

To: ACT Sport and Recreation From: Tim Murphy, Stantec

Project/File: New Gungahlin Tennis Facility Development Application Date: 16 November 2023

Reference: Gungahlin Tennis Facility - Water Sensitive Urban Design Assessment

1 Background

Stantec has been engaged by Infrastructure Delivery Partners (IDP) to undertake the detailed design of a new Gungahlin Tennis Facility located on the northern portion of Block 4 Section 109, Amaroo. A locality plan of the site is shown in **Figure 1-1** below.

An Estate Development Plan (EDP) for the proposed development was submitted in February 2023 and granted conditional approval in September 2023. This Water Sensitive Urban Design (WSUD) Memo has been prepared in support of the subsequent Development Application (DA) being prepared for the new tennis facility.

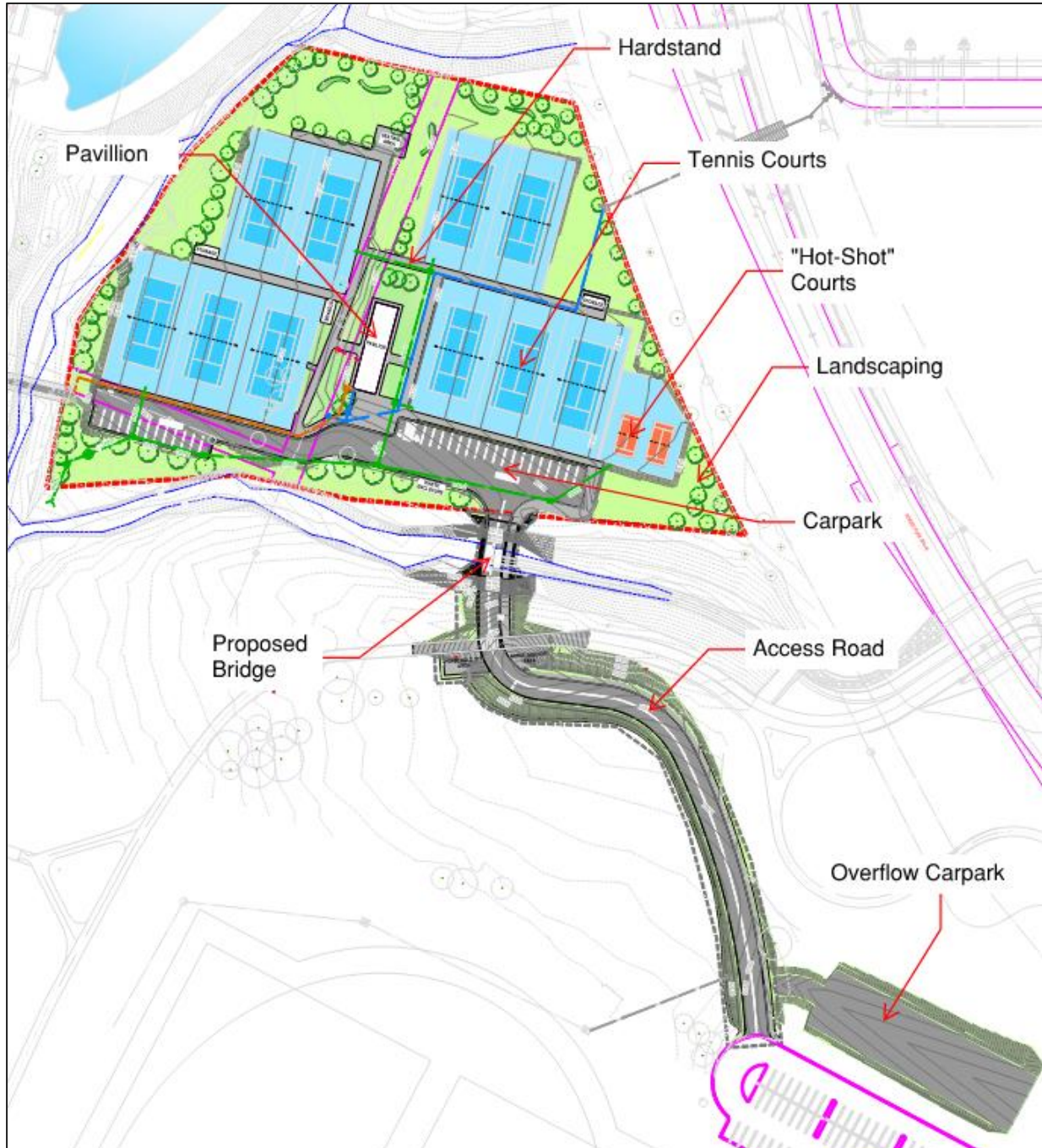
Figure 1-1 Locality Plan



1.1 Proposed Development

The proposed development includes ten tennis courts, two “hot-shot” courts, a new pavilion building, a sealed carpark, a new access road and bridge, and an unsealed overflow carpark. Refer to **Figure 1-2** for further details.

Figure 1-2 Proposed Development



While the previous EDP was submitted for the entire site, the DA is only being prepared for courts, pavilion building, and carpark (Catchment 1 in **Figure 3-1**). The access road, bridge, and overflow carpark (Catchment 2 in **Figure 3-1**) will be developed under a separate approval.

2 Potable Water Management

2.1 Mains Water Use Reduction Targets

The mains water use reduction for developments in the ACT are provided in the Waterways: Water Sensitive Urban Design General Code and are summarised in the below.

“Development achieves a minimum 40% reduction in mains water consumption compared to an equivalent development constructed in 2003.”

