

Non-Technical Summary

Purpose: This Non-Technical Summary document supports an Environmental Permit application to vary the bespoke installation permit (Speciality Organic Chemicals Sector), to reflect the addition of two new emission points to air; a stack from an abatement plant for a new [REDACTED] process and the addition of a second steam generator.

Operator: Purolite Ltd.

Site: Purolite Ltd. Unit C, Llantrisant Business Park, Llantrisant, Rhondda Cynon Taff, CF72 8LF

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Document Reference: SPC0055/Variation/NTS/V1/May 2022

Date: May 2022

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Contents

1	Introduction.....	1
1.1	Overview	1
1.2	Permitting	1
1.3	Confidentiality request	1
2	Site Details.....	2
2.1	Site location	2
2.2	Site description	2
2.3	Process description	3
2.4	Infrastructure	3
3	Environmental sensitivities	4
3.1	Human receptors	4
3.2	Groundwater.....	5
3.3	Surface water	5
3.4	Air Quality Management Areas.....	5
3.5	Ecological receptors	5
3.6	Flood risk.....	6
4	Management	7
4.1	Management System	7
4.2	Accident Management.....	7
4.3	Health and safety	7
4.4	Technical Competency.....	7
5	Control of Emissions to Land and Water	8
5.1	Overview	8
5.2	Storage and handling of polluting materials.....	8
5.2.1	Overview	8
5.2.2	Waste Stream B	8
5.2.3	Elemental [REDACTED] handling area	8
5.2.4	Sodium Formate Reservoir Tank.....	8
5.2.5	Drainage.....	8
6	Control of Emissions to Sewer.....	9
7	Control of Emissions to Air	9
7.1	Control of point source emissions to air.....	9
7.1.1	Overview	9
7.1.2	A5: Steam generator stack B.....	9

7.1.3	A6: [REDACTED] abatement plant stack	9
7.2	Control of fugitive emissions to air	10
8	Waste inventory	10
9	Control of Amenity Impacts	11
9.1	Odour	11
9.2	Noise	11
9.3	Summary	11
Figures.....		12

1 Introduction

1.1 Overview

This Non-Technical Summary (NTS) has been prepared by Shann Pitts Consulting Limited (SPC) on behalf of Purolite Limited to support an application to vary the bespoke installation environmental permit (permit reference EPR/AB3894ZF), which regulates the organic chemical manufacturing plant, namely the manufacture of agarose-based resin for pharmaceutical use, at Unit C, Llantrisant Business Park, Llantrisant, Rhondda Cynon Taff, CF72 8LF herein termed 'the Site' operated by Purolite Limited, herein termed 'the Operator'.

The application has been prepared by SPC in conjunction with and on behalf of the Operator.

Basic pre-application advice has been sought from the Natural Resources Wales with respect to this variation permit application (Andi Kemp and Mostyn Wall).

The following risk assessments have been completed to support the permit variation application:

- A qualitative Environmental Risk Assessment.¹
- A quantitative H1 risk assessment and Air Quality Assessment.⁷

This Non-Technical Summary highlights the key control measures to minimise any impacts from the operational site and signposts the reader to the key supporting documents.

1.2 Permitting

The site is regulated by Natural Resources Wales (NRW) under the Environmental Permitting (England and Wales) Regulations 2016 under Schedule 1, Part 2, Section 4.1 Organic Chemicals, Part A(1).

The permit was issued by Natural Resources Wales on 31st May 2018. This NTS supports the first variation to the permit and it is deemed that the changes constitute a normal or standard variation.

The variation application which this NTS supports is for the addition of two new emission points to air; a stack from a [REDACTED] abatement plant associated with a new [REDACTED] process and the addition of a second natural gas steam generator. The existing and proposed steam generators are of the same specification and both have a net rated thermal input of 510 kWth and are therefore not Medium Combustion Plants.

The existing steam generator is referred to as a 'boiler' in the current permit. It is requested that this is changed to 'generator'.

There are no proposed changes to the listed activities or the directly associated activities. There are some operational changes since permit issue with respect to waste stream segregation and management, which have been detailed within the application documents.

1.3 Confidentiality request

The Operator has requested that aspects of the permit application are redacted from public accessible records as release of some information could undermine the economic interest and competitive

¹ SPC0055/Variation/ERA/V2/May 2022

position of the operator. The Confidentiality Request forms part of the permit variation supporting documents.²

2 Site Details

2.1 Site location

See Figure 1 – Site Location Plan

Address: Purolite Ltd. Unit C, Llantrisant Business Park, Llantrisant, Rhondda Cynon Taff, CF72 8LF

National Grid Reference: ST 04131 84511

Local Authority: Rhondda Cynon Taff Unitary Authority

2.2 Site description

The site is located within Llantrisant Business Park and is immediately adjacent to Purolite's offices. The site includes an industrial building, surrounding tarmac/ concrete slab access road, car park and service yard in an area of approximately 0.5 hectares (1.2 acres) with a perimeter of approximately 250m³. It comprises of one building 30m by 40m and 7m to the eaves, within which the entire production process takes place.

