Flood Risk Screening and Drainage Management Plan

Coleshill Green Hydrogen Electrolyser

Ref	05040-5327792

Revision History

Issue	Date	Name	Latest changes
01	30.03.23	Daniel Cole	First issue
02	06.04.23	Daniel Cole	Amendment to document file name
03	12.04.23	Daniel Cole	Minor wording amendments

Contents

1 Overview

1.1 Introduction

HYRO Energy Limited is developing a Green Hydrogen Electrolysis (GHE) Facility located to the south of the Kimberly Clark plant in Flint, Wales, CH6 5EX.

This report assesses flood risk / consequence and sets out the drainage management plan for the proposed Coleshill GHE Facility, which will house electrolysers, storage tanks and ancillary equipment. The facility will also include Distribution Network Operator (DNO) and project substation compounds. A new unbound gravel access track will grade down to join the existing mill south perimeter access road via a newly constructed junction.

Drawing 05040-RES-PRO-DR-PT-001 included in Appendix A shows the proposed project layout. The development area (excluding access track) measures approximately 0.55 hectares, the total area enclosed by the red line boundary measures 4.2 hectares.

2 Relevant guidance and legislation requirements

All drainage relating to the proposed green hydrogen electrolysis facility will be constructed using best practice and in conformance with the requirements of the relevant regulatory authorities. The key legislation and guidance that will be adhered to are as follows:

- The EU Water Framework Directive (2000/60/EC).
- Rainfall Runoff Management for Developments, Report SC030219, October 2013.
- Engineering in the Water Environment, Good Practice Guide, Temporary Construction Methods, First Edition, March 2009.
- Environmental Permitting (England and Wales) (Amendment) Regulations 2014.
- Strategic Flood Consequence Assessment Flintshire 2018.
- Flintshire County Council Flood Risk Regulations 2009.
- FCC – Supplementary Planning Guidance – Management of Surface Water for New Development.
- Flint County Council Energy, Waste and Pollution (EWP) Policy 17 – Flood Risk (EWP 17)
- Planning Policy Wales – Technical Advice Note 15 (TAN15) 2004
- Environmental Good Practice on Site, CIRIA C692, 3rd Edition.
- Control of Water Pollution on Construction Sites, CIRIA C532.
- The SuDS Manual 2015. CIRIA C753.
- Soakaway Design BRE Digest 365.
- British Geological Survey (BGS) maps.
- BS 8533:2017 – Assessing and Managing Flood Risk in Development – Code of Practice

3 Existing Information

3.1 Site Location

The site location is shown on drawing 05040-RES-LAY-DR-PE-001 (see Appendix A).

Address:	Kimberly Clark, Flint, CH6 5EX, Wales.
Coordinates:	E:323381, N:373281

The development site is located in a greenfield area within the south of the Coleshill papermill plant, which is owned and operated by Kimberly Clark. The plant is approximately 1km north of Flint town centre.

The River Dee tidal estuary runs 900m to the north of site. Ordinary Watercourse Swinchiard Brook runs 500m to the east of site, which flows northwards to discharge into the River Dee. Two large man-made lakes sit within the Kimberly Clark papermill plant, one central to the plant buildings and one adjacent to the north. Both lakes attenuate storm water as part of the plant's existing drainage infrastructure.

As well as enclosing the development site, the application boundary extends northwards to enclose areas of the existing south perimeter access road where the service connections serving the proposed development are expected to run.

3.2 Existing Land Use and Topography

The development site consists of an open field, used for livestock grazing. A public footpath crosses through the development site.

A review of the site topography shows a 1:15 fall northeast and a slight 1:50 fall east. A copy of the site topography survey plan is included in Appendix D.

3.3 Ground Conditions

A review of the bedrock geology from the BGS website shows the site sits entirely within the Pennine Lower Coal Measures Formation, which consists of mudstone, siltstone, and sandstone. Furthermore, two geological faults cross through the site in a northsouth direction. A review of the superficial deposits from the BGS website shows a combination of sand & gravel, till and clay, silt, and sand fluvial deposits.

Coal Authority mapping shows the site sits within the coal mining reporting area. A Coal Mining Risk Assessment has been commissioned for site. The CMRA concludes that the site is safe with regard to coal mining legacy issues, as it is located outside of any existing mine workings' influence zones.

3.4 Existing Hydrology / Drainage

Natural Resources Wales (NRW) flood risk mapping shows the site lies entirely outside the flood risk zones from rivers and the sea.

Localised areas near the site are at risk of surface water flooding from the various watercourses surrounding the site as identified on the NRW Flood Risk Map.

4 Flood Risk Screening

4.1 Overview

A review of flood risk from various sources has been undertaken. Based on NRW data, the site is considered to be at little to no risk of fluvial or coastal/tidal flooding.

4.2 Development Advice Map

In line with the assessment process outlined in TAN15, the proposed site location has been reviewed against NRW Development Advice Map.

The Development Advice Map shows the site to lie entirely within Zone A – considered to be at little or no risk of fluvial or tidal / coastal flooding. In line with TAN15 assessment process, a Flood Consequence Assessment is not required, however flood risk from various sources is considered henceforth is sections 4.3 - 4.8.

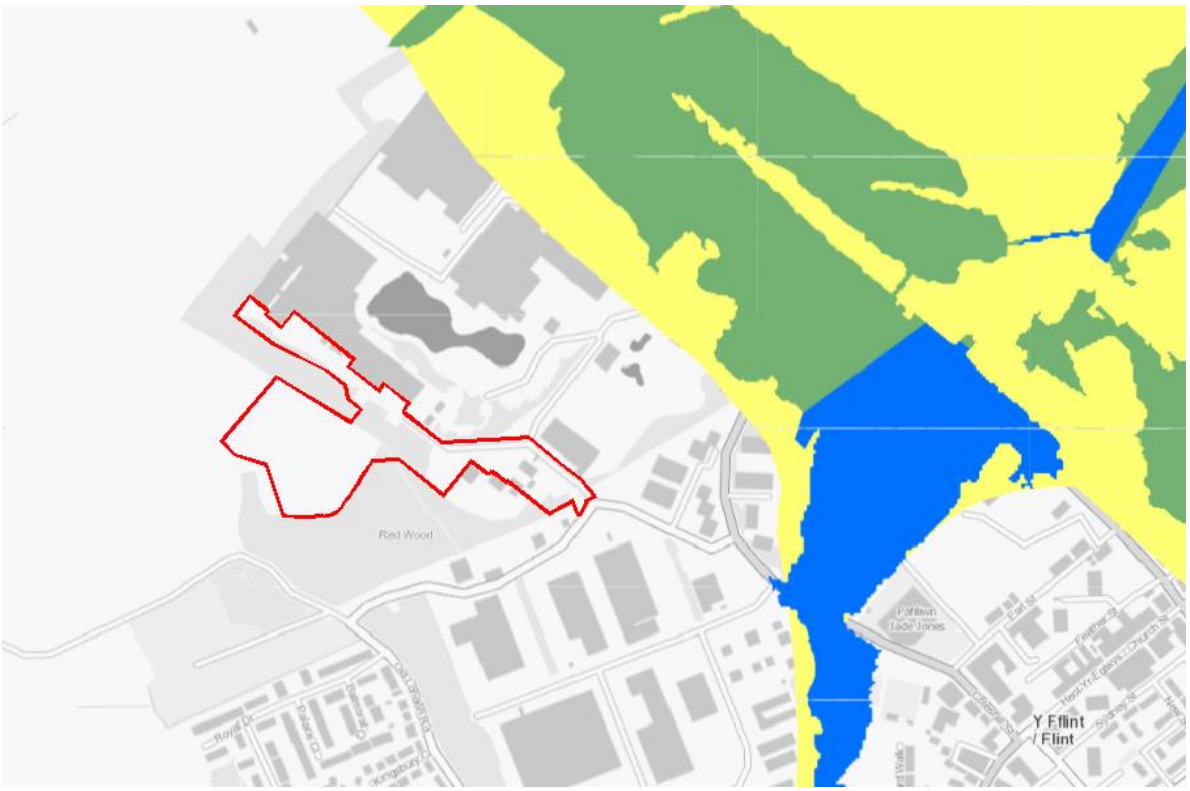


Figure 1 - Excerpt from NRW Development Advice Map, with proposed site boundary overlaid.

4.3 Fluvial Flood Risk

NRW flood risk mapping shows the proposed site to lie entirely outside of any areas of fluvial flood risk. The means the site has an annual probability of less than 0.1% of flooding from fluvial sources.

The nearest area of fluvial flood risk is approximately 400m to the northeast.

Figure 1 below shows a map of fluvial flood risk produced by NRW covering the vicinity of site, overlaid with the proposed development application boundary.

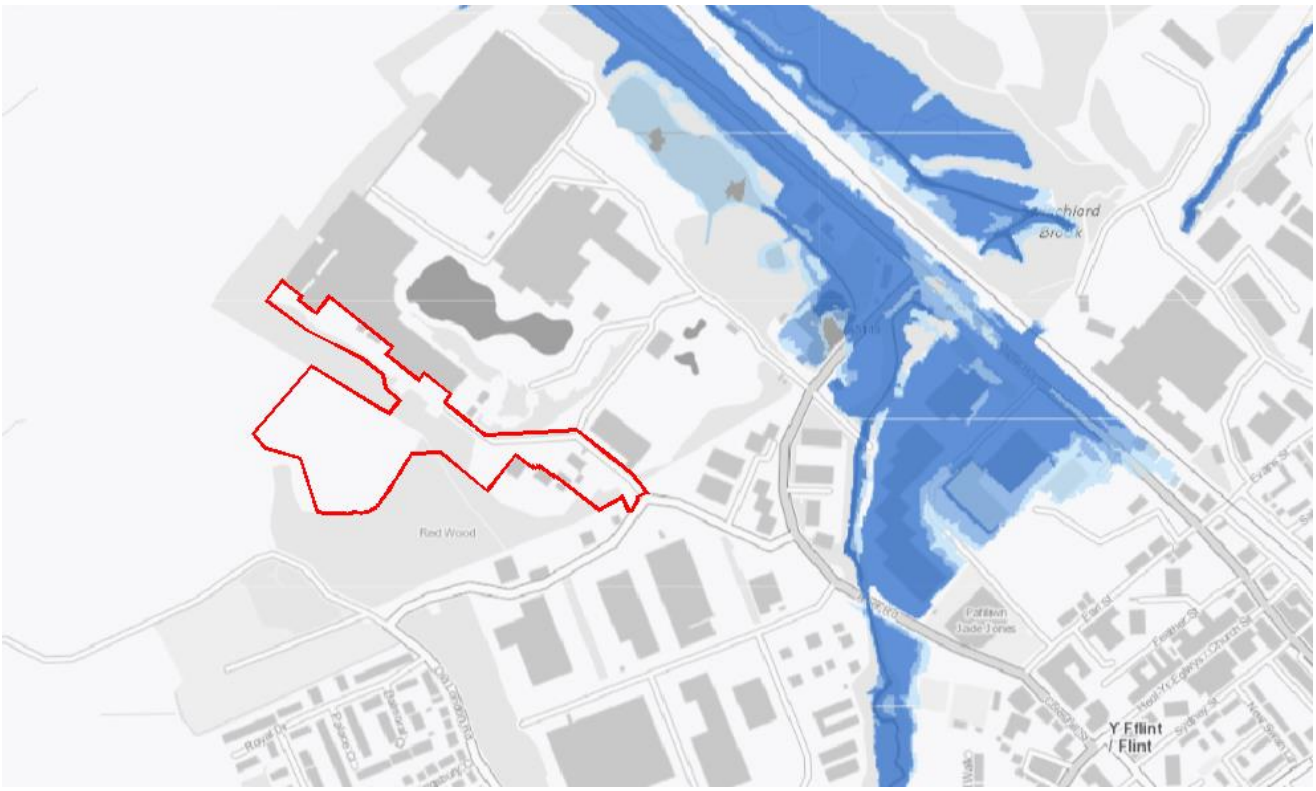


Figure 2 - Excerpt from NRW fluvial flood risk map, with proposed site boundary overlaid.

4.4 Coastal Flood Risk

NRW flood risk mapping shows the proposed site to lie entirely outside of any areas of coastal flood risk. The means the site has an annual probability of less than 0.1% of flooding from coastal sources.

The nearest area of coastal flood risk is approximately 400m to the northeast, arising from the Dee Estuary.

Figure 2 below shows a map of coastal flood risk produced by NRW covering the vicinity of site, overlaid with the proposed development application boundary.

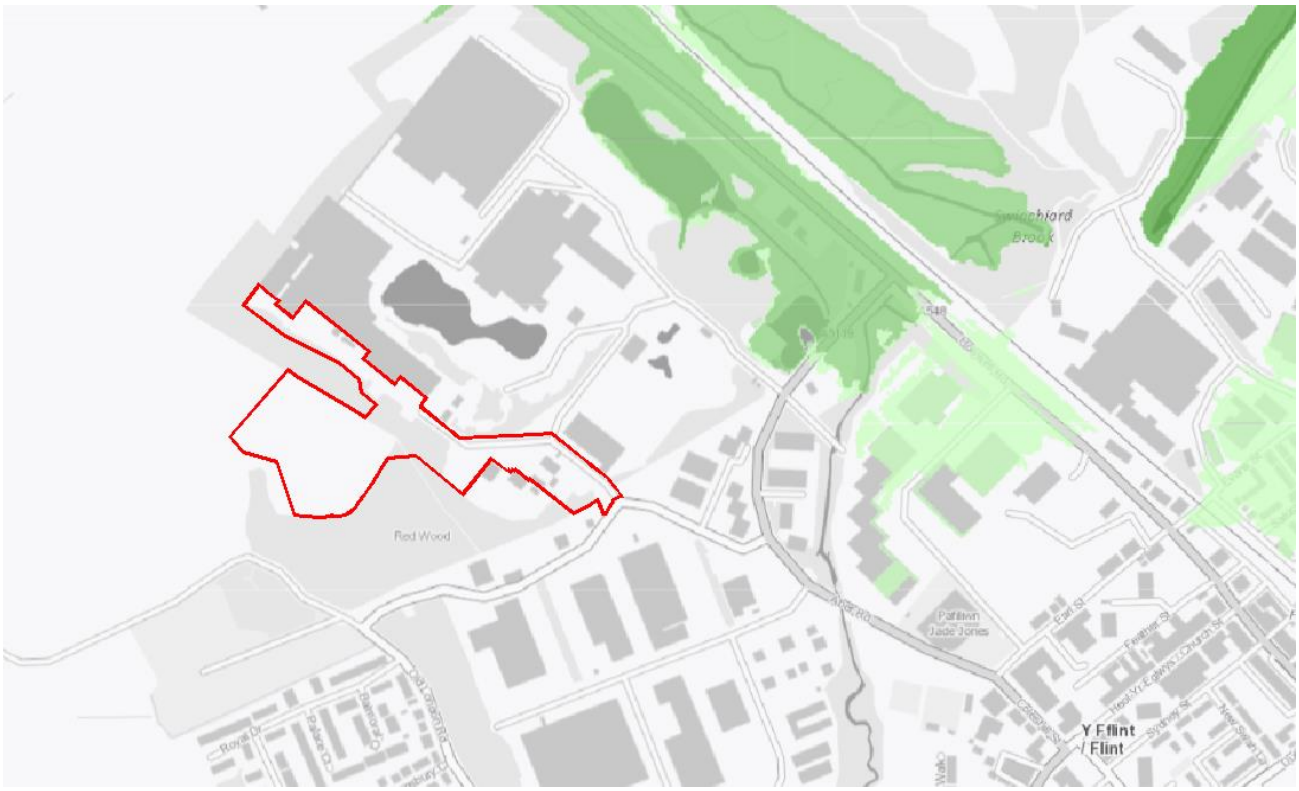


Figure 3 - Excerpt from NRW coastal flood risk map, with proposed site boundary overlaid.

