

Avonmouth Hazardous Waste Transfer Station

Water Discharge Activity Environmental Risk Assessment (H1)

1. Introduction

This Technical Note provides an Environmental Risk Assessment (H1 Assessment) in support of planning and environmental permitting for a proposed new hazardous waste transfer station (HWTS), which will be separate from but within the footprint of the existing Veolia facility ('the Site') at Units A, B & C Estuary Park, Chittening Industrial Estate, Avonmouth, Bristol, BS11 0YB, centred at National Grid Reference (NGR) ST 53076 81166.

2. Background

The Site is located approximately 810 m east of the mean high water mark of the Severn Estuary, the fringes of which comprise a mixture of defended areas and salt marshes. The proposed hazardous WTS will be located in the southwestern corner of the Site covering an L-shaped area of approximately 0.2 ha. The proposed development will comprise areas for waste reception, storage and repackaging, covered waste storage bays, surface water tank and an office, welfare and laboratory cabin.

The proposed operations at the HWTS will include: hazardous waste acceptance, storage and repackaging and loading off-site. The hazardous waste materials to be accepted at the HWTS will be received in packages (IBCs, drums and other containers). The waste storage and reception area will be covered and any leakage or accidental spillages will be collected in dedicated sumps prior to tankering off-site for treatment. Surface water runoff from outdoor operational areas of the HWTS (e.g. yard area used for vehicle manoeuvring) and roof runoff is proposed to be managed via an oil interceptor/silt trap and a retention tank before discharge to the existing surface water drainage system (roof and yard runoff) serving the rest of the Site and ultimately to the Severn Estuary. This surface water is conveyed from the Site to the Severn Estuary via piped surface water drains, then via a short section (700 m) of the watercourse known as Stuppill Rhine, within the Lower Severn Internal Drainage Board (IDB) area, before entering the estuary through a tidal sluice into Stup Pill (see **Figure 2.1**).

3. Methodology

The potential impacts on the receiving watercourse (Severn Estuary) from the proposed discharge activity have been assessed using the environmental risk assessment (ERA) screening methodology comprising the sequential tests described in the web-based guidance at www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit, which replaced the Environment Agency (EA) Horizontal Guidance Note H1 Annex D1 (Assessment of hazardous pollutants in surface water discharges). The relevant tests are described below and are based on the assumption that, in response to Test 2 for transitional (estuarine) and coastal (TrAC) waters, the criterion that “the discharge is direct to the low water channel” of the Severn Estuary is met, so subsequent tests for discharges to freshwaters are applicable but using the EQS applicable to transitional and coastal waters. Although at high tide the Severn Estuary floods across the mud and sands at Avonmouth and Bedwin Sands on the opposite bank, at low water at this point it is a riverine channel

- **Screening Test 1 (estuarine and coastal)** – does the concentration of the substance in the discharge exceed 100% of the EQS for TrAC waters?
- **Screening Test 2 (estuarine and coastal)** – is the discharge to the low water channel in the upper parts of an estuary where the water is mainly fresh (i.e. a riverine estuary)? In this case the answer is ‘yes’ and the guidance is to apply the tests for discharges to freshwater, starting at **Test 2**, but applying the EQS values applicable to TrAC waters.
- **Screening Test 2 (freshwaters)** – is the process contribution (PC) of the pollutant after dilution in the receiving water (Severn estuary) more than 4% of the EQS applicable to TrAC waters?
- **Screening Test 3 (freshwaters)** - does the discharge increase the predicted environmental concentration (PEC) of the pollutant in the river downstream of the discharge by more than 10% of the pollutant’s EQS value applicable to TrAC waters?
- **Screening Test 4 (freshwaters)** - is the PEC higher than the EQS applicable to TrAC waters?

Note that, if the substance is not screened out at **Test 1** or **Test 2**, then both **Test 3** and **Test 4** must be met to allow it to be screened-out.

The assessment takes into account the discharge from the proposed HWTS.

Part B tests

For priority hazardous pollutants, it is necessary to carry out an additional screening test to ascertain whether the annual quantity of the pollutant discharged from the facility exceeds the significant load limit (an annual load limit that has been set for priority hazardous pollutants).

4. Site description

4.1 Avonmouth Resource Recovery Facility

Existing arrangements

The existing Veolia facility on the Site operates under two environmental permits, one covering production of refuse derived fuel (RDF) (permit EPR/DB3806FZ) and one covering wood processing to produce woodchip fuel (permit EPR/DB3805US). These permits both state that there are no emission limits or monitoring requirements associated with the permit, thus existing discharge of surface water is not regulated by either permit.

Proposed new HWTS

The proposed HWTS Site has an area of 0.185 ha and lies in the southeast corner of the Site in Avonmouth. The proposed HWTS site layout is shown on **Figure 4.2** and includes:

- A new HWTS building containing five covered waste storage bays, each with a 2 m³ capacity sump to collect leakages/spillages from the wastes, for off-site disposal and treatment;
- A covered waste reception area with a 2 m³ capacity sump to collect leakages/spillages from the wastes, for off-site disposal;
- A hardstanding yard area for vehicle movements; and
- An office/welfare/lab cabin with a standalone septic tank or equivalent.

Surface water runoff from the HWTS yard area and roof runoff will be managed as part of the existing surface water drainage system for the wider Site. HWTS yard drainage will be contained within the bund shown in **Figure 4.2** and will drain via a 45 m³ surface water holding tank provided with a penstock isolation valve at the outlet. Any spillages will be managed by spill procedures first and if not contained then retained in the surface water tank, allowing water to be tested before release.

4.2 Water discharge assessed

The ERA has been applied to the surface water drainage from the HWTS located within the Site, after implementation of the HWTS proposals. This will still comprise only surface water drainage but with the added low-level risk associated with unloading of packaged hazardous waste and its transfer to the covered handling facilities.

4.3 Characteristics of the altered discharge

Flow rates

Mean annual rainfall in the area is 781 mm¹. The proposed HWTS has an area of 1850 m², thus the annual average runoff from the HWTS will be 1444.85 m³, giving an annual average flow of 0.046 l/s. Maximum flow for the ERA has been taken as the QBAR value of 5.23 l/s, obtained using IH124 methodology, which specifically addresses the runoff from small catchments (Institute of Hydrology, 1994) ¹.

