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## **Technical Guideline**

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# **Environmental Management of Construction Site Dewatering**

EMS-TG-011

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Environmental Management System (EMS)

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## About this release

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## 1.0 Purpose

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The purpose of this Guideline is to assist RTA and Contractor project management teams to develop work method statements (WMS) for dewatering activities for main road construction and maintenance projects.

## 2.0 Scope

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This Guideline applies to all projects undertaken by the RTA or engaged contractors that will involve the dewatering of ponded stormwater or infiltrated groundwater. It provides guidance on the preparation of WMS for dewatering activities where required under either RTA specification G35 (Environmental Protection - Management Plan) or G36 (Environmental Protection - Management System).

## 3.0 Introduction

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Dewatering, for the purposes of this guideline, is any activity that involves the removal of ponded stormwater or infiltrated groundwater from any location on site and the subsequent reuse or discharge of that water.

Captured stormwater and infiltrating groundwater will fill sedimentation controls and pool in low lying areas of construction formations and excavations. These areas must be dewatered to maintain the effectiveness of sedimentation controls and to ensure formations and excavations are not adversely affected by long periods of inundation.

During construction activities there may be a requirement to dewater numerous locations including:

- Sedimentation controls (eg sedimentation basins and sumps)
- Excavations
- Culvert and drainage constructions
- Low lying areas of road formations.

It is the objective of this guideline to ensure that all site dewatering activities are completed in a manner that does not cause harm to the environment. To achieve this, a site-specific WMS must be developed for all construction and maintenance projects to ensure that dewatering actions are planned, approved and supervised to minimise impacts on the receiving environment.

No construction site dewatering activity should be carried out unless it is in accordance with a WMS.

## 4.0 Planning Construction Site Dewatering Activities

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Every dewatering activity must be planned to achieve satisfactory environmental outcomes. Sections 4.1 to 4.8 describe critical decisions that must be made in preparing dewatering WMS.

### 4.1 Identify areas of the site that will require dewatering.

Dewatering locations will be identified through detailed design, in development of the CEMP and during construction as earthworks and construction phases result in changing site drainage conditions. These may include:

- Sedimentation controls (eg sedimentation basins and sumps)
- Excavations
- Culvert and drainage constructions
- Low lying areas of road formations.

Under no circumstances should first flush concrete batching water be pumped to sediment basins for treatment. These waters should be reused within the batching process or must be treated in-situ to ensure accidental discharges do not occur.

#### **4.2 Consider dewatering methods to minimise potential environmental impacts**

There are various methods available for dewatering sedimentation controls and inundated areas of construction excavations and formations. The Contractor should assess different technologies with a view to providing the highest level of protection against environmental impacts.

Dewatering methods for sedimentation controls such as basins include pumping, low flow pipes and siphon discharges. Consideration should be given to alternatives to pumped discharges in all cases where practical.

Pumped dewatering presents specific risks relating to the pump inlet falling to the level of deposited sediment, resulting in direct discharge of polluted water to the environment. Any pumped discharge should be designed to prevent this scenario. Likewise, deposited sediment in controls such as basins must be maintained (removed) to ensure that inlets to dewatering systems are always above the level of deposited sediment.

There are two general methods for achieving water quality objectives for any site discharge, being:

a) Water quality treatment prior to discharge.

This is required for sedimentation basins and is the preferred method for any construction excavation or inundated area that has a sufficient volume and depth of water to provide flocculation of sediments prior to discharge. All area other than defined sedimentation basins that can be treated prior to discharge should have a designed dewatering method (eg a defined pumping point, low flow or siphon discharge).

b) Treatment with best practice controls prior to discharge.

Treatment with best practice erosion sedimentation controls during discharge is applicable for minor stormwater ponding and for activities such as individual culvert extensions where the volume of stormwater captured is minor and the dewatering activity is infrequent.

In these cases a suite of sedimentation controls, and appropriate erosion controls must be designed and implemented to provide on-site treatment of water prior to discharge to the environment. Controls may include sedimentation fences, mulch bunds, sedimentation sumps, geofabric wrapped gravel or mulch bunds, use of onsite grassed areas or a combination of techniques. The discharge from these activities must be managed to prevent erosion of the receiving environment.

#### **4.3 Assess opportunities for reuse**

Onsite reuse of stormwater or detained groundwater should be considered as a priority for all dewatering activities. Onsite reuse may include applications such as dust suppression, earthworks compaction, vegetation establishment/rehabilitation, and plant/vehicle wash-down.