4.5 Surface Water Flood Risk

NRW flood risk mapping shows areas of medium and high surface water flood risk within the existing Kimberly Clark perimeter access road, that falls within the northern region of the application boundary. Medium and high risk correspond to annual probabilities greater than 1% and 3.3% respectively.

As noted in section 3.1, the application extents within the KC existing perimeter access road cover service connections only. No change in flood risk or flood consequence will occur in these regions as a result of the development proposal.

There are no areas of surface water flood risk shown on NRW mapping to lie over the proposed development. Two localised areas of low risk are shown adjacent to the north and southeast of the development. Low risk areas correspond to an annual probability of 0.1% - 1%. The southeastern area of low-risk clashes with the proposed new diverted public right of way route.

Figure 3 below shows a map of surface water flood risk produced by NRW covering the vicinity of site, overlaid with the proposed development application boundary.

Figure 4 - Excerpt from NRW surface water flood risk map, with proposed site boundary overlaid.

4.6 Flooding from Sewers

Whilst there are no existing sewers or drainage infrastructure present in the area proposed for development, the papermill site adjacent to the north is served by a network of surface water and foul sewers.

The probability of flooding occurring from surging in this network is not known. Ground levels in the proposed development area are elevated at least 6m above ground levels in the papermill plant. It is therefore reasonable to conclude that any flooding resulting from the sewers serving the papermill plant will not present a risk to the development site itself.

The perimeter access road adjacent to the north of site is served by surface water drains feeding into the papermill drainage network. The regions of the application boundary that fall within this access road may therefore be at risk of flooding should a surge in the papermill network occur.

Drawing 05040-RES-DRN-DR-PT-001 included in Appendix B shows the existing Kimberly Clark drainage infrastructure. The drawing is based on records provided by Kimberly Clark and drainage surveys.

4.7 Flooding from Groundwater

NRW does not provide information pertaining directly to the groundwater flood risk of an area.

Kimberly Clark have noted during site visits that a high-water table is present across their site due to its proximity to the River Dee.

The proposed development is situated in a greenfield area that abuts the existing Kimberly Clark site and is elevated above it by a minimum 6m. BGS mapping shows that the existing Kimberly Clark site area is underlain by superficial deposits of clay, silt and fluvial deposits, whereas the elevated greenfield area abutting is shown to house deposits of sand and gravel.

On the basis of the proposed site location's elevation and ground conditions compared to the existing Kimberly Clark estate, it is possible that groundwater levels in this area are lower. However, no measurements of groundwater levels have been made in this area. The risk of flooding from groundwater should therefore be considered low to moderate.

4.8 Flooding as a Result of the Development

Whilst the proposed development will increase the total impermeable area on site, the measures set out in Sections 5 and 6 of this report will ensure there would be no increase in flood risk as a result of this development.

5 Surface Water Drainage Solution

5.1 SuDS Hierarchy

In line with The Interim Code of Practice for Sustainable Drainage Systems 2004, as recommended in TAN15, a drainage solution for this proposed development shall be selected based on the principles of the SuDS Hierarchy.

5.1.1 Rainwater Harvesting

As part of the hydrogen production process, electrolysers in the facility will require a water intake. The flow rate, quality and quantity of water intake required for this process does not suit a rainwater harvesting solution. The water will be supplied from a potable water main.

5.1.2 Infiltration

Prior to the detailed design of a drainage solution for the proposed development, infiltration testing will be undertaken on the site, performed to BRE 365 Digest.

It is anticipated that the ground underlying the site will not support an infiltration drainage solution, due to the following:

- Drainage infrastructure for the adjacent Kimberly Clark development adopts land drainage and an attenuation solution instead of infiltration.
- During a visit to site, Kimberly Clark commented on high water table in the area.

A drainage solution for the site is proposed in this report on the conservative assumption that an infiltration solution is not possible.

5.1.3 Attenuate Rainwater in Ponds for Gradual Release

If infiltration to ground proves to be unfeasible, the next preference in the SuDS hierarchy is to attenuate flows in a detention basin with a restricted discharge.

5.2 Proposed Surface Water Drainage Solution

The drainage strategy and indicative details of the proposed drainage infrastructure are included in Appendix B.

5.2.1 Drainage of On-site Surface Water

Stormwater falling into the facility will be intercepted and conveyed via on-site drainage infrastructure to a new attenuation basin located adjacent to the facility's northeast. From this basin, water will discharge via a newly installed outfall pipe which will connect into a manhole that forms part of Kimberly Clark's existing drainage infrastructure. The maximum discharge rate proposed is discussed in section 7.

The access track serving site will be constructed from unbound granular material. Flows will part infiltrate and part shed into the adjacent soft landscaped areas. As such, the change in flow regime from the existing scenario will be minimal.

5.2.2 Surface Water Discharge Route Beyond Site

From the proposed connection manhole, surface water generated from site is conveyed northwards through Kimberly Clark's drainage network into a large pond within the northern region of the Kimberly Clark estate, herein referred to as Lower Pond.

The Lower Pond discharges to the east via a concrete weir. The weir regulates discharge rates with a low flow notch and adjustable sluice to regulate high flows and low flows respectively. Beyond the concrete weir, water heads east along an outlet channel into a final outlet chamber. Water is then directed into a culvert that passes underneath Aber Road to discharge into the Swinchiard Brook, running north underneath the A548. Beyond the A548 to the north, water continues to pass through a series of watercourses before reaching the River Dee.

The proposed flow route of surface water from the site to the River Dee is shown in drawing 05040-RES-DRN-DR-PT-001 included in Appendix B.

5.2.3 Interception and Diversion of Off-site Surface Water

Due to surrounding topography, surface water to the west of site may run into site as it flows to the east in line with topography. To mitigate this risk, an interceptor drain will be installed along the western edge of site. The drain will intercept surface water flows from the west and convey them around the north of site, to connect into an existing land drain that runs past the site to the east. The land drain runs northwards and ultimately discharges into the Lower Pond.

5.3 Water Quality and Treatment

A Simple Index Approach is adopted as per CIRIA SuDS Manual to determine the suitability of the proposed development's SuDS components in mitigating water quality risks, as per Section 26.7.1 of the SuDS Manual 2015 (CIRIA C753).

1. Filtration through proposed new on-site filter strips: TSS = 0.4, metals = 0.4, hydrocarbons = 0.5.
2. Settlement in proposed new on-site attenuation / infiltration basin; mitigation indices for detention basin: TSS = 0.5, metals = 0.5, hydrocarbons = 0.6.
3. Settlement in existing Kimberly Clark attenuation / infiltration basin; mitigation indices for detention basin: TSS = 0.5, metals = 0.5, hydrocarbons = 0.6.

Table 1 below demonstrates how the pollution hazard index for each contaminant is satisfied by the three stages of water treatment provided as part of the proposed drainage strategy.

Table 1 - Simple Index calculation

Contaminant Type	Stage 1	Stage 2	Stage 3	Total SUDS Mitigation Index	Pollution Hazard Index	Utilisation
TSS	0.4	0.5(0.5)=0.25	0.5(0.5)=0.25	0.90	0.80	0.89
Metals	0.4	0.5(0.5)=0.25	0.5(0.6)=0.3	0.95	0.80	0.84
Hydrocarbons	0.5	0.5(0.6)=0.3	0.5(0.6)=0.3	1.10	0.90	0.82

During the construction phase, temporary silts fences will be installed, providing an additional treatment stage of water filtration.

Refer to Appendix B for indicative drainage details and proposed drainage strategy plan.

5.4 FCC SuDS Approval Body

In line with the Statutory National Standards of the Welsh Government, any construction work covering an area exceeding 100m^2 must obtain approval from the SuDS Approval Body (SAB) before commencing. The SAB are a statutory function delivered by FCC to ensure that drainage proposals for new developments are designed and built in accordance with national standards.

As per FCC guidance, SAB approval will be sought by completing and submitting the form 'Full Application Approval of SuDS' along with supporting drawing and information. This process will commence once planning consent has been obtained for the proposed development.

6 Foul Water Drainage Solution

As part of the hydrogen production process, the on-site electrolysers will discharge water. The water discharged in this process is potable water with a concentration factor of three; the concentration of salts, minerals and other solids is approximately three times that found in the potable water. On this basis the discharge will be considered foul water.

In the foul water drainage strategy proposed for site, foul water will leave each electrolyser via newly installed foul drains, which will converge on site into a single new foul outfall drain. The combined maximum flow rate from the electrolysers = 0.33 l/s.

The new foul outfall drain will convey foul flows northeast along the new site access track, before heading south to enter the Kimberly Clark water treatment works. A new package pumping station plant will be installed underground within the Kimberly Clark water treatment works area to receive foul flows from the proposed site. From the new package pumping station, water will then be pumped via a new rising main to discharge into the existing aeration tank that forms part of Kimberly Clark's existing on-site treatment works. Within the treatment process, water passes through a conventional aerobic sludge plant and a sedimentation clarifier, before entering a final holding tank. The holding tank discharges into the river Dee to the north, when the river is in high tide.

Appendix E contains a copy of the discharge permit issued to Kimberly Clark by NRW. The permit contains additional detail on the treatment process.

Drawing 05040-RES-DRN-DR-PT-001 in Appendix B shows the proposed drainage strategy for site. The proposed discharge route for foul water is shown on this drawing.

7 Hydraulic Assessment

A preliminary runoff and attenuation calculation for compound and temporary hardstanding has been undertaken using a HR Wallingford online design tool available from:

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

The inputs taken have been assumed as "worst case" and as such has determined the maximum drainage component extents required for the project. This includes assuming all permanent infrastructure (other than the access track) has an asphalt surface, and that drainage by infiltration is not possible.

A detailed drainage design will be performed following the ground investigation and compound earthing design (to determine surface finishes).

All methods and inputs are taken in accordance with the relevant guidance documents provided in Section 2.

7.1 Greenfield Peak Runoff Rates from Site

Current and future greenfield runoff rates for the development have been estimated using the IH124 Method. Using the mapping software within HR Wallingford Design Tool, the site-specific parameters have been established:

- Standard average annual rainfall between 1941 – 1970 (SAAR): 761mm.
- Standard percentage run-off: 47%.
- Total drained area: 0.55 ha.
- M5-60 rainfall depth: 17mm.
- Ratio M5-60 / M5-2day: 0.30.

Total drained area is defined as the catchment area for the attenuation basin, which comprises the area defined on the Infrastructure Layout as *'surface finish typically comprising stone or asphalt'*. The Infrastructure Layout is included in Appendix A.

Refer to Appendix C for a record of the HR Wallingford Design Tool output. The tool defines Qbar for site as 2.9 l/s.

7.2 Attenuation Storage Required Post Development

The surface water storage volume estimation tool uses a storage assessment method developed by HR Wallingford based on correlations between storage requirements and hydrological characteristics of sites.

Attenuation storage will be provided to accommodate the peak runoff rate calculated up to the critical 1 in 100-year storm plus a 40% allowance for climate change.

Paragraph 1.12 of the FCC Supplementary Planning Guidance for Management of Surface Water for New Developments notes attenuation systems should be designed with a practicable minimum discharge limit of 5.0 l/s. As noted in section 7.1, Qbar for site is calculated as 2.9 l/s, however giving precedence to the

aforementioned FCC planning guidance, a maximum discharge rate of 5.0 l/s is adopted for the proposed attenuation system.

The attention volume calculated based on the above criteria is approximately 354m^3. This volume will be accommodated within a new attenuation basin to be installed adjacent to the northeast of the development site. Additional volume is provided within the on-site filter strips proposed.

3D modelling has been carried out to prove this volume can be accommodated within the site boundary. The attenuation volume should be considered a maximum volume, this assumes that all surface finishes (other than of the access track) are of asphalt and that drainage by infiltration methods is not possible.

Refer to Appendix C for the storage volume calculation and greenfield runoff estimation summary.

8 Operation and Maintenance Requirements

All surface water drainage and pollution control features associated with the site will remain private and will be maintained by the site operator.

The following section outlines the proposed maintenance for the various aspects of the drainage system. If necessary, these outline maintenance proposals will be refined when the site is operational to suit specific conditions.

8.1 Filter Drain / Discharge Pipe

The anticipated maintenance plan for the filter drains and attenuation basin discharge pipe is outlined in Table 2.

Table 2 – Typical filter drain and discharge pipe operation and maintenance requirements

Filter Drain / Discharge Pipe Maintenance Schedule	
Maintenance Action	**Minimum Frequency**
Inspect filter drain / manhole / pipe. Where stone or pipe has become clogged with silt, it will be cleared out	Half yearly
Remove litter and debris	Half yearly
Inspect inlets and outlets for blockages, and clear (if required)	Half yearly

8.2 Basin

The anticipated maintenance plan for the basin at the site is outlined in Table 3.

Table 3 – Typical basin operation and maintenance requirements

Basin Maintenance Schedule	
Maintenance Action	**Minimum Frequency**
Remove litter and debris	Half yearly
Inspect inlets and outlets for blockages, and clear (if required).	Half yearly
Inspect inlets and outlets for noticeable effects of erosion, suitable erosion protection measures such as reno-mattress or placement of large stones (>150mm) to dissipate water energy levels will be installed at the area affected.	Half yearly
Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies	Half yearly
Reseed areas of poor vegetation growth, alter plant types to better suit conditions (if required).	As required, or if bare soil is exposed over 10% or more of the basin treatment area

9 Conclusion

A flood risk assessment has been undertaken across the site. The assessment finds that whilst areas of localised surface water flood risk are present on the existing perimeter access road where some utility works are proposed, the development site is entirely out of any flood risk zones.