Water quality

In the absence of data on effluent quality, the ERA assessment has been based on effluent discharge data for 2020–2022 for a similar hazardous waste transfer station managed by Veolia at Preston (see summary statistics in **Table 4.1** and raw data in **Appendix A**). These represent the effluent quality as it leaves the Preston site before it is discharged to foul sewer. Use of these data is considered to represent a worst-case, as the Preston site includes extensive areas of outdoor storage, including hazardous waste storage, whereas at Avonmouth all handling and storage of waste will be under cover with drainage retained in sumps before tankering off-site. Preston also includes a lower proportion of roofed area than at the proposed Avonmouth HWTS (approximately 16% compared with 23% respectively), so applying the measured concentrations from Preston to the total surface water flow from the proposed Avonmouth HWTS area further ensures a worst-case assessment.

Table 4.1 Discharges from Veolia Preston site

Parameter measured	Units	Mean concentration	Maximum concentration	Number of samples
Ammonia as N (total)	mg/l	<0.806	2.240	15
Suspended solids	mg/l	57.8	257	18
C.O.D. (settled)	mg/l	<170	551	16
pH Value	pH unit	7.0	7.0	16
1,2,3-Trichlorobenzene	µg/l	<0.80	<0.94	13
1,2,4-Trichlorobenzene	µg/l	<0.91	1.53	13
1,3,5-Trichlorobenzene	µg/l	<0.71	<0.84	13
Toluene	µg/l	<9.52	29.4	13
Xylene (meta, para)	µg/l	<11.10	84.9	13
Xylene (ortho)	µg/l	<19.98	174	13
Dichloromethane	µg/l	575	5110	12

¹ <https://www.uksuds.com/tools/greenfield-runoff-rate-estimation>

Parameter measured	Units	Mean concentration	Maximum concentration	Number of samples
Chloroform	µg/l	<9.65	44.4	13
Carbon tetrachloride	µg/l	<0.84	1.55	13
1,2 Dichloroethane	µg/l	<5.13	6.59	13
Trichloroethene	µg/l	9.25	45.2	13
Tetrachloroethene	µg/l	20.2	86.9	13
Methanol *	mg/l	<1.49	9.39	9
Ethanol *	mg/l	<1.05	4.61	9
Propan-1-ol *	mg/l	<0.47	<0.74	9
Propan-2-ol *	mg/l	<0.71	<0.71	9
Butan-1-ol *	mg/l	<0.34	<0.34	9
Butan-2-ol *	mg/l	<0.43	<0.43	9
2 Methyl propan-1-ol *	mg/l	<0.25	<0.25	9
Ethyl acetate *	mg/l	<0.66	<0.66	9
Acetone *	mg/l	<1.22	6.36	9
Butanone *	mg/l	<0.22	<0.22	9
4-Methylpentan-2-one (MIBK) *	mg/l	<0.24	<0.24	9
Arsenic (total)	µg/l	<2.0	<2.0	2
Cadmium (total)	µg/l	<0.5	<0.5	2
Chromium (total)	µg/l	6.34	8.37	2
Copper (total)	µg/l	150	279	2
Iron (total)	µg/l	491	519	2
Lead (total)	µg/l	9.71	10.4	2
Manganese (total)	µg/l	54.9	60.2	2
Mercury (total)	µg/l	<0.05	0.0808	2
Nickel (total)	µg/l	10.41	11.5	2
Zinc (total)	µg/l	756	1020	2

Source: Veolia, Preston

Where results included 'less than' values, means are recorded as less than the value obtained by taking all results at face value

* - two sets of results rejected as LoD reported as 10x normal value

5. Discharge route and receiving water body

5.1 Drainage route

Surface water from the proposed yard area of the HWTS will drain via a 45 m³ surface water holding tank provided with a penstock isolation valve allowing any spillages not captured by spill procedures to be retained. It will then join flows from the roof drainage of the HWTS and the combined flow will be pumped to join the existing surface water drainage system for the wider Site (see **Figure 4.2**). This comprises three connections to a pipe running northwards along Chittening Road to a collection pond. Water from this pond is pumped into Stuppill Rhine, from where it gravitates via a tidal sluice to the Severn Estuary.

5.2 Receiving Watercourse

Description

The surface water drainage from the Site enters the Severn Estuary at Stup Pill (at NGR ST 519821) within the Severn Lower transitional WFD water body (GB530905415401), which extends from the first Severn Bridge (Beachley Point) to a line from Brean Down in England to Lavernock Point in Wales.

Receiving watercourse flow

Freshwater flows in the Severn Estuary at the point of entry of Stuppill Rhine were taken as the sum of the Q₉₅ flows of gauged watercourses within its catchment inland of that point (**Table 5.1**). This is the existing freshwater flow to which the additional component from the HWTS Site will be added, so represents the appropriate baseline for the ERA.

Receiving water flows are required for application of freshwater screening tests 2, 3 and 4.

Receiving watercourse water quality

The Severn Lower transitional WFD water body achieved an ecological status of 'Moderate' (based on mitigation measures in place) and a chemical status of 'Fail' (based on levels of BDPE and mercury) in the 2018 WFD classification (Cycle 2).

Further water quality data were not required, as all parameters were screened out at Test 1 and Test 2 stages of the ERA (see **Section 6**).

Table 5.1 Flows into the Severn Estuary

Gauging Station Name	Reference	NGR	Q ₉₅ (m ³ /s)
River Severn at Deerhurst	Gauging station 54110	SO 867301	18.6
River Chelt at Slate Mill	Gauging station 54026	SO 891263	0.298
River Leadon at Wedderburn Bridge	Gauging station 54017	SO 776233	0.311
River Frome at Ebley Mill	Gauging station 54027	SO 830046	0.834
River Cam at Cambridge	Gauging station 54098	SO 750035	0.13
Cannop Brook at Parkend	Gauging station 54084	SO 616074	0.056
River Little Avon at Berkeley Kennels	Gauging station 54088	ST 682987	0.231
River Wye/Afon Gwy at Redbrook	Gauging station 55023	SO 527110	11.15
Total			31.61

Source: Gauged river flows from National River Flow Archive (NRFA) website <https://nrfa.ceh.ac.uk/data/search> (accessed 31/3/22)

6. Environmental Risk Assessment Screening

6.1 Application of ERA Guidance

The methodology applied complied with the ERA guidance described in **Section 3**. In applying the screening tests the following assumptions were made.

For **Test 1 (estuarine and coastal)**, assessment of whether concentrations of contaminants in the water discharge will exceed the relevant EQS for estuarine and coastal waters, the following approach was adopted.

