

Alternative flocculants and coagulants

Template to propose use

Roads and Maritime Services | July 2018

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# About this release

| **Title** | Alternative flocculants and coagulants – template to propose use |
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| **Author** | Roads and Maritime Services |
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| 1.0 | June 2017 | First release of template |

**Instructions for use of this template:**

* Use this template if you wish to seek approval for flocculants and/or coagulants other than gypsum. This proposal template can be used to seek approval for more than one product at a given site – in this instance all relevant information pertaining to each product must be included (e.g. jar test results and Safety Data Sheet [SDS] for all products to be used).
* Submission of a completed template does not guarantee approval to use a flocculant and/or coagulant other than gypsum. Roads and Maritime has the right to reject the use of a product other than gypsum.
* To seek approval for the use of the alternative flocculant/and or coagulant, the proposal must be submitted to the Principal. The Principal will provide a written response (approval or rejection) to the proposal within 10 working days of receipt.
* If approved, the procedures and safeguards outlined in this proposal must be incorporated into all relevant plans and procedures (e.g. dewatering procedure, Soil and Water Management Plan) and must be implemented and maintained throughout the life of the Project.
* The first four pages (“i” to “iv”) of this template should be deleted prior to finalising the site specific proposal for the use of alternative flocculants and coagulants
* The “Guidance” in each section that is highlighted orange should be used to guide the content that is included in each section. Delete the guidance prior to finalising the template
* For assistance with completing this template, contact your Roads and Maritime Services Environment contact.

# [insert project name]

# Proposal for the use of the alternative [insert either "flocculant" or "coagulant"] “[insert alternative flocculant and/or coagulant name]”

## [insert contractor name]

Aug 2018

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# Glossary / Abbreviations

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| **Table ii: Glossary and Abbreviations** | |
| **Word / Abbreviation** | **Definition / Full text** |
| Alternative flocculant/coagulant | (for the purposes of this proposal) Any substance used to settle suspended solids in water other than gypsum (calcium sulfate) |
| CEMP | Construction Environmental Management Plan |
| Coagulant | A substance that destabilises colloidal suspensions by neutralising the charges to allow settlement. |
| EC50 | The statistically derived concentration of a substance that is expected to produce a certain effect in 50% of the test organisms, after a specified exposure period in hours. |
| EWMS | Environmental Work Method Statement |
| EPL | Environment Protection Licence |
| Flocculant | A substance that causes colloidal particles to clump into larger units or ‘flocs’ that can either settle in a reasonable time or be filtered. |
| G36 | RMS contract specification for Environmental Protection |
| G38 | RMS contract specification for Soil and Water Management |
| SDS | Safety Data Sheet |
| WHS | Work Health and Safety |
| WTP | Water Treatment Plant |
| [word/abbreviation] | [definition/full text] |
| [word/abbreviation] | [definition/full text] |
| [word/abbreviation] | [definition/full text] |
| [word/abbreviation] | [definition/full text] |

1. Introduction

Construction activity on the [insert project name] project requires the use of a flocculant or coagulant to treat construction runoff to meet required water quality limits prior to discharge from site.

The Roads and Maritime Services (Roads and Maritime) specification G38 *Soil and Water Management* specifies that to settle suspended solids in basins and other excavations, calcium sulphate (gypsum) should be applied within 24 hours of the conclusion of each rain event causing runoff. An alternative agent (flocculant or coagulant) may be proposed for use by the contractor, subject to the agreement of the Principal.

This proposal has been developed by [insert contractor name] to seek approval for the use of [insert alternative flocculant and/or coagulant name]. The proposal details how site water would be treated using [insert alternative flocculant and/or coagulant name] prior to discharge from [insert details of where water will be treated / discharged, such as sediment basins, excavations or water quality treatment devices]. It details how [insert alternative flocculant and/or coagulant name] will be appropriately managed on site, and how [insert contractor name] will ensure treated water is suitable for discharge and is compliant with all relevant legislative requirements, including the *Protection of the Environment Operations Act 1997* (POEO Act).

This proposal should be read in conjunction with:

* [insert project name] dewatering procedure
* [insert project name] Construction Environmental Management Plan (CEMP)
* [insert EWMS name] Environmental Work Method Statement (EWMS)
* [insert project name] G36 and G38 project specifications
* [insert project name] Environment Protection Licence
* [insert name]
* [insert name]

# Proposed alternative flocculant and/or coagulant

* 1. [insert alternative flocculant/coagulant name]

**Guidance**

Provide a description of the proposed flocculant/coagulant, including:

* Chemical composition, including the active ingredient (where available)
* Ecotoxicity of the raw product, including discussion around the industry accepted threshold for ‘practically non-toxic’. Include evidence of the alternative flocculant or coagulant’s ecotoxicity in Appendix 1 and reference in this section
* The Safety Data Sheet for the alternative flocculant or coagulant and all products that will be used in association with alternative flocculant or coagulant, and include copies of the SDS’s in Appendix 2.