An assessment of the drainage options has also been undertaken, and it has been concluded that drainage by infiltration is unlikely to be a viable option. As such, the current proposal is to drain the site via an attenuation basin, with a restricted discharge rate into the nearby Kimberly Clark drainage infrastructure, ultimately being discharged into the River Dee.

The required attenuation volume has been calculated as approximately 354m^3. This should be considered a maximum volume, based on the assumption that all permanent infrastructure (other than the access track) has an asphalt surface and that drainage by infiltration methods is not possible.

A site investigation, 3D earthworks design, and earthing design will be undertaken to inform the detailed design of the site drainage.

The drainage strategy proposed will provide sufficient water quality treatment as demonstrated using the Simple Index Approach.

The effluent from the Hydrogen Electrolysers will be discharged via a new foul drainage system and pumping station, to the existing Kimberly Clark water treatment plant. The treatment plant has sufficient capacity to accommodate the minor increase in flow. The increase in flow volume will not impact on Kimberly Clark's existing Natural Resource Wales discharge permit to the River Dee.

Appendix A Project Drawings

A.1 Infrastructure Layout – 05040-RES-PRO-DR-PT-001

A.2 Location Plan – 05040-RES-LAY-DR-PE-001

Appendix B Drainage Drawings

B.1 Proposed Surface Water Drainage Strategy - 05040-RES-DRN-DR-PT-001

B.2 Proposed Foul Water Drainage Strategy - 05040-RES-DRN-DR-PT-002

B.3 Typical Drainage Details – 05040-RES-DRN-DR-PT-003

Appendix C Calculations

C.1 Greenfield Runoff Estimate (HR Wallingford)

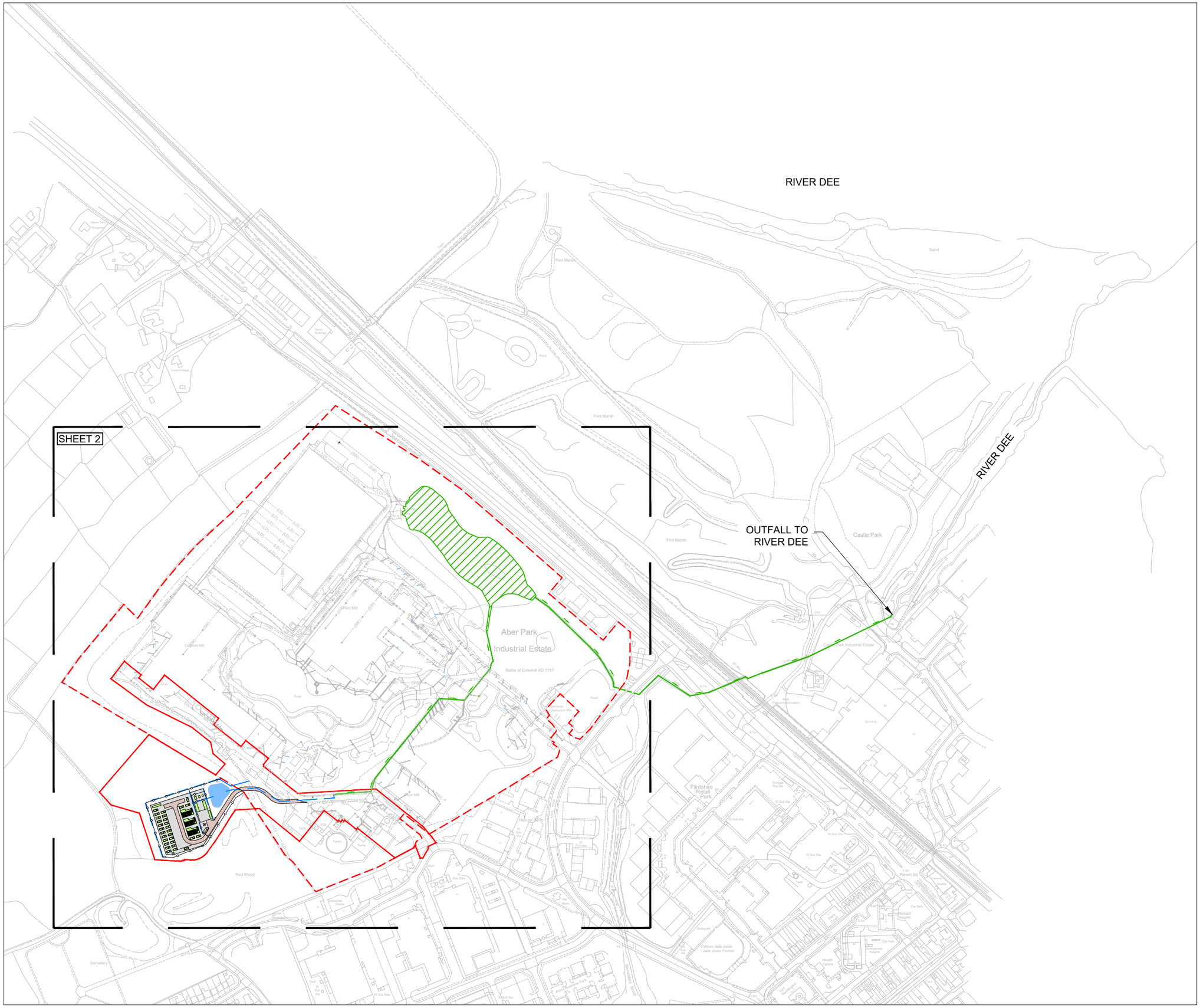
C.2 Storage Volume Calculation

Appendix D Topographic Surveys

D.1 Below Ground Survey

D.2 Topographic Survey

Appendix E NRW Environmental Permit



KEY:

- DEVELOPMENT BOUNDARY
- EXISTING KIMBERLY CLARK SITE BOUNDARY
- PROPOSED EQUIPMENT
- ACCESS TRACK
- HARDSTANDING
- SECURITY FENCE
- GATE
- PROPOSED ATTENUATION POND
- SURFACE WATER PIPE
- SURFACE WATER FILTER STRIP
- INTERCEPTOR DRAIN
- INSPECTION CHAMBER
- PROPOSED OUTFALL FLOW ROUTE
- OUTFALL - ASSUMED CULVERT ROUTE
- EXISTING KIMBERLY CLARK ATTENUATION POND

SHEET 1 OF 2

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
1	BM	DC	MC	2023-04-11	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: OSGB 1936
SCALE: 1:5,000 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
COLESHILL GREEN
HYDROGEN FACILITY

DRAWING TITLE
PROPOSED SURFACE
WATER DRAINAGE
STRATEGY

RES DRAWING NUMBER: 05040-RES-DRN-DR-PT-001
REV: 1

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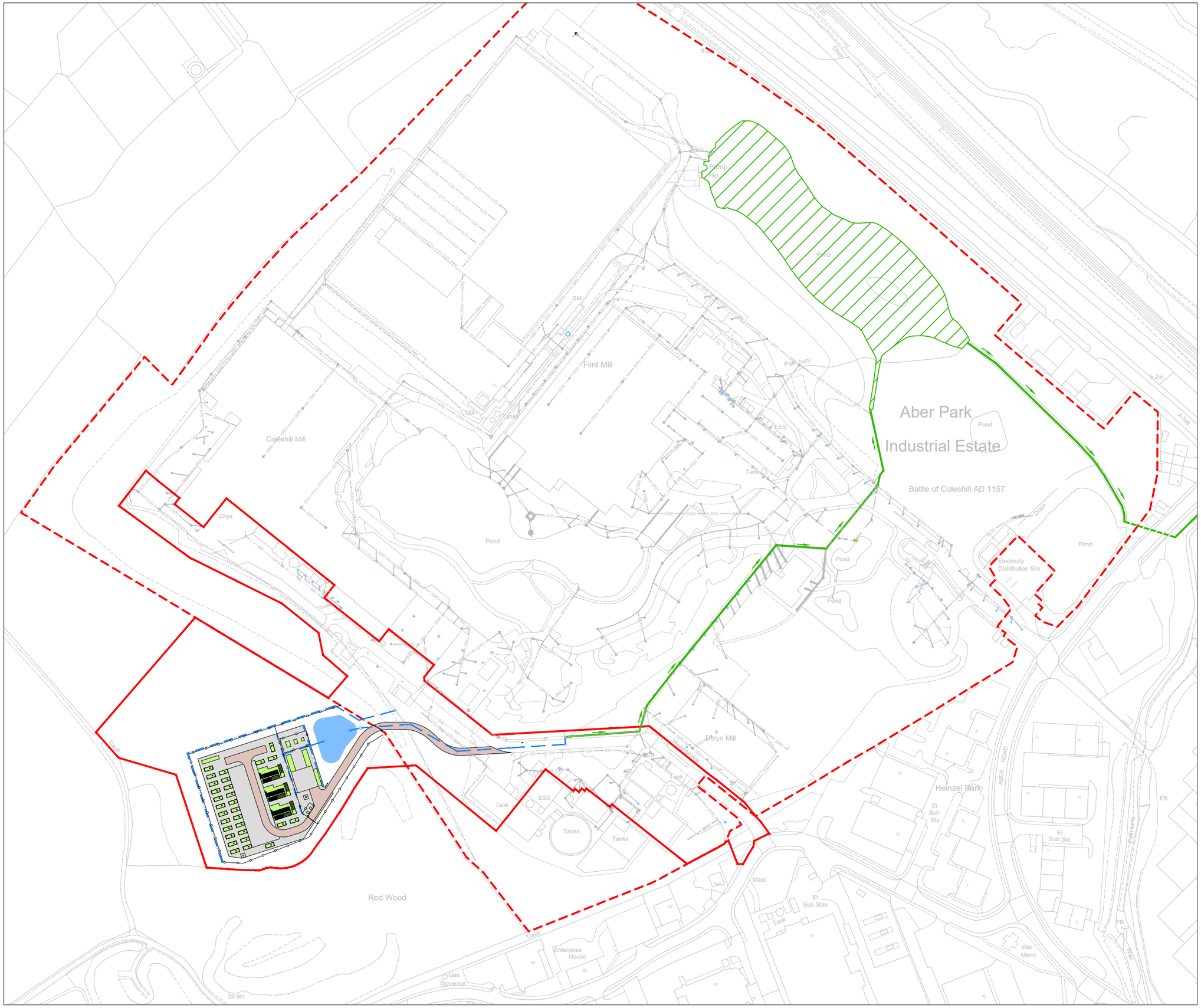

KEY:

- DEVELOPMENT BOUNDARY
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- INSPECTION CHAMBER
- PROPOSED OUTFALL FLOW ROUTE
- OUTFALL - ASSUMED CULVERT ROUTE
- EXISTING KIMBERLY CLARK ATTENUATION POND

SHEET 2 OF 2

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
1	BM	DC	MC	2023-04-11	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: OSGB 1936
SCALE: 1:2,500 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
COLESHILL GREEN HYDROGEN FACILITY

DRAWING TITLE
PROPOSED SURFACE WATER DRAINAGE STRATEGY

RES DRAWING NUMBER: 05040-RES-DRN-DR-PT-001
REV: 1

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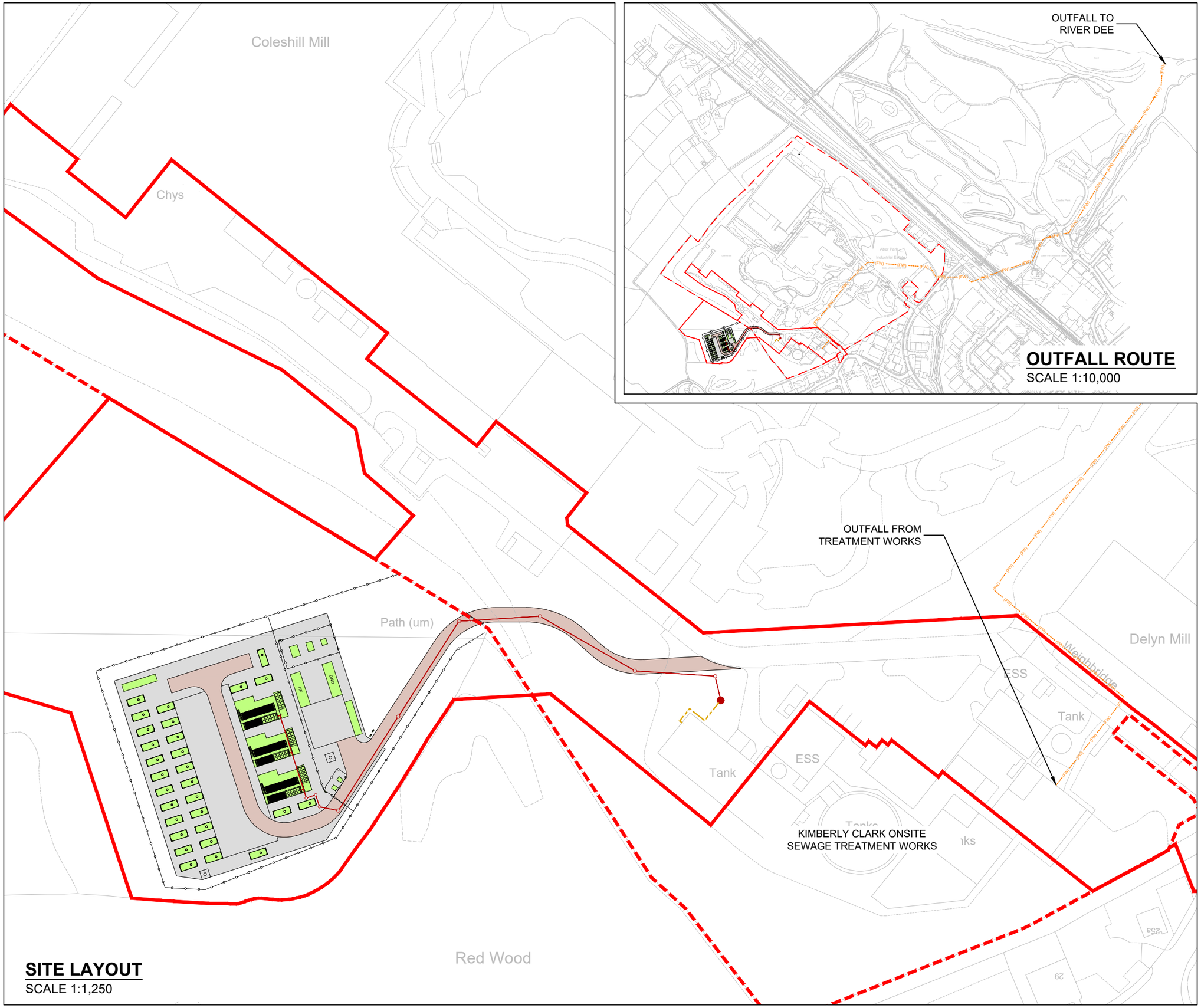