The site is located 17km north west of Cardiff. It is approximately 1.2km north north west of Llantrisant and 1.9km west of Beddau. The northern and western perimeter of the site is bounded by industrial units on the Llantrisant Business Park, with the eastern perimeter being adjacent to Llantrisant Common and Pastures which is a 113-hectare (280 acre) Site of Special Scientific Interest (SSSI). A tributary of the Nant Muchudd runs adjacent to the permitted boundary, alongside the eastern perimeter.³

² Purolite Confidentiality Request to NRW 13-05-2022

³ <https://magic.defra.gov.uk/MagicMap.aspx> Accessed 12th January 2022

2.3 Process description

A full technical description forms part of the permit application in accordance with Part C3, Appendix 2 (Specific Questions for the Chemical Sector).⁴

The variation application details and assesses the changes to the process since the site was permitted on 31st May 2018. The variation is required to reflect the addition of a [REDACTED] and cross-linking process to allow the production of additional end products for the pharmaceutical industry.

[REDACTED]

[REDACTED]

2.4 Infrastructure

The infrastructure associated with the process changes is:

- Elemental [REDACTED] handling area (bundled):
 - [REDACTED] drum ([REDACTED] litres)
 - [REDACTED] water tank ([REDACTED] litres); this is connected to the [REDACTED] abatement plant.
- [REDACTED] abatement plant including:
 - Reservoir tank for sodium formate
 - Media packed vessel
 - Pump and trickling system for sodium formate

⁴ Purolite Technical Description V2 December 21

3 Environmental sensitivities

3.1 Human receptors

The key sensitive human receptors that have been identified within a 1km radius of the site are summarised in Table 1. The prevailing wind direction at the site is westerly.

Table 1: Summary of key human receptors within 1km radius of the site

Receptor Description	Receptor Type	Easting	Northing	Bearing	Approximate distance from site boundary (km)
Farmhouse 1	Residential	304047	185500	N	1km
Commercial residents of the Llantrisant Business Park	Commercial	N/A	N/A	Entire area 180° north of the site	Adjacent and up to 1km
Ynysmaerdy Terrace	Residential	303457	184466	W	0.6km
Ynysmaerdy community centre	Non-residential institution	303397	184362	WSW	0.7km
Royal mint (within Llantrisant Business Park)	Commercial/leisure	304033	185030	NNW	0.5km
Three Saints hotel/ the Red Mint	Hotel	303977	184731	NW	0.3km
Royal Glamorgan Hospital	Hospital	303618	184344	SW	0.5km (at nearest point)
Ansari Court	Residential	303479	184381	WSW	0.6km
Farmhouse 2	Residential	303253	184089	SW	1km
Premier Inn	Hotel	303816	183726	SSW	0.8km
Beefeater Longbow	Restaurant	303814	183657	SSW	0.9km
Farmhouse 3	Residential	303941	184105	SSW	0.4km
Farmhouse 4	Residential	303895	183895	SSW	0.6km
Farmhouse 5	Residential	303995	183651	S	0.8km
Coed Yr Esgob	Residential	304451	183768	SSE	0.8km
Llantrisant Primary School	School	304563	183853	SSE	0.7km
Farmhouse 6	Residential	304853	185169	NE	1km

Source: Magic Maps 2021

To assess the impact of air and odour emissions from the regulated facility upon human receptors, Earthcare Technical Limited were commissioned to conduct an Air Quality Assessment (AQA).⁷ The AQA found predicted levels of odour to be within the adopted odour threshold. Impacts of emissions to air except NO₂ were screened out in the H1 risk assessment. The predicted short-term impacts of NO₂ at human receptor locations was modelled and were found to be not significant.

3.2 Groundwater

The site is not located in a groundwater source protection zone. The bedrock aquifer under the site is designated as 'Secondary A' and is comprised of the following 'sand and gravel' permeable layers:

- Hughes Member
- Glaciofluvial deposits

It is classed as a minor sand and gravel aquifer. Figure 2 is an aquifer map provided by NRW.

3.3 Surface water

A tributary of the Nant Muchudd runs adjacent to the permitted boundary, alongside the eastern perimeter. The water quality status of the Nant Muchudd is classified as 'good' for chemical and 'good' for ecological status under the Water Framework Directive.

