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Status	FINAL

H1 SURFACE WATER ASSESSMENT

1 INTRODUCTION

Oaktree Environmental (Oaktree) on behalf of Elliott Environmental Drainage Ltd have instructed H Fraser Consulting Ltd (HFCL) to undertake an H1 risk assessment to support a bespoke environmental permit application for their site at St. Michaels Close, Aylesford, ME20 7BU.

This version of the document contains minor revisions, most notably the inclusion of ethylbenzene assessment using a PNEC value (see section 2.2.)

1.1 Background

This H1 assessment for the discharge of trade effluent to sewer has been prepared as part of the permit application for the proposed operation of a waste treatment and packaging facility at St. Michaels Close, Aylesford, Kent, henceforth known as The Site.

The goal of the proposed on-site treatment is to clean water-based liquid wastes to the extent that they can either be discharged to sewer, in line with limits within the Trade Effluent Consent presented as Appendix A, or be treated to an extent whereby they can be re-used on site in the process. Solids will be removed and separated at various stages of the process.

Southern Water have issued a Trade Effluent Consent specifying limits on contaminant concentrations for the discharge to sewer. Given the nature of the materials to be held and processed on site, a wider list of contaminants needs to be considered. Oaktree previously presented a Best Available Techniques (BAT) assessment for the site processes and an associated H1 assessment. The Environment Agency responded with a Schedule 5 notice requesting additional information, and subsequently asked for the H1 assessment to be updated with additional information.

The contaminants of concern considered within this H1 assessment are listed in the Assessment Table 2.1.

The site is served by separate clean and foul water sewers. Cleaned water arising from waste treatment processes will be discharged to foul sewer in accordance with Trade Effluent Consent, or used in the process, subject to testing. Only uncontaminated drainage will be discharged to surface water sewer.

The sewer is presumed to drain to Aylesford Wastewater Treatment Works (WWTW), approximately 1.5 km to the west of the site, which discharges to the River Medway. The River Medway runs approximately north and eventually releases into the Thames Estuary and the North Sea at Sheerness. River Medway water quality data is available from the Environment Agency web site.



Site documentation referred to includes the following.

- Southern Water Consent To The Discharge Of Trade Effluent. Consent ID: 18388, 09/04/2025
- Waste Treatment And Packaging Facility, St Michaels Close, Best Available Techniques (BAT) 06/11/2025
- SCHEDULE 5 RESPONSE - EPR/ZP3623LZ/A001 Unit 1, St Michaels Close 07/11/25
- The Environmental Permitting (England & Wales) Regulations 2016 Notice of request for more information. 13/02/2026

2 H1 ASSESSMENT

HFCL have carried out an H1 assessment for the sewage water discharge of the treated effluent.

The Environment Agency's H1 assessment tool is currently unavailable for discharges to surface water. HFCL have therefore developed a spreadsheet tool that back-calculates the maximum allowable concentrations of pollutants, using the guidance set out by the Environment Agency.¹

The H1 tool enables screening out from detailed assessment for discharges to water or to sewer of effluent streams containing substances which are not 'liable to cause pollution'. The tool works through a series of five tests for freshwater or for transitional and coastal (TRaC) waters, as follows:

- If Test 1 fails, then Test 2 is undertaken;
- If Test 2 fails, Tests 3 and 4 are undertaken;
- If either Test 3 or Test 4 fails, further modelling is indicated (i.e. the assessed discharge must pass both tests to be screened out;
- A fifth test (the annual significant load test) must also be undertaken if there are any priority hazardous substances in the discharge. If the discharge fails this test, the Environment Agency may need to include an emission limit in your environmental permit, which will tell you how to control the pollutant.

2.1 Data sources

The data and guidance used are indicated in the calculation spreadsheet provided in Appendix A. For each substance, the estimated release concentration data was multiplied by sewage treatment reduction factors (STRFs), where they exist, to account for water treatment at Aylesford WWTW². Where there is no STRFs, no removal has been assumed.