KEY:

- DEVELOPMENT BOUNDARY
- EXISTING KIMBERLY CLARK SITE BOUNDARY
- PROPOSED EQUIPMENT
- ACCESS TRACK
- HARDSTANDING
- SECURITY FENCE
- GATE
- EXISTING KIMBERLY CLARK FW DRAINAGE OUTFALL
- FOUL WATER PIPE
- FOUL WATER RISING MAIN
- PACKAGE PUMPING STATION
- INSPECTION CHAMBER

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
1	BM	DC	MC	2023-04-11	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: OSGB 1936
SCALE: AS SHOWN @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
COLESHILL GREEN
HYDROGEN FACILITY

DRAWING TITLE
PROPOSED FOUL
WATER DRAINAGE
STRATEGY

RES DRAWING NUMBER: 05040-RES-DRN-DR-PT-002
REV: 1

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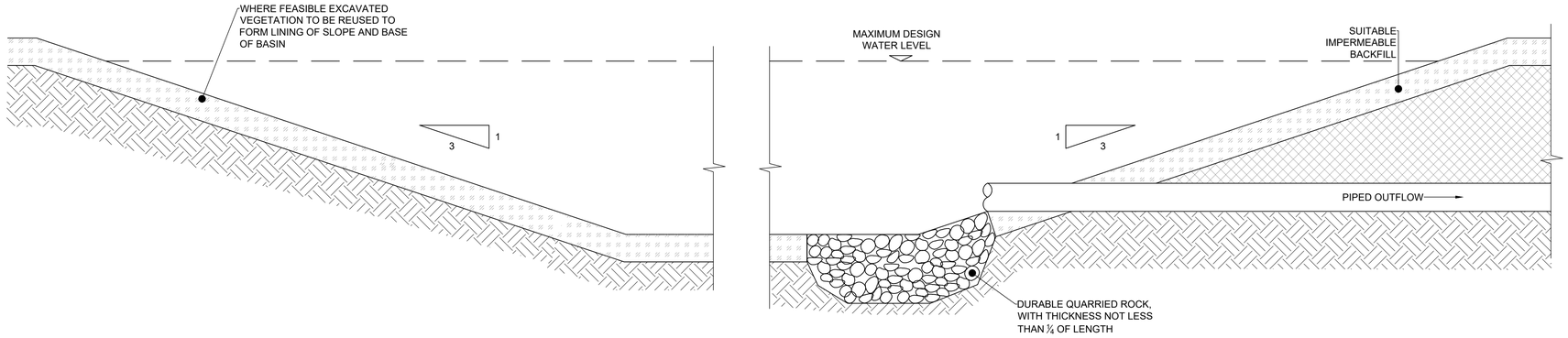

TYPICAL ATTENUATION BASIN DETAIL
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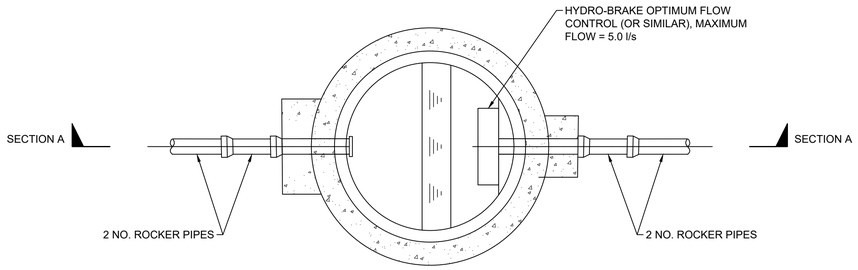
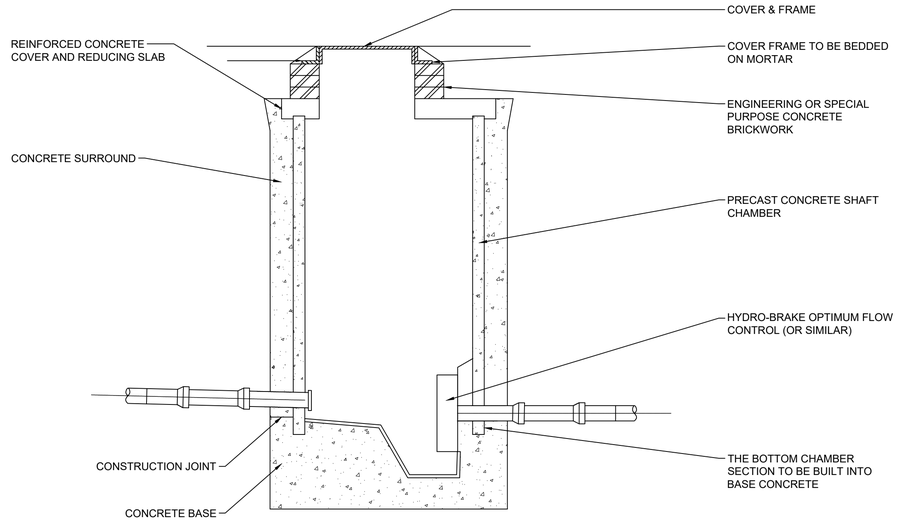
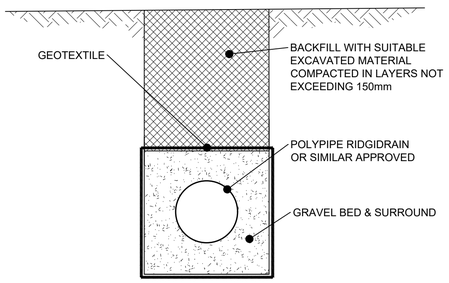


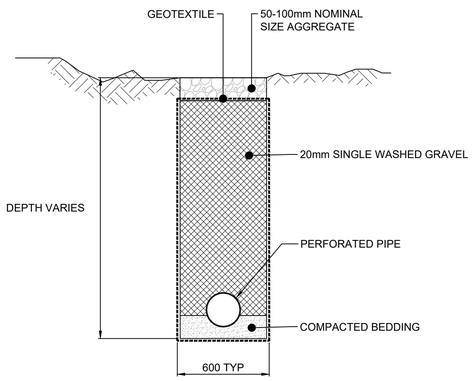
MANHOLE DETAIL WITH FLOW CONTROL DEVICE
SCALE 1:20



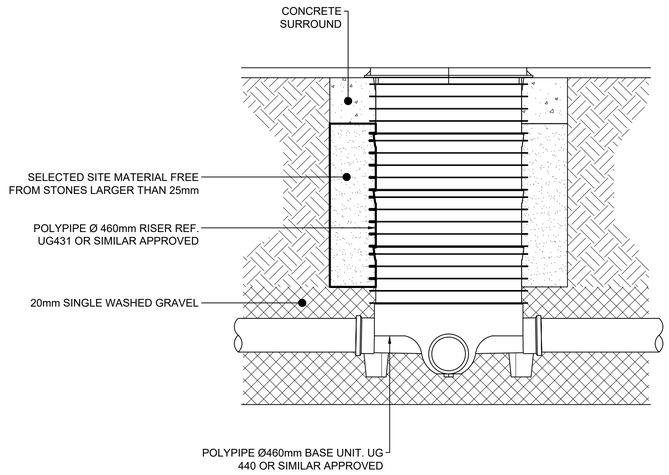
SECTION A-A
SCALE 1:20



OUTFALL PIPE CROSS SECTION
SCALE 1:10



FILTER DRAIN DETAIL
SCALE 1:20



TYPICAL INSTALLATION DETAIL FOR INSPECTION PIPE CHANBER
SCALE 1:10

NOTES:

1. DO NOT SCALE, ANY DISCREPANCIES SHALL BE HIGHLIGHTED TO THE DESIGNER FOR CONFIRMATION.
2. SUDS SYSTEMS TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACK AND COMPOUND. INTERIM MEASURES SUCH AS THE PLACEMENT OF SILT FENCES TO BE USED AROUND WATERCOURSES AND RETAINED IN PLACE UNTIL SUDS ARE ESTABLISHED AND PROVIDING SUFFICIENT SILT REMOVAL.
3. WHERE RESEEDING IS REQUIRED, NATIVE SPECIES SEED MIX SHALL BE USED BASED UPON THE SURROUNDING HABITAT. THE PLANTING SHALL BE CAPABLE OF RESISTING DROUGHT CONDITIONS.
4. AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
5. SILT LEVELS AT DETENTION BASIN TO BE VISUALLY INSPECTED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE.
6. SUDS DETAILS, DIMENSIONS AND LEVELS MAY BE MODIFIED DURING DETAILED DESIGN. CHANGES WILL ADHERE TO THE REQUIREMENTS AND PHILOSOPHY IN THE DRAINAGE MANAGEMENT PLAN.

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
1	BM	DC	MC	2023-04-06	FIRST ISSUE

PURPOSE: PLANNING	COORDINATES: N/A
SCALE: AS SHOWN @ A1	DATUM: N/A
LAYOUT DWG: N/A	T-LAYOUT NO.: N/A

PROJECT TITLE: COLESHILL GREEN HYDROGEN FACILITY

DRAWING TITLE: TYPICAL DRAINAGE DETAILS

RES DRAWING NUMBER: 05040-RES-DRN-DR-PT-003 | REV: 1

BEAUFORT COURT,
EGG FARM LANE,
KINGS LANGLEY,
HERTS WD4 8LR. UK
TEL +44 (0) 1923 296200
WWW.RES-GROUP.COM

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Dan Cole
Site name:	Coleshill GHE
Site location:	Kimberly Clark Flint

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.25118° N
Longitude:	3.14952° W
Reference:	2455177643
Date:	Mar 30 2023 15:12

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.55

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	761	761
Hydrological region:	9	9
Growth curve factor 1 year:	0.88	0.88
Growth curve factor 30 years:	1.78	1.78
Growth curve factor 100 years:	2.18	2.18
Growth curve factor 200 years:	2.46	2.46

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	2.93	2.93
1 in 1 year (l/s):	2.58	2.58
1 in 30 years (l/s):	5.21	5.21
1 in 100 year (l/s):	6.38	6.38
1 in 200 years (l/s):	7.2	7.2

Coleshill GHE - Storage Volume Calculation

PROJECT:	Coleshill GHE
PROJECT NO:	5040
REFERENCE NO:	05040-5371695

Issue	Date	Author	Nature and Location of Change
1	30.03.23	Daniel Cole	First issue

Note: revision history should include design stage, revision of load and other relevant information.

Attenuation Storage

1. INPUT PARAMETERS AND ASSUMPTIONS
1.1 First category of inputs - Hydrological Characteristics

m5-60	17.00	mm	*Five Year - 60 Minute Rainfall Depth (see "Data" Tab)*
r	0.30		*Ratio M5-60/M5-2day (see "Data" Tab)*
Location	E/W		*E/W (England and Wales) or S/NI (Scotland and Northern Ireland)*
Fc	1.40		*Climate Change Factor (refer to the hyperlink for what to choose)*

1.2 Second category of inputs - Catchment Area Characteristics

Ap	0.00	ha	*Permeable Area*
Cp	0		*Permeable area runoff coefficient (see "Data" Tab)*
Ai	0.55	ha	*Impermeable Area (C= 1 assumed) (ha)*
Qa	0.00500	m³/s	*Allowable Discharge*

2. CALCULATIONS
2.1 First calculation section - effective catchment area calculation

Ae	0.55	ha	*Effective area (see "Data" Tab)*

2.2 Second calculation section - calculation to dermine the m5 rainfall for various durations

D (min)	Z1	m5 - D (mm)
15.00	0.59	10.03
30.00	0.77	13.09
60.00	1.00	17.00
120.00	1.25	21.25
240.00	1.57	26.69
360.00	1.78	30.26
600.00	2.12	36.04
1440.00	2.84	48.28

m5-D calculation

Note: z1 is calculation in the "Att Data" Tab

2.3 Third calculation section - attenuation volume calculations for various durations and return periods

D (min)	Z2	MT-10 (mm)	Inflow Vol m^3	Outflow vol (m^3)	Att Volume
15.00	0.61	9	47	5	43
30.00	0.62	11	62	9	53
60.00	0.63	15	82	18	64
120.00	0.65	19	106	36	70
240.00	0.67	25	137	72	65
360.00	0.68	29	159	108	51
600.00	0.69	35	192	180	12
1440.00	0.72	48	267	432	-165

1 year return period calculation

Note: z2 is calculation in the "Att Data" Tab

D (min)	Z2	MT-10 (mm)	Inflow Vol m^3	Outflow vol (m^3)	Att Volume
15.00	1.03	14	80	5	75
30.00	1.03	19	104	9	95
60.00	1.03	25	135	18	117
120.00	1.03	31	169	36	133
240.00	1.03	38	212	72	140
360.00	1.03	44	240	108	132
600.00	1.02	52	285	180	105
1440.00	1.02	69	380	432	-52

5 year return period calculation

Note: z2 is calculation in the "Att Data" Tab

D (min)	Z2	MT-10 (mm)	Inflow Vol m^3	Outflow vol (m^3)	Att Volume
15.00	1.22	17	94	5	90
30.00	1.23	23	124	9	115
60.00	1.24	30	163	18	145
120.00	1.24	37	203	36	167
240.00	1.23	46	254	72	182
360.00	1.22	52	285	108	177
600.00	1.20	61	334	180	154
1440.00	1.17	79	437	432	5

10 year return period calculation

Note: z2 is calculation in the "Att Data" Tab

D (min)	Z2	MT-10 (mm)	Inflow Vol m^3	Outflow vol (m^3)	Att Volume
15.00	1.49	21	115	5	111
30.00	1.51	28	153	9	144
60.00	1.53	36	201	18	183
120.00	1.54	46	253	36	217
240.00	1.53	57	314	72	242
360.00	1.51	64	353	108	245
600.00	1.49	75	413	180	233
1440.00	1.43	97	532	432	100

30 year return period calculation

Note: z2 is calculation in the "Att Data" Tab

D (min)	Z2	MT-10 (mm)	Inflow Vol m^3	Outflow vol (m^3)	Att Volume
15.00	1.91	27	148	5	143
30.00	1.96	36	198	9	189
60.00	2.01	48	263	18	245
120.00	2.03	60	332	36	296
240.00	2.00	75	411	72	339
360.00	1.97	83	459	108	351
600.00	1.92	97	534	180	354
1440.00	1.82	123	679	432	247

