# Resetting sediment ponds

## Best practice guide
## Frog Hollow at Eumemmerring Creek, Hallam.

State Government Victoria

Melbourne Water

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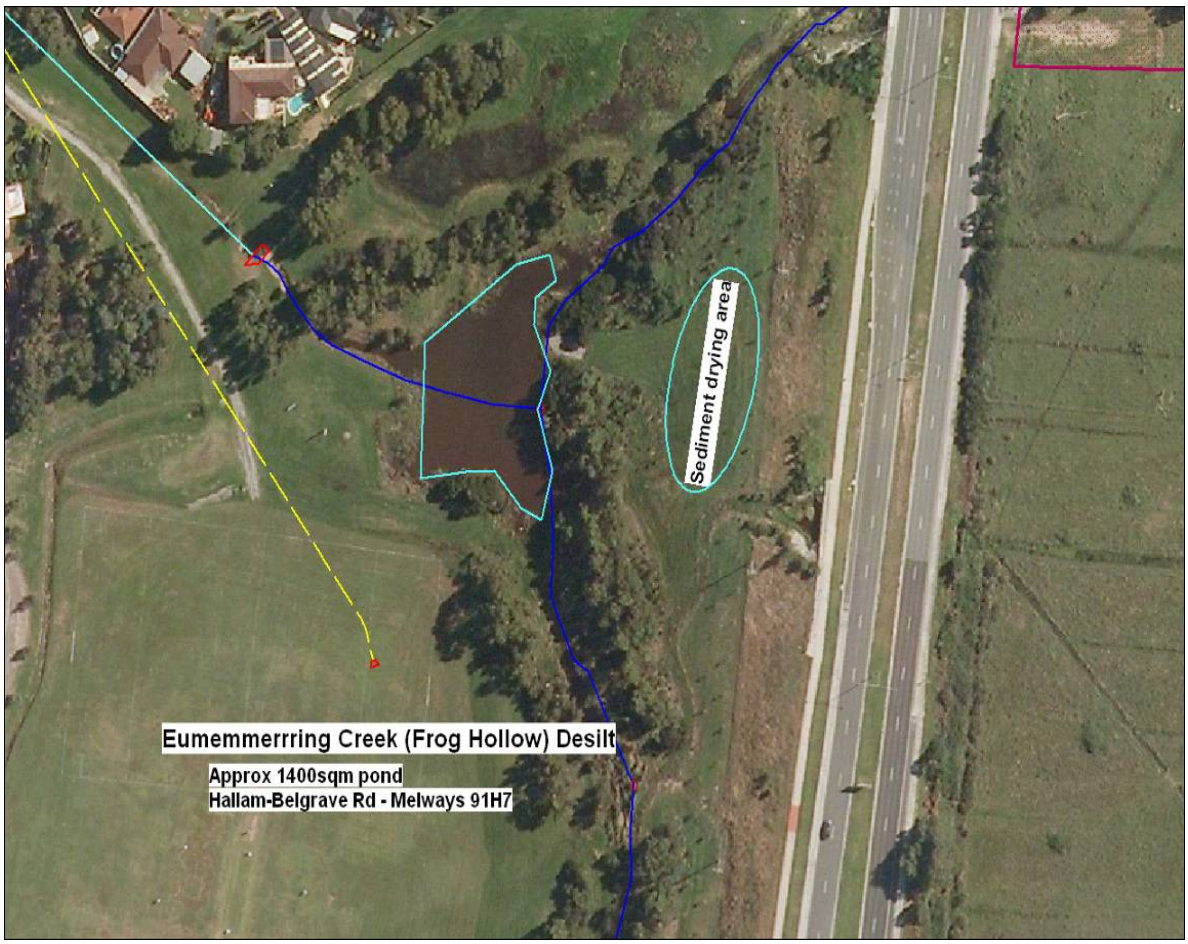
# Introduction

*Melbourne Water opts to set land aside when designing and constructing wetlands that allows for future servicing of the sediment ponds to ensure that wetlands continue to function as designed.*

## Introduction

This document has been created to give an account of the methodology used in resetting the sediment pond at Frog Hollow, on Eumemmerring Creek in 2009.

The purpose is to provide designers and maintenance operators with a better understanding of the maintenance requirements for a sediment pond and the difficulties that can arise if these requirements are not catered for in the initial construction.