Sample release concentrations have been assessed on a multistage basis. As this is a proposed facility with no operational monitoring data, the EA H1 Surface Water Risk Assessment Guidance permits the use of estimated concentrations for new discharges in the absence of actual measured data, noting that "manufacturer specification data or proxy site data may be used". All of the release concentrations (RCs) in this assessment are therefore estimated values. Once the facility is operational, monitored data will be used to verify these figures.

¹ Environment Agency (2025) <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>

² https://assets.publishing.service.gov.uk/media/67a34704b74b3d9dfe36ca75/Sewage_treatment_reduction_factors.ods



2.1.1 Methodology for selection of release concentration values

There are three potential sources of RC data that were considered for each substance, which have been applied in the following order of priority.

Step 1: Trade Effluent Consent (TEC)

Clause 12 of the TEC (ID 18388) has set legally binding conditions for sixteen parameters. Where a limit exists, this represents the maximum concentration that can lawfully enter the sewer and therefore the maximum possible RC for the plant to discharge.

Where the TEC limit is lower than the BAT Associated Emission Level (AEL), the TEC figure is used as the RC. This is a site-specific methodological approach that is not explicitly stated in the H1 guidance and is based on the fact that the TEC represents the legally binding maximum discharge concentration. This remains consistent with the guidance principle that where multiple limits apply, the most protective of the surface water environment will be used.

Step 2: BAT AELs from EU Guidance³

For substances not controlled by the TEC, BAT AELs from Table 6.1 of the Commission Implementing Decision (EU) 2018/1147 are used as the RC value for the assessment. These represent the emission levels associated with using Best Available Techniques. The lower end of the BAT has been used for this assessment where confirmed achievable by the operator based on their planned process flow, presented in Appendix B. Appendix B shows the different elements of the treatment train.

Step 3 – Operator-confirmed design criteria

For six substances operator-confirmed limits have been applied. Four of these have neither a TEC limit value nor a BAT AEL available to provide an RC (or the BAT AEL is expressed a range dependent on the treatment method). In such cases the operator can confirm a specific achievable concentration based on the design criteria for the treatment train. These will be formally confirmed by the operator and will reference plant design specifications. Limits for benzo(a)pyrene and naphthalene have been assigned in this assessment from the Schedule 5 Response⁴ (38.1 and 40.6). Limits for PFOS and PFOA have been confirmed to be achievable by the operator based on Appendix B. For cadmium and mercury BAT AEL values are available, but these are higher than operator-confirmed limits based on the treatment train; again, operator-confirmed limits are therefore used. The operator-confirmed limits are as follows:

- Benzo(a)pyrene: 0.68 µg/L
- Naphthalene: 37 µg/L
- Mercury: 0.66 µg/L
- Cadmium: 2.85 µg/L
- PFOS: 1 µg/L
- PFOA: 1 µg/L

³ Commission Implementing Decision (EU) 2018/1147 - establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (10 August 2018)

⁴ Schedule 5 response - EPR/ZP3623LZ/A001, Elliott Environmental Drainage Ltd (7 November 2025)



No other operator design criteria figures have been assigned. A summary of substance RCs and rationale is presented in Table 2-1.

Table 2-1 RC values and rationales

Substance	Average release concentration (RC) ¹	Rationale
Ammonia	52	Based on TEC Limit
Arsenic	100	Based on TEC Limit
Benzene	500	Lower end of BAT for Hydrocarbon Oil Index
Benzo(a)pyrene	0.68	Operator Confirmed
Toluene	500	Lower end of BAT for Hydrocarbon Oil Index
Ethylbenzene	500	Lower end of BAT for Hydrocarbon Oil Index
Xylene	500	Lower end of BAT for Hydrocarbon Oil Index
Cadmium (Dissolved)	2.85	Operator Confirmed (below BAT range)
Chromium (VI)	10	Lower end of BAT
Copper (Dissolved)	50	Lower end of BAT - Operator Confirmed
Cyanide	20	Lower end of BAT - Operator Confirmed
Lead (Dissolved)	50	Lower end of BAT - Operator Confirmed
Mercury	0.66	Operator Confirmed (below BAT range)
Naphthalene	37	Operator Confirmed
Nickel (Dissolved)	50	Lower end of BAT - Operator Confirmed
Dichloromethane (chloroform proxy)	200	Lower end of BAT for Adsorbable Organically Bound Halogens
Trichloroethylene (TCE)	200	Lower end of BAT for Adsorbable Organically Bound Halogens
Zinc (Dissolved)	100	Lower end of BAT - Operator Confirmed
PFOA	1	Operator Confirmed - Carbon Filtration
PFOS	1	Operator Confirmed - Carbon Filtration

