

Bardon Phase 2 Plot 1

Site Visit

A walkover survey was conducted on the 21st October 2019. The walkover sought to identify potential sources of silt pollution and create a series of measures to prevent, reduce and mitigate that risk of muddy water leaving site.

Geology

The bedrock is the sedimentary Mudstone with a diamicton superficial deposit and topsoil of loam and clay. It is noted to have slow permeability and be seasonally wet.

Watercourses

There are no watercourses within the site boundary, surface water is transferred from site and penultimately enters the River Sence to the north.

Settlement and Flocculation Tests

Water samples were collected. These samples were then tested to establish settlement times and reaction with Water Lynx flocculants, to facilitate the agglomeration of particles, which will improve settlement and provide an opportunity to filter or trap the suspended solids.

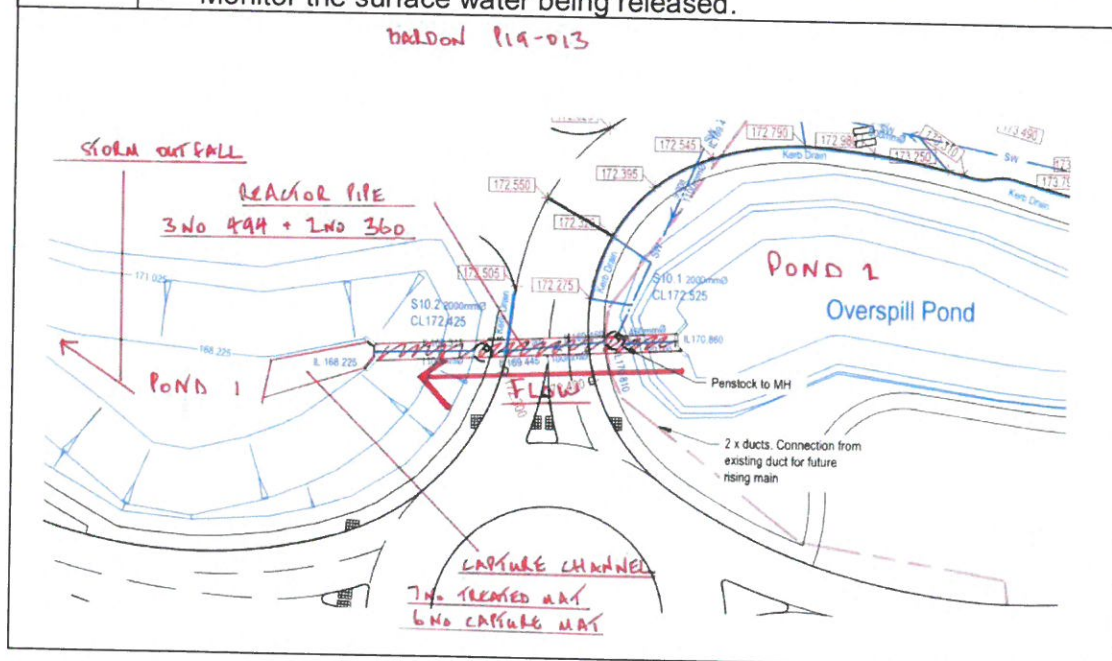
Settlement did not remove the fine colloidal clay particles in suspension over a short period of time. To remove the finer silt fraction, flocculants were required. The most effective flocculant was a duplex with WL360 and WL494 blocks, reaction started to occur within 20 seconds from hydrated block state. The flocs produced were large and heavy allowing rapid settlement. A large volume of silt was produced.

Water Lynx are synthetic anionic polyacrylamides that also have a coagulating function. Water Lynx is non-toxic to the aquatic environment and do not bioaccumulate, remaining bound to the sediment until they degrade to produce water, carbon dioxide and nitrogen oxide.

Silt Control Measures

As a significant volume of silt is produced, it will be necessary to use a settlement system such as a lagoon to enable their efficient removal. A further, secondary polishing system would further improve the clarity of water.

Action	Description
A1	<ul style="list-style-type: none"> - Utilise existing silt settlement/water treatment ponds - In construction use topsoil over clay, create slope roughness by tracking machines up/down the banks to trap the water on the slope reducing its erosive power and vegetate banks at the earliest opportunity. - Constantly treat and release water to ensure maximise capacity in the attenuation feature. - Introduce water lynx flocculant blocks (WL494/WL360) in the connecting 600mm pipework between ponds 2 and 3. - Ensure the water treatment system is easily accessible from site to enable regular maintenance and replacement of blocks. - Form a rock check around the outfall to prevent soft sediments from being drawn through the outfall. - Discharge from the settlement pond at a regulated speed via gravity.
A2	<ul style="list-style-type: none"> - Create a polishing channel exiting the silt treatment lagoons. - Line the channel where it passes through unstable clay materials - Use FlocMats and SiltMats in series to provide final polishing.
	- Monitor the surface water being released.



Appendix A: Overview Water Lynx™

Water Lynx Flocculants

Water Lynx™ are a synthetic anionic polyacrylamide flocculant held in gel and granular form. The flocculants are non-toxic to the aquatic environment and do not bioaccumulate, remaining bound to the sediment until they degrade to produce water, carbon dioxide and nitrogen oxide.



Figure One: Water Lynx Blocks (Gel form)

The Water Lynx flocculants bind the colloidal clay particles to form larger particles known as 'flocs'. The flocs must be separated from the water before it can be released from site.

The ideal placement for the water lynx is in the immediately vicinity downstream of the activity producing sediment or in an outfall pipe that carried muddy water.

The block can either be tied in place using the netting or held within a small cage such as a gabion basket.

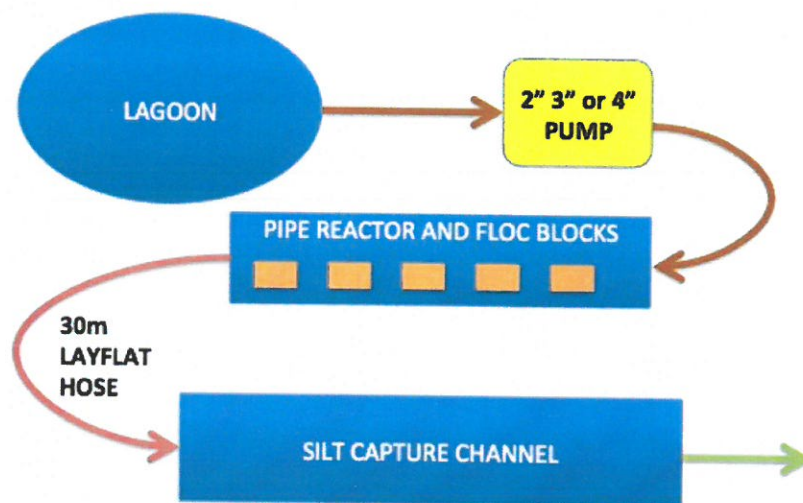
The water must be turbulent around the block to allow the flocculant to be released. A simple way to create turbulence is to use local material such as rocks to create broken water around the block.

When using the blocks in duplex place WL494 upstream of WL360, these only need to be separated by a few inches.

It will take around 30m for the flocculants to be created. The flocculated particles will then need to be captured.

The method of silt capture will be site specific it may be that the channel enters a settlement lagoon or tank, the channel may be lined with materials to support the capture, retention and future removal of the sediments such as SiltMat or Floc Mat. It will be imperative that this silt capture is specified in advance of deploying the water lynx blocks.

On leaving site the remaining flocculant should be removed and stored in a sealed plastic bag until required for another site or dispose as directed on the MSDS.



Common Pipe reactor and silt capture channel set up