Surface Water Pollution Risk Assessment

Clockhouse Quarry

SUEZ Recovery and Recycling UK Ltd

Prepared by:

SLR Consulting Limited

3rd Floor, Brew House, Jacob Street, Tower Hill,
Bristol, BS2 0EQ

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Basis of Report

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Table of Contents

Tables in Text

Appendices

1.0 Introduction

1.1 General Background

SUEZ Recycling and Recovery UK Ltd (SUEZ) is applying for a deposit for recovery permit to allow the restoration of their Clockhouse Quarry landfill site.

Groundwater and surface water which collects in an untipped part of the site is currently discharged to Fylls Brook via an unnamed ditch under an agreement with Forterra who hold an existing discharge permit.

SUEZ is seeking to replicate this existing consent to allow them to discharge water during the deposit for recovery operation. Upon completion of the restoration process, the post restoration surface water management scheme has been designed to enable passive drainage from the site at greenfield run-off rates or lower. Essentially this means that the Discharge Consent is tied to the Deposit for Recovery Permit and upon surrender of the permit, the consent will also be surrender

This assessment has been carried for the purpose of supporting the application for the deposit for recovery permit and the associated water discharge activity during the recovery process.

2.0 Surface Water Pollution Risk Assessment Methodology

A Risk Assessment is sometimes required when applying for a bespoke environmental permit that includes discharging hazardous pollutants or certain other potentially polluting substances to surface water, or if a variation of an existing permit is required to cover an increase in quantity and/or concentration of pollutants to surface water under the Environmental Permitting Regulations[1].

The purpose of an surface water pollution risk assessment (SWPRA, otherwise known as an 'H1 assessment') is to quantify the environmental impact of discharging hazardous chemicals and elements to a receiving watercourse to assess whether they are a risk to the environment.

This includes discharging to:

- Freshwaters;
- Estuaries and coastal waters; and
- Sewers

The EA methodology contained in the "*Surface water pollution risk assessment for your environmental permit"* guidance[2] provides guidance on assessing effluent discharges containing potentially polluting substances to surface water.

Hazardous pollutants are the pollutants listed in the tables of the guidance (specific pollutants list and priority hazardous substances list).

The EA's "*H1 Annex D2 – Assessment of sanitary and other pollutants within surface water"* guidance[3] was also used, which provides guidance on assessing effluent discharges containing sanitary and other pollutants within surface water.

Most substances are assessed using a series of screening tests, beyond which further modelling may be required for those which fail (cannot be screened out). Some substances are assessed using a Monte Carlo modelling approach via the EA's River Quality Planning (RQP) tool.

Further guidance contained within the EA document *"LIT 13134 - Permitting of hazardous chemicals and elements in discharges to surface waters"* was also used for reference and methodology.

2.1 Environmental Quality Standards

The surface water risk assessment guidance contains a list of environmental quality standards (EQS) for hazardous chemicals and elements.

There are two types of EQS values that might apply:

- Maximum Allowable Concentration EQS (MAC-EQS) - to evaluate the short-term environmental impact of emissions to a receiving watercourse; and

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[1] Environmental Permitting (England and Wales) Regulations 2016

[2] Environment Agency and DEFRA, (2026). Surface water pollution risk assessment for your environmental permit. [Available at]: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit

[3] Environment Agency, (2014). H1 Annex D2: Assessment of Sanitary and Other Pollutants within Surface Water Discharges (v1.0). [Available at]: https://www.gov.uk/government/publications/h1-annex-d2-assessment-of-sanitary-and-other-pollutants-insurface-water-discharges

- Annual Average (AA-EQS) - to evaluate the long-term environmental impact of emissions to a receiving watercourse.

A hazardous chemical or element may only have a corresponding AA-EQS value, a MAC-EQS value or both an AA-EQS and MAC-EQS value.

Some substances require site specific EQS values to be determined, based on site setting and local water quality data.

2.2 Screening Phase

Phase 1 screening eliminates all hazardous chemicals and elements which are considered to not be a risk to the environment. This phase uses precautionary raw data which has not been "cleaned-up" (e.g., the minimum reporting values (MRVs) are taken at "face-value").

Phase 1 screening is composed of two parts – part A for all hazardous chemicals and elements and part B for priority hazardous substances.

The EA has developed a Risk Assessment software tool[4] to perform many of the calculations involved in the Risk Assessment to aid in the quantification of the impact of releases from the regulated activities.

2.2.1 Screening Tests

Phase 1-part A screening comprises of a series of tests. These tests vary depending on whether the receiving water is freshwater or coastal/Estuarine. The tests for freshwater are described in Table 2-1 as the receiving watercourse is a freshwater watercourse at the point of discharge.