¹All values in µg/L, excepting mg/L for ammonia.

2.1.2 Flow data

The Q95 flow at the assessment point was estimated by using the National River flow archive⁵ on a point upstream of Aylesford WWTW's main effluent discharge point in the River Medway to return an estimate 1.59 m³/s.

In the discharge consent for the Site, it states the maximum quantity of The Trade Effluent discharged at any period of twenty-four hours shall not exceed 300 m³. As no effluent flow rate can be measured until the site is in operation, this maximum is used in the calculations as a conservative measure.

Background concentration data was available for all the compounds assessed, from River Medway Upstream Allington Sluices⁶.

⁵ <https://fehweb.ceh.ac.uk/>

⁶ <https://environment.data.gov.uk/water-quality/sampling-point/SO-E0000362>



2.2 Results

The results are presented in Table 2-2 below and all calculations are presented in Appendix C. The test values in the table indicate the maximum concentrations that would allow the substance to pass each test. Failures (i.e. where the concentration is above this maximum value) are in orange-shaded cells. Test passes are highlighted in green.

Table 2-2: H1 assessment results (µg/l)

Substance	Release concentration - STRF applied ¹	Test 1	Test 2
Ammonia	0.33	2.10	385
Arsenic	79.21	2.50	459
Cadmium	2.26	0.02	3.67
Chromium (VI)	0.83	0.06	11.0
Copper	16.82	0.51	93.6
Cyanide	2.05	0.10	18.4
Lead	22.45	0.13	23.9
Mercury	0.30	0.007	1.28
Benzo(a)pyrene	0.68	0.005	0.918
Naphthalene	0.30	0.20	36.7
Nickel (Dissolved)	35.53	0.86	158
Dichloromethane (chloroform proxy)	200	2.00	367
Trichloroethylene (TCE)	8.34	1.00	184
Zinc	100	0.68	125
PFOA	0.0016	0.00044	0.0808
PFOS	0.0016	0.00001	0.00239
Ethylbenzene	500	1.0	184

¹All values in µg/L, excepting mg/L for Ammonia.

Benzene, toluene and xylene are not included in the table above as they have a sewage reduction factor of 100%. Ethylbenzene and manganese have no EQS for estuarine waters. For such substances, where they are hazardous an appropriate PNEC (predicted no-effect concentration) should be used as a proxy. Ethylbenzene is hazardous and has been assigned a PNEC of 10 µg/l. Manganese is not hazardous and is therefore not included.

Ammonia passes test 1 and needs no further assessment. All other substances pass test 2 and need no further assessment, with the exception of cadmium, mercury and PAH, which are priority hazardous substances requiring an annual load calculation as part of Test 5. Table 2-3 shows that they are well beneath the maximum annual load limit.

Table 2-3: Test 5 results

Substance	Effluent flow rate		Release concentration		Annual load (kg)	Maximum load allowable (kg)
	m ³ /s	m ³ /yr	µg/l	kg/m ³		
Cadmium	0.003472	109,500	2.257	2.26E-06	0.247	1
Mercury			0.296	2.96E-07	0.0324	5
PAH ¹			0.976	9.76E-07	0.107	5

¹ Includes naphthalene and BaP (as a marker for all other PAH)



2.3 Discussion

The above results are conservative estimates; for the following reasons the real emissions impact of effluent are likely to be lower than given here.