The above information will be considered by Roads and Maritime when assessing the proposal. Assessment of the alternative flocculant/coagulant will focus on all site specific environmental risks associated with treating and discharging water. Ecotoxicity will be considered along with all other site specific risks, however an ecotoxicity threshold of the raw product will not be imposed.

[Enter description of the chemical composition of the alternative flocculant and/or coagulant]

The [Approved Criteria for Classifying Hazardous Substances](https://www.safeworkaustralia.gov.au/system/files/documents/1702/approvedcriteria_classifying_hazardous_substances_nohsc1008-2004_pdf.pdf) (*National Occupational Health and Safety Commission 2004*) indicates that substances can be considered practically non-toxic if they have a 48-hour EC50 (immobilisation) for Daphnia and a 96-hour EC50 (imbalance) for fish in a solution of greater concentration than 100 milligrams per litre. [insert alternative flocculant/coagulant name] is reported to have [insert detail about the ecotoxicity of the product].

[Include discussion of SDS for the alternative flocculant/coagulant and any product used in association].

* 1. Why [insert alternative flocculant/coagulant name] has been proposed and is appropriate for use

**Guidance**

Provide project specific information such as:

* Gypsum has been found to be ineffective at treating basins within required timeframes – include details such as number and size of rain events, application method, timeframes and responses in water quality improvement
* A water treatment plant has been proposed for the Project, which requires the use of a flocculant or coagulant other than gypsum
* High performance flocculation or coagulation is required (e.g. short turnaround times for restoration of capacity in sediment basins, more stringent discharge water quality criteria have been imposed, a large number of basins need to be treated across the project)
* That the proposed flocculant/coagulant is suitable for use on the soil type/s found on the specific project site.

[Enter information relating to why the alternative flocculant/coagulant has been proposed for use]

* 1. When [insert alternative flocculant/coagulant name] will be used

**Guidance**

Outline the conditions when the alternative flocculant/coagulant would be used instead of gypsum and how this would be determined. Provide the expected duration for use of the alternative flocculant/coagulant.

[Enter information relating to when the alternative flocculant/coagulant will be used]

1. Flocculation methodology
   1. Water treatment structures and equipment

Provide a description of the water treatment equipment to be used, such as dosing equipment, pumps and sediment trap forebays. Include equipment specifications where relevant. Delete this section if not applicable.

[Enter information about water treatment structures and equipment]

* 1. Dosage rates

**Guidance**

Describe how the effective and maximum dosage rates were calculated, considering the soil type and the prevailing weather conditions. This should include jar tests and consider manufacturer recommendations, and may also include laboratory tests. An example of suitable jar testing procedure is available in Appendix B of the IECA Best Practice Erosion and Sediment Control (<https://www.austieca.com.au/documents/item/697>).

Ensure the proposal outlines how the dosage rates will be monitored and updated (where required) throughout use. Include discussion about changes in soil type, both across the length of the project and as the project interacts with different soil horizons. Include the supplier instructions for determining the dosage rates in Appendix 3 if applicable.

[Enter information about dosage rates]

* 1. Preparing the flocculant/coagulant for use

**Guidance**

Provide the methodology to prepare the flocculant and/or coagulant for use including mixing to achieve the appropriate dosage rate. Describe any controls required to prevent spills.

Where appropriate, reference section 4.1 of this proposal to describe who would be trained in and responsible for preparing the flocculant/coagulant.

[Enter information about the methodology to prepare the flocculant/coagulant for use]

* 1. Application of the flocculant/coagulant

**Guidance**

Clearly describe the method that will be used to apply the flocculant and/or coagulant mixture to the water to be treated. The methodology should include a process to monitor the application and effectiveness of the application technique. Describe any controls required to prevent spills.

Where appropriate, reference section 4.1 of this proposal to describe who would be trained and responsible for applying the flocculant.

[Enter information about the application of the flocculant/coagulant]

* 1. Discharging treated water

**Guidance**

Describe the following as applicable:

* Any additional water quality treatment requirements that might be required prior to discharge (e.g. pH adjustment), and the methodology that will be used
* Methods of analysis, including details of how any independent / laboratory water quality testing will be undertaken
* How the project will demonstrate that discharge of treated water will be compliant with all relevant legislative requirements, including section 120 of the POEO Act. Additionally, if the project holds an Environment Protection Licence (EPL), describe how the project will demonstrate that discharge of treated water will be compliant with relevant licence conditions. This should include periodic testing of relevant analytes in inflows and the effluent discharged, to identify residual product. Frequency of testing should be guided by site specific risks such as the ecotoxicity of the product and the sensitivity of the receiving environment.