2.2 Mains Water Use Reduction Assessment

It is proposed that the future pavilion will be a low water-use development and will be fitted out with a minimum 5-star rating on all appliances. Using ACT Planning and Land Authority’s *Commercial Development Waterways Calculator*, the development was shown to achieve a 45% reduction in mains water consumption when compared to the same development in 2003. Therefore, the development achieves the required mains water use reduction targets.

The full results of the calculator are provided in **Appendix A**.

3 Stormwater Management

3.1 Water Quantity Assessment

The impacts of the development on water quantity are covered in the New Gungahlin Tennis Facility Flood Memo prepared by Stantec.

3.2 Water Quality Assessment

3.2.1 WATER QUALITY OBJECTIVES

The water quality objectives for developments in the ACT are provided in the Waterways: Water Sensitive Urban Design General Code and are summarised in the below.

“The average annual stormwater pollutant export is reduced when compared with an urban catchment of the same area with no water quality management controls for all of the following:

- a) *Gross pollutants by at least 90%*
- b) *Suspended solids by at least 60%*
- c) *Total phosphorous by at least 45%*
- d) *Total nitrogen by at least 40%”*

3.2.2 WATER QUALITY MODELLING

MUSIC Modelling of the proposed development was undertaken to investigate the proposed pollutant generation of the development and determine the treatment required to achieve the above water quality objectives.

While the access road, bridge and overflow carpark are not part of this DA, the water quality modelling has been undertaken for the entire development to ensure that the development as a whole still meets the required water quality targets.