100 year return period calculation

Note: z2 is calculation in the "Att Data" Tab

D (min)	Z2	MT-10 (mm)	Inflow Vol m^3	Outflow vol (m^3)	Att Volume
15.00	2.17	30	168	5	163
30.00	2.24	41	226	9	217
60.00	2.30	55	302	18	284
120.00	2.32	69	381	36	345
240.00	2.28	85	469	72	397
360.00	2.24	95	522	108	414
600.00	2.18	110	606	180	426
1440.00	2.06	139	766	432	334

200 year return period calculation

Note: z2 is calculation in the "Att Data" Tab

3. RESULTS

Att 1	70	m³	*Attenuation volume required in a 1 in 1 year event*
Att 5	140	m³	*Attenuation volume required in a 1 in 5 year event*
Att 10	182	m³	*Attenuation volume required in a 1 in 10 year event*
Att 30	245	m³	*Attenuation volume required in a 1 in 30 year event*
Att 100	354	m³	*Attenuation volume required in a 1 in 100 year event*

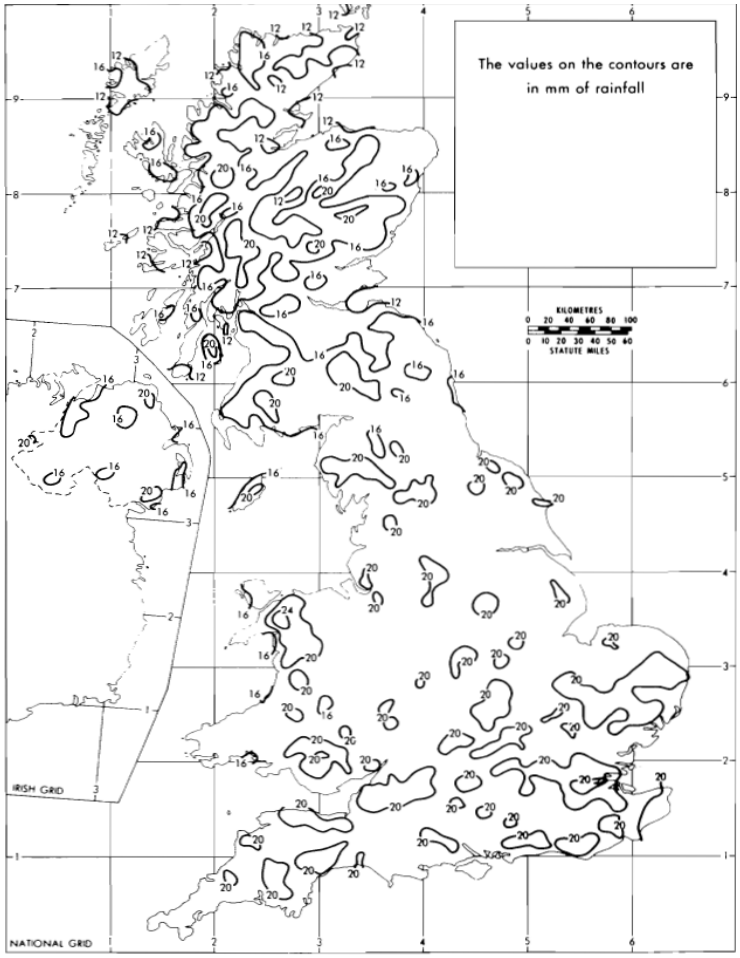
Att Data

This sheet may be used for data which does not need to be presented in the final calculation sheets but should be included for completeness.

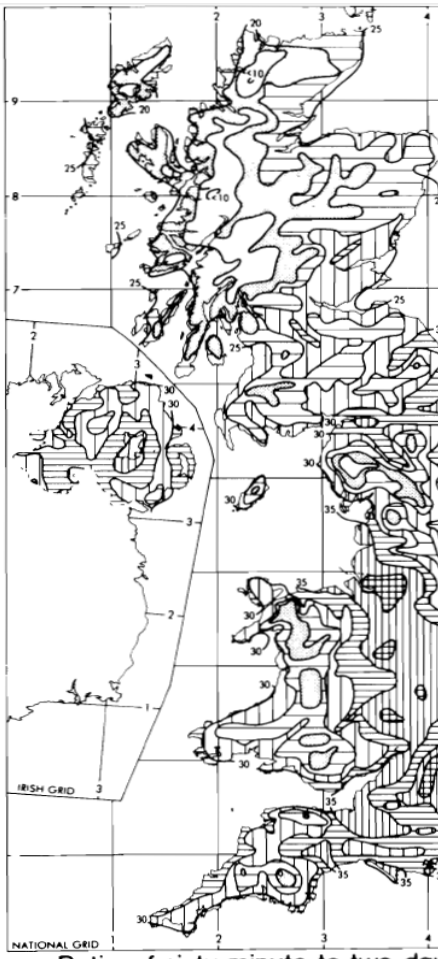
r and M5-60

r and M5-60 can be manually derived from the figures below based on geographic location. Alternatively the user can use the Wallingford Tool giv
the map and have the r and M5-60 values returned.

http://www.uksuds.com/greenfieldrunoff_js.htm



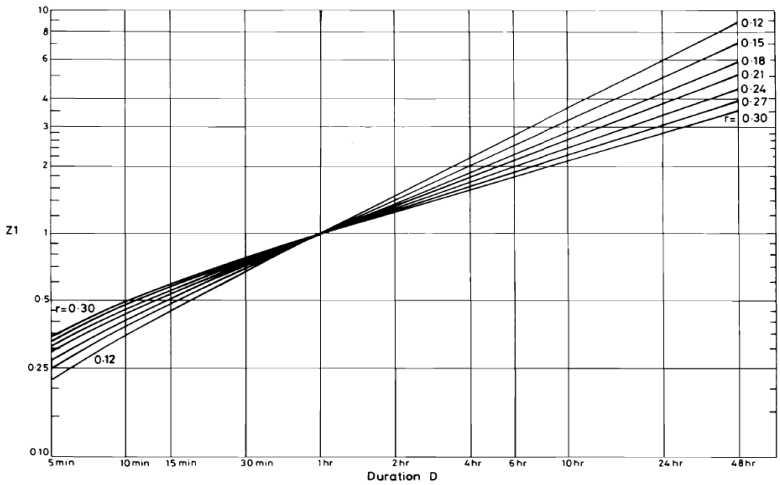
Rainfall depths of five year return period and 60 minutes duration (M5—60 min)

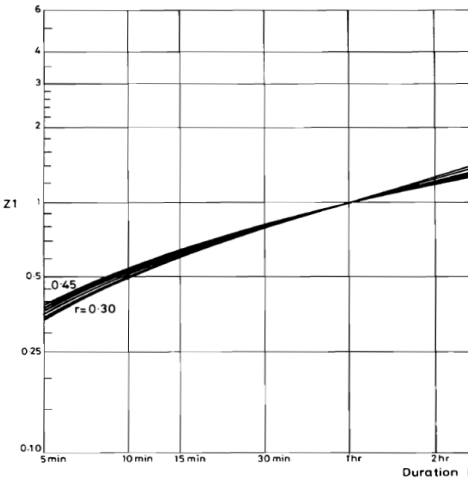


Ratio of sixty minute to two da
return period

Z1

Z1 can be manually derived from the graphs below based on r and D. For this spreadsheet however, Z1 has been automatatically selected from th
taken from BRE 365.



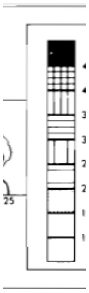


Relation between Z1 and D for different values of r. (0·12 ≤ r ≤ 0·30)

Relation between Z1 and D for diffe

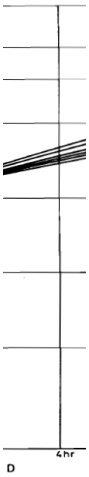
Calculation	r	duration	h.index	v.Index	r1	r2	d1	d2	d1r1	d2r1	d1r2
1	0.3	900	8	4	0.3	0.33	900	1800	0.59	0.77	0.61
	0.3	1800	8	5	0.3	0.33	1800	3600	0.77	1.00	0.78
	0.3	3600	8	6	0.3	0.33	3600	7200	1.00	1.25	1.00
	0.3	7200	8	7	0.3	0.33	7200	14400	1.25	1.57	1.23
	0.3	14400	8	8	0.3	0.33	14400	21600	1.57	1.78	1.53
	0.3	21600	8	9	0.3	0.33	21600	36000	1.78	2.12	1.73
	0.3	36000	8	10	0.3	0.33	36000	86400	2.12	2.84	2.04
	0.3	86400	8	11	0.3	0.33	86400	86400	2.84	2.84	2.60

ven in the



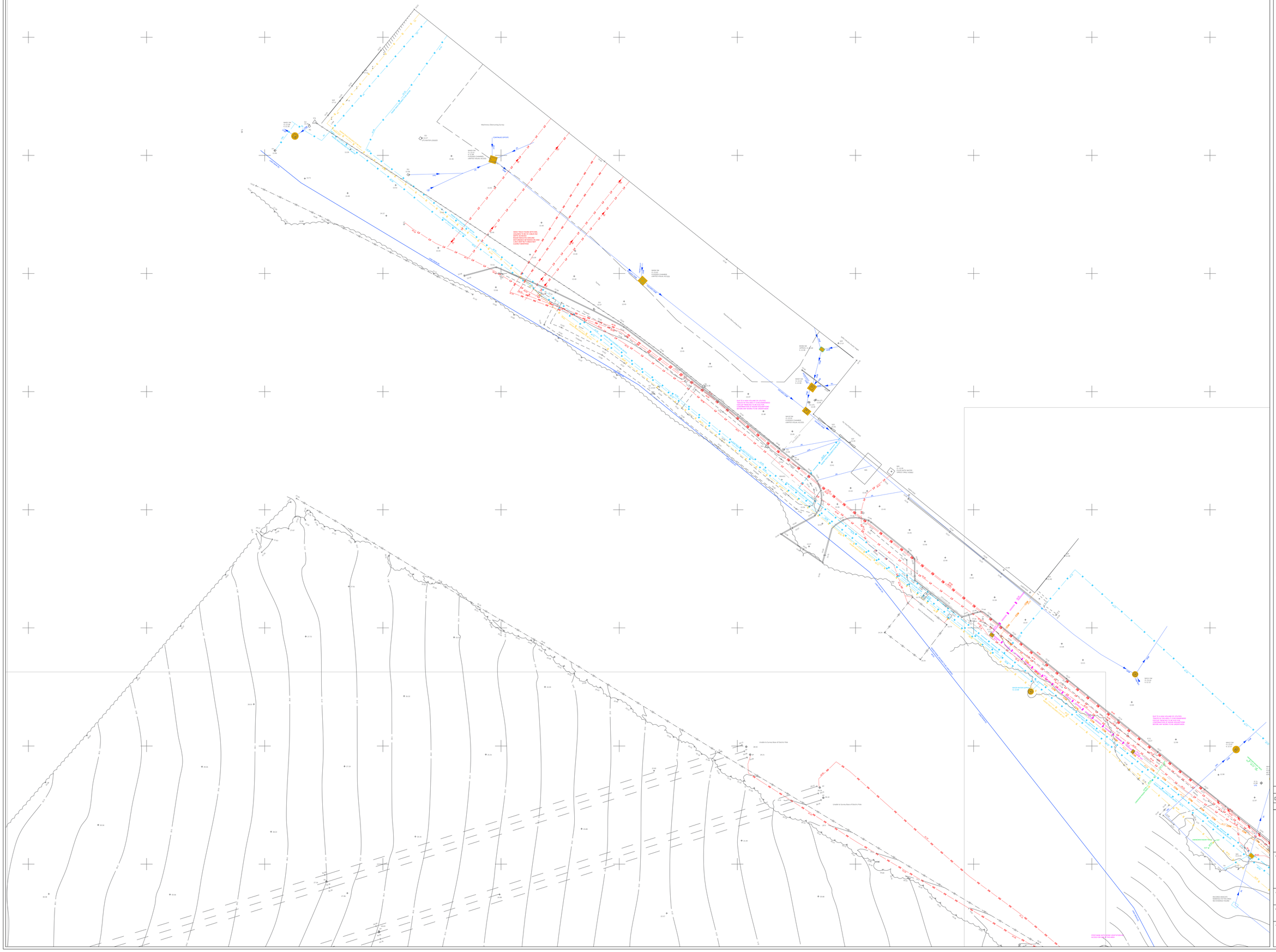
y rainfc
(r)

he graphs



rent val

d2r2
0.78
1.00
1.23
1.53
1.73
2.04
2.60
2.60



UTILITY SURVEY DRAWING KEY

Abbreviations and Symbols

EOT - End of trace
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G	Gas
O	Oil Pipe
-	British Telecom
U	Unknown Trace
W	Water
	Foul Water Sewer
	Combined Water Sewer
	Surface Water Sewer
	Utility Survey Extents
	Other
	Chamber Extents
	End of Trace

UTILITY SURVEY SITE NOTES

- Record information shows 3 missing manholes on site. No evidence of this has been found. possibly buried or removed.

Disclaimer

General Notes

Electro-magnetic techniques and/or ground penetrating radar have been used in the location of underground services. The results are not infallible and trial excavations should be carried out to confirm service identification, positions and depths. Although all reasonable practices have been undertaken to detect buried services, the information cannot be guaranteed. The methods of the survey does not differentiate between live and dead services, and as such all services should be treated as live. Where services are non-metallic, these would be located with GPR. However services are likely to go undetected, if they are smaller than 2 inches, or below 2 meters. Where we have been unable to trace a service, we may show an assumed route. This is not to be treated as exact.

Vertical & Horizontal Position

Vertical position (depth) is approximate to the trace. Drains may have been detected using a tracing wire, and the depth indicated could be between the bottom and top of the pipe. Horizontal position is indicative to the centre of the utility/service, and should not be taken as exact.

Warranty

Paint marks may fade, no warranty is given in respect of the durability of the paint marks. Therefore this drawing should be used as the primary reference for the survey results. This drawing does not provide an absolute representation of the sub-surface. Utilities have been detected using non invasive technologies only, and the performance can be adversely affected by ground, weather and site conditions. Therefore some utilities may be undetectable. While Landmark Surveys uses reasonable procedures to detect all utilities. It does not guarantee 100% detection will be achieved. Services at depths greater than 2m, will not be detectable.

