Transport Services Division Water Quality Monitoring Manual for Construction Sites
Level Two Water Quality Monitoring

Objective

To ensure that sediment is not entering the aquatic environment and that remedial actions are undertaken, where necessary, to prevent pollution of waterways.

Components of Monitoring

Level Two monitoring consists of:

- Visually checking the site soil erosion and drainage management measures and potential discharge point(s) for sediment discharges,
- Photographic records at the discharge point(s),
- Recording the colour of site water discharges and the receiving waters upstream and downstream of the site,
- Taking manual turbidity readings, and
- Reporting results.

Monitoring Records

The following information should be recorded:

Site Description

- A basic description of the site.
- A map of the monitoring site showing drainage lines, receiving waters, location of erosion & sediment control measures, vegetated or environmentally sensitive areas, work site/depot or the extent of the general works. The map should also include site characteristics such as slope (can be obtained from project SEDMP[1]).
- A record of watercourse characteristics at discharge point(s) and monitoring locations at the start of the project. Parameters recorded should include mean width, depth and composition of watercourse bed (sandy/rock/clay, vegetated/bare, stable/unstable). Changes in these parameters during the project should be recorded.
- A description of the aquatic environment including information on water clarity, presence of algae, predominant aquatic and terrestrial vegetation type and abundance/density.
- Cross-section of the water course at the sampling point, including watercourse bed level. Also a record of the bed level at a point 50m up and downstream of the monitoring point to allow the estimation of flows.

Climatic data

A record of daily weather conditions including maximum temperature and rainfall. (Can be sourced from the nearest Bureau of Meteorology measuring station).

Photographic Records

The location of the photo points, time and date taken.

Sediment trapping facilities

Location and inspection frequency.

A record of the percentage of sediment trapping capacity remaining and a record of the amount of sediment removed from sediment traps when they are cleaned or removed.

Discharge characteristics

The location and sampling frequency.

A record of any evidence of discharges is to be kept. Notes should include the location of discharges, colour of discharge, and colour of receiving waters up and down stream.

Photo Points

Establishment

Appropriate photo points should be established with the aim of providing visual evidence of the state of the discharge points and receiving environment before and after discharges.

Photo points provide a visual record of a monitoring site and support the observational records.

[1] Soil Erosion & Drainage Management Plan

Photo points should be established upstream of the works, at discharge point(s), and downstream of the works. They may also be established at selected sediment trapping facilities.

Monitoring
Photos are to be taken before, during and after the infrastructure works, with the need for photos dependant on the level of monitoring required. Generally the higher the environmental risk, the more frequent the photos.

Water Quality Information

Establishment
Manual turbidity recordings are to be taken to provide an indication of the amount of sediment being discharged into and carried in the receiving waters.

Monitoring
Turbidity should be measured with a portable hand probe. The probe should be regularly calibrated with laboratory samples.
Replicates of each sample (minimum of 3) should be taken where possible to limit variability at each sample point.
Field turbidity readings are likely to vary between 20 and 200 NTU depending on flow and discharge characteristics. Ideally turbidity readings should be below 20 NTU as per the *Environment Protection (Water Quality) Policy 2003*, or at least no greater than the turbidity in the receiving water if this already exceeds 20 NTU. If readings fail these tests an investigation should be undertaken to determine and eliminate the cause.

Water depth readings should also be taken at the recording point. Installing a Gauge Board in the watercourse or drain can assist this.

Sampling Locations

Level Two observations and monitoring should be undertaken at the following locations:
- site soil erosion and drainage management measures
- drainage discharge point(s)
- upstream and downstream of the works.

Sampling Frequency

Frequency of sampling will be based upon:
- Season
- Rainfall events
- Perceived risk of discharge, environmental value of the area.

The greater the risk or environmental value of the area, the more often it will be necessary to monitor.

Task	Frequency
Visual check of soil erosion & drainage management measures, record amount of sediment removed from traps	W, RE
Check potential discharge point(s) for sediment discharges,	W, RE
Take photos at photo point(s)	W, RE
Hand-held in-situ turbidity water quality monitoring at discharge points	W, RE

W = Weekly
RE = during or following a rainfall event

Data Storage & Retrieval

Basic information describing the site is to be recorded on the Water Quality Monitoring Data Sheet (attached).