3.4 Air Quality Management Areas

The site is not within an Air Quality Management Area (AQMA). In response to breaches of the Air Quality Objectives for nitrogen dioxide, there are currently 16 AQMAs within Rhondda Cynon Taf including five AQMAs within 6km of the site all declared due to exceedances of the objective for nitrogen dioxide (NO₂) (annual mean):

- Mwyndy AQMA (approximately 3.2km, south-southeast)
- Llanharan AQMA (approximately 4.1km, southwest)
- Church Village AQMA (approximately 4.7km, northeast)
- Tonyrefail AQMA (approximately 4.8km, northwest)
- Broadway AQMA (approximately 6.0km, northeast)).⁵

3.5 Ecological receptors

The eastern perimeter of the site is adjacent to Llantrisant Common and Pastures which is a 113-hectare (280 acre) Site of Special Scientific Interest (SSSI). Two local fields are also protected as a SSSI under the name 'Rhos Tonyrefail' (meaning the moorland of Tonyrefail) also within 2km of the site boundary. Cardiff Beech Woods is nationally designated as a Special Area of Conservation (SACs) and is situated approximately 7km to the southeast. There are no designated Special Protection Areas (SPAs) within 10km.⁶

Table 2: Key ecological receptors

Receptor Description	Receptor Type	Easting	Northing	Bearing	Approximate distance from site boundary (km)
Llantrisant Common and Pastures	Site of Special Scientific Interest (SSSI)	N/A	N/A	Along eastern perimeter of site	Adjacent
Rhos Tonyrefail 1	SSSI	302106	187479	NW	0.8km
Rhos Tonyrefail 2	SSSI	302106	187497	NNW	1.7km

⁵ <https://uk-air.defra.gov.uk/aqma/maps> Accessed 25th April 2022

⁶ <https://magic.defra.gov.uk/MagicMap.aspx> Accessed March 2022

Cardiff Beech Woods	SAC	310945	182495	SE	7.1km
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Source: Magic Maps 2022³

To assess the impact of air emissions from the regulated facility upon ecological receptors, Earthcare Technical Limited were commissioned to conduct an Air Quality Assessment (AQA).⁷ The AQA concludes:

The potential for long and short-term impacts of NO_x at Cardiff Beech Woods SAC and locally designated conservation sites were determined to be not significant. The potential for nutrient nitrogen and acid deposition to impact these sites was also considered unlikely.

At the Llantrisant Common and Pastures SSSI site the predicted concentrations (PCs) and predicted environmental concentrations (PECs) of NO_x were within the long-term (annual) limit. Predicted short-term (daily) NO_x concentrations were within the lower (screening) limit and upper limit (used in conjunction with ozone for detailed NO_x assessment). The highest levels of nutrient nitrogen and acid deposition were predicted at areas of the SSSI adjacent to and/or within close proximity of the Site. On this basis, it is considered that the operation is unlikely to unduly impact the SSSI.

3.6 Flood risk

See Figure 3 for map showing flood risk areas in relation to the site.

NRW mapping indicates a high surface water flooding risk affecting the rear service yard, originating from the watercourse on the site's eastern boundary, which is a tributary to the Nant Muchudd⁸. High means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%).

The design and profiling of the site ensure that if a storm event of a significant magnitude were to occur, flows would be directed around the main building affording the building adequate protection. All other external infrastructure has been raised with this risk in mind, protecting it from inundation in the most extreme of flood events. The risk of surface water flood was assessed in detail at the design stage and is included in the 'Drainage Philosophy,' written by civil and structural engineers, CD Gray and Associates Ltd.⁹

⁷ Earthcare Technical Ltd. (May 2022) Air Quality Assessment. Application to vary the Bespoke Installation Permit (Doc Ref: ETL663/AQA/V1.0/Purolite/May 2022)

⁸https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood_Risk/viewers/Flood_Risk/virtualdirectory/Resources/Config/Default Accessed 15/11/2021

⁹ CD Gray Associates Ltd (December 2017). Drainage Philosophy Purolite. CDGA-9021-REPO1-R4

4 Management

4.1 Management System

The Operator has in place an Environmental Management System (EMS) certified to ISO 14001:2015, which commits the Operator to maintaining and continually improving environmental performance.

The Operator has an accredited occupational health and safety management system in place; ISO 45001:2018.

4.2 Accident Management

The new processes of [REDACTED] and cross linking have been assessed in terms of the environmental aspects and impacts and a HAZOP for the modifications has been undertaken¹⁰. Control measures to prevent incidents and accidents have been reviewed and updated where necessary.