Table 2-1: Freshwater Screening Test Descriptions

Freshwater Screening Test	Test Detail
Test 1	This test is devised to quickly screen out hazardous pollutants. If the concentration of the hazardous pollutant in the effluent exceeds 10% of the EQS, it is potentially significant and should be carried forward to Test 2.
Test 2	This test introduces the dilution available in the receiving watercourse by calculating the Process Contribution (PC). PC is the concentration of the discharged hazardous pollutant in the receiving water after dilution. If the PC exceeds 4% of the EQS, it is potentially significant and should be carried on to Tests 3 and 4.
Test 3	This test introduces the existing concentration of the hazardous pollutants in the receiving watercourse. The Predicted Environmental Concentration (PEC) is the predicted concentration in the receiving water downstream of the discharge. If the difference between the upstream quality and the PEC is >10% of the EQS, the hazardous pollutant is potentially significant and will fail the Risk Assessment screening process and require further modelling. If it is not, then Test 4 must be carried out.
Test 4	This test assesses whether the discharge, when combined with the existing upstream water quality, will contribute to an EQS failure in the receiving watercourse. It therefore takes into account the combination effects with existing discharges. If the PEC exceeds the EQS, the hazardous pollutant is potentially

[4] Environment Agency (2016). Environment Agency H1 Software Tool, Version 2.7.6, February 2016 (64-bit). Available upon request from the Environment Agency.

Freshwater Screening Test	Test Detail
	significant and will fail the Risk Assessment screening process and require further modelling.

Tests 1 and 2 in Part A of the screening are progressive i.e. a hazardous pollutant can be screened out at any stage having failed to be screened out at the previous stage(s). However, a hazardous pollutant must pass both Test 3 & 4 to be considered as not liable to cause pollution and requires no additional control.

2.2.2 Significant Load Assessment

Phase 1-part B screening assesses whether the discharge exceeds pre-determined significant load limits and is only carried out on Priority Hazardous Pollutants. Priority Hazardous Pollutants must be screened out in the Part A assessment and the Part B assessment (where applicable) to be deemed to require no further detailed assessment.

2.3 Modelling of Sanitary and "Other" Pollutants

Modelling[5] is required for assessing the effect of discharging sanitary and "other" pollutants (described in "*H1 Annex D2 – Assessment of sanitary and other pollutants within surface water"* guidance[6]). Modelling consists of additional tests which assess whether the discharge is a risk to the environment. If the modelling tests show the discharge is an unacceptable risk to the environment, then the EA may include conditions on the permit to control certain pollutants.

The following subsections detail the modelling methodology outlined in the EA's modelling guidance.

2.3.1 Modelling Test 1 – Risk to EQS

Modelling Test 1 assesses whether the proposed load could cause failure of the receiving water EQS using the RQP Monte Carlo simulation tool.

For 90th percentile EQSs, if the 90th percentile downstream quality is less than the EQS, the discharge is not predicted to cause an EQS failure, and this modelling test has been passed. If instead the 90th percentile downstream quality exceeds the EQS, the substance is considered significant and a numeric emission limit for this substance will be required on the permit.

For annual average EQSs, if the mean downstream quality is less than the EQS, the discharge is not predicted to cause an EQS failure, and this modelling test has been passed. If instead the mean downstream quality exceeds the EQS, the substance is considered significant and a numeric emission limit for this substance will be required on the permit.

2.3.2 Modelling Test 2 – Significant Deterioration of Receiving Water Quality

Test 2 determines whether the discharge causes upstream/background quality to deteriorate significantly. If the calculated downstream concentration is higher than 80% of the relevant

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[5] Environment Agency (2014). LIT 10419 Modelling: surface water pollution risk assessment. [Available at]: https://www.gov.uk/government/publications/modelling-surface-water-pollution-risk-assessment

[6] Environment Agency, (2014). H1 Annex D2: Assessment of Sanitary and Other Pollutants within Surface Water Discharges (v1.0). [Available at]: https://www.gov.uk/government/publications/h1-annex-d2-assessment-of-sanitary-and-other-pollutants-insurface-water-discharges

EQS and / or results in more than 50% of the remaining headroom below EQS being utilised, then the substance is considered significant, and a numeric emission limit is required for this substance on the permit.