- The test was applied to the surface water drainage from the HWTS area of the Site, after implementation of the HWTS proposals which will still comprise only surface water drainage but with the added low-level risk associated with unloading of packaged hazardous waste and its transfer to the covered handling facility.
- The effluent concentrations in the discharge from Veolia's Preston Hazardous Waste Transfer Station were assumed to represent a worst-case for the likely discharge quality from the proposed HWTS part of the Site.
- Existing surface water run-off from the remainder of the Site is currently unregulated and is assumed to be uncontaminated. This will not change, so is not considered in the ERA.
- EQS values were obtained from *The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015* and cross-checked against the latest tables in the EA's web-based guidance. Where no EQS was established, other standards were used as noted.

- The ERA does not consider domestic sewage discharges from the additional welfare facility that is to be provided within the HWTS. This will be addressed separately when proposals have been finalised.

For **Test 2 (estuarine and coastal)**, the discharge is to a riverine estuary, so the freshwater tests can be applied, using the EQS values for estuarine and coastal waters.

For **Test 2 (freshwaters)**, assessment of whether the process contribution (PC) in the receiving water (Severn Estuary) of each contaminant from the discharge will exceed 4% of the relevant estuaries and coastal waters EQS, the receiving water flow (Severn Estuary) downstream of entry of the discharge via Stup Pill was taken as the sum of the Q₉₅ flows of gauged watercourses within its catchment. Dilution calculations were carried out on the flows from the HWTS only.

6.2 Environmental quality standards (EQS)

The EQS values used in the assessment are shown in **Table 6.1**. Where EQS values have not been adopted in the UK, predicted no effect concentration (PNEC) values were identified from the literature and applied in the ERA.

Table 6.1 EQS values for TrAC waters

Parameter measured	Units	EQS as annual average (AA)	EQS as maximum allowable concentration (MAC) or 95%ile	Source
Ammonia as N (non-ionised)	mg/l	0.021	N/A	WFD
Suspended solids	mg/l	N/A	N/A	
C.O.D. (Settled)	mg/l	N/A	N/A	
1,2,3-trichlorobenzene	µg/l			
1,2,4-trichlorobenzene	µg/l	0.4 (1)	N/A	WFD
1,3,5-trichlorobenzene	µg/l			
Toluene	µg/l	74	370 (95%ile)	WFD
Xylene (meta, para)	µg/l			
Xylene (ortho)	µg/l	30 (2)	N/A	OP
Dichloromethane	µg/l	20	N/A	WFD
Chloroform	µg/l	2.5	N/A	WFD
Carbon tetrachloride	µg/l	12	N/A	WFD
1,2 dichloroethane	µg/l	10	N/A	WFD
Trichloroethene	µg/l	10	N/A	WFD
Tetrachloroethene	µg/l	10	N/A	WFD

Parameter measured	Units	EQS as annual average (AA)	EQS as maximum allowable concentration (MAC) or 95%ile	Source
Methanol	mg/l	N/A	N/A	(3)
Ethanol	mg/l	0.79	N/A	PNEC from ECHA
Propan-1-ol	mg/l	10.0	N/A	PNEC from ECHA
Propan-2-ol	mg/l	140.9	N/A	PNEC from ECHA
Butan-1-ol	mg/l	0.008	N/A	PNEC from ECHA
Butan-2-ol	mg/l	47.1	N/A	PNEC from ECHA
2 methyl propan-1-ol	mg/l	0.04	N/A	PNEC from ECHA
Ethyl acetate	mg/l	0.024	N/A	PNEC from ECHA
Acetone	mg/l	1.06	N/A	PNEC from ECHA
Butanone	mg/l	55.8	N/A	PNEC from ECHA
4-methylpentan-2-one (MIBK)	mg/l	0.06	N/A	PNEC from ECHA
Arsenic (dissolved)	µg/l	25	N/A	WFD
Cadmium (dissolved)	µg/l	0.2	N/A	WFD
Chromium (dissolved)	µg/l	N/A	N/A	(4)
Copper (dissolved)	µg/l	3.76	N/A	WFD
Iron (dissolved)	µg/l	1000	N/A	WFD
Lead (dissolved)	µg/l	1.3	14	WFD
Manganese (dissolved)	µg/l	3.0	N/A	
Mercury (dissolved)	µg/l	N/A	0.07	WFD
Nickel (dissolved)	µg/l	8.6	34	WFD
Zinc (dissolved)	µg/l	7.9	N/A	WFD

(1) – sum for all trichlorobenzenes

(2) – sum for all xylenes

(3) - ECHA records as no hazard identified for marine waters

(4) - ECHA records as hazard unlikely for marine waters

WFD – EQS contained in *The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015*

OP – EA operational standard

PNEC from ECHA – probable no effect concentration from European Chemicals Agency

6.3 Application of Test 1

Average and maximum recorded values of substances analysed in the discharge from the Velia Preston site (see **Table 4.1**) were compared with EQS (AA) and EQS (MAC) values detailed in **Table 6.1**. Where measured values did not exceed the EQS values, these substances were screened out as substances of concern. This allowed the substances below to be eliminated from further assessment:

- toluene;
- xylenes;
- carbon tetrachloride;
- 1,2-dichloroethane;
- trichloroethene;
- propan-1-ol;
- propan-2-ol;
- butan-2-ol;
- butanone;
- arsenic; and
- iron.

Note that for metals, available analytical results for total metals were compared with EQS for dissolved metals. This represents a highly precautionary approach.

The comparisons for Test 1 are presented in **Appendix B**.

6.4 Application of Test 2

Test 2 considers the process contribution (PC) of a substance in the discharge (from the HWTS) to the total concentration of that substance in the receiving water. This is essentially a dilution calculation. Substances can be screened out if their process contribution in the receiving water is less than 4% of the EQS.

The assessment against EQS which are set as an annual average (AA) used average flows from the HWTS, Q_{95} flows in the River Severn and average concentrations of substances in the HWTS discharge.

The assessment against EQS which are set as a maximum allowable concentration (MAC) or as a 95%ile used maximum (QBAR) flows from the HWTS, Q_{95} flows in the River Severn and maximum concentrations of substances in the HWTS discharge.

For assessment against EQS set as AA, the dilution factor at Q_{95} river flow was calculated as 6.87×10^5 times.

For assessment against EQS set as MAC or 95%ile, the dilution factor at Q_{95} river flow was calculated as 6.04×10^3 times.

In the case of ammoniacal nitrogen, non-ionised ammonia concentration was calculated from the total ammoniacal concentration (AA) using the EA's algorithm for ammonia in saline waters, assuming a pH of 7.5, salinity of 10 units and a maximum temperature (worst-case) of 25°C in the receiving water at low tide. Dilution calculations give an annual average process contribution of total ammoniacal nitrogen (as N) of <0.0012 µg/l, equivalent to a non-ionised ammonia concentration of <0.00002 µg/l, well below 4% of the EQS (AA) of 21 µg/l.

