

LOWER HARE INERT LANDFILL

Lower Hare Farm

SURFACE WATER RISK ASSESSMENT

STATUS: JULY 2024

213189/SWRA

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1.0 INTRODUCTION

- 1.1 Lower Hare Farm is located 800 m west of Whitestone village, at Lower Hare Farm, Hare Lane, EX4 2HW. The site is centred at National Grid Reference SX 85762 93431. The site location is shown in drawing 213189/D/001. The site is circa 8 km west of Exeter.
- 1.2 The site has planning permission for an inert landfill, as part of which there will be a permanent surface water attenuation lagoon on the western boundary. The lagoon is already in place. Improvements will be made to control the outflow from the lagoon to the tributary of the Alphin Brook. This will include a hydrobrake and a penstock.
- 1.3 This report assesses the risks to the surface waters of the Alphin Brook from the discharge made from the permanent lagoon.

2.0 DISCHARGE DETAILS

Location

- 2.1 The location of the discharge point will be on the southwest corner of the permanent attenuation lagoon. This is shown on AAe drawing 213189/D/008. The National Grid reference of the discharge point is SX 85574 93328.
- 2.2 The discharge will flow south into the tributary of the Alphin Brook, which is approximately 15 m south west of the discharge point.
- 2.3 Approximately 125 m further south the tributary joins the main Alphin Brook, flowing from the west and turning to flow southwards.

Surface Water Quality

- 2.4 Surface water quality monitoring to data has been undertaken in the following locations:
 - SW1 – upgradient of the attenuation pond in the tributary of the Alphin Brook;
 - SW2 – in the Alphin Brook to the west;
 - SW3 – just below the confluence of the Alphin Brook and tributary, south of the proposed landfill; and
 - SW4 – from the attenuation pond itself.

The water quality data is presented in Appendix A.

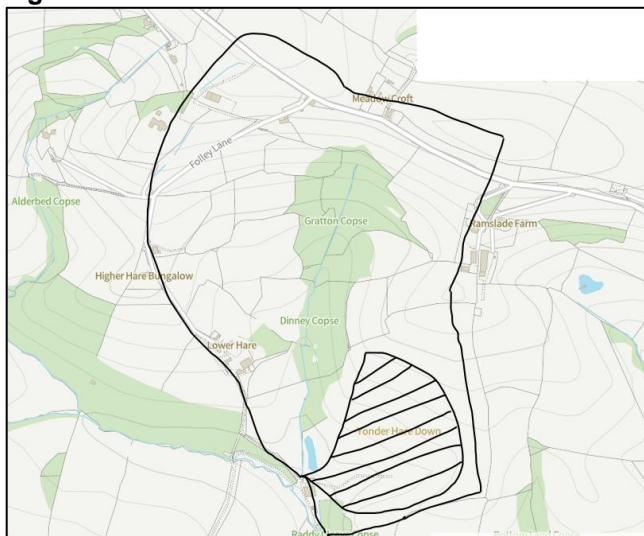
Discharge Rate

- 2.5 The discharge rate has been estimated within the AAe 2022 Detailed Drainage Design as 24.9 l/s, the 1 year greenfield runoff rate.

River Flow Rate

- 2.6 The river flow rate has been estimated using data for catchment size. The area of the landfill draining to the permanent drainage pond is 11.5 ha. The landfill forms most of the downgradient portion of the wider catchment area contributing to the tributary of the Alphin Brook, refer to Figure 1. The full catchment area is 45 ha, therefore, the landfill area contributes a quarter of the flow to the tributary of the Alphin Brook. The flow in the tributary upgradient of the landfill (monitoring location SW1) can, therefore, be assumed to have three quarters of the catchment flow, which would equate to 74.7 l/s.

Figure 1 – Surface Water Catchment



Discharge Quality

- 2.7 The background quality of the existing attenuation lagoon has been established through monitoring, refer to Appendix A. As the landfilling proceeds there will be stripping of topsoils, which will lead to temporary increases to suspended solids. There will be two further temporary attenuation lagoons constructed within the final landfill phase, used to control settlement of runoff during landfilling. Details are shown in drawing 213189/PL/D/012.
- 2.8 The imported waste materials will be of a restricted number of EWC codes, refer to Table 1. They will be inert and locally sourced, giving low potential for contamination. Runoff from the operational landfill will pass through two attenuation lagoons before reaching the permanent lagoon for a further phase of settlement. This lagoon will be regularly monitored for water quality.

Table 1 – Waste Codes

Waste description	EWC code
Acceptable Inert Materials	
Concrete	17 01 01
Bricks	17 01 02
Tiles and ceramics	17 01 03
Mixtures of concrete, bricks, tiles and ceramics	17 01 07
Soils and stones (excluding topsoil and peat)	17 05 04 or 20 02 02
Potentially Acceptable Materials	
Soils and stones (excluding topsoil and peat)	17 05 04 or 20 02 02

- 2.9 The quality of the discharge has the potential to vary during landfilling and measures need to be taken to protect the quality of the waters in the receiving tributary of the Alphin Brook. The section below assesses the thresholds for water quality that should not be exceeded in order to remain protective of the tributary.

3.0 SURFACE WATER RISK ASSESSMENT

- 3.1 The surface water risk assessment uses the principles of the Environment Agency guidance <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>
- 3.2 In accordance with the guidance, available water quality data is screened against Water Framework Directive freshwater environmental quality standards (EQS). Test 1 within the guidance assesses whether concentrations within the discharge will exceed 10% of the EQS. Test 2 assesses dilution in the receiving water against 4% of the EQS. Test 3 assesses background concentration in the receiving water in relation to the proposed discharge. The predicted environmental concentration in the water downstream of the discharge should not exceed 10% of the EQS.
- 3.3 In this instance the quality of the discharge from the operational landfill is not known and therefore, the calculations are used in reverse in order to determine the maximum permissible concentrations within the discharge to meet the criteria of Test 3. The calculations are presented in Appendix B and the maximum discharge concentrations are highlighted.

4.0 MONITORING

- 4.1 The key determinands within the Hydrogeological Risk Assessment (HRA) are arsenic, toluene, chloride, nickel and suspended solids. Thresholds have been set within the HRA for the downgradient compliance point SW3.
- 4.2 Monitoring for the key determinands will be undertaken monthly together with ammoniacal nitrogen. All attenuation ponds on site will be visually assessed weekly for signs of any visible oils or grease.

5.0 CONCLUSIONS

- 5.1 The site has an existing attenuation pond that discharges to a tributary of the Alphin Brook. During landfilling two new attenuation ponds will be constructed on the southern, final phase of landfilling. This will maximise the time they are operational before infilling in the final stages of landfilling. These two ponds will discharge into the permanent attenuation lagoon. The permanent lagoon and discharge therefore, have the potential to be affected by residual suspended solids resulting from landfill development.
- 5.2 Water quality thresholds for the permanent attenuation lagoon have been derived using Environment Agency guidance on surface water pollution risk assessment. A monitoring regime will be implemented to ensure these thresholds are not breached. In the event of an incident a manual penstock fitted to the discharge point will be closed until such time as surface water has been remediated.

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DRAWINGS

APPENDIX A

APPENDIX B