

The purpose of this monitoring is to give the client and regulatory organisations confidence that the construction aspects of the project are adopting good environmental management practices to ensure legal requirements are met as well as continued protection of water courses from silt pollution.

The site assessment will be planned to coincide with water management activities on site and following heavy rainfall events. Full cooperation of the principal contractor is required for the period of the site assessment and subsequent provision of evidence. Any non-compliance observed, risk identified, and subsequent actions will be discussed and agreed with relevant parties in an open and transparent manner. The principal contractor must report any major non-compliance to the regulator within 24 hours of the site visit this will include any actions that have been taken to resolve the issue.


In all circumstances a copy of the site assessment will be supplied to the principal contractor on the same day as completion for site files. It is the principal contractor's responsibility to share this information with the regulator should it be requested.

<b>SITE:</b> <b>Malthouse Farm</b>	<b>CLIENT:</b> <b>Enzos Homes</b>
<b>MONITORING CARRIED OUT BY:</b> <b>Leela O'Dea</b>	<b>DATE:</b> <b>20/01/2023</b>
<b>PERSONS PRESENT:</b> <b>Andrew Rudd</b> <b>Alastair Krzyzosiak (NRW)</b>	

Supplementary information to provide context such as location and layout of proposed actions will be appended to this document.

Action No.	Risk Identified and Proposed Action	Photo No.	Priority	Responsible Person
<b>MAIN DISCHARGE FROM SITE</b>				
<b>1</b>	<p><b>Roads throughout the development are unmade and movement of vehicles is unrestricted. The exposed, heavy soils are saturated and in a heavy rainfall events a slurry of suspended solids is mobilised downhill.</b></p> <p><b>Stabilise the all the roads.</b></p> <p><b>Scrape the mud, line with a geotextile and cover with aggregate. Include a drainage pipe (ideally diameter 300mm) to capture and transfer water to the base of the slope</b></p>	<b>1</b>	<b>HIGH</b>	<b>Andrew Rudd</b>

2	<p><b>Attenuation ponds formed behind silt fences have become inundated with soft highly mobile silts (a slurry). In a heavy rainfall event, it is extremely likely that this material will mobilise.</b></p> <p>Remove the silts.</p> <p>Do not access the ponds using heavy tracked machinery as the soils are saturated and damage caused would lead to further silt inputs/flow pathways.</p> <p>Work when there is no flow through the ponds or very low flow.</p> <p>Install floc mats and silt mats downstream to treat and capture sediments leaving site.</p> <p>Develop a method to suction the silt from behind the silt fences, the pump head will need to be moved around the pond to extract as much of the material as possible.</p> <p>Options include the use of a tractor/trailer, truxor aquatic tractor.</p> <p>Silt must be collected for removal from site.</p> <p>Consider that there will be a high proportion of water in the material moved and transportation must prevent leaks to the environment.</p> <p>Waste transfer notes to cover movement from site, consider using EWC 170506 as exempt from landfill tax.</p>	2 & 3	<b>HIGH</b>	Andrew Rudd
3	<p><b>Sediment capture materials should be used immediately downstream of the final Silt Fence.</b></p> <p>Cut back the brambles to gain access to the ditch.</p> <p>Install a Silt Mat downstream of the Silt Fence to capture sediments leaving site.</p>	4	<b>HIGH</b>	Andrew Rudd

<p><b>4</b></p>	<p><b>An open channel connecting the site with the river has signs of accumulated sediments.</b></p> <p>Dig out by hand the accumulated sediments and remove the saturated Silt Mats from the channel connecting the river. Work in the dry if at all possible, over pumping the water from the culvert to downstream of the works area.</p> <p>To reduce the risk of silty water being passed downstream place a Silt Mat and Silt Wattle at the most downstream point to help filter and capture any sediments before works.</p> <div data-bbox="359 1008 805 1198">  <p>Silt Wattle</p> <p>Silt Mat</p> </div> <p>Should the LDA consent line this channel with Silt Mats secured in place with metal pins to stop them from being mobilised during flood events. Once the works are complete these must be removed from the channel.</p>	<p><b>5 &amp; 6</b></p>	<p><b>MED</b></p>	<p><b>Andrew Rudd</b></p>
<p><b>5</b></p>	<p><b>There is a possibility that sediments have accumulated in the culvert between the site and the open ditch connecting the river.</b></p> <p>Jet the culvert out to remove any accrued sediments. Ensure that there is a dam downstream to limit any transfer of material and that the Silt Mats and Silt Wattle are in place.</p>			