Using these dilution factors, all other substances for which an EQS or PNEC value had been identified were also screened out at Test 2, as the process contribution in each case was significantly less than 4% of the EQS. Again in the case of metals, the PC based on available analytical results for total metals were compared with EQS for dissolved metals, representing a highly precautionary approach.

The detailed results of Test 2 are provided in **Appendix B**.

6.5 Part B critical load assessment

Of the parameters measured, only cadmium and mercury have significant load values established. These are maximum annual quantities of priority hazardous substances that may be discharged from a permitted installation or operation. In many cases, effluent results were below the limit of detection (LoD) and the LoD values have been entered in the calculation of annual discharged loads. Results of this screening test are given in **Table 6.2**. Both substances pass the Part B screening test.

Table 6.2 Critical loads assessment for discharge D1

Parameter	Significant load limit	Calculated discharged load	Screening result
Cadmium	5 kg/year	<0.00073 kg/year	PASS
Mercury	1 kg/year	<0.000073 kg/year	PASS

7. Conclusion

Using data from Veolia's Preston site as an indicator of likely worst-case water quality in the surface water run-off from the proposed new HWTS at their Avonmouth site, application of the EA's ERA methodology to assess the effects of this discharge on the Severn Estuary showed that all substances examined could be screened out at Test 1 or Test 2 stage of the assessment.

The surface water run-off from the yard area of the proposed HWTS will pass through a tank furnished with a penstock before passing into the existing surface water drainage system, thus allowing any spillage to be captured before discharge, minimising the risk of any discharge outside the range of concentrations considered in this assessment.

The conclusion from the assessment is that the emission of the surface water run-off from the HWTS via the existing surface water drainage system to the Severn Estuary will have no adverse effects and that it would be appropriate for the discharge to be treated in the same way as surface water drainage from the rest of the Site.

Issued by

.....
John Pomfret

Approved by

.....
Ana Braid

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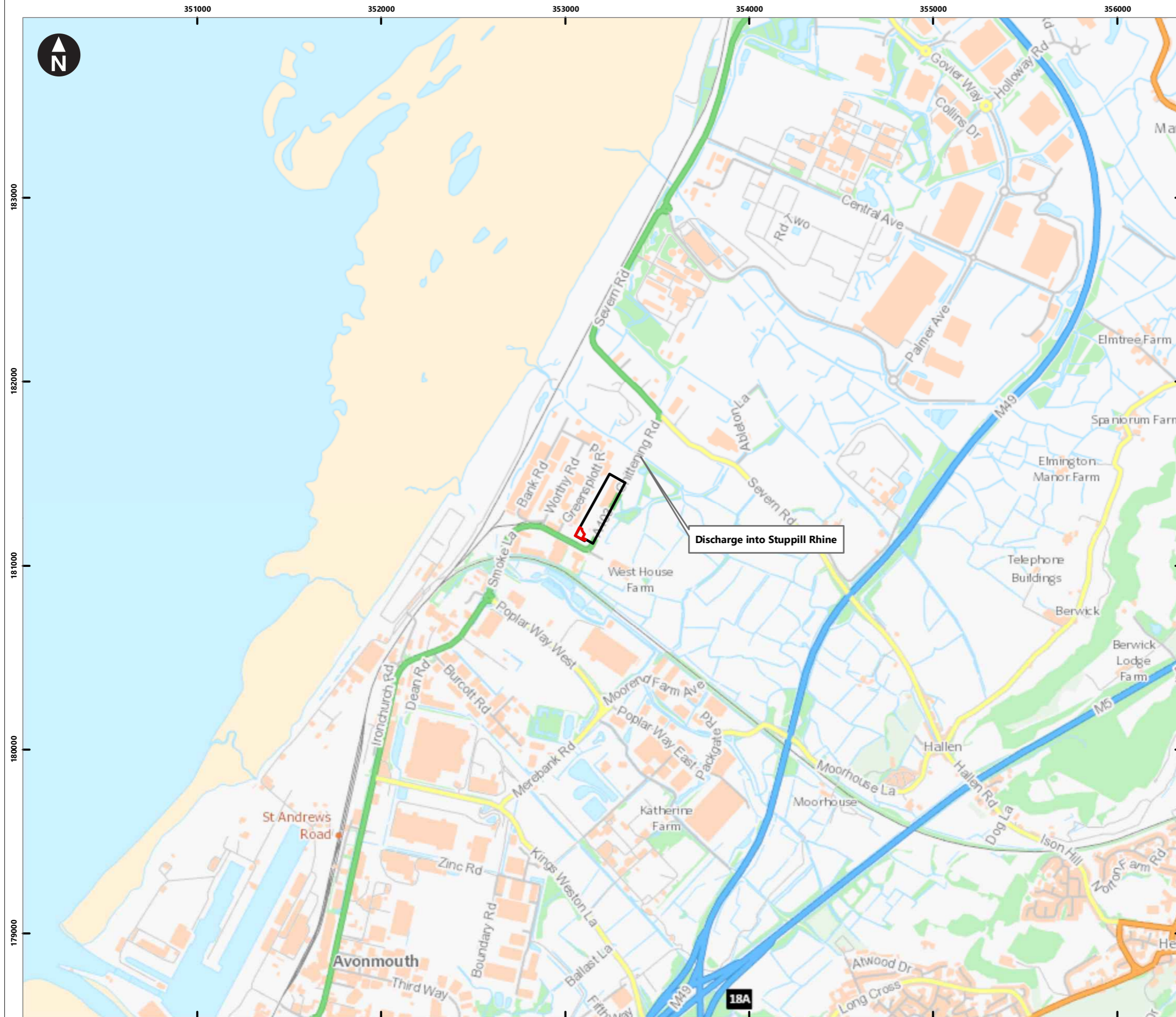
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Document revisions