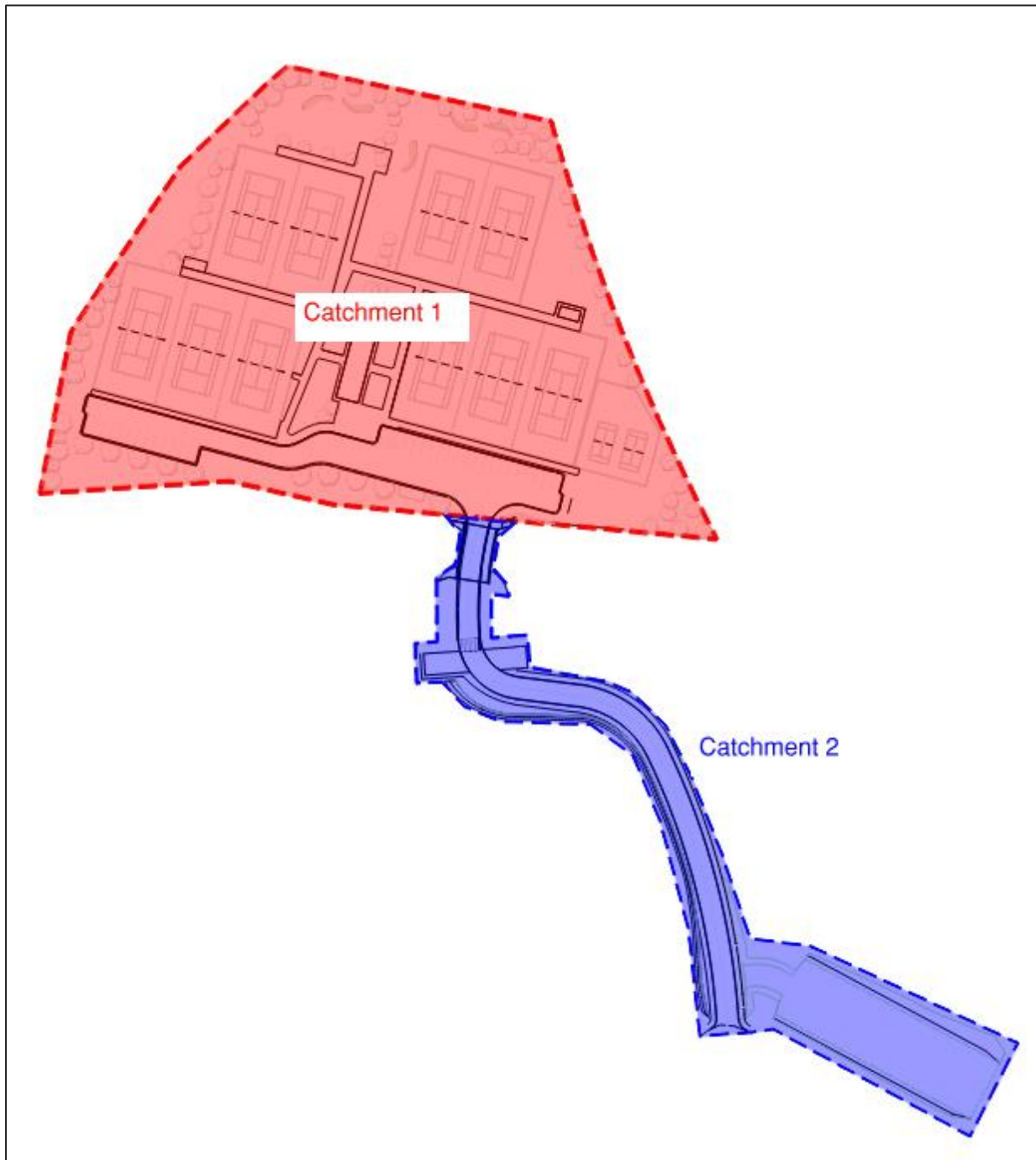
3.2.2.1 MUSIC Model Parameters

The MUSIC Model was set up as an ACT Government MUSIC-link model using MUSIC X version 1.10.

3.2.2.2 Major Catchments

The proposed development consists of two major catchments which have been delineated based on the proposed development under this DA and the remaining development area. Catchment 1 includes the tennis courts, pavilion, carpark, and surrounding landscaped area while Catchment 2 includes the new access road, the proposed bridge over the existing creek, and the overflow carparking area. Refer to **Figure 3-1** for further details.

Figure 3-1 Major Catchments



3.2.2.3 Minor Catchments

Within the two major catchment, there are several minor catchments that were used for modelling purposes. These minor catchments are summarised in **Table 3-1**. The areas and impervious percentages for the catchments were measured from the latest design drawings.

Table 3-1 Catchment Details

Major Catchment	Minor Catchment	Area (ha)	% Impervious
Catchment 1	Combined Roof – Total roof area of proposed pavilion, storage area and waste enclosure	0.019	100%
	Tennis Courts – Total area of all Tennis Courts	0.684	100%
	Carpark – Total area of carpark within the Catchment	0.177	100%
	Hardstand – Total area of all footpaths and other hardstand areas around the catchment	0.130	100%
	Landscaping – Total area of landscaping within the catchment	0.596	0%
Catchment 2	Access Road L1 – the portion of the access road and surrounding verge that drains into Swale L1	0.020	63%
	Access Road L2 – the portion of the access road and surrounding verge that drains into Swale L2	0.080	73%
	Access Road L3 – the portion of the access road and surrounding verge that drains into Swale L3	0.045	53%
	Access Road Untreated – the remaining area of the access road that does not drain to the swales	0.110	51%
	Overflow Carpark – Total area of the proposed unsealed overflow carpark	0.156	0%

3.2.2.4 Treatment Devices

The entirety of Catchment A is designed to be treated by an ATLAN Ecoceptor 1500 series located in the southwestern corner of the catchment. For Catchment B, three of the catchments are designed to be treated by proposed swales along the southwestern verge of the access road, while the remaining two catchments will have stormwater runoff discharge directly into the existing creek without treatment. The details of the proposed swales are summarised in **Table 3-2**.