- The effluent flow is assumed to be the maximum limit provided within the TEC. This neglects any periods where discharges would be lower due to changes in site activity.
- The river flow in the River Medway is taken to be the Q95 flow, which would be exceeded 95% of the time.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

The data set available for the assessment is restricted to EA sampling data upstream and downstream in the River Medway and estimated release concentrations for the various parameters applicable.

The H1 assessment for surface water concluded that all substances pass the assessment by test 2 and need no further assessment. The hazardous substances pass the test 5 annual load limit. On that basis the discharge is unlikely to cause significant harm to the surface water environment.

3.2 Recommendations

Given the assessment is based on design parameters for the treatment system, chemical analysis of the discharge should be undertaken as soon as is reasonably possibly following the commencement of operations on site. The operator has confirmed that in the event of abnormal results following this sampling, the effluent would not be discharged and would be subject to further treatment and additional testing. The final stage of this further assessment would be that the effluent would be transported away for appropriate disposal if the relevant criteria cannot be met. Further considerations should be as follows:

- Actual flow monitoring of effluent discharge should be established from the outset to confirm whether the use of the maximum consented flow (300 m³ per day) is representative.
- The applicant should submit a report once operational monitoring data is available, to confirm that the effluent limits set out in this document are being achieved. If these limits are not being achieved, the H1 assessment should be updated accordingly.

APPENDIX A

Trade Effluent Consent

WATER INDUSTRY ACT 1991**CONSENT TO THE DISCHARGE OF TRADE EFFLUENT**

(1) Whereas

Elliott Environmental Drainage Ltd (Companies House Reg. No. 06983458)

whose Head Office or Registered Office is at

**Unit 1
St Michaels Close
Aylesford
ME20 7BU ('The Trader')**

is the occupier(s)/owner(s) of trade premises situated at

**Unit 1
St Michaels Close
Aylesford
ME20 7BU
(‘The Trade Premises’)**

and by a Trade Effluent Application dated the 20/02/2025 have requested that **Southern Water Services Ltd**, ('The Company') consent to the discharge of trade effluent from the trade premises into the sewers of the Company.

(2) The nature and composition of the trade effluent ('The Trade Effluent') to be discharged under this consent is specified in the said Application.

In exercise of the powers under Section 121 conferred upon it by the Water Industry Act 1991, the Company hereby consent to the discharge of The Trade Effluent from The Trade Premises into their sewers subject to the following conditions:

1. Trade Effluent

The Trade Effluent shall consist only of wastewater from the following:
Treatment and disposal of commercial and industrial waste.

No change shall be made in the nature and composition of The Trade Effluent without the written permission of the Company. This Consent supersedes any previous Consents or Directions which become void from the date of this document save as otherwise specified herein.

2. Sewer Affected

The Trade Effluent shall discharge into the public FOUL sewer ('The Sewer') situated in St Michaels Close (TQ74594101). No change shall be made in the location of the discharge point without the written permission of the Company.

3. Maximum Quantity to be discharged in Any One Day

The maximum quantity of The Trade Effluent discharged at any period of twenty-four hours shall not exceed 300 m³.

4. Maximum Rate of Discharge

The maximum rate at which The Trade Effluent may be discharged shall not exceed 10 litres/sec.

5. Time of Discharge

At all times.

6. Condensing Water

No uncontaminated condensing or cooling water shall be discharged into the sewer.

7. Changes in Process or Materials leading to Alteration of the Nature and Composition of the Trade Effluent or the Cessation of Discharge

The Trader shall immediately notify The Company of any changes in the process of manufacture, raw materials used, pre-treatment of The Trade Effluent or other circumstances likely to alter the nature and composition of The Trade Effluent. In such circumstance, no substance of which The Company has not had previous notice, may be discharged unless and until The Company has agreed to accept the substance at a limit imposed by The Company. The Trader shall immediately notify the Company of any circumstances resulting or likely to result in a cessation of discharge.