The site-specific Emergency Plan has been updated to incorporate the safe handling of bromine, the bromination and cross-linking processes, the bromine abatement plant and the second steam generator.

4.3 Health and safety

The operation is subject to Health and Safety regulations that apply to workplaces and industry. The Operator has an accredited occupational health and safety management system in place; ISO 45001:2018.

The operation falls under the threshold for regulation under the Control of Major Accident Hazards (COMAH) Regulations.

4.4 Technical Competency

The Operator's management systems fully cover staff training and development. All training will be documented.

During operational hours the site is supervised by at least one member of staff who is suitably trained and conversant with the requirements of the management system, the operating techniques, the conditions of the environmental permit, site maintenance including inspections, the Operators internal health and safety procedures and emergency action plans. The SHE Manager, Operations Director and Head of Engineering are responsible for compliance. Team Leaders working weekend and night shifts are trained on how and when to escalate any actual or potential incidents.

The permit does not require the Operator to meet with an approved industry scheme to enable them to comply with the permitting regulations.

¹⁰ Purolite Agarose Manufacturing Plant - Modifications HAZOP, SEP Consultants, 10005, June 2020

5 Control of Emissions to Land and Water

5.1 Overview

There are no point source emissions to land arising from the process.

Under normal operating conditions there are emissions of clean water to the environment only. Accumulated surface and roof water runoff are discharged at Emission Point W1 which is a tributary of the Nant Muchudd on the eastern side of the site. There is no change to this emission point as a result of the proposed changes.

5.2 Storage and handling of polluting materials

5.2.1 Overview

The production process is carried out entirely within a building under highly controlled conditions.

There is a rear service yard behind the production building where there is a tank farm for storage of waste liquids prior to removal off site and also for storage of raw materials. There is a bund around the tanks built to CIRIA C736 (Containment Systems for the Prevention of Pollution)¹¹ standards in addition to a containment strategy to manage abnormal operations i.e. spillage.

This has not changed from the original design however, there is additional infrastructure and procedures detailed below. New processes have been assessed as part of an updated HAZOP.¹²

5.2.2 Waste Stream B

A new gravity collection pot has been installed for Waste Stream B, but unlike the other existing waste streams, this transfers directly to a new external bulk holding tank rather than via an internal buffer tank.

The bulk holding tank (25,000 litres) for Waste Stream B is located within the existing tank farm which is located outside of the main processing facility. The tank farm bund capacity was designed with the intention of adding additional tanks and remains over specification in terms of capacity. The bulk holding tank will be connected to the existing tanker bay station for discharging waste to road tanker.

5.2.3 Elemental [REDACTED] handling area

This is where the [REDACTED] drum (140 litres) is connected to the [REDACTED] water tank. This area is bunded. The [REDACTED] Water Tank is connected to the [REDACTED] abatement plant.

5.2.4 Sodium Formate Reservoir Tank

Any spillages will be contained within the crash tank.

5.2.5 Drainage

There are no changes to the fundamental site drainage design as a result of the changes.

¹¹ Containment systems for the prevention of pollution (C736), Walton, I L W, CIRIA, June 2014

¹² Purolite Agarose Manufacturing Plant - Modifications HAZOP, SEP Consultants, 10005, June 2020

6 Control of Emissions to Sewer

There are no changes to control of emissions to sewer. Less liquid waste is discharged to sewer than anticipated during the design phase as the quality limits cannot be met and therefore the liquid waste is taken off site for recovery or disposal as appropriate.

7 Control of Emissions to Air

7.1 Control of point source emissions to air

7.1.1 Overview

The locations of point source emissions to air from the manufacturing facility are shown in the Permitted Site Layout Plan (Figure 4).

These are two new emission points to air as a result of the process changes and the relevant controls are detailed in the sections below. Due to the batch nature of the process, emissions to air will occur in peaks over time and not continuously.

The control measures in relation to point source emissions to air are all detailed within Table 6 of the Emissions Management Plan, a up to date version of which supports this permit variation application.¹³

7.1.2 A5: Steam generator stack B

The 700 kg/hr steam generator (A5) will combust natural gas and may emit pollutants including oxides of nitrogen (NO_x) and carbon monoxide (CO) from a 8.2m stack. The new steam generator will be subject to the same planned preventative maintenance schedule as the existing steam generator in accordance with manufacturers requirements which is controlled using the Q-Pulse system.

The steam generator has a water treatment unit for incoming water. This is tested weekly by Purolite staff and also maintained under the service contract with the equipment supplier.