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Key

- Site boundary
- Planning application boundary

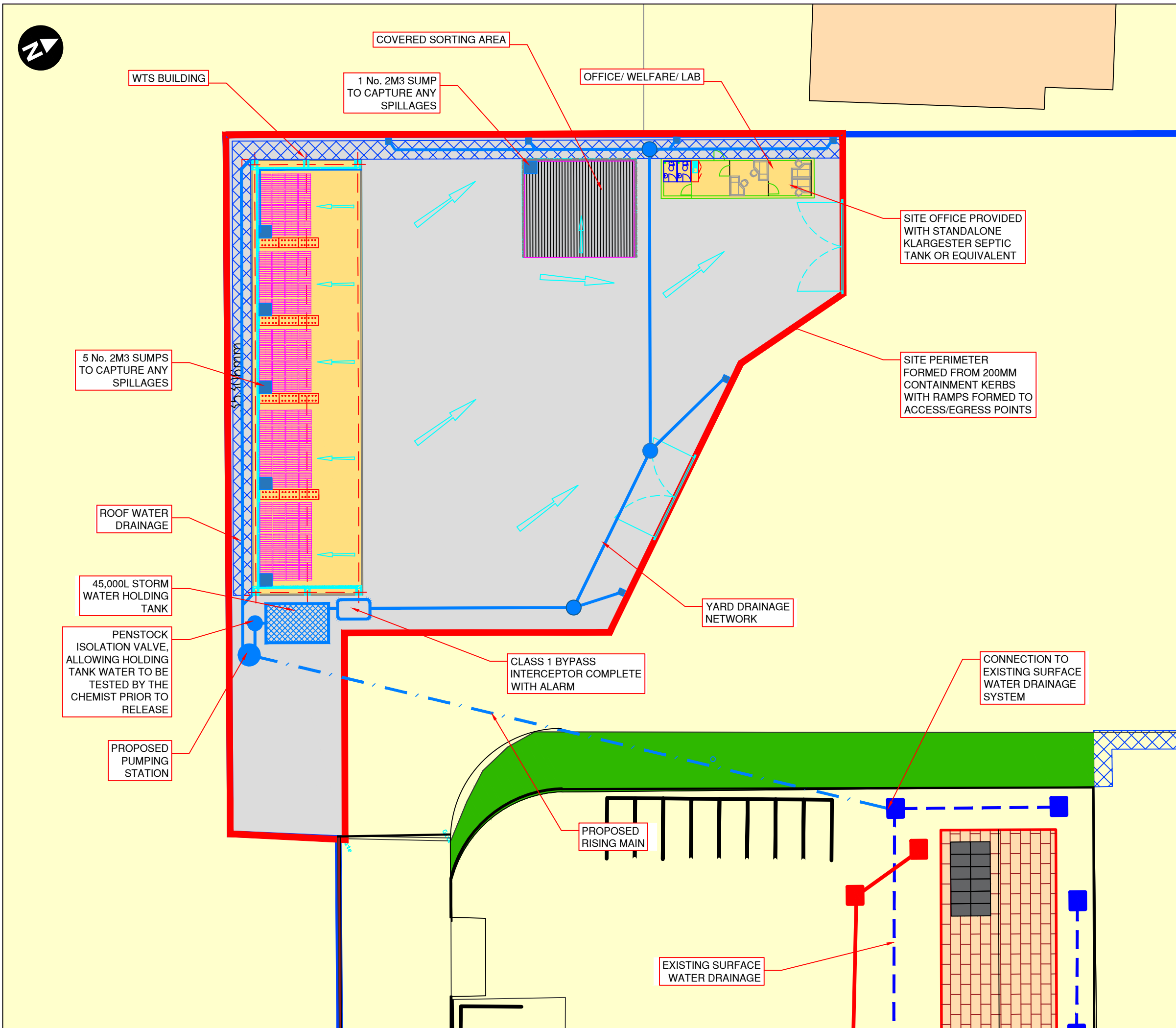
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Avonmouth Resource Processing and Management Facility
 Hazardous Waste Transfer Station
 Environmental Risk Assessment

Figure 2.1
Site location plan

March 2022





Key

- Veolia Resource Recovery Operational Area
- Planning application boundary
- Slab cross falls

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Avonmouth Resource Processing and Management Facility
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Figure 4.2
Site layout plan

Appendix A

Raw data from Preston site used as indicative of quality of run-off from the HWTS

Table A1- Raw data from Preston site used as indicative of quality of run-off from the HWTS

Parameter measured	Units	Date										
		16/1/20	12/2/20	27/2/20	1/7/20	9/7/21	15/7/20	9/11/20	19/11/20	11/12/20	8/2/21	10/3/21
Ammonia as N	mg/l	0.55	0.61		0.4	<0.34	0.74	0.89	2.24	<0.34	0.48	1.15
Suspended solids	mg/l	17	36	39	50	44	82	96	60	61	100	24
C.O.D. (Settled)	mg/l	46	86	56	199	79	113	102	551	266	147	69
1,2,3-trichlorobenzene	µg/l	<0.94	<0.94		<0.94	<0.94		<0.94		<0.94	<0.94	<0.94
1,2,4-trichlorobenzene	µg/l	<0.87	0.91		<0.87	<0.87		0.98		<0.87	<0.87	1.47
1,3,5-trichlorobenzene	µg/l	<0.84	<0.84		<0.84	<0.84		<0.84		<0.84	<0.84	<0.84
Toluene	µg/l	<4.58	11.1		8.29	<4.58		<4.58		7.52	29.4	18.5
Xylene (meta, para)	µg/l	<3.87	<3.87		<3.87	<3.87		<3.87		<3.87	84.9	21.3
Xylene (ortho)	µg/l	<4.6	<4.6		<4.6	<4.6		<4.6		<4.6	42.4	174
Dichloromethane	µg/l	43.5	19.5		5110	82.3		18.9			391	144
Chloroform	µg/l	5.7	8.4		<5.35	<5.35		<5.35		44.4	21.5	5.81
Carbon tetrachloride	µg/l	<0.74	1.55		<0.74	<0.74		<0.74		<0.74	<0.74	<0.74
1,2 dichloroethane	µg/l	<5.88	<5.88		<5.88	<5.88		<5.88		6.59		<5.88
Trichloroethene	µg/l	7.9	9.58		3.39	1.85		6.91		7.48	45.2	8.5
Tetrachloroethene	µg/l	16	28.8		12.1	4.58		11.9		17.2	86.9	16.4

