# Attachment 3 – Surface Water Monitoring Program and Trigger Values

| | | | Sample Locations | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Site Code | SW12 | SW13 | SW14 | SW15 | SW16 | GW Sump | SWStg1&2 | SWStg5 | GWILP | GWILP3 | GWI5 | GWI6 |
| | | Easting (MGA Zone 52) | 709035 | 709065 | 709287 | 709405 | 709490 | 709102 | 709724 | 709003 | 709771 | 709645 | 708952 | 709811 |
| | | Northing (MGA Zone 52) | 8630495 | 8630504 | 8630536 | 8630699 | 8630756 | 8629880 | 8629982 | 8630206 | 8630733 | 8630902 | 8630107 | 8629975 |
| **Parameter** | **Units** | **Trigger Value** | **Frequency** | | | | | | | | | | | |
| Flow | kL/day | - | - | - | - | - | - | - | M[6] | M[6] | C[7] | C[7] | C[7] | C[7] |
| Water Level | measure | - | M | M | M | M | M | M[8] | - | - | - | - | - | - |
| pH | pH units | 6 – 8.5[1] | M | M | M | M | M | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Electrical Conductivity (EC) | µS/cm | - | M | M | M | M | M | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Dissolved Oxygen (DO) | % saturation | | M | M | M | M | M | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Temperature | °C | - | M | M | M | M | M | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Turbidity | NTU | - | M | M | M | M | M | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| **Metals/Metalloids (filtered (0.45µm) and unfiltered)** | | | | | | | | | | | | | | |
| Boron (B) | µg/L | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Cadmium (Cd) | | 1.4[2] | A | A | A | A | A | A | A | A | A | A | A | A |
| Chromium (Cr) | | 20[3] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Cobalt (Co) | | 14[2] | A | A | A | A | A | A | A | A | A | A | A | A |
| Copper (Cu) | | 3[2] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Lead (Pb) | | 6.6[2] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Nickel (Ni) | | 200[2] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Zinc (Zn) | | 23[2] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| **Other** | | | | | | | | | | | | | | |
| Total Organic Carbon (TOC) | mg/L | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Chemical Oxygen Demand (COD) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Total Suspended Solids (TSS) | | 50[4] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Total Dissolved Solids (TDS) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| **Major Ions** | | | | | | | | | | | | | | |
| Carbonate ($CO_3$) | mg/L | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Bicarbonate ($HCO_3$) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Calcium (Ca) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Magnesium (Mg) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Potassium (K) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |

| Parameter | Units | Trigger Value | Frequency | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sodium (Na) | mg/L | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Chloride (Cl) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Sulphate ($SO_4$) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| **Nutrients** | | | | | | | | | | | | | | |
| Ammonia ($NH_3$ as N) | µg/L | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Nitrate ($NO_3$) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Nitrite ($NO_2$) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Oxides of Nitrogen ($NO_x$) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Total Nitrogen (TN) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Total Phosphorous (TP) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| Filterable reactive phosphorous (FRP) | | - | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | M[8] | Q | Q | Q | Q |
| **Hydrocarbons** | | | | | | | | | | | | | | |
| Total Recoverable Hydrocarbons (TRH) | µg/L | - | A | A | A | A | A | A | A | A | A | A | A | A |
| Benzene | | 900[2] | A | A | A | A | A | A | A | A | A | A | A | A |
| Toluene | | - | A | A | A | A | A | A | A | A | A | A | A | A |
| Ethylbenzene | | - | A | A | A | A | A | A | A | A | A | A | A | A |
| Xylene | | - | A | A | A | A | A | A | A | A | A | A | A | A |
| Naphthalene | | 90[2] | A | A | A | A | A | A | A | A | A | A | A | A |
| **PFAS (per-and poly-fluoroalkyl substances) (Analysis on a minimum of 28 PFAS compounds using LC-MS/MS)** | | | | | | | | | | | | | | |
| PFOS | µg/L | 2[5] | A | A | A | A | A | A | A | A | A | A | A | A |
| PFOA | | 632[5] | A | A | A | A | A | A | A | A | A | A | A | A |

**C** – Continuous
**M** – Monthly
**Q** – Quarterly (January, April, July, October)
**A** – Annually (January)

1 – Based on Darwin Harbour Water Quality Objectives (Shoal Bay upper area marine ambient water quality)
2 – Based on 90% species protection for marine waters ANZECC Water Quality Guidelines 2018 (ANZG 2018)
3 – Based on Hexavalent chromium 90% species protection ANZECC Water Quality Guidelines 2018 (ANZG 2018). Analyse for Trivalent and Hexavalent Chromium if total chromium exceeds trigger value
4 – Based on International Erosion Control Association Australasia Best Practice Erosion and Sediment Control Appendix B – Sediment Basin Design and Operation 2018 revision
5 – Based on PFAS NEMP 2.0, however trigger values for the latest NEMP must be used when available
6 – Estimate the flow at the time of sampling
7 – Using a flow meter
8 – Only during months October to April