7.1.3 A6: [REDACTED] abatement plant stack

7.1.3.1 *In Process Control*

[REDACTED] water is added to the reactor vessel below the liquid level through a dip pipe to minimise vapour lost to atmosphere i.e. to reduce the work that the [REDACTED] abatement plant needs to do.

7.1.3.2 [REDACTED] abatement plant

The abatement plant consists of a packed media bed through which drops of sodium formate are passed to react with any residual [REDACTED] in the off gas from the process vessel. The key elements of the [REDACTED] abatement plant are:

- Media packed vessel
- Reservoir tank for sodium formate beneath media bed
- Pump and trickling system for sodium formate
- A fan to draw air through the abatement plant.

¹³ Emissions Management Plan, V2.0, Shann Pitts Consulting, May 2022

Air is drawn through the packed media bed in which residual [REDACTED] reacts with droplets of sodium formate.

The [REDACTED] abatement plant stack is of an appropriate height (10m) to ensure dispersion of any residual odourous compounds.

7.1.3.3 Monitoring of abatement plant

pH testing on the sodium formate reservoir is conducted. Sodium formate has a pH of 6.3. As [REDACTED] reacts with the sodium formate, hydrogen [REDACTED] solution is formed which causes the pH in the reservoir tank to drop. There is an alarm connected to the SCADA system which is triggered at pH 5.8.

Fresh sodium formate is added to the reservoir every day and every 90-100 days the sodium formate liquid is completely replaced.

7.1.3.4 Maintenance of abatement plant

The [REDACTED] abatement plant stack fan is subject to a planned preventative inspection and maintenance programme. In the case of the fan breaking down, the system will go into 'hold' mode and the vent line would close. There is provision to add in a stand-by pump to be installed when frequency of [REDACTED] is higher.

The sodium formate recirculation pump is subject to a planned preventative inspection and maintenance programme. Again, in the case of the pump breaking down, the system will go into 'hold' mode and the vent line would close. Spare parts are stored on site.

7.2 Control of fugitive emissions to air

The new processes of [REDACTED] and cross linking have been assessed in terms of the environmental aspects and impacts and a HAZOP for the modifications has been undertaken¹⁴, which incorporates the following points:

- There is a software interlock on new reactor vessel (RE09) to prevent overfilling.
- All powder hoppers have lids.
- [REDACTED] is fully contained. There are two [REDACTED] detectors in the [REDACTED] water make up area and one in the production area which are linked to the control panel in control room.
- The sodium formate used in the [REDACTED] abatement plant is heated to reduce risk of crystallisation of sodium formate.

8 Waste inventory

Waste produced by the facility, including new waste streams, has been considered in line with Best Available Techniques and the waste hierarchy and are summarised in the updated Emissions Management Plan submitted as part of the permit application.¹³

¹⁴ Purolite Agarose Manufacturing Plant - Modifications HAZOP, SEP Consultants, 10005, June 2020

9 Control of Amenity Impacts

9.1 Odour

The qualitative Environmental Risk Assessment¹ shows that without risk management measures there is a medium magnitude of risk of odour impacting the local human population and / or causing a nuisance. The potential sources of odour are emissions from the main and [REDACTED] stacks, tank breather valves and chemical deliveries and collection of waste. There is no odour potential from the hydrogen and nitrogen vents as these are odourless gases.

[REDACTED] is an odourous gas and therefore the proposed changes on site have the potential to increase the risk of odour emissions impacts local human population. The controls with respect to [REDACTED] under Section 7.1.3 are relevant here.

To assess the impact of air and odour emissions from the regulated facility upon human receptors, Earthcare Technical Limited were commissioned to conduct an Air Quality Assessment (AQA).⁷ The AQA found predicted levels of odour to be within the adopted odour threshold.

9.2 Noise

There is no change to the risk of noise emissions impacting local human receptors except for the additional steam generator. The new generator uses the same compressor as the existing steam generator.

The steam generators benefit from anti-vibration mounting to reduce noise emissions and is housed within a building.

9.3 Summary

In accordance with the qualitative Environmental Risk Assessment¹, there are no other significant amenity hazards.