3.0 Data Inputs to Surface Water Pollution Risk Assessment

3.1 Assumptions

The following assumptions have been made by SLR in preparing this Risk Assessment:

- The effluent quality and volume data is based on best estimates of future quality and volume given existing water quality information from the site and understanding of the pumping infrastructure and operation described by SUEZ;
- Due to the intermittent nature of the discharge, flow rates have been derived by averaging the estimated daily volume over 24 hours;
- The initial effective point of discharge has been taken as the point of mixing between the unnamed ditch and Fylls Brook, followed by further assessment of the impact on the watercourse once it becomes a designated main river at the confluence of Porters Gill where it becomes known as Boldings Brook;
- Data relating to hazardous chemicals and elements referenced in the EA guidance[7] only has been reviewed; and
- Substances which are referenced in the EA guidance and for which no data has been provided, have not been considered in this report.

3.2 Effluent Quality

SUEZ has supplied sample analysis data for the period April 2025 to February 2026 for samples taken of the existing water being discharged from the site, which consists of incident rainfall onto the site and groundwater inflow from the surrounding clay dominant geology (as defined in the site's hydrogeological risk assessment, HRA)

During the recovery process, the water discharged from the site will continue to originate from incident rainfall onto the site and groundwater inflow from the surrounding clay dominant geology. The only difference will be contact with clean, deposited inert waste material (such as soils, and overburden recovered from local construction projects). The extent to which this will alter the chemical composition of the water to be discharged is currently unknown but is likely to be limited due to the inherent inert nature of the material to be accepted for deposit.

Whilst it is acknowledged that some leaching may occur from infiltration of rainfall and groundwater through the deposited material (noting the inherent low permeability of soils when placed and compacted), due to the inert nature of the material to be deposited and limited contact times for water passing over the soil surface, it is not anticipated that the water will become significantly contaminated. Furthermore, the permit application proposes differentiating waste types, so that the cleanest wastes are deposited below the water table.

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[7] Environment Agency and DEFRA, (2020). *Surface water pollution risk assessment for your environmental permit.* [Available at]: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit

SUEZ is seeking permission to discharge water during the deposit for recovery scheme under the same conditions as the existing discharge arrangement. On this basis, the quality of the existing discharge has been used in the initial assessment of the discharge to Fylls Brook. SUEZ do, however, propose additional quality limits on key parameters to ensure that the discharge does not pose a significant risk to the receiving watercourse.

The quality limits proposed are based on quality limits set in the HRA for groundwater monitoring on the basis that in a worst-case scenario (whereby drought conditions are in place for an extended period), the collected waters may become concentrated and take a greater input from groundwaters. It is therefore deemed as a conservative approach to use the same limits for groundwater and discharge monitoring. Where such limits are being proposed, these have been used as maximum concentration values in the assessment.

Table 3-1: Estimated Discharge Quality

Substance	Count	Number of samples below Limit of Detection (LOD)	Average Concentration (µg/l)	Maximum Concentration (µg/l)
Ammoniacal Nitrogen	7	0	160	1,200 [1]
Arsenic (Total)	5	2	3.4	11
Biological Oxygen Demand (BOD)	7	6	1,014	1,100
Chloride	7	0	10,286	120,000 [1]
Chromium (Total) [2]	5	4	6.4	28
Copper (Dissolved)	5	5	1	1
Lead (Dissolved)	0 [3]	N/A [3]	0.2 [3]	0.2 [1]
Manganese (Dissolved)	5	4	6.4	24
Nickel (Dissolved)	5	5	1	12 [1]
pH	7	N/A	7.6	7.8
Sulphate	5	0	319,200	328,000
Suspended Solids	7	4	7,714	40,000 [1]
Zinc	5	1	4.2	9

Notes

[1] Proposed discharge limit used in placed of analysis data.

[2] Assumed to be CrIV to be conservative (on the basis of a lower AA-EQS)

Substance	Count	Number of samples below Limit of Detection (LOD)	Average Concentration (µg/l)	Maximum Concentration (µg/l)
[3] The proposed discharge limit has been used as both average and maximum in the absence of recent analysis data for lead. (This is considered to be a conservative approach.)				
[4] Total metal concentrations have been used with the exception of metals for which AA-EQS values are based on bioavailability.				

3.3 Effluent Flow Rate

The volume of effluent generated will be dependent on rainfall and groundwater infiltration into the site. Of these two inputs, rainfall is anticipated to be the source of the overwhelming majority of effluent generation given the expected low permeability of the material to be deposited and groundwater infiltration rates described in the HRA. Whilst some groundwater is expected to enter the site, this may well be compensated by losses due to evapotranspiration of rainfall which have not been accounted for. Therefore, in the absence of measured flow data from the site, estimation of effluent generation via rainfall was deemed to be a suitable and appropriately conservative method.

The standard average annual rainfall (SAAR) rate for the site (at grid reference TQ 17648 38555) is 859mm.

