



Dedicated to a better Brisbane

**Urban Management Division
Subdivision and Development Guidelines
Part C Water Quality Management Guidelines**

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13.0 MONITORING REQUIREMENTS

13.1 BACKGROUND

Water quality monitoring¹ may be required for a development as a consequence of the development assessment process and subsequent approval conditions. Such monitoring is typically needed to determine the performance of management practices (eg constructed wetlands for stormwater treatment) or the development's impact on receiving waters (eg a downstream creek). For such monitoring to be of value, Water Quality Objectives need to be clearly defined and measurable (see Chapter 2 of Part C of this document), so that water quality monitoring normally only applies to 'high risk' developments.

Monitoring may involve stormwater leaving the site (stormwater discharge quality monitoring) and/or downstream receiving waters (eg ambient water quality monitoring). Monitoring may also include 'baseline monitoring', that is, measuring water quality (and/or ecological health) before site disturbance begins.

This Chapter describes when such monitoring is likely to be required and what form such monitoring should take.

13.2 KEY ISSUES/DESIGN CRITERIA

Council considers water quality (or in some cases waterway health) monitoring is a reasonable requirement for a development under any of the following circumstances:

- where Stormwater Quality Best Management Practices will be donated to Council as contributed assets but do not have a proven performance record (eg a purpose built wetland or pond, rather than a standard gross pollutant trap unit of a 'proprietary design' for which credible performance data is available); and/or
- where significant environmental risks are involved² and such monitoring could lead to significant improvements in the way stormwater or wastewater is managed on the site (eg monitoring could lead to reasonable and relevant improvement actions).

¹ See Glossary (Chapter 16 of Part C of this document) for a description of different types of 'water quality monitoring'.

² These include Environmentally Relevant Activities (ERAs), activities classified as 'high risk' in the Stormwater Management Code of *City Plan*, or developments upstream of a waterway or wetland with highly significant environmental values (eg containing rare or threatened species).



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Note that:

- The choice of whether to require water quality monitoring in affected receiving waters and/or stormwater discharge quality monitoring will be determined by Council on a site by site basis following the development assessment process.
- If any water quality monitoring is required for a development (eg a large subdivision), minimum monitoring requirements are defined in Table C13.1. If water quality monitoring in downstream receiving waters is also required, minimum requirements are defined in Table C13.2.
- Water quality monitoring in downstream receiving waters (as opposed to stormwater discharge quality monitoring) should only be required if the results of this monitoring will clearly relate to the performance of the development that is subject to approval conditions. This consideration becomes an issue when stormwater draining from the site is mixed with other stormwater before being discharged to a location where monitoring can occur. Upstream and/or baseline monitoring of receiving waters would normally be required as part of this form of monitoring.
- Baseline monitoring may also be needed prior to site disturbance if the objectives of the development include the maintenance of specific habitats and/or water quality conditions (eg to protect a community of a particular frog or fish species with specific environmental needs). Ideally, 12 months of baseline data must be available before site disturbance begins (ie 1 full seasonal cycle).
- If water quality monitoring is required to assess the performance of an Environmentally Relevant Activity (ERA), monitoring should be an ongoing feature of the approval/licence (eg monthly stormwater discharge quality monitoring - subject to rainfall).
- Where neighbouring activities not associated with the development are polluting downstream or on-site water quality, it may be prudent to also monitor the quality of water associated with these activities, particularly if there is a likelihood that stakeholders may attribute the poor water quality to the development.



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TABLE C13.1 MINIMUM REQUIREMENTS FOR DEVELOPMENTS
THAT REQUIRE ANY WATER QUALITY MONITORING

Monitoring Type	Type of Sampling	Frequency	Methods	Comments
During the construction phase:				
Stormwater discharge quality monitoring over the entire construction phase.	Event based or 'wet weather' sampling (ie sampling stormwater during rainfall and/or shortly after rainfall). ³	Collect >10 samples over the construction period (per location).	<ul style="list-style-type: none"> ▪ Hand/manual sampling (requires on-site personnel), rising stage samplers, and/or automatic samplers. ▪ Several water samples should be taken throughout each runoff event, composited (mixed) and then analysed to account for the high level of variability typically associated with stormwater pollution in a storm event. 	<ul style="list-style-type: none"> ▪ Sample stormwater where it leaves the site. ▪ Where the construction stage is short and occurs in the winter months, >10 samples may not be possible. ▪ Some measure of the magnitude of the rainfall event is required to interpret the data from wet periods (ie measure flow or local rainfall).
After the construction phase:				
Stormwater discharge quality monitoring for at least 12 months immediately after the construction phase has finished (ie one full seasonal cycle).	Event based or 'wet weather' sampling (see above).	Collect >10 samples over the operational period (per location).	<ul style="list-style-type: none"> ▪ As above. 	<ul style="list-style-type: none"> ▪ Sample stormwater where it leaves the site. ▪ Some measure of the magnitude of the rainfall event is required to interpret the data from wet periods (ie measure flow or local rainfall). ▪ The resulting data set would then be able to be analysed (eg medians determined) and compared against relevant WQOs (see Chapter 2 of Part C of this document).

³ For the purpose of these guidelines, 'dry periods' are defined as periods where rain has not fallen for >72 hours, and 'wet periods' are defined as periods where stormwater is still draining from the site (ie surface runoff, not base flow).



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TABLE C13.2 MINIMUM REQUIREMENTS FOR DEVELOPMENTS THAT REQUIRE WATER QUALITY MONITORING IN AFFECTED RECEIVING WATERS

Monitoring Type	Type of Sampling	Frequency	Methods	Comments
<p>Water quality monitoring in the nearest affected receiving waters from before the site disturbance begins (baseline) to at least 12 months after the construction phase has finished (ie one full seasonal cycle).</p> <p>Note that ideally, a full 12 months of pre-disturbance, baseline monitoring would be undertaken (to represent 1 full seasonal cycle). Note however, with the use of WQOs in Brisbane as water quality 'goals', the pre-development water quality (as measured by a baseline monitoring program) becomes less relevant.</p>	<p>Time-based sampling (eg weekly, fortnightly, monthly) and suitably frequent sampling so that several 'wet periods' are likely to be represented in the final data set.</p>	<p>Collect >10 samples (per location) over both the pre-disturbance period (if a baseline is required) and post-disturbance period.</p>	<p>Hand/manual sampling.</p>	<ul style="list-style-type: none"> ▪ Sample the receiving waters that are most affected by the discharge from the site and least affected by other stormwater/wastewater discharges. ▪ Include upstream and baseline monitoring in the program. ▪ Sampling events should be clearly identified as being during 'dry' or 'wet' periods. ▪ The resulting data set would then be able to be analysed (eg medians determined) and compared against relevant WQOs (see Chapter 2 of Part C of this document).

13.3 REFERENCES

1. ANZECC, 1999. *Draft Australian Water Quality Guidelines for Fresh and Marine Waters* (1999). Australian and New Zealand Environment and Conservation Council, Canberra.
2. Brisbane City Council, 2000. *Guideline on Identifying and Applying Water Quality Objectives in Brisbane City*. Brisbane City Council, Brisbane.