Parameter measured	Units	Date										
		16/1/20	12/2/20	27/2/20	1/7/20	9/7/21	15/7/20	9/11/20	19/11/20	11/12/20	8/2/21	10/3/21
Methanol	mg/l	<0.43	<0.43		0.74	0.7	<0.43	<0.43		<4.3		<4.3
Ethanol	mg/l	<0.36	<0.36		<0.36	<0.36	<0.36	2.32		<3.62		<3.62
Propan-1-ol	mg/l	<0.47	<0.47		<0.47	<0.47	<0.47	<0.47		<4.75		<4.75
Propan-2-ol	mg/l	<0.71	<0.71		<0.71	<0.71	<0.71	<0.71		<7.19		<7.19
Butan-1-ol	mg/l	<0.34	<0.34		<0.34	<0.34	<0.34	<0.34		<3.49		<3.49
Butan-2-ol	mg/l	<0.43	<0.43		<0.43	<0.43	<0.43	<0.43		<4.31		<4.31
2 methyl propan-1-ol	mg/l	<0.25	<0.25		<0.25	<0.25	<0.25	<0.25		<2.55		<2.55
Ethyl acetate	mg/l	<0.66	<0.66		<0.66	<0.66	<0.66	<0.66		<6.61		<6.61
Acetone	mg/l	<0.58	<0.58		6.36	<0.58	<0.58	<0.58		<5.89		<5.89
Butanone	mg/l	<0.22	<0.22		<0.22	<0.22	<0.22	<0.22		<2.28		<2.28
4-methylpentan-2-one (MIBK)	mg/l	<0.24	<0.24		<0.24	<0.24	<0.24	<0.24		<2.46		<2.46
Arsenic (dissolved)	µg/l											
Cadmium (dissolved)	µg/l											
Chromium (dissolved)	µg/l											
Copper (dissolved)	µg/l											
Iron (dissolved)	µg/l											

Parameter measured	Units	Date										
		16/1/20	12/2/20	27/2/20	1/7/20	9/7/21	15/7/20	9/11/20	19/11/20	11/12/20	8/2/21	10/3/21
Lead (dissolved)	µg/l											
Manganese (dissolved)	µg/l											
Mercury (dissolved)	µg/l											
Nickel (dissolved)	µg/l											
Zinc (dissolved)	µg/l											

Red text indicates results rejected as reporting limit was ten times usual value

Parameter measured	Units	25/5/21	6/7/21	10/8/21	12/10/21	27/10/21	11//1/22	11/2/22	Mean	Maximum	No. samples
Ammonia as N	mg/l	0.39	0.48	1.25	1.44	0.79			<0.806	2.24	15
Suspended solids	mg/l	257	21	68	24	42	10	9	57.78	257	18
C.O.D. (Settled)	mg/l	67	75	510	<83	277			<170	551	16
1,2,3-trichlorobenzene	µg/l		<0.94	<0.94	<0.94		0.0635	<0.01	<0.80	<0.94	13
1,2,4-trichlorobenzene	µg/l		<0.87	<0.87	1.53		0.688	0.127	<0.91	1.53	13
1,3,5-trichlorobenzene	µg/l		<0.84	<0.84	<0.84		<0.01	<0.01	<0.71	<0.84	13
Toluene	µg/l		6.51	18.5	<4.58		3.52	2.04	<9.52	29.4	13
Xylene (meta, para)	µg/l		<3.87	5.17	<3.87		<1.0	<1.0	<11.10	84.9	13
Xylene (ortho)	µg/l		<4.6	<4.6	<4.6		<1.0	<1.0	<19.98	174	13
Dichloromethane	µg/l		135	768	108		59.8	18.4	575	5110	12
Chloroform	µg/l		<5.35	10.9	<5.35		<1.0	<1.0	<9.65	44.4	13
Carbon tetrachloride	µg/l		<0.74	<0.74	<0.74		<1.0	<1.0	<0.84	1.55	13
1,2 dichloroethane	µg/l		<5.88	<5.88	<5.88		<1.0	<1.0	<5.13	6.59	12
Trichloroethene	µg/l		5.16	8.5	12.3		1.46	1.98	9.25	45.2	13
Tetrachloroethene	µg/l		9.54	16.4	33		4.64	5.64	20.2	86.9	13
Methanol	mg/l		<0.43	9.39	<0.43				<1.49	9.39	9

Parameter measured	Units	25/5/21	6/7/21	10/8/21	12/10/21	27/10/21	11//1/22	11/2/22	Mean	Maximum	No. samples
Ethanol	mg/l		<0.36	4.61	<0.36				<1.05	4.61	9
Propan-1-ol	mg/l		<0.47	<0.47	<0.47				<0.47	<0.74	9
Propan-2-ol	mg/l		<0.71	<0.71	<0.71				<0.71	<0.71	9
Butan-1-ol	mg/l		<0.34	<0.34	<0.34				<0.34	<0.34	9
Butan-2-ol	mg/l		<0.43	<0.43	<0.43				<0.43	<0.43	9
2 methyl propan-1-ol	mg/l		<0.25	<0.25	<0.25				<0.25	<0.25	9
Ethyl acetate	mg/l		<0.66	<0.66	<0.66				<0.66	<0.66	9
Acetone	mg/l		<0.58	<0.58	<0.58				<1.22	6.36	9
Butanone	mg/l		<0.22	<0.22	<0.22				<0.22	<0.22	9
4-methylpentan-2-one (MIBK)	mg/l		<0.24	<0.24	<0.24				<0.24	<0.24	9
Arsenic (dissolved)	µg/l						<2	<2	<2.0	<2.0	2
Cadmium (dissolved)	µg/l						<0.5	<0.5	<0.5	<0.5	2
Chromium (dissolved)	µg/l						4.31	8.37	6.34	8.37	2
Copper (dissolved)	µg/l						279	20.2	150	279	2
Iron (dissolved)	µg/l						463	519	491	519	2
Lead (dissolved)	µg/l						9.02	10.4	9.71	10.4	2
Manganese (dissolved)	µg/l						49.5	60.2	54.9	60.2	2

Parameter measured	Units	25/5/21	6/7/21	10/8/21	12/10/21	27/10/21	11//1/22	11/2/22	Mean	Maximum	No. samples
Mercury (dissolved)	µg/l						0.0808	<0.02	<0.05	0.0808	2
Nickel (dissolved)	µg/l						9.32	11.5	10.41	11.5	2
Zinc (dissolved)	µg/l						1020	492	756	1020	2