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Ver. 2.9

REVISIONS/UPDATES & ASSOCIATED DETAILS

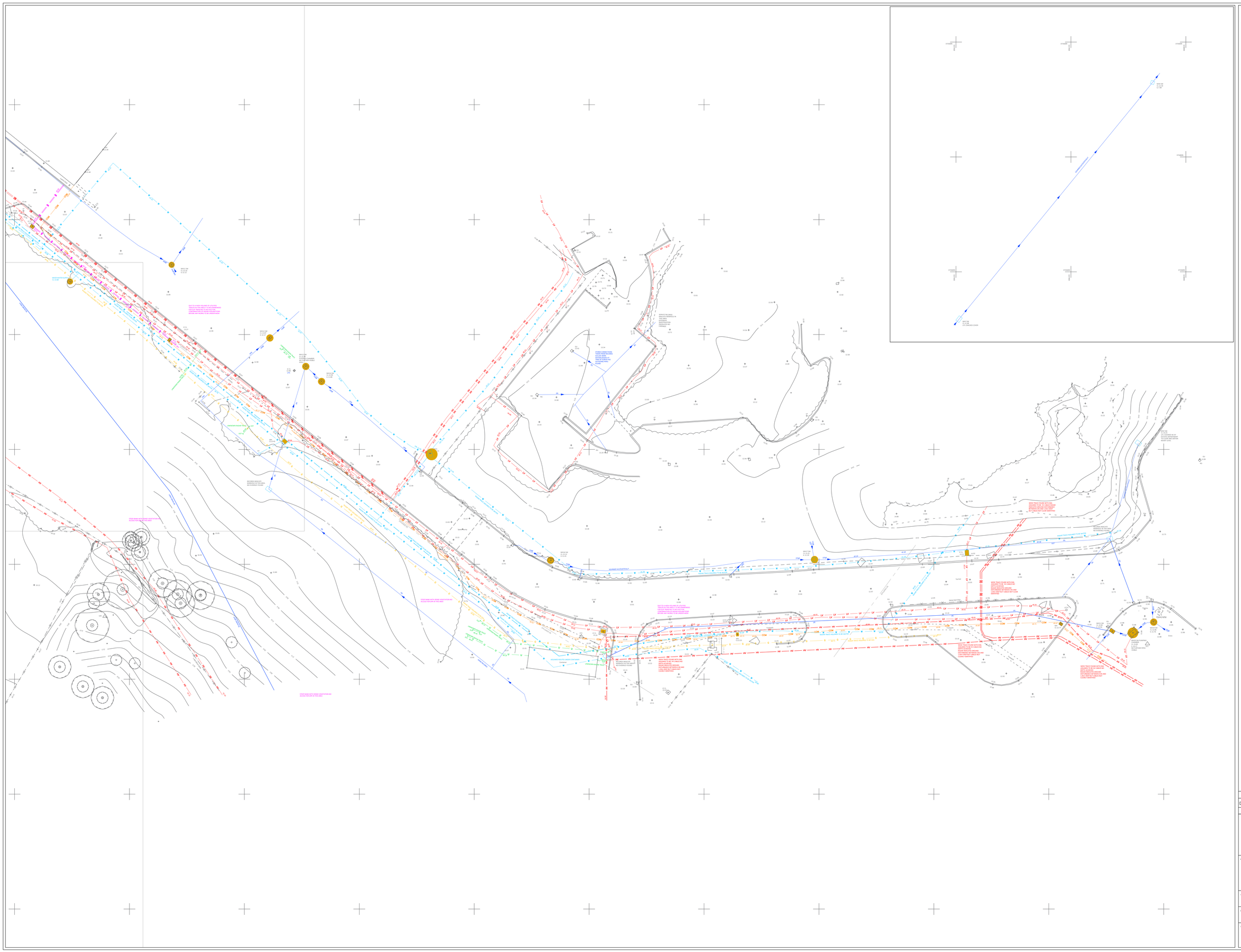
Dwg No	Details	By	Date
6491A	Further detail investigated on storm run	MC	March 23

LANDMARK SURVEYS WALES
THE SURVEY PEOPLE
→ www.lmswalesltd.co.uk → enquiries@lmswales.co.uk → Tel: 01584 821590

JOB TITLE
Utility Survey
Greenhill Hydrogen 2
Kimberly Clark
Coleshill

SHEET SIZE & SCALE	DATE SURVEYED
A0 @ 1:200	January 2023
DRAWING NUMBER	DRAWN BY
6491/U/01-03A	MC

CLIENT
RES - Group



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THE SURVEY PEOPLE

~ www.lmswalesltd.co.uk ~ enquiries@lmswales.co.uk ~ Tel: 01554 821590

JOB TITLE

Utility Survey
Greenhill Hydrogen 2
Kimberly Clark
Coleshill

SHEET SIZE & SCALE: A0 @ 1:200

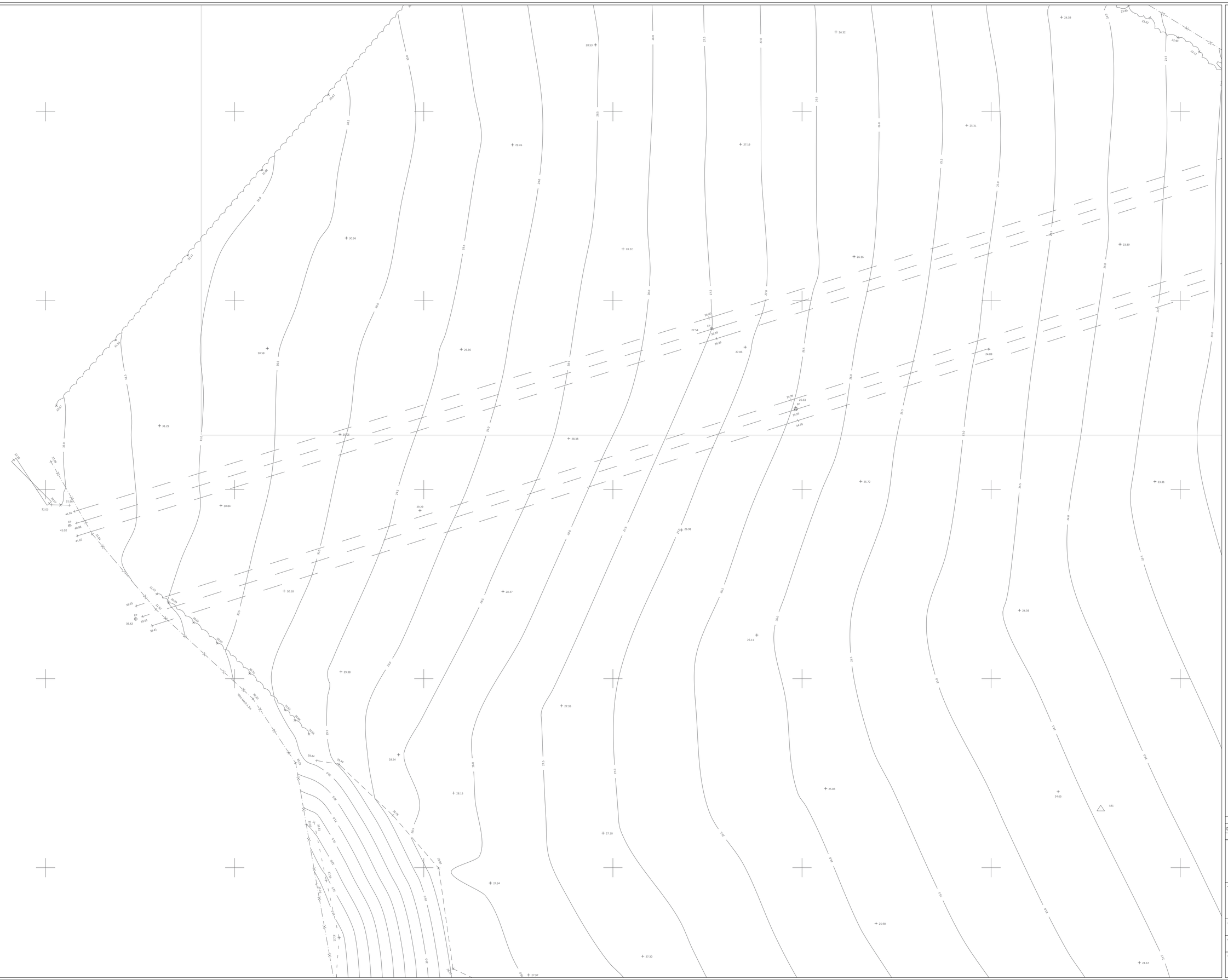
DATE SURVEYED: January 2023

DRAWING NUMBER: 6491/U/02-03A

DRAWN BY: MC

CLIENT

RES - Group



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Disclaimer

General Notes

Electro-magnetic techniques and/or ground penetrating radar have been used in the location of underground services. The results are not infallible and trial excavations should be carried out to confirm service identification, positions and depths. Although all reasonable practices have been undertaken to detect buried services, the information cannot be guaranteed. The methods of the survey does not differentiate between live and dead services, and as such all services should be treated as live. Where services are non-metallic, these would be located with GPR. However services are likely to go undetected, if they are smaller than 2 inches, or below 2 meters. Where we have been unable to trace a service, we may show an assumed route. This is not to be treated as exact.

Vertical & Horizontal Position

Vertical position (depth) is approximate to the trace. Drains may have been detected using a tracing wire, and the depth indicated could be between the bottom and top of the pipe. Horizontal position is indicative to the centre of the utility/service, and should not be taken as exact.

Warranty

Paint marks may fade, no warranty is given in respect of the durability of the paint marks. Therefore this drawing should be used as the primary reference for the survey results. This drawing does not provide an absolute representation of the sub-surface. Utilities have been detected using non invasive technologies only, and the performance can be adversely affected by ground, weather and site conditions. Therefore some utilities may be undetectable. While Landmark Surveys uses reasonable procedures to detect all utilities, It does not guarantee 100% detection will be achieved. Services at depths greater than 2m, will not be detectable.

Where a utility is shown on this drawing as a single line, this may represent multiple utilities. Where service records have been provided, Landmark Surveys will endeavor to match results in the field. However some results may coincidentally match a provided service location. This could result in false information being provided. Sewer and manhole details will be critical to the project design. Landmark Surveys would recommend that entry into the chamber be undertaken using a specialist team qualified for confined space entry.

Irrespective of the information provided by a utility survey and statutory plans, excavation work should be undertaken with extreme caution and in accordance with HSE guidelines - HSG47 Avoiding danger from 'Underground services'.

Ver. 2.9

REVISIONS/UPDATES & ASSOCIATED DETAILS

Dwg No	Details	By	Date
6491A	Further detail investigated on storm run	MC	March 23

LANDMARK SURVEYS WALES

THE SURVEY PEOPLE

– www.lmswalesltd.co.uk – enquiries@lmswales.co.uk – Tel: 01554 821590

JOB TITLE
Utility Survey
Greenhill Hydrogen 2
Kimberly Clark
Coleshill

SHEET SIZE & SCALE: A0 @ 1:200

DATE SURVEYED: January 2023

DRAWING NUMBER: 6491/U/03-03A

DRAWN BY: MC

CLIENT: RES - Group

Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2010

Kimberly-Clark Limited

Flint Paper Mill
Aber Road
Flint
Flintshire
CH6 5EX

Permit number

EPR/BJ9703IM

Flint Paper Mill
Permit number EPR/BJ9703IM

Introductory note

This introductory note does not form a part of the permit

The main features of the permit are as follows.

Kimberly Clarke Flint site consists of two mills and a distribution centre. Flint mill produces baby wipes from non-woven base sheets and is not under IPPC control. Coleshill mill produces tissue products for Kimberly Clarke Professional sector and falls under IPPC control. The mills and distribution centre share a 96 acre site on the edge of the Aber Park Industrial Estate, located on the outskirts of Flint in Flintshire, North Wales.

Within sight of the River Dee Estuary, the mills are bounded on the North by the A548 and the railway. To the South lies the A55, with the town of Flint to the East and farmlands to the West. The Dee Estuary with its SSSI is 600m from the site boundary. A short row of terrace houses back on to the site boundary on the NNE. However the remaining neighbouring area is covered by industry, with the closest housing estate being 150m away (Old London Road).

The National Grid Reference for the site is SJ 236 735 and for the effluent outfall (which belongs to Coleshill Mill) is SJ 246 741.

Kimberly Clarke Limited produce approximately 36,000 tonnes of toilet tissue per annum at its Flint site, almost all of which is destined for the domestic UK market. The products are manufactured from recycled fibre produced on-site from the recycling of used newsprint, office waste and corrugates.

The recycled paper pulping process at Coleshill Mill involves careful selection of the waste mixture, it is dependent on the finished product requirements, and additional de-inking and bleaching stages. A surfactant is added to the initial pulp to help floatation later in the process, after the various screening stages to remove wood and plastics, metal staples and clips, un-pulped fibre, coarse and adhesive contaminants the product moves on to the next stage.

Fine ink and dirt particles are removed by froth floatation using micro-bubbles of air. The foam is removed from the floatation tank and is collected and de-gassed before appropriate off-site disposal. The de-inked SFS then passes through a series of cleaners and screens to remove fine contaminants, followed by a washing process to remove ash/filler and colloidal material.

The residual inks and adhesive residues are dispersed throughout the slurry by agitation and heating.

The dyes in the SFS are removed by bleaching with a stabilised solution of sodium hydrosulphite at elevated temperatures (~90°C) after a vacuum de-gassing stage.

The filtrate from the thickening and other processes is then clarified to reduce the level of suspended solids.

There is no sewerage connection at the mills. The water from all internal drains within each mill and any external drains with the potential for contamination is recycled through the mill clarifier. Other external drains with non-contaminated run-off is discarded through interceptors to either of the lakes and thence to the Dee Estuary.

Sludge from the clarifier is de-watered in a press ad stored in the crumb store prior to appropriate off-site disposal. Other wastes and rejects from the process are also stored in skips on hardstanding prior to the appropriate off-site disposal. The drainage from the storage areas is recycled after clarification.

The clarified water is mostly recycled within the respective mill with the excess water being sent to the effluent treatment plant at the Coleshill Mill before final discharge to holding tanks prior to release to the Dee Estuary on ebb tide.

The effluent treatment plant is a conventional aerobic activated sludge plant with a sedimentation clarifier. The aeration/digestion stage is a completely mixed tank with surface aeration turbines and submerged invent mixers. The overflow from the aeration tank is de-gassed before the final clarifier. Settled sludge is removed by siphon tube in the rotating bridge clarifier. Sludge is either recirculated or de-watered for appropriate disposal.

The main releases from the paper mills are the discharge of effluent from the effluent treatment plant, the exhaust stacks from the boilers & dryers and the vent stacks. All of these releases have previously been regulated under IPPC Authorisation Number AU6820 and IPPC permit EPR/BK9703IM. An ISO14001 accredited Environmental Management System (EMS) is in place to ensure that there is an ongoing review of the activities at the installation to minimise the environmental impact.

