Shot Machine Creek

The sample site is a section of Shot Machine Creek located in Swain Gardens, Killara, and consists of Sydney Sandstone Gully Forest. The Shot Machine Creek is part of the Middle Harbour Catchment, draining to the East into Gordon Creek and eventually Middle Harbour.

The water quality in Shot Machine Creek is generally good by the standards of urban creeks in Ku-ring-gai. Creeks in urban settings are impacted by elevated phosphate levels primarily due to stormwater runoff from residential areas with fertilizer use, detergents and household products, pet waste, erosion, organic matter being washed into creeks, and wastewater discharges from sewage overflows. Shot Machine Creek also suffers from low Dissolved Oxygen levels due to the nature of the creek having low water levels or isolated pools with little to no flow, particularly in the absence of recent rainfall, a correlation clearly shown by the data.

Physical Condition

- Dissolved oxygen – whilst dissolved oxygen naturally fluctuates depending on time of day and flow conditions, unusually low levels of dissolved oxygen can be an indicator of a pollution event.
- pH – a measure of how acidic the water is. Our waterways naturally vary in acidity depending on the local geology, soils, amount of urban development and fluctuations in flow and rainfall. Sudden changes in acidity can indicate the potential for a contaminant in the water.
- Available Phosphate – a measurement of the phosphate compounds that are soluble in water. The concentrations of phosphorus in Australian soils and water are naturally low, and a high phosphate level can indicate potential pollution events or contaminants.
- Electrical Conductivity – provides an indication on the amount of salts in the water.
- Turbidity is a measure of how clear or cloudy a liquid is and can be an indicator of sediment being carried by the water. Turbidity can vary drastically in urban waterways, primarily in response to rainfall, but also in response to soil type and even biological factors.

Sample Date	Water Level	Time Since Last Rainfall	Rainfall Intensity	Rainfall Previous 72hrs (mm)	Comments	Air Temp (°C)	Cloud Cover (%)	Water Temp (°C)	D.O. (ppm)	Sulphuric Acid Drops	pH	Available Phosphate (ppm)	E.C. Probe Calibrated (Select)	E.C. (µS/cm)	Turbidity (NTU)	Turbidity - (FAU)	Sample Testing Comments
4 February 2023	Medium (Normal)	Within 24hrs	Light	1.8		22	0	18	7.1	8*2	6.5	0.07	Yes	270	10	4	
19 March 2023	No Flow/Isolated Pool	Within 24hrs	Light	0.2		31	0	20	3.6	8*2	7	0.14	Yes	480	10	6	Very humid
23 April 2023	High	Within 24hrs	Medium	9.2		18.5	n	17	6.8	8*3	6.5	0.09	Yes	320	10	4	
4 June 2023	Medium (Normal)	Not Recorded	Light	2.4		15	80	13	3.7	8*2	6.5	0.04	Yes	700	10	9	
17 June 2023	No Flow/Isolated Pool	1-3 Days	None/Not Recorded	0		11	0	11	3.7	8*2	6.5	0.09	Yes	490	10	13	Water low and murky
2 July 2023	No Flow/Isolated Pool	4-7 Days	Light	0		8	0	10	4.4	8*1	6	0.06	Yes	300	10	6	
6 August 2023	No Flow/Isolated Pool	1-3 Days	Light	3.4	Colour - dark, black	12	100	13	7.9	8*9	6.5	0.09	Yes	190	10	5	D.O. 72 drops added, flocks still present when tested
2 September 2023	Not recorded	4-7 Days	Heavy	0	Wed 16mm 4 days previous	18	33	12	-	-	6.5	0.04	Yes	560	10	2	Didn't test as air was introduced into tube
1 October 2023	No Flow/Isolated Pool	Within 24hrs	Light	6.4		26	60	17	5.1	8*3	7	0.04	Yes	510	10	1	
3 December 2023	Medium (Normal)	Within 24hrs	Light	0.8	Murky & flowing	24	0	18	5.3	8*7	7	0.12	Yes	530	10	3	
14 January 2024	Low	Within 24hrs	Medium	20.6		23	100	21	3.3	8*7	7	0.06	Yes	330	10	1	
4 February 2024	Low	1-3 Days	Light	0.8		25	60	20	5.8	8*6	7	0.21	Yes	320	10	4	
24 February 2024	Medium (Normal)	Within 24hrs	Heavy	4.4	Steady flow, clear	19	100	20	6.8	8*4	7	0	Yes	550	10	2	
3 March 2024	No Flow/Isolated Pool	Not Recorded	Light	1.4		22	80	19.5	5.7	8*3	6.5	0.02	Yes	640	10	9	
7 April 2024	High	1-3 Days	Heavy	285.4	Water deeper and murkier	20.5	0	18	7.1	8*5	6.5	0.14	Yes	590	10	4	
5 May 2024	High	Within 24hrs	Medium	11.4	Post rain	16	100	15.5	8.6	8*4	6.5	0.06	Yes	170	10	6	Normal

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2 June 2024	High	Within 24hrs	Medium	107.2	Post heavy rain, signs of higher flows in past 24 hours	13.2	20	13	7.77	8*4	6.5	0.16	Yes	420	10	26.19	Water is a bit yellow

Traffic Lights Key

Condition:

- **Green**: All Okay
- **Orange**: Watch and Observe
- **Red**: Investigate and Act

Dissolved oxygen (ppm)	<6	6 – 7.9	>8		
pH	<5.5	5.6 – 6.4	6.5 – 8.3	8.4 – 9	>9.1
Available Phosphate (ppm)	<0.05	0.051 – 0.09	>0.091		
Electrical Conductivity (µS/cm)	0 – 400	401 – 900	>901		
Turbidity (NTU)	0 – 25	25.1 – 40	>40.1		

Actions prompted by Streamwatch results may be either short-term or long-term. If there is evidence of a significant pollution or contamination event, Streamwatch volunteers report immediately to Council for investigation and resolution in a timely manner. Spikes in available phosphate and turbidity are often caused by high rainfall events, which wash debris and urban pollutants into creeks. Similarly, low dissolved oxygen levels can result from low water flow during dry periods. Creeks, especially in urban environments, will experience peaks and troughs in water quality which can resolve naturally. If unusually high levels are observed consistently and cannot be explained by rainfall events, further investigation to identify potential sources of pollution will be undertaken. Investigations may involve Streamwatch volunteers. If an isolated pollution source is not identified and an issue is ongoing, long-term management actions such as street sweeping, stormwater management controls and Water Sensitive Urban Design (WSUD) features can be considered.

Disolved Oxygen (ppm) — line chart showing D.O. (ppm), Med Trigger (yellow), and High Trigger (red) from 4-Feb-23 to 2-Jun-24.

Available Phosphate (PPM) — line chart showing Available Phosphate (ppm), Med Trigger (yellow), and High Trigger (red) from 4-Feb-23 to 2-Jun-24.

E.C. (µS/cm) — line chart showing E.C. (µS/cm), Med Trigger (yellow), and High Trigger (red) from 4-Feb-23 to 2-Jun-24.

Turbidity (NTU) — line chart showing Turbidity (NTU), Med Trigger (yellow), and High Trigger (red) from 4-Feb-23 to 2-Jun-24.