Appendix B

Environmental Risk Assessment Screening

Tests

Table B1- Details of Test 1 and Test 2 results

Parameter measured	Units	Mean conc	Max. conc.	TrAC AA-EQS	TrAC MAC-EQS	Test 1 result AA	Test 1 result MAC	Test 2 PC (AA)	Test 2 4% EQS (AA)	Test 2 result AA	Test 2 PC (MAC)	Test 2 4% EQS (MAC)	Test 2 result MAC
Ammonia as N	mg/l	<0.806	2.24			See report text							
Trichlorobenzenes	µg/l	<0.807	<1.53	0.4		FAIL		<0.0000012	0.016	PASS			
Toluene	µg/l	<9.52	29.4	74	370	PASS	PASS						
Xylenes	µg/l	<15.54	174	30		PASS							
Dichloromethane	µg/l	575	5110	20		FAIL		0.0008368	0.8	PASS			
Chloroform	µg/l	<9.65	44.4	2.5		FAIL		<0.0000140	0.1	PASS			
Carbon tetrachloride	µg/l	<0.84	1.55	12		PASS							
1,2 dichloroethane	µg/l	<5.13	6.59	10		PASS							
Trichloroethene	µg/l	9.25	45.2	10		PASS							
Tetrachloroethene	µg/l	20.2	86.9	10		FAIL		0.0000295	0.4	PASS			
Ethanol	mg/l	<1.05	4.61	0.79		FAIL		<0.0000015	0.0316	PASS			
Propan-1-ol	mg/l	<0.47	<0.47	10		PASS							
Propan-2-ol	mg/l	<0.71	<0.71	140.9		PASS							
Butan-1-ol	mg/l	<0.34	<0.34	0.008		FAIL		<0.0000005	0.00032	PASS			
Butan-2-ol	mg/l	<0.43	<0.43	47.1		PASS							

Parameter measured	Units	Mean conc	Max. conc.	TrAC AA-EQS	TrAC MAC-EQS	Test 1 result AA	Test 1 result MAC	Test 2 PC (AA)	Test 2 4% EQS (AA)	Test 2 result AA	Test 2 PC (MAC)	Test 2 4% EQS (MAC)	Test 2 result MAC
2 methyl propan-1-ol	mg/l	<0.25	<0.25	0.04		FAIL		<0.0000004	0.0016	PASS			
Ethyl acetate	mg/l	<0.66	<0.66	0.024		FAIL		<0.0000010	0.00096	PASS			
Acetone	mg/l	<1.22	6.36	1.06		FAIL		<0.0000018	0.0424	PASS			
Butanone	mg/l	<0.22	<0.22	55.8		PASS							
4-methylpentan-2-one (MIBK)	mg/l	<0.24	<0.24	0.06		FAIL		<0.0000003	0.0024	PASS			
Arsenic (dissolved)	µg/l	<2.00	<2.00	25		PASS							
Cadmium (dissolved)	µg/l	<0.50	<0.50	0.2		FAIL		<0.0000007	0.008	PASS			
Copper (dissolved)	µg/l	150	279	3.76		FAIL		0.0002178	0.1504	PASS			
Iron (dissolved)	µg/l	491	519	1000		PASS							
Lead (dissolved)	µg/l	9.71	10.40	1.3	14	FAIL	PASS	0.0000141	0.052	PASS			
Manganese (dissolved)	µg/l	54.9	60.2	3		FAIL		0.0000798	0.12	PASS			
Mercury (dissolved)	µg/l	<0.05	0.0808		0.07		FAIL				0.0000134	0.0028	PASS
Nickel (dissolved)	µg/l	10.41	11.50	8.6	34	FAIL	PASS	0.0000152	0.344	PASS			
Zinc (dissolved)	µg/l	756	1020	7.9		FAIL		0.0011004	0.316	PASS			



Environment Agency Permit Application
Environmental Risk Assessment
Avonmouth Waste Management Centre
EPR/MP3804MU

December 2021

				Judgement				Action (by permitting)	
Source	Pathway	Receptor	Harm	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk

- Repacking activity -

Point source or fugitive release (not including odour) during repacking and storage	Air transport then inhalation	Local human population and site staff	Harm to human health - illness	Low	Medium	Medium	Packaged waste may contain hazardous properties that are harmful to health.	<p>Waste is contained at all times in rigid UN approved sealed leak-proof containers such as drums or IBCs and undercover. They are securely sealed at the place of production.</p> <p>Care will be taken to protect the integrity of primary waste packaging at all times to prevent rather than control routine emissions. Packaged waste will not be handled in any manner that may result in a failure of packaging integrity.</p> <p>Primary containers will not be opened during the repacking operation and any loss of containment would be by exception only.</p> <p>If any spillage of waste occurs the operation will cease immediately and will be dealt with using spillage procedures as a precaution.</p> <p>The proposed process is not high rate, high volume so there will be sufficient time available to undertake the operation with the appropriate level of care.</p> <p>The surfaces of the repackaging area and storage areas will allow containment of spilled materials and prevention of any emissions off site.</p> <p>Regular inspection of the area will be carried out.</p> <p>The waste repacking operation is not in a sensitive location. The activity is located within the Chittening Industrial Estate and approximately 65m from the nearest industrial receptor.</p> <p>The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west).</p> <p>There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway.</p> <p>These receptors would not be impacted by dust given the direction of the prevailing winds and/or their distance away from the site. As well as the nature of the</p>	Low
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								operation.	
Release of effluent to surface water during repacking and storage	Transmission through the surface water management drainage network from spillages	Receiving water course	Adverse impact to the water course	Very Low	Medium	Low	Healthcare waste to be repacked in the Main Storage Building. This will have dedicated drainage to blind sumps. There is no pathway to the surface water management system Risk assessment should consider the impact to receiving watercourse	Releases to surface water are not likely to present a risk. Unloading is only undertaken in areas with impermeable surfaces and sealed drainage. Any loss of material from primary containment will be by exception and will be dealt with immediately at source in accordance with spillage procedures. Spilt or leaked material (including fluids) will, rather than being disposed of to surface water be cleaned up and disposed of at a suitably authorised waste management facility. Repacking in a building with sealed drainage to blind sumps.	Low
Noise or vibration emitted during processing activity	Propagation direct from source and secondary pathways (e.g. reflection, diffraction, transmission through buildings)	Occupiers of local sensitive receptors	Nuisance / annoyance	Very low	Low	Low	The magnitude of the noise source is very small from the proposed operation	The waste repackaging and storage operation is not in a sensitive location. The activity is located within the Chitting Industrial Estate . The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west). There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway. These receptors would not be impacted by noise/vibration given the direction of the prevailing winds and/or their distance away from the site. As well as the nature of the operation.	Low
Point source release of odour from the unloading of vehicles	Air transport then inhalation	Occupiers of local sensitive receptors	Nuisance / annoyance	Low	Low	Low	Loss of primary containment will be by exception. Waste types accepted are unlikely to be odorous	Waste is contained at all times in rigid UN approved sealed leak-proof containers such as drums or IBCs. They are securely sealed at the place of production. Primary containers will not be opened during the repacking operation and any loss of containment would be by exception only. If any spillage of waste occurs the operation will cease immediately and will be dealt with using spillage procedures as a precaution. The waste repacking operation is not in a sensitive location. The activity is located within the Chitting Industrial Estate and approximately 65m from the nearest industrial receptor. The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west). There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway. These receptors would not be impacted by odour given the direction of the	Low