Table 3-2 Swale Details

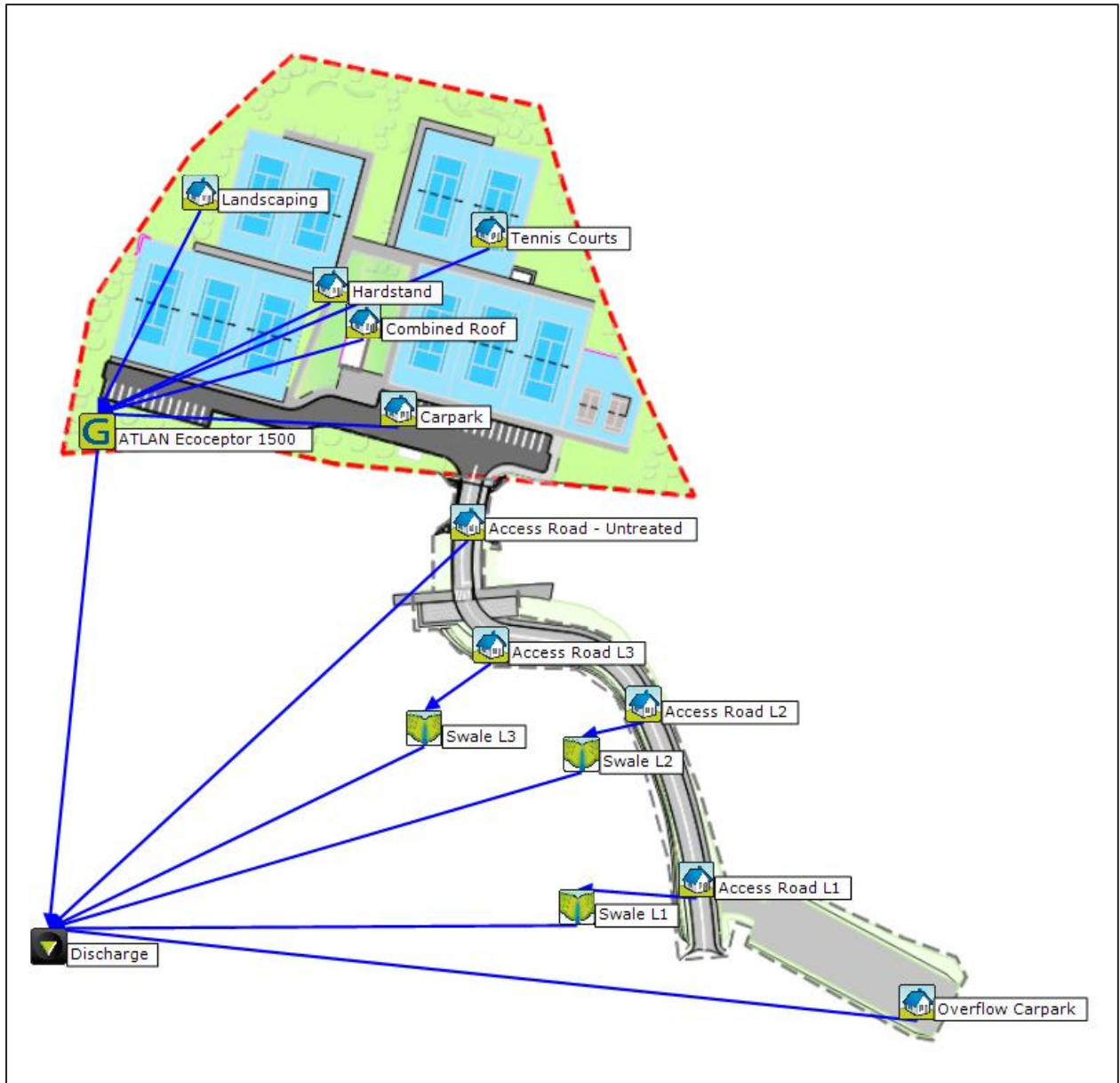
Swale	Design Length (m)	Effective Length (m)	Grade	Top Width (m)	Bottom Width (m)	Depth (m)
L1	15.26	8	1%	1.7	0	0.2
L2	78.06	40	1%	1.7	0	0.2
L3	43.23	22	1%	1.7	0	0.2

3.2.2.5 Results

3.2.2.5.1 Final Model

Figure 3-2 shows the final MUSIC Model developed for this assessment.