	Collect the muddy jet water, pumped up to a tanker positioned on the road or other hard standing for removal from site.			
<b>6</b>	<p><b>Reinstate the silt fences</b></p> <p>Remove and reinstate the silt fences following the natural spring / stream direction.</p> <p>Complete this work by hand, do not track machinery into the area.</p> <p>Ensure the silt fences are installed correctly, digging in the base, and forming a curve on the outside edges to contain water and prevent bypassing around the curtain.</p>	<b>7</b>	<b>HIGH</b>	<b>Andrew Rudd</b>
<b>7</b>	<p><b>Capture the water from the roads in a series of newly constructed settlement ponds.</b></p> <p>Continue to form attenuation ponds, utilising all available space to give the largest settlement area.</p> <p>Slow and spread the flow of water entering these basins from point sources (ie pipes) this may be achieved using a baffle/check made from clean aggregate.</p> <p>The aggregate bases will help to create friction and drop sediments to the point at which they are saturated, and then maintenance will be needed to dig out the ponds to increase capacity.</p> <p>Moving water between the ponds is being achieved by skimming off the surface water via a pipe (top of pipe must be perfectly flat or castellated to allow water entry.</p>	<b>8</b>	<b>HIGH</b>	<b>Andrew Rudd</b>


	It is likely that in heavy rainfall that the ponds will over top into one another and therefore downstream protection is continued to be needed.			
8	<b>Pumping techniques</b>  Select a single point on site where water will collect prior to pumping through the treatment system. Do not allow the pump hose or strainer to rest on and draw silts from the base of the pond to avoid mobilisation of settled silt. Instead create a sump, stone pad, use a dolphin or float the head on a pontoon to extract water just below the surface. Do not create any disturbance in the settlement basins prior to it being pumped. Consider issuing permits to pump to ensure that full consideration is given to the operation before the pump is started. Include any monitoring requirements and detail water quality parameters to be achieved as well as noting any other limitations such as flow rate.		<b>MED</b>	<b>Andrew Rudd</b>
9	<b>It is considered that the settlement tanks are inadequate. They do not have a valve to allow for the chamber to be emptied of silts in a controlled manner and their size (c.6m<sup>3</sup>) will mean that the flow rate would have to be a trickle to enable any further sedimentation than that which has been achieved in the basins.</b>  Install a Bauer fitting to the valve in the base of the tank to allow for the controlled emptying of silts. IHP have a good	9	<b>MED</b>	<b>Andrew Rudd</b>

	<p>selection of Bauer parts and can make fittings as required.</p> <p>When pumping start with the pump throttled back to the maximum so only the lowest flow is moving through the tank.</p> <p>Check to establish if any sediments are being collected in the capture area. If not, the tanks are not fit for purpose and are not offering you any treatment so should be removed from site.</p>			
10	<p><b>It is considered that the Geobag to provide final polishing may be limited by the particle size and speed of flow</b></p> <p>Retain the geobag on site as this has potential to provide significant polishing in combination with water treatment.</p> <p>Good practice was already observed enclosing the geobag in a silt fence to act as a bund should it burst.</p> <p>Lift the geobag and cover the grass with a geotextile membrane to improve ease of cleaning the area</p> <p>Line the geotextile with Floc Mats (beneath the geobag) and Silt Mats (around the geobag) to act as further polishing and capture.</p>	10	HIGH	Andrew Rudd
11	<p><b>Implement all physical measures and interventions before considering the use of a flocculant/coagulant.</b></p> <p><b>Should these measures not be sufficient to achieve clean water then consideration should be given to Water Treatment</b></p>		MED	

	<p>A settlement test and Gel Flocculant validation report has been completed to illustrate the likely need for introduction of chemical treatment should the works to prevent silt from entering the water at source not be adequate.</p> <p>Management calculations have been provided by frog environmental to demonstrate that there will be no environmental risk from their proper application.</p> <p>The use of water treatment with a flocculant/coagulant will require a discharge permit from NRW. Should Enzos Homes introduce flocculant prior to obtaining a permit this would be at their risk. Unfortunately, the local NRW officers do not have the ability to offer an interim position on this treatment, but it is imperative that they are kept informed of your intention of use.</p>			
<b>12</b>	<p><b>To improve solid separation from the water in basins</b></p> <p>Gel Flocculant blocks (WL494 in combination with WL360 a ratio of 3:2) can be introduced into each 300mm drainage pipe 30-50m in advance of the settlement ponds.</p> <p>The blocks can be connected to a chain using quick links and fed into the pipe. The flocc particles formed will be collected in the settlement basins</p>	<b>11</b>	<b>MED</b>	<b>Andrew Rudd</b>