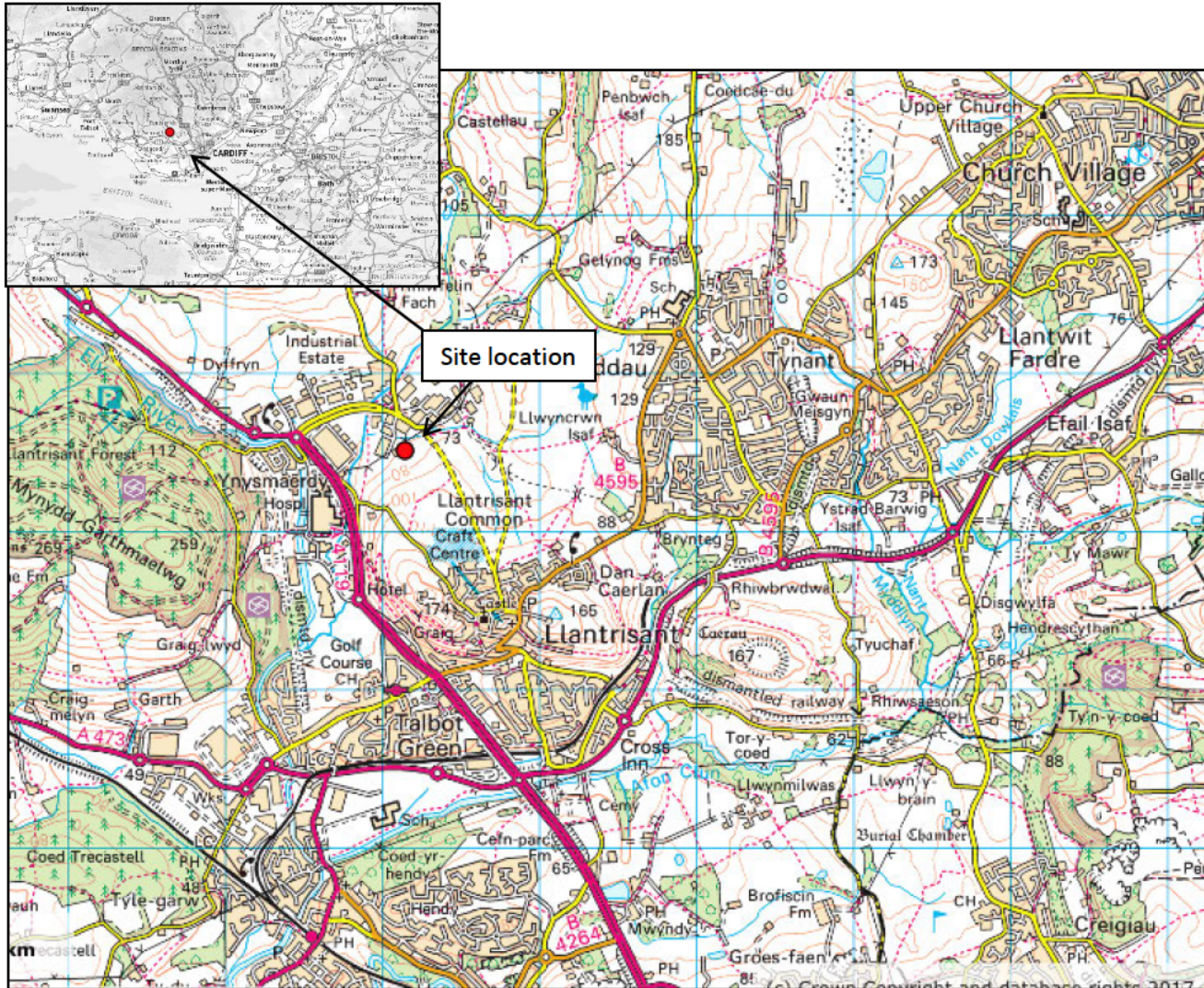
Figures

Figure 1 - Site location plan – Drawing ref SPC0055/ME17.11.23/Site Location Plan/V1/Purolite

Figure 2 - Aquifer map (provided by Natural Resources Wales)

Figure 3 - Flood risk plan – Drawing ref SPC0055/Flood Risk Plan/V2/Purolite

Figure 4 - Permitted Site Layout Plan, James Partnership, Drawing no PA 01, Rev 1, 30/11/2021



Project: Purolite, Unit C,
Llantrisant Business Park,
Llantrisant, Rhondda Cynon
Taff, CF72 8LF

Title: Site Location Plan

Reference number:
SPC0055/ME17.11.23/Site
Location Plan/V1/Purolite

Date: December 2017

Produced by: Amy Wolff,
Melbury Environmental
Limited

Based on Magic Map data
Crown Copyright and database
rights 2017. Ordnance Survey
100022861