## Background

The Frog Hollow sediment pond is 1400sqm in size. Following routine inspection it was decided to schedule the resetting of the sediment pond thereby restoring the appropriate invert and vegetation.

De-silting of the sediment pond using a single excavator and truck was planned. Time constraints and the cost of machine hire led to a swamp dozer also being utilised to quicken the process and reduce cost. The site constraints were:

- no formal access track into the sediment pond
- no designated area for the dry out of sediment
- no hard base
- width of the sediment pond in excess of 7m from the edge and therefore out of the excavators reach
- no facility to isolate the sediment pond from the main creek flows
- the sediment pond is in close proximity to the general public, houses, roads and a sporting field.

# Planning and execution of the de-silt

## Planning

### Scope the works:

a) Locate the most suitable access point and understand the work required (including what vegetation has to be removed).
b) Determine how the sediment pond is to be isolated from the main stream flows during the operation.
c) Identify the appropriate plant and equipment that will be required given the constraints of the site. **Note:** Existing plant and equipment available to maintenance contractor dictates that eduction is not possible. Tipping fees for this method would also be cost prohibitive.
d) Site the temporary sediment dry out area for the storage and removal of all unwanted material from site (approximately 1000m3 of material).
e) Plan for the revegetation of the sediment pond edge with 3000 indigenous plants after sediment removal occurs.
f) Identify the impact of works on the community and environment.

### Complete a CEPHA (Community Environment Public Health Assessment).

This is a risk assessment tool which outlines the hazards associated with de-silting the sediment pond and the control measures that will be implemented to mitigate the risk to:

a) Land
b) Water
c) Air
d) Archaeological heritage
e) Aboriginal or cultural areas of significance
f) Community & stakeholders
g) Public safety
h) Flora & Fauna
i) Material & waste management

### Complete a Site Environmental Management Plan (SEMP) addressing:

a) Dust and noise
b) Traffic Management
c) Waste
d) Erosion & sediment control
e) Flora & fauna
f) Community noticeboard locations

[Click here to open SEMP]

## Estimate the cost the works.

## Communications

Liaise with the Regional Communications and Engagement team to notify the community of commencement date, working hours and construction timeframe (start to finish). Communications team to determine the most appropriate form of communication eg: signage, mail outs, door knocking, newspaper announcements etc.

Notify Council and seek the relevant approvals to place sediment on Council land while it dries out.

# Carry out the de-silt

## Step 1

Communications staff door knocked nearby residents, issued mail outs and erected information signage notifying the public of the desilting process.


**Figure 2: Information signage**

## Step 2

The sediment pond is isolated from the main flows and dewatered (manually pumped down) in a dry period (summer) creating a dry working area and preventing the sediment from being reactivated.

**Figure 3: Sediment pond prior to dewatering (pumping)**

**Figure 4: Sediment pond being manually pumped down**

**Figure 5: The sediment pond after it has been dewatered.**

## Step 3

Vegetation is removed and the access track constructed with imported material to allow machinery access.

**Figure 6: Access track**

## Step 4

Having determined that the excavator had insufficient reach to conduct the reset from the edge of the sediment pond, both the excavator and swamp dozer drive into the pond floor (invert) and begin removing sediment from the pond.


**Figure 7: Excavator and swamp dozer on the pond floor removing sediment.**

## Step 5

The most efficient method is for the swamp dozer to push the semi dried material over to the excavator, reducing tracking distance required by the excavator and time taken to empty the pond of sediment.

**Figure 8: The swamp dozer pushes the semi dried material over to the excavator.**

## Step 6

The excavator then places the material into the trucks (three in tandem were used) and the trucks deposit it on the designated dry out area.


**Figure 9: Excavator loading truck**

## Step 7

Excavated material is spread out on the temporary dry out area. It takes approximately two weeks to dewater the pond (manually pump it down) and remove the sediment to the designated dry out area.

**Figure 10:** Truck depositing material on the temporary dry out area.


**Figure 11: Material being stacked approximately 150mm high due to consistency**

**Note:** Due to the consistency of the material it can only be stacked approximately 150mm high as shown in figure 11.

## Step 8

The temporary sediment dry out area is fenced off to the public with temporary exclusion fencing until the material is removed off site.