13	<p><b>To improve solid separation as water is pumped to the settlement tank(s)/geobag</b></p> <p>A pipe reactor may be used inline to the pump to introduce Gel Flocculant, a 30-50m length of lay flat hose then connects to the settlement tanks/geobag.</p> <p>The pumped flow should be limited to between 600-900L/min, the treatment success will depend on several variables including volume of suspended solids and settlement in the capture system.</p> <p>If the two settlement tanks are being kept split the flows between them so that the speed of flow through both is reduced.</p> <p>Use Floc Mats and Silt Mats to line the area of the geobag as these will offer further polishing before water is released from site.</p>	12		
<b>BOUNDARY FEATURES</b>				
14	<p><b>Maintain the protection along the boundaries to prevent water from entering ditches.</b></p> <p>Complete the final section of the bund on the plot perimeter to prevent water runoff from site across the fields and direct water into the new settlement basins</p> <p>Maintain Silt Fence along the edge of the stream to prevent surface water runoff direct to this feature.</p>	13 & 14	GOOD	Andrew Rudd



15	<p><b>Interventions in the boundary stream need maintenance, there is a build-up of sediment and some of the interventions are damaged.</b></p> <p>Dig out by hand the accumulated sediments and remove the saturated Silt Mats from the channel connecting the river.</p> <p>To reduce the risk of silty water being passed downstream place a Silt Mat and Silt Wattle at the most downstream point to help filter and capture any sediments before works.</p>  <p>Replace the Silt Fence sections with a more suitable product such as a Silt Wattle that is designed to slow the flow and slowly percolate the water.</p>	15 & 16	<b>HIGH</b>	Andrew Rudd
16	<p><b>Evidence of water flows down road entrance by site compound into the development (near ladder)</b></p> <p>Bund the top of the step to prevent water being added to the development roads</p> <p>Scrape the route so there is less available material.</p>	17	<b>MED</b>	
<b>ROAD DRAINAGE</b>				
17	<p><b>Good practice already operating on site is road sweeping</b></p>	18	<b>GOOD</b>	Andrew Rudd

	Continue this good practice, ensure material is removed from site or managed appropriately so it can be treated and not escape into surface waters.			
18	<b>Wheel washing was in operation</b>  Wheel washing was in operation as vehicles were leaving site, a capture pit recirculated the water to use	19	GOOD	Andrew Rudd
19	<b>Road drains have been previously covered to minimise debris entering the drainage system however some of these have become worn and need replacing</b>  Replace the hessian on the drain covers	20	MED	Andrew Rudd
<b>MONITORING AND MAINTENANCE</b>				
20	Actively monitor the discharge points.  This is likely to mean checking the water quality daily at the outfall(s) from site, especially important if water is being pumped.  Define a monitoring plan / chart to be completed and train the responsible persons		HIGH	
21	Investigate any pollution incidents so that you can act to treat the water and notify NRW.		HIGH	
22	Include water management and silt control in the weekly briefing to ensure that it is a priority and modifications made to the plan as new activities take place on site.  Assign a responsible person so that they can make executive decisions regarding the water management		HIGH	

<b>23</b>	<p>Create a plan to monitor and maintain the silt control interventions. This should include how silts will be removed from the ditches/basins and where they will be stored to prevent further pollution or removed from site.</p> <p>It must also include the replacement of materials including Silt Mats and Gel Flocculant as they are exhausted.</p>		<b>HIGH</b>	
<b>24</b>	<p>Consider specific silt control training for those responsible for monitoring and maintaining the water quality</p> <p>As a minimum deliver a Silt Control Toolbox Talk to site workers.</p>		<b>MED</b>	

Photographs should be taken to support the site assessment and make a formal record of the site condition at the time of the visit; specific photography should record the downstream water (colouration) to demonstrate effectiveness of the silt control measures where they may be in place. If there is any colouration a visual check must be made upstream of the works and a 1ltr water sample taken both upstream and downstream.