8.1 Matters to be Eliminated Prior to Discharge to the Sewer

The following substances are strictly prohibited from entry to the Company's sewer(s) and shall not be contained in The Trade Effluent that is to say:

- (i) Any petroleum spirit or other inflammable solvents.
- (ii) Any Organic Solvents (unless specifically mentioned below in Clause 12).
- (iii) Any other substances, either alone or in combination with any other matter lawfully present in the Company's sewers, likely to injure the said sewers or to interfere with the free flow of their contents or to affect prejudicially the treatment and disposal of their contents or to be dangerous to the health of the persons working in the sewers or at the Wastewater Treatment Works or to make specially difficult or expensive any process of purification or to pollute in any way the watercourse, estuary or coastal water into which the effluent will eventually discharge.
- (iv) Any substance or substances, which either alone or in combination with any

matter in any sewers or receiving Wastewater Treatment Works vested in and/or under the control of Southern Water, would give rise to obnoxious poisonous or inflammable gases, or otherwise a statutory nuisance as defined by the Environmental Protection Act 1990, in such sewers or works, or would be deleterious to such sewers or to the processes in use at such works, or to the disposal of sludges produced by such works.

8.2 The Trade Effluent shall not contain any substances listed in Schedule 1 of the Trade Effluent (Prescribed Processes and Substances) Regulations 1989, as amended, at a concentration greater than background concentration (as defined in the said Regulations).

9. Temperature of Trade Effluent

No Trade Effluent shall be discharged which has a temperature in excess of 43°C at the point of discharge to the sewer.

10. pH

No Trade Effluent shall be discharged which has a pH value of less than 6 or greater than 10.

11. Roof Water, Surface Water and Domestic Sewage

No roof water, surface water or domestic sewage shall be passed through any equipment installed in connection with the treatment sampling or measurement of The Trade Effluent discharge without the written permission of the Company.

12. Limits on Effluent Composition

The following Trade Effluent Constituents shall not exceed the stated concentration.

Constituent	Maximum Concentration
12.1. Arsenic Total	100ug/l
12.2. Cadmium Total (mg/l)	0.1mg/l
12.3. Chemical Oxygen Demand Shaken as O	1500mg/l
12.4. Chloride	50mg/l
12.5. Chromium Total mg/l	0.3mg/l
12.6. Copper Total	0.5mg/l
12.7. Cyanide Free as Cn	0.1mg/l
12.8. Lead Total	0.1mg/l
12.9. Mercury Total	5ug/l
12.10. Nickel Total	0.5mg/l
12.11. Nitrogen Ammoniacal as N	52mg/l
12.12. Oil and Grease	200mg/l
12.13. Phosphorus Total	15mg/l
12.14. Solids Suspended 105 Degrees C	1000mg/l
12.15. Sulphate as S04	1000mg/l
12.16. Zinc Total mg/l	1mg/l

13. Inspection Chamber

An inspection chamber or manhole shall be provided by and maintained by the licensee in a suitable position in connection with the pipe(s) through which The Trade Effluent is discharged and such inspection chamber or manhole shall be so constructed and maintained as to enable a person authorised by the Company to obtain samples of The Trade Effluent so discharged at any reasonable time. The inspection chamber or manhole shall be unobstructed and accessible at all times.

14. Trader Analysis

Should The Trader, with the agreement of The Company, undertake sample analysis for use by the Company, this must be carried out by a UKAS accredited laboratory.

15. Flow Measurement of Discharge

15.1 The Trader shall provide install and maintain flow measurement apparatus of a type approved by the Company to include all associated upstream and downstream connective pipework or channels to enable the daily volume and instantaneous rate of flow to be measured or determined as required.

15.2 The Trader shall record daily readings from the said apparatus either manually or electronically and make such readings available to a representative from the Company upon request.

15.3 The Trader shall calibrate the said apparatus on a periodic basis according to the manufacturer's recommendations (a minimum of once every 12 months) to ensure that it is operating to a standard agreed between the Company and the Licensee. The Licensee shall keep a record of the calibration results which shall be made available to a representative of the Company upon request.