Level Two data analysis includes:
- Records of the effectiveness of soil erosion and drainage management measures and any remedial actions taken.
- Visual monitoring and monitoring with a turbidity probe of site drainage points for evidence of sediment in run-off areas and watercourses.
- Comparison of water quality between discharge point(s), up/downstream points and assessment criteria.

Data should be stored on a database or in a secure filing system for weekly site reports.

Reporting & Results

The following information should be documented throughout the life of a project:
- Monitoring Plan – description of the objectives of the program, results of the risk analysis assessment and reason for selection of level of monitoring.
- Monitoring Implementation Reports – regular (weekly) reporting of the water quality monitoring, site management and the implementation of the soil erosion and drainage management plan.
- Project Review Report – on completion of the project, a review of the effectiveness of the monitoring program for feedback into future projects.

During the construction phase, monitoring results are to be included in a weekly report.

The report should document the performance of the site management measures, whether or not discharge(s) were found and action(s) taken to improve management measures and prevent discharges.

Staff Expertise

Level Two monitoring may be undertaken by staff, trained in water quality monitoring, who have the ability to reliably record and report site conditions.

Visual inspection of site soil erosion & drainage management measures and a discharge point

Sampling Site Description Data Sheet

(to be completed for each sampling site)

PROJECT DESCRIPTION.

Project Name: _____ Project Number: _____

Road Number: _____

SITE DESCRIPTION (include sketch overleaf)

Sampling Site Name / Code: _____

Chainage: _____ Maintenance Marker: _____

Location Name (river and site location): Nearest Named Place: _____

Map sheet Name: _____ Map sheet no and scale: _____

AMG Zone: _____

Easting: _____ Northing: _____

Latitude: _____ Longitude: _____

SITE ACCESS

Access by ☐ Conventional Car ☐ Foot
☐ 4WD ☐ Boat

Keys required ☐ Key Number _____

Landholder to be notified ☐ Landholder Contact Details: _____
_____

Landmarks for finding site: _____
_____
_____

PARAMETERS

Monitoring Level for Site: _____

Parameters to be recorded:

- ☐ Photo Point
- ☐ % Sediment Trapping Capacity Remaining
- ☐ Field Turbidity
- ☐ Biological
- ☐ Stream flow
- ☐ Colour Chart
- ☐ Suspended Solids (may be required for earthworks drainage licence)
- ☐ Water Level
- ☐ Automatic Recorder
- ☐ Other _____
  _____
  _____

Sampling Site Location Sketch: TSD Project Name: _____

Sampling Site Code: _____

(Show site location, stream boundaries, vegetation, physical features, points of sampling, photo points, water levels taken, automated sampling devices etc.).

North 

LEVEL TWO MONITORING
DATA RECORDING AND REPORTING SHEET

TSD Project Name: _____ Sampling Site Code:_____

Road Number: _____

Week Start Date _____

Daily Summary Table							
Date:							
Temperature							
Rainfall (mm)							
Photo taken ? (Y / N)							
Photo Label							
SEDMP Measure							
% Sediment Trapping Remaining							
Volume of Sediment Removed (m^3)							

Nature of Site Activities: (eg earthworks, laying pavement etc)

_____

_____

_____

IN SITU SAMPLING DETAILS

DATE	TIME	WATER DEPTH (METRES)	COLOUR	TURBIDITY (NTU) SATISFACTORY IF LESS THAN 20 NTU	TOTAL SUSPENDED SOLIDS (mg/L) SATISFACTORY IF LESS THAN 25mg/L	COMMENTS

LABORATORY SAMPLES TAKEN
Label container with: sample identification code/location, time, date, who sample collected by. Use a waterproof marking pen. Any changes to label should be initialled and dated.

Containers used: **Storage method:**

Transport time to lab:

(Tick if sample taken and record when results are received from the laboratory)

SAMPLE DATE	TIME	SAMPLE ID	TURBIDITY (NTU)	SEDIMENT SAMPLE (note type)	OTHER SAMPLES TAKEN			SATISFACTORY IF LESS THAN 25 mg/L ☰/ x	SATISFACTORY IF LESS THAN 20 NTU OR NO GREATER THAN TURBIDITY OF RECEIVING WATER ☰ / X

Non-complying result recorded from site? YES NO

Date and time of observation(s) _____

Action Taken: _____
_____
_____
_____
_____

Name of Sampler: _____

Signature: _____

Forward copy of completed sheet to Site Manager and TSD Contract Manager