**Record all proposed actions giving as much detail as possible, e.g. risk, severity, size, quantity, and equipment. Identify an immediate corrective action or requirement for long term plan/additional monitoring and assign a person responsible for delivering this and a deadline/timeframe for it to be achieved. This must be signed to confirm that the responsible person has been informed of their duties.**

**Please retain a copy of this in the site files and for review at progress meeting.**

**Appendix A – Site Plan**





**Appendix B - Photos****Photo 1 – Standing water/slurry on unmade haul road****Photo 2 – Attenuation ponds have deep unconsolidated mud**





**Photo 3 – Attenuation ponds have deep unconsolidated mud**



**Photo 4 – Install Silt Mat following final Silt Fence**





**Photo 5 – Remove saturated Silt Mats from ditch connecting the river**



**Photo 6 – Sediments accumulated in ditch connecting the river**





**Photo 7 – Reinstall silt fence**



**Photo 8 – Creation of new settlement pond on the site boundary**

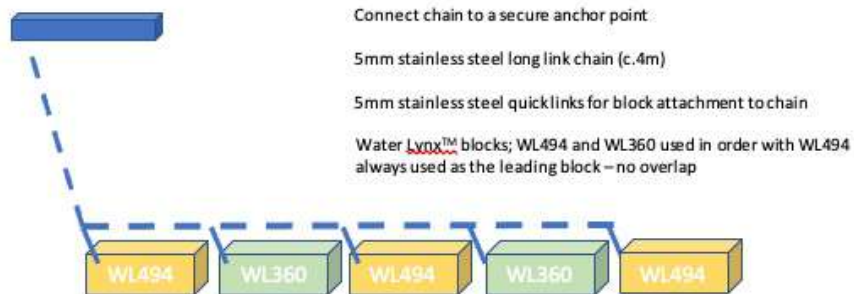




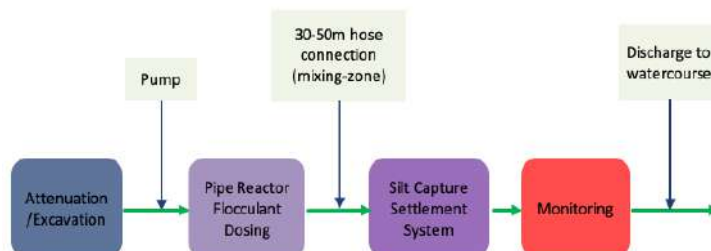
**Photo 9 – Adapt settlement tank and confirm fit for purpose**