Reuse of water on the construction site may reduce the need for imported or extracted water and provide a lower risk to the environment than direct discharge to the environment. Common minimum requirements for any reuse activity are that the reuse should not cause the ponding or runoff of water, which may then cause concentrated runoff and unauthorised discharge.

#### **4.4 Assess limitations for any proposed reuse methods**

Any reuse activity may be limited by climatic or site conditions. During heavy rainfall periods when the need is greatest to remove treated stormwater from sedimentation basins, construction sites may be closed and un-trafficable due to the wet condition of the site. In these cases, onsite reuse for dust suppression or compaction is not feasible or possible. In these cases the water must be discharged to meet the sedimentation basin

maintenance timeframes specified in either the environmental protection licence or the CEMP (for non-licensed sites).

Planning for any reuse activity and the WMS for dewatering must take these limitations into consideration, and a WMS developed for the management of discharge which may be required in high rainfall events.

Discharge water quality objectives (see 4.6) will not apply only in the cases where the reuse activity is designed to be operational under all climatic and construction conditions and discharge to the environment will not be required.

#### **4.5 Select discharge locations and provide adequate energy dissipation**

It is important to ensure that dewatering activities do not cause subsequent erosion at the discharge location or in receiving environments. Consideration must be given to the potential for erosion at discharge locations when designing dewatering outlets. Preference should be given to locations with established stable drainage.

Energy dissipation must be provided at all dewatering discharge points. This may include the use of surface protection such as concrete aprons, geofabric, shade cloth, gabions or form ply depending on the condition of the receiving environment.

#### **4.6 Determine and document water quality criteria for discharge and/or reuse**

Sites with Environmental Protection Licenses will have defined water quality objectives for discharges from sedimentation basins. Best management practice still applies when discharging water from all other sites. This includes defining representative water quality criteria for the receiving environment and ensuring all discharges comply with these requirements. Standard project water quality objectives criteria are as follows:

- |                          |                  |
|--------------------------|------------------|
| • Total suspended solids | 50mg/L           |
| • pH                     | 6.5 – 8.5        |
| • oil an grease          | no visible trace |

Specific water quality criteria may be required for activities that have the potential to impact water quality through a range of pollutants including:

- general earthworks in soils with contamination issues
- earthworks in soils with naturally occurring issues such as acid sulphate soils, saline soils or high levels of other sulphide minerals (which may result in high concentrations of heavy metals in runoff).
- hydrocarbon spills
- concrete works (including batching operations)
- stabilised pavements
- precoat aggregates and spray sealing

Generally a review of environmental assessment and approval conditions and onsite conditions will provide further information on potential pollutants that may be present onsite or in site waters. Other methods to determine water pollutants may include the use of a testing probe, indicator strips, laboratory analysis, local knowledge and consultation with environmental officers and regulatory agencies.

If reuse activities are properly designed and managed then ponded stormwater or groundwater may be able to be reused onsite without specific treatment.

#### **4.7 Assess the treatment techniques required to meet the water quality criteria.**

Treatments should be designed to achieve the water quality outcome specified for the project, as well as to cater for the time constraints that may be applicable to the activity (ie 5 day management period for sedimentation basins). Treatments should be applied to waters as soon as the requirement is determined, and should be applied only by experienced and competent personnel. Care needs to be taken to ensure treatment methods do not adversely affect water quality.

Examples of common treatment applicable to RTA projects may include;

- Flocculation of turbid waters is used to minimise the settling duration of suspended particles, as well as facilitate the clearing of waters exposed to dispersive soils that are prevalent throughout NSW. Flocculation enables water quality standards to be achieved within an accepted time period. A suitable flocculent should be chosen for sites based on an impact assessment of the receiving environment. In most cases RTA projects would utilise gypsum which is considered to be inert. There are other flocculants available however the use of these must be subject to consultation with relevant stakeholders, including DECCW and NSW Industry & Investment (Fisheries) prior to use.
- pH adjustment using a base such as hydrated lime (for acidic waters) and inversely an acid such as hydrochloric acid (for alkaline waters). Low volume trials for each location will need to be carried out to determine dosage rates. Special care must be taken when adjusting pH to understand the buffer capacity of the waters, ensuring the neutral point is not over-shot. Any personnel involved in the adjustment of pH must be suitably trained and competent in the use of any additives.
- Absorption of oils and grease is used to remove traces of hydrocarbons that may have been mobilised by rainfall. Sources of oil and grease on a project may include spill and leaks from machinery, runoff from precoat aggregate stockpiles, and runoff from adjacent travel lanes. Generally oils and grease will be removed from the surface of water detention structure by the use of floating booms, pads and socks.