15.4 If the flow measurement apparatus aforesaid ceases to measure or record correctly then the quantity of The Trade Effluent discharged into the sewers of the Company during the period from the date at which the records of the volume of The Trade Effluent discharged into the sewers were last accepted by the Company as being correct up to the date when the said apparatus again measured or recorded correctly shall for the purpose of any payment to be made to the Sewerage Retailer in respect of trade effluent charges for the period during which the flow measurement apparatus was measuring or recording incorrectly be based on the average daily volume of the trade effluent discharged during the preceding 30 consecutive days over which the said records were last accepted as aforesaid or during the 30 consecutive days immediately after the flow measurement apparatus has been corrected whichever is higher.

16. Sampling and Analysis of Discharge

16.1 The Trader shall keep weekly accurate records of the nature and composition of the Trade Effluent discharged into the sewer for all parameters in this Consent and shall make such records available for inspection at all times by an authorised representative of the Company and shall provide copies of such records to the Company on request.

17. Entry

The Trader shall permit duly authorised representatives of The Company to inspect, examine and test at all times any works and apparatus installed in connection with The Trade Effluent and to take sample of The Trade Effluent.

18. Non-Compliance

The Trader will comply with all the Consent conditions at all times. Failure to do so is a criminal offence and will lead to enforcement action being taken by The Company. The Trader must notify The Company of any non-compliance or incident associated with the discharge of Trade Effluent from The Premises as soon as is reasonably practicable and no later than 14 days.

19. Payment

The Trader shall make payment to the Sewerage Retailer for the reception, treatment and disposal of The Trade Effluent discharged to The Sewer and all such sums shall become due and payable on demand.

20. Interpretation

Words and expression to which meanings are assigned by the Water Industry Act 1991 (or any legislation amending the same) shall have the same meanings assigned to them when used in this Consent.

Dated this the 9th Day of April of Two Thousand and Twenty Five.