The site area was estimated at 134,000 m^2. Averaging the SAAR rate of 859mm over 365 days and multiplying by the site area indicates and average daily effluent generation of 315 m^3. The validity of this estimation was compared to the actual pumping regime from the site to ensure that the average flow rate used in the assessment was reasonable.

Water is pumped from the site via a submersible pump (model number 150EUB-M-5.100) which is estimated to have an output of up to 90 m^3/hr given the head being pumped. This is understood to be pumped for “a few hours per day” at most. In addition, a smaller pump with approximately half of this output runs for around one to two hours per day. Therefore, an assumption was made that four hours pumping from the larger pump and two hours from the smaller pump, i.e., 450 m^3 per day is likely to be a conservative estimate of volume pumped from site on an average day. This is particularly considered to be conservative when compared to the calculated rainfall generation rate of 315 m^3.

An average flow rate of 0.052 m^3/s was therefore derived from the estimated daily generation rate of 450 m^3 averaged over 24 hours for 365 days per year.

SUEZ are seeking to replicate the existing maximum daily discharge limit of 2,160 m^3 per day at a maximum rate of 25 l/s (0.025 m^3/s). This flow rate was therefore used as the maximum in the assessment.

3.4 Receiving Water Quality

Effluent from the site is discharged into an unnamed ditch which flows into Fylls Brook. The unnamed ditch is artificially modified by the existence of the site itself and is consequently dry with the exception of the effluent pumped form the site, making it conceptually a conduit for effluent to Fylls Brook which was deemed to be the immediate receiving watercourse. The point of discharge to the receiving watercourse was therefore modelled at grid reference TQ 17931 38304.

Fylls Brook is not classified by the EA as a main river and no background quality data for the watercourse was available on the EA’s water quality monitoring database.

SUEZ has supplied water quality for Fylls Brook which they have collected and had analysed. This data is summarised along with relevant EQS values in Table 3-2.

The assessment also considered the impact of the discharge on Boldings Brook, where Fylls Brook combines with Porters Gill to become a designated main river. No background data for Boldings Brook was available either from the EA's water quality monitoring database or SUEZ and therefore the background quality was assumed to be equal to that of Fylls Brook.

Boldings Brook is described by the EA's Catchment Data Explorer[8] as a "heavily modified" water body. From the latest publicly available data, the river had a designated overall "poor" classification in 2022 in accordance with the Water Framework Directive.

Specific quality classifications in 2022 were as follows:

- Ammonia: High
- Dissolved Oxygen: High

Table 3-2: Receiving Water Background Quality and EQS Values

Substance	Average Concentration (µg/l)	Maximum Concentration (µg/l)	AA-EQS (µg/l)	MAC-EQS (µg/l)
Ammoniacal Nitrogen	74.29	300	N/A	300 [1]
Arsenic (Total)	1.8	2	50	N/A
Biological Oxygen Demand (BOD)	1,029	1,200	N/A	4,000 [1]
Calcium	290,200	343,000	N/A	N/A
Chloride	30,429	35,000	250,000	N/A
Chromium (Total) [2]	1	1	3.4	N/A
Copper (Dissolved)	1	1	1 (bioavailable) / 21.38 (site specific dissolved PNEC) [3]	N/A
Dissolved Organic Carbon (DOC)	5,238	5,970	N/A	N/A
Lead (Dissolved)	0.6 [4]	0.6 [4]	1.2 (bioavailable)	14
Manganese (Dissolved)	7.2	24	123 (bioavailable) / 392.43 (site specific dissolved PNEC) [3]	N/A

[8] Environment Agency Catchment Data Explorer. [Available at]: https://environment.data.gov.uk/catchment-planning/

Substance	Average Concentration (µg/l)	Maximum Concentration (µg/l)	AA-EQS (µg/l)	MAC-EQS (µg/l)
Nickel (Dissolved)	2.8	3	4 (bioavailable) / 14.18 (site specific dissolved PNEC) [3]	34
pH	7.7	7.8	N/A	6 – 9 (95th percentile)
Sulphate	565,400	703,000	400,000	N/A
Suspended Solids	30,000	92,000	N/A	N/A
Zinc	5.8	12	10.9 (bioavailable) / 28.99 (site specific dissolved PNEC) [3]	N/A

Notes

[1] Site specific standards were calculated for Ammoniacal Nitrogen and BOD based on altitude of less than 80m, alkalinity above 200 mg/l and high quality status of the watercourse for ammonia and dissolved oxygen (as described in section 3.4 main body of text)

[2] Assumed to be CrIV to be conservative (on the basis of a lower AA-EQS)

[3] A site specific predicted no effect concentration (PNEC) was calculated for bioavailable metals (with the exception of lead) using the EA's bioavailability assessment tool (M-BAT)

[4] 50% of AA-EQS was assumed in the absence of recent background data

3.5 Receiving Water Flow Rate

Theoretical flow rates for the receiving water (both Fylls Brook and Boldings Brook) have been calculated using the Centre for Ecology and Hydrology's (CEH) LowFlow 2 software at locations TQ 17931 38304 (Fylls Brook) and TQ 17951 36771 (Boldings Brook).