#### 4.8 Assess water sampling and testing requirements

Water quality sampling and testing may be required to ensure that the water quality objectives are met prior to either reuse or discharge of the water. Techniques may include sample collection and laboratory testing or in-situ field assessment.

A list of approved testing methods for various analytes can be referenced from "Approved Methods for the Sampling and Analysis of Water Pollutant in New South Wales" (DEC 2004). Licensed premises require approved testing methods as per the conditions of the environmental protection licence (EPL) unless formal agreement has been reached with the relevant agencies. Any such agreement must be documented, and records kept onsite at all times

Non-licensed sites still require an approach to demonstrate due diligence for the testing of waters prior to discharge. This may include the use laboratory analysis and the approved testing methods, but alternatively can include calibrated comparison samples, turbidity tubes, portable probe analysis, or indicator strips. With the use of any of these alternative methods, their use should be discussed with environmental officers and personnel testing must be trained and competent. Regardless of the type testing utilised, comprehensive records must be kept onsite of all discharges.

## 5.0 Minimum Requirements for Dewatering Work Method Statements

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### 5.1 WMS format

The format of site-specific WMS is flexible according to the procedures used by each Contractor. This guideline and RTA specifications G35 or G36 do not require an individual WMS for each dewatering location on each site.

Maps should be used to show all identified dewatering locations that the WMS applies to. Coded systems for similar type activities (eg pumping from sedimentation basin) can be used. The WMS should provide clear guidance for each dewatering activity on the following:

- a) a map showing areas of the Site that will require dewatering
- b) detailed description and justification of all selected dewatering methods

- c) description of onsite water reuse requirements
- d) a map showing proposed discharge locations for any offsite discharge
- e) design requirements for each offsite discharge location to prevent erosion at the discharge location or in the receiving environment
- f) water quality objectives relevant to the type of dewatering activity
- g) description of the water quality treatment techniques to be used
- h) water sampling and testing regime to validate water quality prior to and (if required) during dewatering
- i) Proposed monitoring and supervision regime.

If changes are proposed to the dewatering method used at any location or new dewatering requirements are identified during construction you must submit either of the following to the Principal before commencing the activity:

- a) revised and updated the Site WMS, or
- b) a site-specific WMS for the activity.

## 5.2 Document the site activity approvals process

All sites discharging water must have in force a robust delegation for the approval of all controlled discharges. This process is to be clearly documented in work method statements and must nominate specific personnel who can approve dewatering activities. Delegates responsible for dewatering approval must be suitably trained and experienced in their duties. The approval process for dewatering activities is to be included in the worksite induction and training of onsite personnel to ensure unauthorised discharges are eliminated.

The minimum requirements of this approval are:

- water quality is demonstrated to meet the objectives in the WMS
- inspection of intake and discharge locations, equipment and receiving environment completed
- trained personnel are available to supervise and monitor the activity as specified on the WMS.

## 5.3 Document training and induction requirements

All staff responsible for approval and/or carrying out dewatering activities must be trained and inducted into use of the WMS. The WMS should include an induction register as a record of staff that are approved to conduct or approve dewatering activities.

## 5.4 Document the requirements for supervision of dewatering activities

The WMS must provide a clear description of all supervision and monitoring required for each dewatering activity. All dewatering activities must be inspected and monitored by inducted, experienced and competent personnel. Prior to commencing any dewatering activity the entire system, including intake and outlet, pump, and discharge location must be inspected.

All dewatering activities must be directly supervised for the entire duration. To remove the need for direct supervision, sites may carry out risk assessments and implement mitigation measures to ELIMINATE risks of causing environmental harm. Mitigation measures must be demonstrated to eliminate the possibilities of the following incidents:

- Intakes dropping into deposited sediments and discharging sediment laden waters,
- Erosion of the discharge locations and downstream environment,
- Inadvertent or intentional controlled discharge of untreated waters.

## 5.5 Record keeping for dewatering activities

You must keep the following records:

- a) A copy of the dewatering WMS
- b) date, time and estimated volume of water released for each discharge location

- c) water quality test results for each discharge
  - d) records indicating who provides approval for each dewatering activity, and
  - e) evidence of discharge monitoring or risk assessment.
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