**Note:** It takes around three months for the material to dry out sufficiently to be removed via a non-sealed truck. The swamp dozer turns the material at regular intervals to assist with dry out.

**Figure 12: Temporary exclusion fencing**

### Step 9

The material is turned regularly to quicken the drying process.

**Figure 13: Swamp dozer turning sediment to assist dry out**

### Step 10

Screening tests of the dried sediment are completed in accordance with EPA regulations for off-site disposal. The tests ascertain if it is contaminated waste or clean fill. In this instance the results indicated that the sediment be classified as clean fill. Refer Appendix 1 for an example of typical screening test results.

### Step 11

The dry material is taken via truck to the local landfill tip as non-contaminated waste.

### Step 12

Rock is placed in the base of the sediment pond to assist with the next reset. This will ensure the machines have a hard base to drive on and the clay liner isn't ruptured resulting in the pond not retaining water.

**Figure 14: Sediment pond base prior to rock lining**

### Step 13

The access track is formalised via the placement of rock. **Note:** Better placement of rock would be possible during the initial construction of the asset.

**Figure 15: Access track & pond base after rock lining**

## Step 14

The sediment pond edge is reinstated and planted out for public exclusion and to enhance flora and fauna values.

**Figure 16: Reinstated sediment pond edge planting & rock work**

## Step 15

The site is demobilised as per the SEMP and left in a pre-operation condition.

## Cost of resetting Frog Hollow sediment pond:

The costs below are indicative of what it cost to de-silt the sediment pond.

Pre-construction cost (including)

a) Site Investigation
b) Stakeholder Consultation
c) Survey
d) Geotechnical Investigation
e) Landscape reinstatement design
f) SEMP
g) Internal (CEPHA)

*Sub* Total: $13,402

Construction & demobilisation cost (including):

h) Site amenities
i) Project Signage
j) Site fencing
k) Access tracks & hard stand area creation
l) Environmental controls & traffic management
m) Sediment removal & stockpiling
n) Supply & install plants
o) Screening tests of the dried sediment for off-site disposal
p) Cartage of dried sediment off site
q) Demobilisation of site

*Sub Total* $71,578

**Grand Total $84,980**

All sites will vary and specific conditions will govern the final approach to de-silting.

# Conclusion

The lack of consideration for future maintenance activities in the initial design and construction of the Frog Hollow sediment pond have significantly increased the cost of resetting the asset.

Modern wetlands must be designed and constructed to include:

- an adequate access to the sediment pond
- a designated dry out area for the removed sediment
- a hard base. Even for sediment ponds that can be accessed from the edge a hard base will indicate the depth at which excavation shall cease in order to protect the clay liner
- a facility that will enable the sediment pond to be taken offline while maintenance is carried out
- ability to drawdown water level (gravity preferable or a pump point).

It is important when designing a sediment pond that Council's approval is sought for the location of the temporary dry out area as it may affect the community's use of the reserve while maintenance is being undertaken.

# Appendices

## Appendix 1: Example of typical screening test results.

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**Certificate of Analysis**

**Batch No: 08-34182**

**Final Report**

Report Number: **66436**

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Date Issued: **24-Oct-2008**

Client Program Ref: **MW - Waterways Alliance** PO No: **020951** Date Sampled: **21-Oct-2008**

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The sample(s) referred to in this report were analysed by the following method(s):

| Analysis | Method | Laboratory | Analysis | Method | Laboratory | Analysis | Method | Laboratory |
|---|---|---|---|---|---|---|---|---|
| CHC | WSL 8210 B (HCCP not NATA) | Melbourne | Cyanide | APHA 4120 B | Melbourne | Tot Fluoride | NEPM 404 | Melbourne |
| HVOL | WSL 3810A | Melbourne | MAH | WSL 3810A | Melbourne | MS Total Metals | WSL 032 | Melbourne |
| OCP | WSL 8080B | Melbourne | PAH | WSL 8100B | Melbourne | PCB | WSL 8080B | Melbourne |
| Phenols(Halo) | CM8040D | Melbourne | Phenols(NonHalo) | CM8040D | Melbourne | Total Cr 6+ | EPA 3060A (not NATA) | Melbourne |
| TPH | CM030 | Melbourne | | | | | | |

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NATA This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. No. 992

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