In lieu of site-specific observed data, LowFlow 2 provides a means for predicting flows within ungauged catchments based on regionalised models represented by flow duration statistics. In addition, LowFlow 2 contains / has access to the UK Hydrometric Register and thus actual recorded flow data from gauges within the respective catchments are integrated into the flow derivation simulation to improve the accuracy of the results.

The theoretical flow rates for Fylls Brook and Boldings Brook derived from the LowFlow 2 software are summarised in Table 3-3.

Table 3-3: Receiving Watercourse Flow Rates

Watercourse	(Mean, m^3/s)	Q95 (95th Percentile, m^3/s)
Fylls Brook	0.0146	0.0012
Boldings Brook	0.1	0.016

4.0 Risk Assessment Results

4.1 Screening Tests

Screening tests were carried out for a discharge into Fylls Brook.

4.1.1 Test 1

Arsenic and Chloride were screened out by test 1. All other substances were carried over to test 2.

4.1.2 Test 2

No substances were screened out by test 2. All substances were therefore carried over to tests 3 and 4.

4.1.3 Tests 3 and 4

All remaining substances (Chromium, Copper, Lead, Manganese, Nickel Sulphate and Zinc) were screened out by tests 3 and 4.

Chromium and Copper could not be immediately screened out and were examined in further detail.

4.1.4 Significant Load Test

The dataset provided contained no relevant priority hazardous substances, hence none were assessed as part of the assessment process.

4.1.5 pH

The average and maximum pH (7.6 and 7.8 respectively) of the effluent is within the MAC-EQS range of 6-9. Therefore, it is not anticipated to cause a significant impact on the receiving watercourse.

4.2 RQP Modelling of Sanitary and Other Pollutants

4.2.1 Ammoniacal Nitrogen

4.2.1.1 Risk to EQS

Ammoniacal Nitrogen was modelled using the RQP software to determine the impact on Fylls Brook. The resultant 90th percentile downstream concentration was calculated to be 198 µg/l. Therefore, the discharge is deemed to pose a risk to the 90th percentile standard of 300 µg/l in the downstream watercourse.

A copy of the modelling parameters and results are presented in Appendix A.

4.2.1.2 Risk of Significant Deterioration – Fylls Brook

The resultant 90th percentile downstream concentration of 202 µg/l is less than 80% of the 90th percentile standard of 300 µg/l. However, the 90th percentile downstream concentration of 198 µg/l utilises more than 50% of the remaining headroom below EQS compared to the upstream concentration. Therefore, Ammoniacal Nitrogen was modelled further by assessing its impact on the downstream main river watercourse, Boldings Brook.

A copy of the modelling parameters and results are presented in Appendix A.

4.2.1.3 Risk of Significant Deterioration – Boldings Brook

Further modelling was carried out to determine the impact of the discharge on the downstream main river Boldings Brook. The resultant 90th percentile downstream concentration was calculated to be 164 µg/l. This value is both less than 80% of the 90th percentile standard of 300 µg/l and also utilises less than 50% of the remaining headroom below the 90th percentile standard in the watercourse. Therefore, the risk of the discharge is deemed to be low and therefore acceptable in terms of impact on the downstream watercourse.

A copy of the modelling parameters and results are presented in Appendix A.

4.2.2 BOD

The concentration of BOD in the discharge is less than that of the receiving watercourse upstream. Therefore, modelling was deemed not to be required on the basis that the discharge will have no negative impact on the water quality downstream.

4.2.3 Suspended Solids

4.2.3.1 Risk to EQS

No specific EQS or standard exists for suspended solids. A guideline standard of 25 mg/l (25,000 µg/l) is stated in the Freshwater Fish Directive, however the upstream concentration in Fylls Brook is already in exceedance of this value and therefore no modelling of risk to EQS was undertaken.

4.2.3.2 Risk of Significant Deterioration

The average concentration of Suspended Solids in the discharge is lower than the concentration in the receiving watercourse upstream. Therefore, modelling was deemed not to be required on the basis that the discharge will have no negative impact on the water quality downstream.