								prevailing winds and/or their distance away from the site. As well as the nature of the operation.	
- Storage activities -									
Releases of particulate matter (dusts)	Air transport then inhalation.	Local human population & Site staff	Harm to human health - respiratory irritation and illness.	Low	Medium	Medium	Local residents are often sensitive to dust Waste types accepted are unlikely to generate particulates.	<p>Waste is contained at all times in rigid UN approved sealed leak-proof containers such as drums or IBCs. They are securely sealed at the place of production.</p> <p>Waste will remain within primary containment at all times during storage. There is therefore minimal potential for fugitive emissions.</p> <p>Speed restrictions are in place on site for the movement of waste in vehicles to minimise the likelihood of waste material becoming dislodged during transport around the site. Regular maintenance of hardstanding ensures the development of unevenness in the roadways which could dislodge waste material during transit is avoided.</p> <p>The waste storage operation is not in a sensitive location. The activity is located within the Chittening Industrial Estate and approximately 65m from the nearest industrial receptor.</p> <p>The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west).</p> <p>There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway.</p> <p>These receptors would not be impacted by dust given the direction of the prevailing winds and/or their distance away from the site. As well as the nature of the operation.</p>	Very low
Contaminated water from storage of waste	Runoff overground	Surface water or groundwater	Pollution of surface water or groundwater	Very low	Medium	Low	<p>The site has a sealed drainage system</p> <p>Storage areas have dedicated drainage to blind sumps.</p>	<p>Waste is contained at all times in rigid UN approved sealed leak-proof containers such as drums or IBCs. They are securely sealed at the place of production.</p> <p>Water from the yard area will be captured by the sealed drainage system.</p> <p>Effluent arising from the storage / handling areas will be captured within dedicated sumps within the main storage building.</p>	Low

<p>Odour emissions from storage of waste</p>	<p>Air transport and detection</p>	<p>Local human population</p>	<p>Nuisances, loss of amenity</p>	<p>Low</p>	<p>Medium</p>	<p>Medium</p>	<p>Local residents / businesses could be particularly sensitive to odours of a waste nature</p>	<p>Waste is contained at all times in rigid UN approved sealed leak-proof containers such as drums or IBCs. They are securely sealed at the place of production.</p> <p>Wastes will be stored and handled in accordance with the Appropriate Measures guidance.</p> <p>Waste failing to meet the acceptance criteria will be stored in a dedicated quarantine area and dealt with appropriately; the maximum storage time for quarantined waste takes account of the potential for odour generation.</p> <p>Storage areas will be regularly monitored to check for pests and vermin, litter, odour, breached containers and spillages.</p> <p>Good housekeeping will be ensured by regular cleaning of the storage area.</p> <p>The waste storage operation is not in a sensitive location. The activity is located within the Chitting Industrial Estate and approximately 65m from the nearest industrial receptor.</p> <p>The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west).</p> <p>There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway.</p> <p>These receptors would not be impacted by odour given the direction of the prevailing winds and/or their distance away from the site. As well as the nature of the operation.</p>	<p>Low</p>
<p>Release of effluent to surface water from storage</p>	<p>Transmission through the surface water management drainage network from spillages</p>	<p>Receiving water course</p>	<p>Adverse impact to the water course</p>	<p>Very Low</p>	<p>Medium</p>	<p>Low</p>	<p>Healthcare waste to be repacked in the Main Storage Building. This will have dedicated drainage to blind sumps. There is no pathway to the surface water management system</p> <p>Risk assessment should consider the impact to receiving watercourse</p>	<p>Releases to surface water are not likely to present a risk. Unloading is only undertaken in areas with impermeable surfaces and sealed drainage. Any loss of material from primary containment will be by exception and will be dealt with immediately at source in accordance with spillage procedures. Spilt or leaked material (including fluids) will, rather than being disposed of to surface water be cleaned up and disposed of at a suitably authorised waste management facility.</p> <p>Repacking in a building with sealed drainage to blind sumps.</p>	<p>Low</p>

Animals, Pests and insects	Atmosphere and land	Local human population	Nuisances, loss of amenity, harm to health	Low	Low	Low	<p>Local residents are often sensitive to pests/insects Scavenging animals/birds may spread disease Scavenging animals/birds may spread litter.</p> <p>Waste types accepted are unlikely to be attractive to pests or insects</p>	<p>All loads of waste entering the site will be contained within primary packaging. Any abnormal events resulting in loss of primary containment will be dealt with immediately. Therefore the removal of waste material by pests or vermin is very low due in principle to the low availability.</p> <p>Waste failing to meet the acceptance criteria will be stored in a dedicated quarantine area and dealt with appropriately; the maximum storage time for quarantine waste takes account of the potential for odour generation and insect infestation.</p> <p>Wastes will be stored and handled in accordance with the Appropriate Measure guidance.</p> <p>Storage areas will be regularly monitored to check for pests and vermin, breached containers and spillages.</p> <p>Good housekeeping will be ensured by regular cleaning of the storage area.</p> <p>The waste storage operation is not in a sensitive location. The activity is located within the Chittening Industrial Estate and approximately 65m from the nearest industrial receptor.</p> <p>The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west).</p> <p>There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway.</p> <p>These receptors would not be impacted by pests given the direction of the prevailing winds and/or their distance away from the site. As well as the nature of the operation.</p>	Very Low
Escape of litter from storage of wastes	Release from storage and carried off site by wind or on vehicles	Local human population	Nuisances, loss of amenity	Medium	Low	Medium	<p>Local residents / businesses could be particularly sensitive to escaped litter.</p> <p>Waste types accepted are unlikely to generate litter</p>	<p>All loads of waste entering the site will be contained within primary packaging so the escape of litter from containment will not be a routine occurrence.</p> <p>Repacking of rigids will take place indoors.</p> <p>In rare cases where loss of containment does occur this will be dealt with as a priority in accordance with procedures for spillages.</p> <p>Visual inspection of litter levels will be undertaken on a daily basis.</p> <p>The waste storage operation is not in a sensitive location. The activity is located within the Chittening Industrial Estate and approximately 65m from the nearest industrial receptor.</p> <p>The prevailing wind is from the west/south west. There is only one RAMSAR and Site of Special Scientific Interest (SSSI) within 2km of the installation: Severn Estuary (~810m west).</p> <p>There are no residential properties within 1km of the site. The closest settlement (village of Hallen) lies 2.2km to the south east and beyond the M49 motorway.</p> <p>These receptors would not be impacted by litter given the direction of the prevailing winds and/or their distance away from the site. As well as the nature of the operation.</p>	Low