Legend

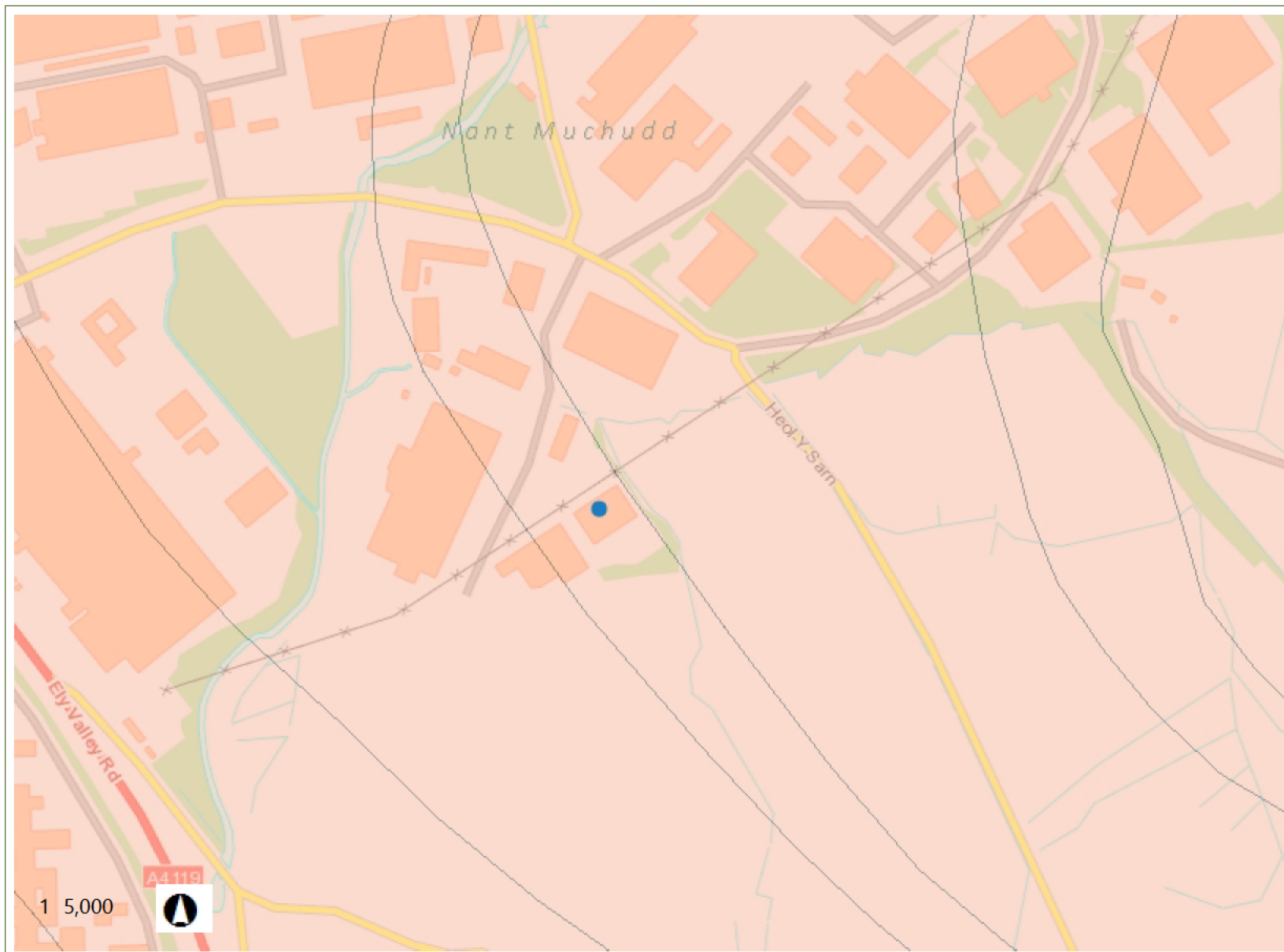
Aquifer Designation (Bedrock)

- Principal
- Secondary (undifferentiated)
- Secondary A
- Secondary B
- Unproductive

Aquifer Designation (Superficial)

- <all other values>
- Secondary (undifferentiated)
- Secondary A
- Secondary B
- Unproductive