5.0 Justification for Discharge Quality Limits Proposed

5.1 Hazardous Substances

The screening assessment resulted in all hazardous substances which were assessed passing the assessment. This assessment used the proposed quality limits for Lead, Nickel and Chloride as maximum discharge concentrations. Therefore, on the basis that the screening tests passed at these concentrations, the limits are deemed to be acceptable.

5.2 Ammoniacal Nitrogen

Ammoniacal Nitrogen was modelled further using the RQP software to determine the impact on Boldings Brook with a discharge concentration at the proposed limit of 1.2 mg/l (1,200 µg/l). The resultant 90th percentile downstream concentration was calculated to be 300 µg/l. The derived 90th percentile standard for the river is 300 µg/l. On the basis that this value is not anticipated to be exceeded downstream in the 90th percentile, the limit of 1.2 mg/l could be deemed to be acceptable.

A copy of the modelling parameters and results are presented in Appendix A.

5.3 Suspended Solids

As discussed in section 4.2.3, the upstream concentration of Suspended Solids in Fylls Brook is already in exceedance of a commonly used standard of 25,000 µg/l and therefore modelling the risk of the discharge limit causing an exceedance of the standard downstream is not possible since it is already exceeded.

Therefore, the upstream quality data was assessed and the 90th percentile Suspended Solids concentration determined. This was calculated to be 56,600 µg/l (56.6 mg/l). Therefore, it is suggested that a discharge limit of 40 mg/l which is below the 90th percentile upstream concentration could be deemed acceptable.

6.0 Conclusion

SLR has undertaken a surface water pollution risk assessment (H1 assessment) on the proposed discharge from Clockhouse Quarry to Fylls Brook.

The average flow rate was based on assumptions relating to the pumping regime in place at the site, cross reference with rainfall rates for the site, whilst the maximum flow rate was based on the limit being proposed which mirrors that of an existing consent held by Forterra for the discharge activity.

Sample quality data provided by SUEZ for the existing discharge and the receiving watercourse upstream was used to undertake screening via the EA's screening tool was used to run basic screening tests.

Chromium and Copper initially failed the screening tests, but passed after review of the data, removing outliers and halving values recorded as less than the limit of detection. All other hazardous substances passed the screening tests.

No priority hazardous substances were assessed meaning that the significant loads assessment was not required.

pH of the discharge was found to be within the acceptable range of 6 – 9.

Ammoniacal Nitrogen was modelled using the EA's RQP software. Modelling initially focussed on the impact to Fylls Brook where the risk to EQS (90th percentile quality standard) was found to be low on the basis that the 90th percentile downstream concentration was lower than the 90th percentile quality standard. However more than 50% of remaining headroom below the EQS was utilised at this location. Therefore, on the basis that Fylls Brook is not a designated main river, the impact of the discharge on the watercourse further downstream at the point that it does become a main river (Boldings Brook) was assessed. At this location the 90th percentile downstream concentration was less than 80% of the 90th percentile standard and utilised less than 50% of the remaining headroom below the standard. It is therefore suggested that the discharge is acceptable given that the impact on the main river watercourse is within acceptable limits.

The average concentration of BOD and Suspended Solids in the discharge from the site was noted to be below that of the receiving watercourse upstream. Therefore, no modelling was deemed necessary since they pose no risk of deterioration downstream.

Appendix A H1 Screening and RQP Tool Results

Surface Water Pollution Risk Assessment

Clockhouse Quarry

SUEZ Recovery and Recycling UK Ltd

SLR Project No.: 402.065294.00001

22 April 2026

A.1 H1 Tool Screening Results

Water Impacts - Fresh Water Releases

Apply Test 1 (See Guidance) and Calculate Process Contributions of Emissions to Water

This table applies Test 1 and also estimates the Process Contribution for Freshwater releases, this is calculated after dilution into the relevant surface water type for each emission to water listed in the inventory, according to the release point parameters input earlier. If you have more accurate data obtained through dilution modelling, this may be entered as indicated and will be used instead of the estimated PC. Any releases which 'Pass' Test 1 are screened out at this point.