The status log of the permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application EPR/BJ9703IM/A001 received	21/02/01	Application for paper mill.
Response to request for additional information, request dated 29/04/02	21/05/02	
Permit determined EPR/BJ9703IM	27/03/03	Permit issued to Kimberly –Clark Limited
Environment Agency Paper and Pulp Sector Review 2011 Variation determined EPR/BJ9703IM/V002 Permit EPR/BJ9703IM	27/09/11	Varied and consolidated permit issued in modern condition format
Agency variation determined EPR/BJ9703IM/V003	21/03/13	Agency variation to implement the changes introduced by IED
Low risk partial surrender application EPR/BJ9703IM/S004	Duly Made 12/11/14	Application to partially surrender an area of the permit
Application determined EPR/BJ9703IM/S004	25/02/14	Low risk partial surrender issued

Status log of the permit		
Description	**Date**	**Comments**
Regulation 60 Notice dated 19/11/14 (Notice requiring information for statutory review of permit)	Response received 26/03/15	Technical standards detailed in response to the information notice. Information to demonstrate that relevant BAT conclusions are met for the production of paper, pulp and board
Natural Resources Wales Variation Application EPR/ EPR/BJ9703IM/V005 (Variation and Consolidation)	31/03/16	Natural Resources Wales Variation and consolidation following the implementation of the Industrial Emissions Directive

End of introductory note

Permit

The Environmental Permitting (England and Wales) Regulations 2010

Permit number
EPR/BJ9703IM

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/BJ9703IM/V005 authorising,

Kimberly-Clark Limited ("the operator"),

whose registered office is
1 Tower View
Kings Hill
West Malling
Kent
ME19 4HA

company registration number **00308676**

to operate an installation at
Flint Paper Mill
Coleshill Mill
Aber Road
Flint
CH6 5EX

to the extent authorised by and subject to the conditions of this permit.

Name	Date
	31/03/2016

Eirian Macdonald

Authorised on behalf of Natural Resources Wales

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.2 Energy efficiency

1.2.1 The operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities;

(b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:

(a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and

(b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and

(c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.

1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the “activities”).

2.1.2 Waste authorised by this permit shall be clearly distinguished from any other waste on the site.

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 (a) The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by Natural Resources Wales.

(b) If notified by Natural Resources Wales that the activities are giving rise to pollution, the operator shall submit to Natural Resources Wales for approval within the period specified, a revision of any plan or other documentation (“plan”) specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

2.3.2 Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2 table S2.1 and

(b) it conforms to the description in the documentation supplied by the producer and holder.

2.3.3 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:

(a) the nature of the process producing the waste;

(b) the composition of the waste;

(c) the handling requirements of the waste;

(d) the hazardous property associated with the waste, if applicable; and

(e) the waste code of the waste.

2.3.5 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by Natural Resources Wales.

2.4.2 Except in the case of an improvement which consists only of a submission to Natural Resources Wales, the operator shall notify Natural Resources Wales within 14 days of completion of each improvement.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.

3.1.2 The limits given in schedule 3 shall not be exceeded.

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil agreed in writing with Natural Resources Wales under IC3, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution, submit to Natural Resources Wales for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Monitoring

3.3.1 The operator shall, unless otherwise agreed in writing by Natural Resources Wales, undertake the monitoring specified in the following tables in schedule 3 to this permit:

(a) point source emissions specified in tables S3.1, S3.2 and S3.3;

3.3.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.3.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.3.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by Natural Resources Wales.

3.3.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1 and S3.2 unless otherwise agreed in writing by Natural Resources Wales.

3.4 Odour

3.4.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.4.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to odour, submit to Natural Resources Wales for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.5 Noise and vibration

3.5.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.5.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to noise and vibration, submit to Natural Resources Wales for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by Natural Resources Wales, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

(ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by Natural Resources Wales.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to Natural Resources Wales using the contact details supplied in writing by Natural Resources Wales.

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by Natural Resources Wales, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4 table S4.1;

(b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.3 ; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to Natural Resources Wales, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.2.5 Within 1 month of the end of each quarter, the operator shall submit to Natural Resources Wales using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.3 Notifications

4.3.1 (a) In the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform Natural Resources Wales,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and

(iii) take the measures necessary to prevent further possible incidents or accidents;

(b) in the event of a breach of any permit condition the operator must immediately—

(i) inform Natural Resources Wales, and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

(c) in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 Where Natural Resources Wales has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform Natural Resources Wales when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to Natural Resources Wales at least 14 days before the date the monitoring is to be undertaken.

4.3.4 Natural Resources Wales shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name(s) or address(es); and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) Natural Resources Wales shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.3.6 Natural Resources Wales shall be given at least 14 days' notice before implementation of any part of the site closure plan.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 - Operations

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
A1	S6.1 A1 (b)	Producing paper in industrial plant, paper board where the plant has a production capacity of more than 20 tonnes per day. Production takes place at the Coleshill Mill.	From receipt of waste paper and virgin, to despatch of products to distribution warehouse.
A2	S5.4 A(1) (a) (i)	Biological treatment of effluent from the paper making process in an on-site effluent treatment plant.	From transfer of effluent from Coleshill Mill to the effluent treatment plant through to discharge of treated effluent to the Dee Estuary. Effluent shall only be discharged to the Dee Estuary on the ebb tide 30 mins after high tide for a maximum of 2 hours.
	Directly Associated Activity		
A3	Combustion Plant	Provision of steam for use in the process by burning gas (or gas oil) in a boiler.	Combustion of fuel to release of exhaust gases to atmosphere.
A4	Surface water disposal	Discharge of clean uncontaminated site surface water from roofs, paths and roads	From transfer through the drainage system to discharge into the Dee Estuary via Flint mill and the Swinchard Brook.

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application	The response to question B2.3 given the Application sections 5.0 and 6.0.	22/02/2001
Response to Schedule 4 notice Request dated 29/04/2002	Response to question 4.	22/05/2002
Response to Reg.60 notice	The response and supporting information requested by NRW	26/03/2015

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC 1	If storing Priority Hazardous Substances on site, the Operator must carry out the following assessments with reference to the Environment Agency's guidance "*How to carry out a risk assessment if you're applying for a bespoke permit* that includes discharging hazardous pollutants to surface water", • Phase 1 Part A screening tests for mercury, cadmium, nickel, lead, benzene, polyaromatic hydrocarbons and any other relevant substances. Phase 1 Part B screening tests for mercury, cadmium, polyaromatic hydrocarbons and any other relevant priority hazardous substances. • For any substance which is not screened out by the Phase 1 Part A or Part B screening tests the Operator will also need to carry out Phase 2 modelling, as described in "*How to carry out a risk assessment if you're applying for a bespoke permit that includes discharging hazardous pollutants to surface water*". The Operator must provide Natural Resources Wales with the results of the emissions monitoring, the results from the screening tests and the results from any Phase 2 modelling. The Operator may use the Environment Agency's H1 electronic screening tool to present the emissions data and to carry out the Phase 1 screening tests. Note: With regard to the Phase 1 Part A screening - a full list of relevant substances is provided in the Environment Agency guidance "*How to carry out a risk assessment if you're applying for a bespoke permit that includes discharging hazardous pollutants to surface water*" under the section entitled "*Screening test: priority hazardous pollutants*". The Operator must review the list and carry out the screening for any substances, in addition to those specified in the notice, that may be present in the installations discharges to surface water. With regard to the Phase 1 Part B screening for priority hazardous pollutants, the section entitled "*Screening test: priority hazardous pollutants*" provides a full list of relevant priority hazardous substances and their associated annual significant loads.	30/09/2016
IC 2	The Operator shall submit the written protocol referenced in condition 3.1.3 for the monitoring of soil and groundwater for approval by Natural Resources Wales. The protocol shall demonstrate how the Operator will meet the requirements of Articles 14(1) (b), 14(1) (e) and 16(2) of the IED. *The procedure shall be implemented in accordance with the written approval from Natural Resources Wales.*	30/09/2016
IC 3	The Operator shall submit a report on the baseline conditions of soil and groundwater at the installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in the application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.	31/03/2017

Schedule 2 - Waste types, raw materials and fuels

Table S2.2 Permitted waste types and quantities	
Maximum quantity	**No limit on maximum quantity, subject to appropriate storage.**
Waste code	**Description**
20 01 01	Paper and Cardboard – Municipal Waste
15 01 01	Paper and Cardboard Packaging
19 12 01	Paper and Cardboard – From the Mechanical Treatment of Waste

Schedule 3 (a)– Emissions and monitoring

Emissions until 29/9/2018

Table S3.1 Point source emissions to air – emission

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A6 Coleshill Mill boiler flue - point A6 in Figure 5.2.2.1	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	Boiler Plant	No limit set	Half hourly average	Every 6 months (Note 1)	BS EN 14792 or ISO 10849
A7 Coleshill Mill drying hood - point A7 in Figure 5.2.2.1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	Drying hood	No limit set	Half hourly average	Every 6 months (Note 1)	BS EN 14792 or ISO 10849
	Particulates		No limit set	Minimum 4 hour sample		BS13284-1 and MID
A8 Coleshill Mill H&V fan 1 - point A8 in Figure 5.2.2.1	No parameters set	H&V fan 1	No limit set	-	-	-
A9 Coleshill Mill H&V fan 2 - point A9 in Figure 5.2.2.1	No parameters set	H&V fan 2	No limit set	-	-	-
A10 Coleshill Mill H&V fan 3 - point A10 in Figure 5.2.2.1	No parameters set	H&V fan 3	No limit set	-	-	-
A11 Coleshill Mill H&V fan 4 - point A11 in Figure 5.2.2.1	No parameters set	H&V fan 4	No limit set	-	-	-
A12 Coleshill Mill H&V fan 5 - point A12 in Figure 5.2.2.1	No parameters set	H&V fan 5	No limit set	-	-	-
A13 Coleshill Mill H&V fan 6 - point A13 in Figure 5.2.2.1	No parameters set	H&V fan 6	No limit set	-	-	-
A14 Coleshill Mill de-ink vacuum exhaust - point A14 in Figure 5.2.2.1	No parameters set	De-ink vacuum exhaust	No limit set	-	-	-

Table S3.1 Point source emissions to air – emission						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A15 Coleshill Mill dust extraction - point A15 in Figure 5.2.2.1	Particulates	Dust extraction flue	No limit set	Minimum 4 hour sample	Every 6 months	BS13284-1 and MID
A16 Coleshill Mill stock preparation extract duct - point A16 in Figure 5.2.2.1	No parameters set	Stock preparation extract duct	No limit set	-	-	-
A17 Coleshill Mill roof mounted air extract units (x8) - point A17 in Figure 5.2.2.1	No parameters set	Coleshill Mill roof mounted air extract units	No limit set	-	-	-
A18 Coleshill mist extract	No Parameters set	Coleshill mist extract	No limit set	-	-	-
Note 1: Monitoring to be undertaken when burning gas as the fuel.						

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
W1 point of discharge from Flint Mill Lake to Swinchard Brook	No parameters set	Uncontaminated site surface water	No limit set	-	-	-
W2 point of discharge to the Dee Estuary (at Grid Ref: SJ 246 741) from Effluent treatment plant	Biological Oxygen Demand		35 mg/l	Tidal flow proportional sample	Weekly (Note 1)	BS EN 1899-1 (1998)
	Ammonia (Note 4)		4 mg/l	Tidal flow proportional sample	At every discharge to the Dee Estuary	BS EN 11732:2005
	Chemical Oxygen Demand		No limit set	Spot Sample (Note 4)	Daily (Note 1)	BS 6068-2.34:1998
	Suspended solids (Note 4)		80 mg/l	Tidal flow proportional sample	At every discharge to the Dee Estuary	BS EN 872:2005
	pH		5 - 9	Instantaneous	Continuous (Note 2)	BS EN 06068-2.50:1995

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
	Priority Hazardous Substances (Note 3)		No limit set	Tidal flow proportional sample	Annually (Note 1)	GC/MS analysis to be carried out by UKAS accredited laboratory
	Temperature		Maximum Temp 30°C	Instantaneous	Continuous (Note 2)	Standard temperature sensor
	AO_x		No limit set	Tidal flow proportional sample	Quarterly (Note 1)	As agreed in writing with the NRW.
	Total Nitrogen		No limit set	Tidal flow proportional sample	Weekly (Note 1)	BS EN ISO 11905-1:1998, BS 6068-2.62:1998
	Total Phosphorous		No limit set	Tidal flow proportional sample	Weekly (Note 1)	BS EN ISO 15681-1:2004, BS6068-2.86:2003
	Pentachlorophenol (PCP) and its compounds		4 ug/l	Tidal flow proportional sample	Quarterly (Note 1)	BS EN 12673:1999
	Flow Rate		500 l/second	Instantaneous	Continuous (Note 2)	MCERTS self-monitoring of effluent flow scheme
	Maximum Tidal volume		2500 m^3/tide	From 30 mins after high tide for a maximum of 2 hours	Continuous (Note 2)	MCERTS Self-Monitoring of effluent flow scheme
	Maximum Daily Volume		5000 m^3/day	24 hours	Continuous (Note2)	MCERTS Self-Monitoring of effluent flow scheme
	Metals – Zn, Cu, As, Pb, Ni, Total and dissolved		No limit	Tidal flow proportional sample	Once a year	Method in accordance with M18 guidance note.

Note 1: Monitoring shall be undertaken when discharging on the ebb tide to the Dee Estuary.

Note 2: Monitoring shall be undertaken during every discharge on the ebb tide to the Dee Estuary.

Note 3: Water Framework Directive Priority Hazardous Substances detailed in Schedule 6 – Interpretation.

Note 4: Where in-house analysis is used for compliance assessment purposes for the following substances, a duplicate sample shall be sent for external analysis (UKAS/ ISO17025) at a six monthly frequency: Suspended Solids, Chemical Oxygen Demand (COD) and Ammonia.