Signed

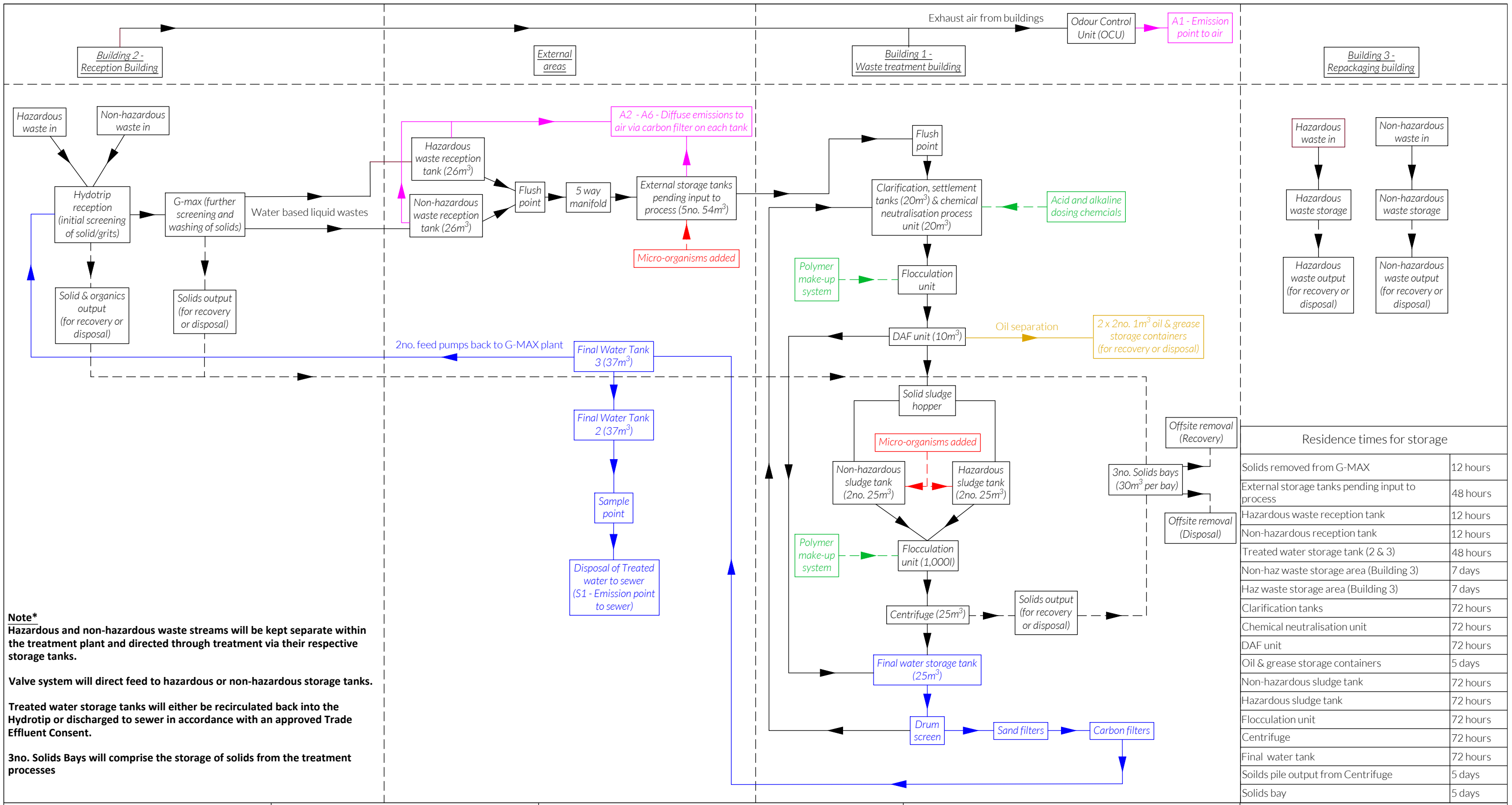


Finn Middleton
Trade Effluent Manager

NOTE Your attention is drawn to the right of appeal to the Director General of Water Services conferred by Section 122 of the Water Industry Act 1991 on any person who is aggrieved by a condition attached to consent.

APPENDIX B

Process Flow



Note*
 Hazardous and non-hazardous waste streams will be kept separate within the treatment plant and directed through treatment via their respective storage tanks.

Valve system will direct feed to hazardous or non-hazardous storage tanks.

Treated water storage tanks will either be recirculated back into the Hydrotip or discharged to sewer in accordance with an approved Trade Effluent Consent.

3no. Solids Bays will comprise the storage of solids from the treatment processes

Residence times for storage	
Solids removed from G-MAX	12 hours
External storage tanks pending input to process	48 hours
Hazardous waste reception tank	12 hours
Non-hazardous reception tank	12 hours
Treated water storage tank (2 & 3)	48 hours
Non-haz waste storage area (Building 3)	7 days
Haz waste storage area (Building 3)	7 days
Clarification tanks	72 hours
Chemical neutralisation unit	72 hours
DAF unit	72 hours
Oil & grease storage containers	5 days
Non-hazardous sludge tank	72 hours
Hazardous sludge tank	72 hours
Flocculation unit	72 hours
Centrifuge	72 hours
Final water tank	72 hours
Solids pile output from Centrifuge	5 days
Solids bay	5 days

TITLE:
PROCESS FLOW

CLIENT:
Elliot Environmental Drainage Ltd

Waste, Planning & Environmental Consultants

PROJECT/SITE: St Michael's Close, Aylesford, Kent		
SCALE @ A3: Not to scale	CLIENT NO: 2499	JOB NO: 002
DRAWING NO: 2499-002-06	REV: D	STATUS: Issued
DATE: 24.02.2026	DRAWN: IA	CHECKED: DY
This drawing is copyright and property of Oaktree Environmental Ltd.		

NOTES
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KEY:

- Process line
- Water treatment flow & emission point to sewer
- Air emission points
- Oil separation treatment flow
- Raw material input
- Biological process

REVISION HISTORY

Rev:	Date:	Init:	Description:
-	29.08.25	IA	Initial drawing
A	23.10.25	IA	Treatment process amendments
B	23.10.25	IA	Process flow amendments
C	24.10.25	IA	Client comments
D	24.02.26	IA	Process flow amendments

APPENDIX C

H1 Assessment spreadsheet (electronic only)