Substance	Annual Avg EQS			MAC EQS		
	Release µg/l	EQS µg/l	Release conc < 10% EQS Test 1	Release µg/l	MAC µg/l	Release conc < 10% EQS Test 1
e.g.						
[w1] Arsenic ()	3.4000	50.0000	Pass	11.0000		N/A
[w1] Chloride ()	10286.0000	#########	Pass	#########		N/A
[w1] Chromium III (95%ile) (dissolved) ()	1.0000	4.7000	Fail	28.0000	32	Fail
[w1] Chromium VI (95%ile) (dissolved) ()	1.0000	3.4000	Fail	28.0000		N/A
[w1] Copper ()	0.5000	1.0000	Fail	1.0000		N/A
[w1] Lead and it's compounds ()	0.2000	1.2000	Fail	0.2000	14	Pass
[w1] Manganese ()	6.4000		N/A	24.0000	123	Fail
[w1] Nickel and its compounds ()	1.0000	4.0000	Fail	12.0000	34	Fail
[w1] Sulphate ()	#########	#########	Fail	#########		N/A
[w1] Zinc ()	4.2000	10.9000	Fail	9.0000		N/A

Water Impact Screening - Fresh Water Releases

Apply Test 2

This page applies Test 2 and displays the Process Contribution as a proportion of the EQS. Emissions with PCs that are less than 4% of the EQS can be screened from further assessment as they are likely to have an insignificant impact.

Substance	Annual Avg EQS					MAC EQS				
	Annual Avg EQS µg/l	PC µg/l	Modelled PC	% PC of EQS %	PC < 4% of EQS? Test 2	MAC EQS µg/l	PC µg/l	Modelled PC	% PC of MAC %	PC < 4% of MAC? Test 2
Chromium III (95%ile) (dissolved) ()	4.7	0.8125		17.29	Fail	32	26.7176		83.5	Fail
Chromium VI (95%ile) (dissolved) ()	3.4	0.8125		23.90	Fail		26.7176		-	Pass
Copper ()	1	0.4063		40.63	Fail		0.9542		-	Pass
Lead and it's compounds ()	1.2	0.1625		13.54	Fail	14	0.1908		1.37	Pass
Manganese ()		5.2000			Pass	123	22.9008		18.7	Fail
Nickel and its compounds ()	4	0.8125		20.31	Fail	34	11.4504		33.7	Fail
Sulphate ()	400000	########		64.84	Fail		########		-	Pass
Zinc ()	10.9	3.4125		31.31	Fail		8.5878		-	Pass

Water Impact Screening (Predicted Environmental Concentration) - Fresh Water Releases

Apply Tests 3 and 4 and identify which releases may need more Detailed Modelling of Emissions/Discharges to Water

his page applies Tests 3, 4a and 4b and displays the Predicted Environmental Concentrations in relation to the backgound pollutant levels and the AA or MAC EQS. Any substances that pass all 3 of these ests can be screened out. Substances failing any of the tests must be modelled. Note that releases that have passed Tests1 and 2 are insignificant are not shown as they are already screened out.

Number	Substance	Bkgrnd Conc. µg/l	Annual Avg EQS						MAC* EQS			
			PC µg/l	PEC µg/l	(PEC - BC)/ EQS	PEC -BC >10% AA EQS Test 3	% PEC of EQS %	PEC >100% AA EQS Test 4a	PC µg/l	PEC µg/l	% PEC of MAC %	PEC >100% MAC Test 4b
	e.g.	200										
5	Chromium III (95%ile) (dissolved) ()	1	0.813	1.000	0.0%	Pass	21.3	Pass	26.8	26.8	83.7	Pass
6	Chromium VI (95%ile) (dissolved) ()	1	0.813	1.000	0.0%	Pass	29.5	Pass	26.8	0	-	Pass
7	Copper ()	0.5	0.407	0.501	0.0%	Pass	50.0	Pass	0.955	0	-	Pass
2	Lead and it's compounds ()	0.6	0.163	0.276	-27.1%	Pass	23.0	Pass	0.191	0.219	1.56	Pass
8	Manganese ()	7.2	5.21	0		Pass	-	Pass	23.0	23.3	18.9	Pass
1	Nickel and its compounds ()	2.8	0.813	1.34	-36.6%	Pass	33.5	Pass	11.5	11.6	34.1	Pass
10	Sulphate ()	565400	259,350	365,362	-50.0%	Pass	91.4	Pass	312,977	0	-	Pass
9	Zinc ()	5.8	3.42	4.51	-11.9%	Pass	41.3	Pass	8.59	0	-	Pass

A.2 Ammonia Modelling Results

MASS BALANCE (MONTE CARLO): Version 6.0

Calculations: 20 April 2026 at 09:45

Discharge:	Clockhouse			
River:	Fylls Brook			
Pollutant:	Ammoniacal Nitrogen	Target:	300	90-percentile

