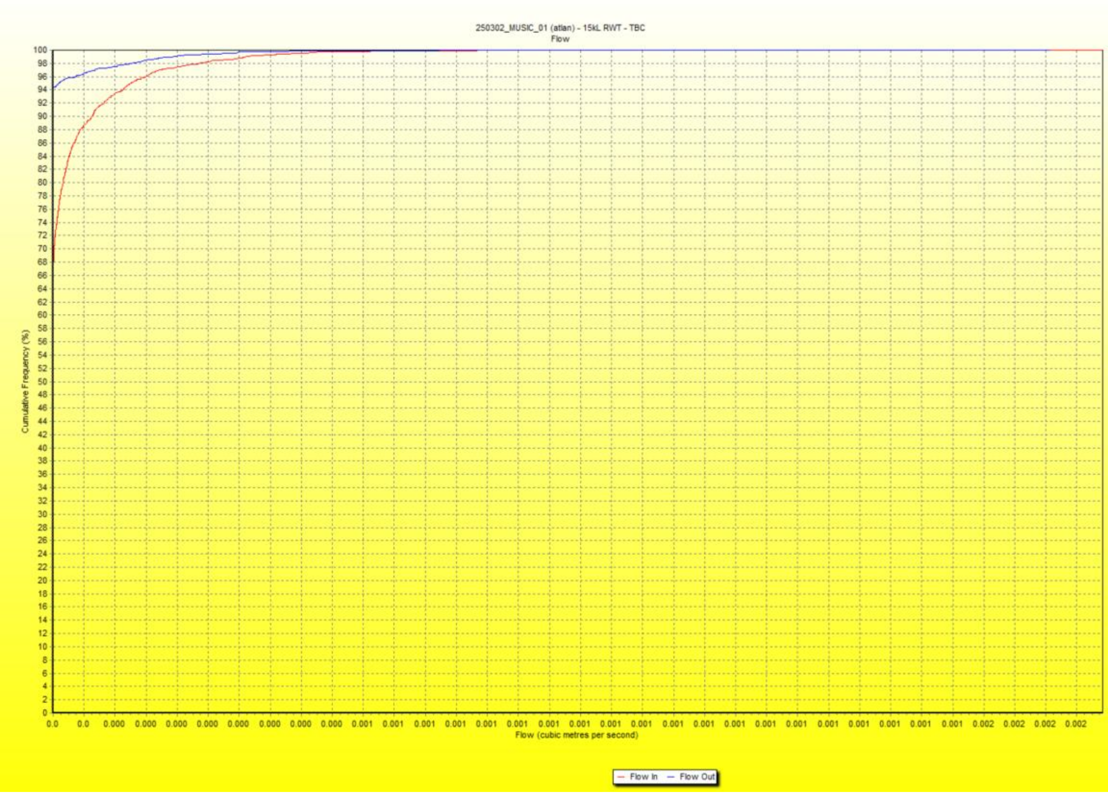


Figure 6 – Rainwater Tank Cumulative Frequency Graph (MUSIC)