**Photo 10 – Geobag final polishing treatment**



**Photo 11 – The addition of Gel Flocculant in pipes**



**Photo 12 – The use of a Pipe Reactor to treat water pumped off site**





**Photo 13 – Bund the site perimeter to direct water to settlement basins**



**Photo 14 – Maintain Silt Fence along the perimeter to prevent runoff into stream**





**Photo 15 – Interventions in the boundary stream need maintenance**



**Photo 16 – Interventions in the boundary stream need maintenance**





**Photo 17 – Bund and divert water from top section of plot**



**Photo 18 – Road sweeper in operation**





**Photo 19 – Wheel wash in operation**



**Photo 20 – Drainage covers require maintenance**

**Appendix C - Checklist**

1. Project Management	YES	NO	ACTION No	
1.1 Are there any outstanding actions from previous monitoring reports?		x		
1.2 Have there been any environmental incidents or non-conformances since previous monitoring?	x			
1.3 Have there been regulatory actions since previous monitoring?	x			
1.4 Have there been any active communications or complaints regarding water quality for members of the public?		x		
1.5 Can water be discharged from site using the EA exemption?		x		
1.6 Is an environmental permit for temporary surface water discharge required?	x			
1.7 Has an environmental permit for temporary surface water discharge been obtained?		x	10	
1.8 Has environmental training been provided to site team? (i.e. Silt Control Toolbox Talk)		x	23	
1.9 Is there a silt incident response plan?		x		
1.10 Have site specific silt control measures been adopted?	x			
1.11 Is there an up-to-date plan showing silt control measures, inspection, maintenance, and monitoring requirements?		x		
1.12 Has the silt control plan been communicated and actioned?		x		
<b>Comments/Notes*</b>  <b>NRW have attended site on two occasions when water discharging from site via a temporary ponding is not meeting the consent parameters. Whilst there are some silt control measures on site these need to be reviewed to ensure they are still fit for purpose and any additional measures can be incorporated.</b>  <b>The use of a Gel Flocculant needs to be considered, a settlement test and flocculant validation report completed. The use of a GF will require an environmental permit.</b>  <b>Further monitoring and assessment is needed on site, improved knowledge of employees in relation to silt control.</b>				
2. Silt Pollution Risk Management	N/A	YES	NO	ACTION No
2.1 Are there any rivers, streams, ditches, and drains that have not been identified on site?			x	
2.2 Is there any risk of water leaving site in an unplanned manner?		x		
2.3 Is there any unplanned water accumulation or puddling?		x		
2.4 Is any work taking place or planned within 10m of the water?		x		
2.5 Is there any evidence of silt pollution on site?		x		
2.6 Are there any exposed areas that are not protected and can lead to muddy water or discharge from site?		x		
2.7 Are dewatering protocols in place for excavations?	x		x	
2.8 Are instructions on pumps required that remind operator of silt control measures needed before use?			x	

2.9 Is the water attenuation on site sufficient?			x	
2.10 Are there any stockpiles located less than 10m away from watercourses and drains?			x	
2.11 Stockpiles are recommended to be a maximum of 2m in height and less than 30° slope. Are there any stockpiles that are greater in height or slope than this?			x	
2.12 Do stockpiles require protection from erosion and compaction?			x	
2.13 Is there a requirement for topsoil spreading (during dry conditions), surface roughness and seeding?			x	
2.14 Is there any evidence of excess mud on roads or muddy water being released from roads?		x		
2.15 Do haul roads require stabilising, cleaning, rumble strips or filter drain management to minimise silt release?		x		
2.16 Does the site drainage need maintenance, is there excess material in the site drainage and gullies?		x		
2.17 Is management of road sweeper wastewater sufficient?		x		18
2.18 Are vehicle washing or rumble strips required?			x	19
2.19 Is there a requirement for boot wash facilities or improvements to the present facilities on site? (Is wastewater being intercepted?)			x	
2.20 Are concrete wash waters being collected / treated / released on or off site?	x			

**Comments/Notes\***

The roads were the biggest contributor of silts. They require immediate remedial action. At present there is deep mud tracks and standing water accumulating in places creating a slurry. The roads are being built up using aggregates and a drainage system incorporated.

Evidence of significant silt pollution in the stream immediately adjacent to site, large volumes of silt is accumulated on the fiends and in the channels.

Additional attenuation is required on site to hold more water as this would benefit the physical treatment

Didn't check the road sweeper/wheel wash discharge location.

3. Silt Control Measures Inspection, Maintenance and Monitoring			N/A	YES	NO	ACTION No
3.1 Is water being discharged to river, stream or ditch?				X		
3.2 Is the discharge covered by a discharge permit?					X	
3.3 Are specific limits (TSS, pH, Volume) set in the permit?					X	
3.4 Is monitoring of the discharge taking place? If NO, detail in the comments section the reasons why no monitoring is taking place					X	
3.5 Have these limits been met? Record values below			X			
Grid Reference	NTU	pH				



3.6 Is the discharge point free of erosion?		X		
3.7 Are silt control mechanisms in place?		X		
3.8 Is there an inspection and maintenance programme in place?			X	
3.9 Are silt control mechanisms effective on site?			X	
3.10 Is the pump head floating, on rock bed or in a specific sump to minimise silt being drawn through?		X		
3.11 Are site ditches free of signs of erosion on bed and bank?			X	
3.12 Are silt control measures of an adequate scale (or do these need to be scaled up or down)? Do other measures need to be included?		X		
3.13 Are settlement ponds effective?			X	
3.14 Is flocculant being used on site?			X	
3.15 Check the flocculant/coagulant use. Is this working optimally?	X			
3.16 Are silt control measures clean and without a requirement to maintain or replace components?			X	
3.17 Is there a designated route for reuse and/or disposal of accumulated silts and other materials.			X	
3.18 Have all new silt control requirements identified? Outline anything not covered in the questions above and suggestions as to how these may be managed.		X		
<b>Comments/Notes*</b>  <b>Didn't take measurements from discharge although there was a small flow of water leaving site this was only slightly coloured. The silts readily mobilised and ground was saturated so there is no infiltration</b>				