Update Table 3.5 with the project-specific water quality discharge criteria that will be monitored and complied with.

[Enter information about how treated water will be discharged]

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 3.5: Water Quality Discharge Criteria** | | | |
| **Parameter** | **Discharge criteria** | **Analysis method** | **Frequency** |
| Total suspended solids | <50mg/L | Laboratory analysis | Every discharge event |
| pH | 6.5 – 8.5 | Probe | Every discharge event |
| Oil and grease | None visible | Visual inspection | Every discharge event |
| [insert other] |  |  |  |
| [insert other] |  |  |  |
| [insert other] |  |  |  |

1. Safeguards for use of flocculant/coagulant
   1. Training, roles and responsibilities

**Guidance**

Populate Table 4.1 to detail the roles, responsibilities and required training for all staff responsible for using the flocculant and or coagulant. This should include, but is not limited to, staff responsible for:

* Undertaking water quality testing
* Authorising preparation and application of the flocculant and or coagulant
* Authorising de-watering after water treatment has been completed
* Inspecting de-watering setup, water treatment equipment and monitoring discharge to ensure compliance with requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Table 4.1 – Roles, responsibilities and training** | | | |
| **Name** | **Title** | **Roles and responsibilities** | **Required training** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

* 1. Environmentally sensitive areas

**Guidance**

Include information on discharge locations and any environmentally sensitive areas (eg drinking water catchments, Marine Parks, aquaculture and habitat for threatened species) where water treated with that alternative flocculant/coagulant will be discharged. Provide appropriate safeguards for use of the flocculant/coagulant in these environmentally sensitive areas. This could include:

* avoiding use in some catchments
* lower dosage rates in some catchments
* more frequent testing of discharge in some catchments

[Enter information about environmentally sensitive areas]

* 1. Storage and location

**Guidance**

Provide a description of how the proposed flocculant/coagulant will be stored and the storage location of the chemical and containers. This section should be consistent with the requirements of G36 section 4.3, including: Storage must be in a suitably located and bunded area to minimise the impact of any spillage or contamination on the site and adjoining areas. Do not locate the storage area within 50m of any aquatic habitat, flood prone areas (eg not within the 20 ARI flood zone, unless a contingency plan is in place), or on slopes steeper than 1:10.

Where appropriate, include a map and/or photos of storage location(s).

[Enter information about the storage and location of the flocculant/coagulant]

* 1. Disposal

**Guidance**

Provide details of how the flocculant and or coagulant will be disposed. This should address disposal or re-use of empty containers, excess product and treated/settled sediment captured within water quality treatment devices. Ensure that the disposal method is appropriate for the proposed alternative flocculant/coagulant (and its chemical composition). Where relevant, include reference to the licensed waste facility that will be used. This section should be consistent with the requirements of G36 section 4.11.

[Enter disposal information]

* 1. Transport, handling and WHS considerations

**Guidance**

Provide a description of how the alternative flocculant/coagulant will be safely handled and transported to minimise human health and environmental risks. Provide details of required PPE that must be used when handling the product. Where relevant, cross reference training requirements included in section 4.1.

[Enter transport and handling information]

* 1. Related documents

**Guidance**

Include here a list of related documents that would be updated to reflect the use of the alternative flocculant and/or coagulant if approved for use.

* [Project name] dewatering procedure
* [Project name] Soil and Water Management Plan
* [Project name] CEMP
* EWMS
* the [insert name of project-specific incident procedure]

These documents can be found [insert locations of electronic and hard copies of the above documents].

* 1. Record keeping

**Guidance**

Provide the methodology to record results from the use of the alternative flocculant/ coagulant such as size of rain event, dosage rates, timeframes and water quality responses. Detail how records will be used to verify / inform / alter future use of the flocculant/coagulant.

Provide a template table in Appendix 4 that will be used to capture this information.

[Enter record keeping requirements]

# Appendix 1 – Ecotoxicity information

**Guidance**

Provide in this Appendix specific evidence of the ecotoxicity of the proposed alternative flocculant/coagulant. This may be obtained from product specifications, Safety Data Sheets or independent testing.

# Appendix 2 – Safety Data Sheet/s

**Guidance**

Provide in this Appendix a complete copy of the Safety Data Sheet for the proposed alternative flocculant/coagulant and complete copies of Safety Data Sheets for any products used in association with the alternative flocculant/coagulant.

# Appendix 3 – Flocculant/coagulant dosing instructions

**Guidance**

Provide in this Appendix any dosing instructions in addition to that covered in Section 3.2.

Delete this Appendix if no additional dosing instructions are required.

# Appendix 4 – Records

**Guidance**

Provide in this Appendix a table template that will be used to capture the records as identified in Section 4.7.