Figure 3-2 MUSIC Model



Reference: **Gungahlin Tennis Facility - Water Sensitive Urban Design Assessment**

3.2.2.5.2 Stormwater Quality Results

A summary of the results from the MUSIC Model is presented below.

Table 3-3 MUSIC Results

Pollutant	Source (kg/yr)	Residual (kg/yr)	% Reduction	Target Compliance (Y/N)
Gross Pollutants	260.3	25.81	90.09%	90%
Total Suspended Solids	1281	410.6	67.96%	60%
Total Phosphorus	1.856	0.6994	62.31%	45%
Total Nitrogen	22.12	12.56	43.2%	40%

As can be seen above, the results of the MSUIC modelling shows that the pollutant reduction targets can be met through the proposed water quality treatment devices.

4 Conclusion

The water quality assessment for the proposed Gungahlin Tennis Facility has been undertaken using MUSIC Modelling software. The following treatment measures are proposed to be incorporated into the development:

- ATLAN Ecoceptor 1500 Series
- Three (3) grassed swales along the south-western side of the access road.

The modelling results showed that the above water quality treatment measures are sufficient to meet the performance targets outlined in the Water Sensitive Urban Design General Code.

Regards,

STANTEC AUSTRALIA PTY LTD

Tim Murphy

Civil Engineer

Phone: +61 2 5110 8445

tim.murphy@stantec.com

Attachment: [Attachment]

APPENDIX A

Water Reduction Calculator

This spread sheet is an online calculator for individuals, designers and developers to gauge possible methods of reducing mains water consumption for commercial, industrial and institutional developments. Please enter ALL the relevant information for your development before using the reduction percentage. This calculator will not be able to cover all water use and water savings for every commercial, industrial and institutional developments. If your development has significant water use or savings that can not be shown in this calculator, then this needs to be disclosed in your Development Application.

Percentage Reduction

=

45%

Indoor information

What is the Net Lettable Floor Area (m ²)?	150
What is the water rating of the shower head?	5 Star ▼
What is the water rating of the dishwashers?	5 Star ▼
What is the water rating of the sink in the kitchen?	5 Star ▼
What is the water rating of the toilets?	5 Star ▼
What is the water rating of the urinals?	5 Star ▼
What is the water rating of the basins in the bathroom?	5 Star ▼

Site information

Site area (m ²)?	16,062
Roof area (including house and garage or carport) (m ²)?	160
Irrigated garden area (m ²)?	0

Other water use

What is the approximate yearly water consumption of the Cooling System (L/yr)?	4,000
What is the approximate yearly water consumption of the Fire Testing System (L/yr)?	0

Rain water tank information	
Is there going to be a water tank installed?	No ▼
What is the size of the tank (L)?	0
What is the approx. roof area flowing into the tank (m ²)?	0
What will be the use for the water in the tank?	▼
What is the % of Toilets connected to Rain Water?	0%
What is the % of Urinals connected to Rain Water?	0%

Grey water information	
What type of grey water system is installed?	None ▼
What is the size of the grey water storage tank (L)?	0
Where will the grey water be collected from?	▼
What will be the use for the grey water?	▼
What is the % of Toilets connected to Grey Water?	0%
Does this treated Grey water supply Toilets that have Rain water supplied to them?	No ▼
What is the % of Urinals connected to Grey Water?	0%
Does this treated Grey water supply Urinals that have Rain water supplied to them?	No ▼

Pool, spa or water feature information	
Is there going to be a pool, spa, or water feature?	No ▼
Is there going to be a cover on the pool or water feature?	No ▼
Average depth of the pool, spa or water feature (m)?	0
Average length of the pool, spa or water feature (m)?	0
Average width of the pool, spa or water feature (m)?	0
The volume of the pool, spa or water feature is (L)	0