Mean u/s river flow	0.015		Mean discharge flow	0.0052	
95-percentile low flow	0.0012		Standard deviation	0.0005	
		(confidence)			(confidence)
Mean u/s river quality	74.29	(0.0000 - 152)	Mean d/s river quality	106	(81.7 - 238)
Standard deviation	105.8	(53.4 - 154)	Standard deviation	78.1	(56.0 - 157)
Number of samples	7		Number of samples	7	
90-percentile	160	(77.6 - 772)	90-percentile	198	(128 - 524)
CURRENT DISCHARGE		(confidence)			
Mean discharge quality	160	(81.4 - 239)			
Standard deviation	107	(56.2 - 158)			
Number of samples	7				
95-percentile	362	(233 - 1051)			
99-percentile	547	(321 - 2236)			
99.5-percentile	637	(360 - 2960)			

CORRELATION COEFFICIENTS	
River and discharge flow	0.6000
River flow and quality	-0.3000
Discharge flow and quality	-0.2000

	FILES WITH NON-PARAMETRIC DATA
River flow	none

River quality	none
Discharge flow	none
Discharge quality	none
Intermittent discharge flow	

	INTERMTTENT DISCHARGE ADDED
% time in operation	0.0000
Mean flow (when operating)	0.0000
Standard deviation	0.0000
Correlation coefficient	0.0000
Mean quality	0.0000
Standard deviation	(0.0000 - 0.0000)
Correlation with flow	0

MASS BALANCE (MONTE CARLO): Version 6.0

Calculations: 20 April 2026 at 10:41

Discharge:	Clockhouse			
River:	Boldings Brook			
Pollutant:	Ammoniacal Nitrogen	Target:	300	90-percentile

Mean u/s river flow	0.10		Mean discharge flow	0.0052	
95-percentile low flow	0.016		Standard deviation	0.0005	
		(confidence)			(confidence)
Mean u/s river quality	74.29	(0.0000 - 152)	Mean d/s river quality	80.4	(81.7 - 238)
Standard deviation	105.8	(53.4 - 154)	Standard deviation	96.2	(56.0 - 157)
Number of samples	7		Number of samples	7	
90-percentile	160	(77.6 - 772)	90-percentile	164	(83.6 - 684)
CURRENT DISCHARGE		(confidence)			
Mean discharge quality	160	(81.4 - 239)			
Standard deviation	107	(56.2 - 158)			
Number of samples	7				
95-percentile	362	(233 - 1051)			
99-percentile	547	(321 - 2236)			
99.5-percentile	637	(360 - 2960)			

CORRELATION COEFFICIENTS	
River and discharge flow	0.6000
River flow and quality	-0.3000
Discharge flow and quality	-0.2000

	FILES WITH NON-PARAMETRIC DATA
River flow	none

River quality	none
Discharge flow	none
Discharge quality	none
Intermittent discharge flow	

	INTERMTTENT DISCHARGE ADDED
% time in operation	0.0000
Mean flow (when operating)	0.0000
Standard deviation	0.0000
Correlation coefficient	0.0000
Mean quality	0.0000
Standard deviation	(0.0000 - 0.0000)
Correlation with flow	0

MASS BALANCE (MONTE CARLO): Version 6.0

Calculations: 20 April 2026 at 09:39

Discharge:	Clockhouse			
River:	Boldings Brook			
Pollutant:	Ammoniacal Nitrogen	Target:	300	90-percentile

Mean u/s river flow	0.10		Mean discharge flow	0.0052	
95-percentile low flow	0.020		Standard deviation	0.0006	
		(confidence)			(confidence)
Mean u/s river quality	74.29	(0.0000 - 152)	Mean d/s river quality	164	(1200 - 1200)
Standard deviation	105.8	(53.4 - 154)	Standard deviation	126	(0.0000 - 0.0000)
Number of samples	7		Number of samples	32	
90-percentile	160	(77.6 - 772)	90-percentile	300	(236 - 418)
CURRENT DISCHARGE		(confidence)			
Mean discharge quality	1200	(1200 - 1200)			
Standard deviation	0.1	(0.083 - 0.12)			
Number of samples	47				
95-percentile	1200	(1200 - 1200)			
99-percentile	1200	(1200 - 1200)			
99.5-percentile	1200	(1200 - 1200)			

CORRELATION COEFFICIENTS	
River and discharge flow	0.6000
River flow and quality	-0.3000
Discharge flow and quality	-0.2000

	FILES WITH NON-PARAMETRIC DATA

River flow	none
River quality	none
Discharge flow	none
Discharge quality	none
Intermittent discharge flow	

	INTERMTTENT DISCHARGE ADDED
% time in operation	0.0000
Mean flow (when operating)	0.0000
Standard deviation	0.0000
Correlation coefficient	0.0000
Mean quality	0.0000
Standard deviation	(0.0000 - 0.0000)
Correlation with flow	0

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