Schedule 3 (b)– Emissions and monitoring

Emissions from 30/09/2018

Table S3.1 Point source emissions to air – emission

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference period	Monitoring frequency	Monitoring standard or method
A6 Coleshill Mill boiler flue - point A6 in Figure 5.1.2.1	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	Boiler Plant	No limit set	Half hourly average	Every 6 months (Note 1)	Monitoring methods used shall be in accordance with Environment Agency document "*Technical Guidance Note M2 Monitoring of stack emissions to air*".
A7 Coleshill Mill drying hood - point A7 in Figure 5.2.2.1	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	Drying hood	No limit set	Half hourly average	Every 6 months (Note 1)	
	Particulates		No limit set	Minimum 4 hour sample		
A8 Coleshill Mill H&V fan 1 - point A8 in Figure 5.2.2.1	No parameters set	H&V fan 1	No limit set	-	-	-
A9 Coleshill Mill H&V fan 2 - point A9 in Figure 5.2.2.1	No parameters set	H&V fan 2	No limit set	-	-	-
A10 Coleshill Mill H&V fan 3 - point A10 in Figure 5.2.2.1	No parameters set	H&V fan 3	No limit set	-	-	-
A11 Coleshill Mill H&V fan 4 - point A11 in Figure 5.2.2.1	No parameters set	H&V fan 4	No limit set	-	-	-
A12 Coleshill Mill H&V fan 5 - point A12 in Figure 5.1.2.1	No parameters set	H&V fan 5	No limit set	-	-	-
A13 Coleshill Mill H&V fan 6 - point A13 in Figure 5.2.2.1	No parameters set	H&V fan 6	No limit set	-	-	-
A14 Coleshill Mill de-ink vacuum exhaust - point A14 in Figure 5.2.2.1	No parameters set	De-ink vacuum exhaust	No limit set	-	-	-

Table S3.1 Point source emissions to air – emission						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A15 Coleshill Mill dust extraction - point A15 in Figure 5.2.2.1	Particulates	Dust extraction flue	No limit set	Minimum 4 hour sample	Every 6 months	Monitoring methods used shall be in accordance with Environment Agency document "*Technical Guidance Note M2 Monitoring of stack emissions to air".*
A16 Coleshill Mill stock preparation extract duct - point A16 in Figure 5.2.2.1	No parameters set	Stock preparation extract duct	No limit set	-	-	-
A17 Coleshill Mill roof mounted air extract units (x8) - point A17 in Figure 5.2.2.1	No parameters set	Coleshill Mill roof mounted air extract units	No limit set	-	-	-
A18 Coleshill mist extract	No Parameters set	Coleshill mist extract	No limit set	-	-	-
Note 1: Monitoring to be undertaken when burning gas as the fuel.						

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
W1 point of discharge from Flint Mill Lake to Swinchard Brook	No parameters set	Uncontaminated site surface water	No limit set	-	-	-
W2 point of discharge to the Dee Estuary (at Grid Ref: SJ 246 741) from Effluent treatment plant	Biological Oxygen Demand		35 mg/l	Tidal flow proportional sample	Weekly (Note 1)	BS EN 1899-1 (1998)
	Ammonia (Note 4)		4 mg/l	Tidal flow proportional sample	At every discharge to the Dee Estuary	BS EN 11732:2005
	Chemical Oxygen Demand		No limit set	Spot Sample (Note 4)	Daily (Note 1)	BS 6068-2.34:1998

Table S3.2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
	Suspended solids (Note 4)		80 mg/l	Tidal flow proportional sample	At every discharge to the Dee Estuary	BS EN 872:2005
	Pentachlorophenol (PCP) and its compounds		4 ug/l	Tidal flow proportional sample	Quarterly (Note 1)	BS EN 12673:1999
	pH		5 - 9	Instantaneous	Continuous (Note 2)	BS EN 06068-2.50:1995
	Priority Hazardous Substances (Note 3)		No limit set	Tidal flow proportional sample	Annually (Note 1)	GC/MS analysis to be carried out by UKAS accredited laboratory
	Temperature		Maximum Temperature 30ºC	Instantaneous	Continuous (Note 2)	Standard temperature sensor
	AO_x		No limit set	Tidal flow proportional sample	Once every 2 months (Note 1)	BS EN ISO 9562:2004 or as otherwise agreed in writing with NRW.
	Total Nitrogen		No limit set	Tidal flow proportional sample	Weekly (Note 1)	BS EN ISO 11905-1:1998, BS 6068-2.62:1998
	Total Phosphorous		No limit set	Tidal flow proportional sample	Weekly (Note 1)	BS EN ISO 15681-1:2004, BS6068-2.86:2003
	Flow		500 l/second	Instantaneous	Continuous (Note 2)	MCERTS self-monitoring of effluent flow scheme
	Maximum Tidal volume		2500 m^3/day	From 30 mins after high tide for a maximum of 2 hours	Continuous (Note 2)	MCERTS Self-Monitoring of effluent flow scheme
	Maximum Daily Volume		5000 m^3/tide	24 hours	Continuous (Note 2)	MCERTS Self-Monitoring of effluent flow scheme
	Metals – Zn, Cu, As, Pb, Ni, Total and dissolved		No limit	Tidal flow proportional sample	Once a year	Method in accordance with M18 guidance note.

Note 1: Monitoring shall be undertaken when discharging on the ebb tide to the Dee Estuary.
Note 2: Monitoring shall be undertaken during every discharge on the ebb tide to the Dee Estuary.
Note 3: Water Framework Directive Priority Hazardous Substances detailed in Schedule 6 – Interpretation.
Note 4: Where in-house analysis is used for compliance assessment purposes for the following substances, a duplicate sample shall be sent for external analysis (UKAS/ ISO17025) at a six monthly frequency: Suspended Solids, Chemical Oxygen Demand (COD) and Ammonia.

Table S3.3 Annual limits		
Substance	**Medium**	**Limit (including unit)**
Chemical Oxygen Demand (COD)	Water	4.0 kg/t
Total Suspended Solids (TSS)	Water	0.4 kg/t
Total Nitrogen	Water	0.15 kg/t
Total Phosphorus	Water	0.015 kg/t
Adsorbable organically bound halogens (AO_X)	Water	0.05 kg/t

Schedule 4 (a) – Reporting

Reporting until 29/9/2018

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data

Parameter	Emission or monitoring point/reference	Reporting period	Period begins
Emissions to air Parameters as required by condition 3.3.1	A6, A7 and A15	Every 6 months	From date of variation issue
Emissions to water Parameters as required by condition 3.3.1	W2	Every 12 months where monitoring frequency is annual and every 3 months for monitoring frequency less than annual.	From date of variation issue

Table S4.2 Performance parameters

Parameter	Frequency of assessment	Units
Total Energy Used	Annually	MWh
Water usage	Annually	Tonnes
Chemical Oxygen Demand	Annually	kg/t
Total Suspended Solids	Annually	kg/t
Total Nitrogen	Annually	kg/t
Total Phosphorus	Annually	kg/t
Adsorbable organically bound halides (AOX)	Annually	kg/t

Table S4.3 Reporting forms

Media/parameter	Reporting format	Date of form
Air	Form air 1 or other form as agreed in writing by Natural Resources Wales	26/09/2011
Water	Form water 1 or other form as agreed in writing by the Natural Resources Wales	26/09/2011
Energy Usage	Form energy 1 or other form as agreed in writing by the Natural Resources Wales	01/01/2016
Other performance indicators	Form performance 1 or other form as agreed in writing by Natural Resources Wales	26/09/2011
Waste subject to condition 4.2.5	Spreadsheet provided by Natural Resources Wales, to be e-mailed to waste.returns@cyfoethnaturiolcymru.gov.uk	N/A
Resource efficiency	Form Performance 2 or other form as agreed in writing by Natural Resources Wales	01/01/2016

Schedule 4 (b) – Reporting

Reporting from 30/09/2018

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air Parameters as required by condition 3.5.1	A6, A7 and A15	Every 6 months	From date of variation issue
Emissions to water Parameters as required by condition 3.5.1	W2	Every 12 months where monitoring frequency is annual and every 3 months for monitoring frequency less than annual.	From date of variation issue

Table S4.2 Performance parameters		
Parameter	**Frequency of assessment**	**Units**
Total Energy Used	Annually	MWh
Water usage	Annually	Tonnes
Chemical Oxygen Demand	Annually	kg/t
Total Suspended Solids	Annually	kg/t
Total Nitrogen	Annually	kg/t
Total Phosphorus	Annually	kg/t
Adsorbable organically bound halides (AOX)	Annually	kg/t

Table S4.3 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air	Form air 1 or other form as agreed in writing by Natural Resources Wales	30/09/2018
Energy Usage	Form energy 1 or other form as agreed in writing by Natural Resources Wales	30/09/2018
Water	Form water 1 or other form as agreed in writing by Natural Resources Wales	30/09/2018
Other performance indicators	Form Performance 1 or other form as agreed in writing by Natural Resources Wales	26/09/2011
Waste subject to condition 4.2.5	Spreadsheet provided by Natural Resources Wales, to be e-mailed to waste.returns@cyfoethnaturiolcymru.gov.uk	N/A
Resource efficiency	Form Performance 2 or other form as agreed in writing by Natural Resources Wales	30/09/2018

Schedule 5 - Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any activity that gives rise to an incident or accident which significantly affects or may significantly affect the environment	
To be notified Immediately	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a permit condition	
To be notified immediately	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) In the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment:	
To be notified immediately	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B - to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 - Interpretation

"accident" means an accident that may result in pollution.

"AOX" means Adsorbable organic halides measured according to the EN ISO:9562 standard method for waste waters

""Annex I" means Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"Annex II" means Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"*annually*" means once every year.

"application" means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

"authorised officer" means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

"background concentration" means such concentration of that substance as is present in:

- for emissions to surface water, the surface water quality up-gradient of the site; or
- for emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge.

"disposal" means any of the operations provided for in Annex IIA to Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on Waste.

"emissions to land" includes emissions to groundwater.

"EP Regulations" means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

"emissions of substances not controlled by emission limits" means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit**.**.

"groundwater" means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

"hazardous property" has the meaning given in Schedule 3 of the Hazardous Waste (England and Wales) Regulations 2005 No.894 and the Hazardous Waste (Wales) Regulations 2005 No. 1806 (W.138).

"Industrial Emissions Directive" *means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions "MCERTS"* means the Environment Agency's Monitoring Certification Scheme.

"Pests" *means Birds, Vermin and Insects.*

"quarter" means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

"WFD" means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste

Water Framework Directive Priority Hazardous Substances are Anthracene, Brominated diphenyl ether, Cadmium, C10-13 Chloroalkanes, Endosulphan, Hexachlorobenzene, Hexachlorobutadiene, Hexachloro-cyclohexane, Mercury and its compounds, Nonylphenol (4-Nonylphenol), Pentachlorobenzene, Polycyclic aromatic Hydrocarbons (PAHs), Tributyltin compounds (Tributyltin-cation)

waste code" means the six digit code referable to a type of waste in accordance with the list of wastes established by Commission Decision 2000/532/EC as amended from time to time (the 'List of Wastes Decision') and in relation to hazardous waste, includes the asterisk.

“year” means calendar year ending 31 December.

Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

(a) in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or

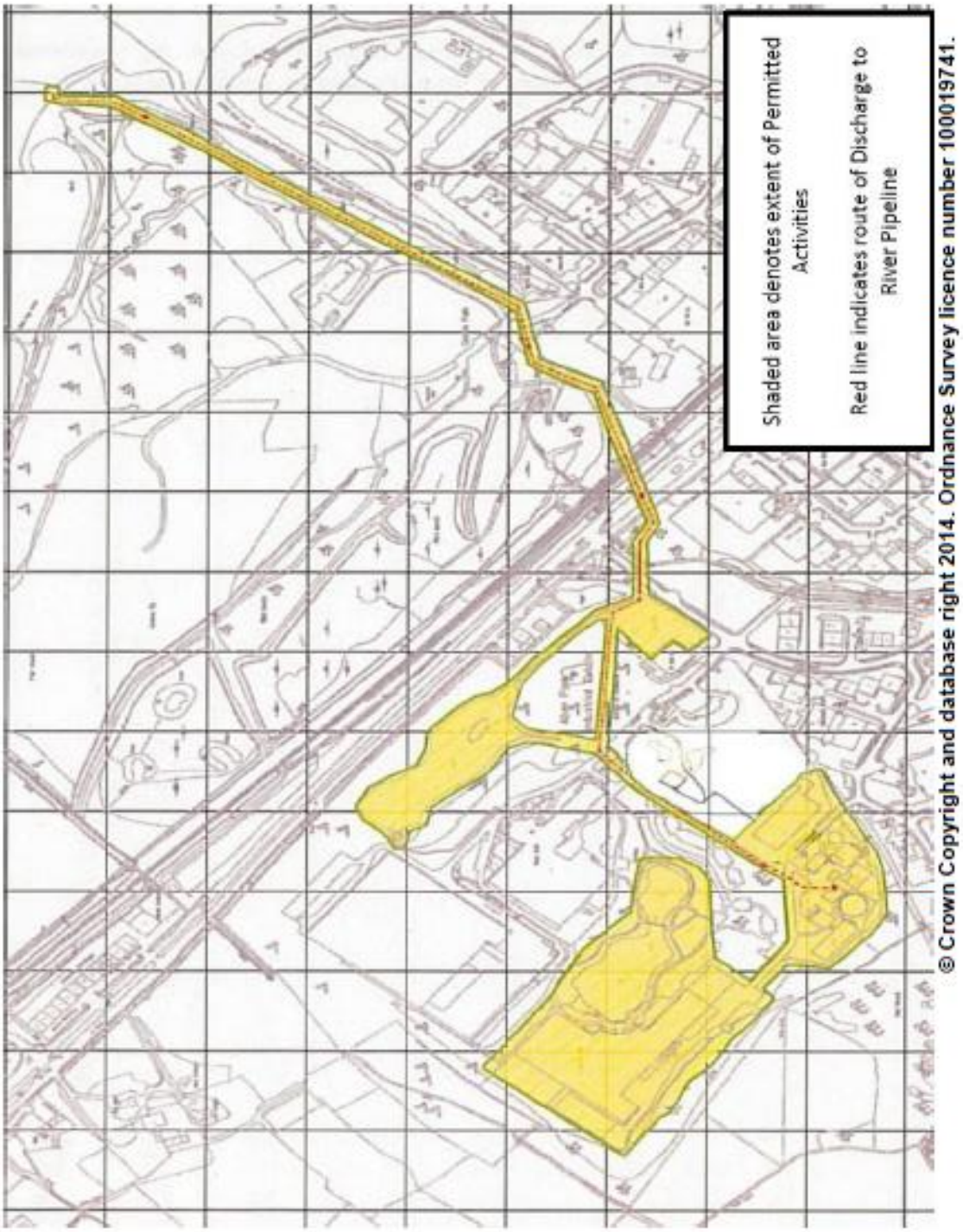
(b) in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content

Net production is

(i) For paper mills: the unpacked, saleable production after the last slitter winder, i.e. before converting.
(ii) (ii) For off-line coaters: production after coating.
(iii) (iii) For tissue mills: saleable production after the tissue machine before any rewinding processes and excluding any core.
(iv) For market pulp mills: production after packing (ADt).
(v) For integrated mills: Net pulp, production refers to the production after packing (ADt) plus the pulp transferred to the paper mill (pulp calculated at 90 % dryness, i.e. air dry). Net paper production: same as (i)

Calculation for the conversion of mg/l to kg/t can be found in Annex I of the BRef Notes

Schedule 7 - Site plan



END OF PERMIT