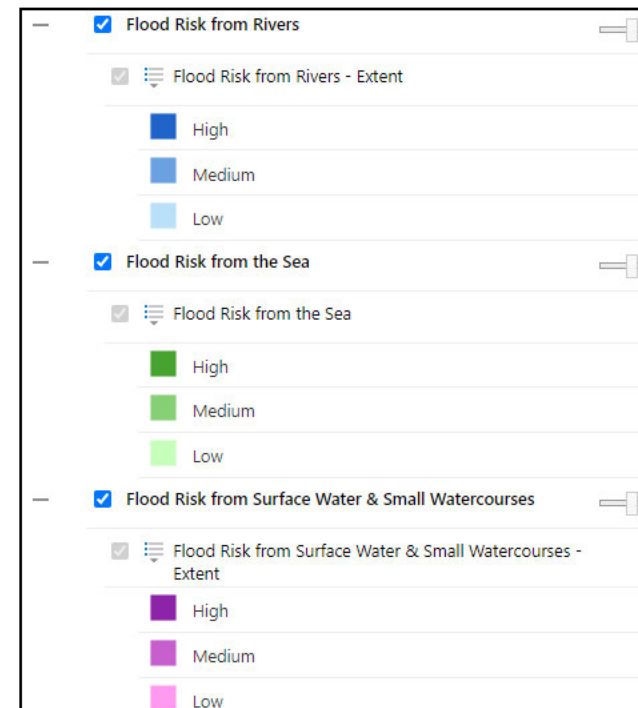
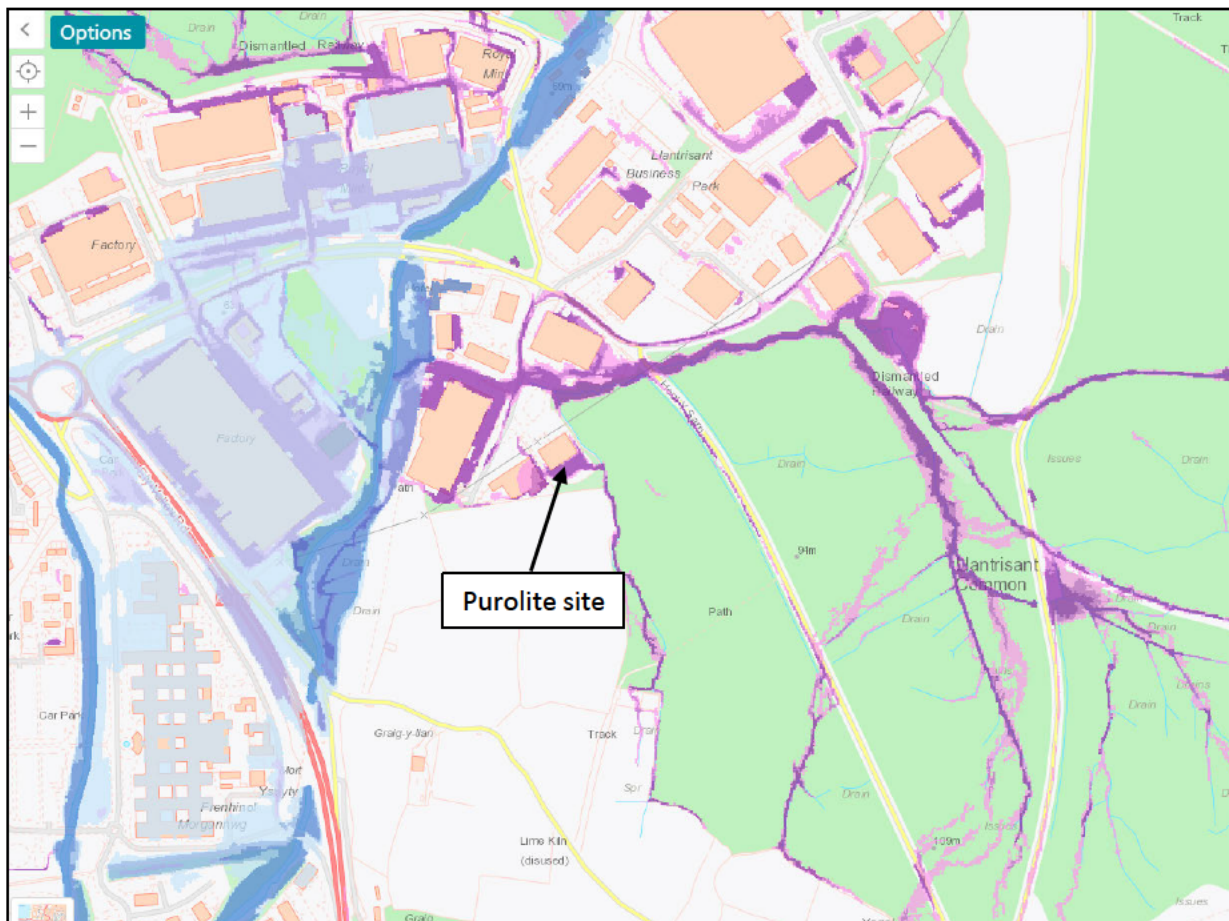
Notes



0.3 0 0.13 0.3 Kilometers

British_National_Grid

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Project: Purolite, Unit C, Llantrisant Business Park, Llantrisant, Rhondda Cynon Taff, CF72 8LF

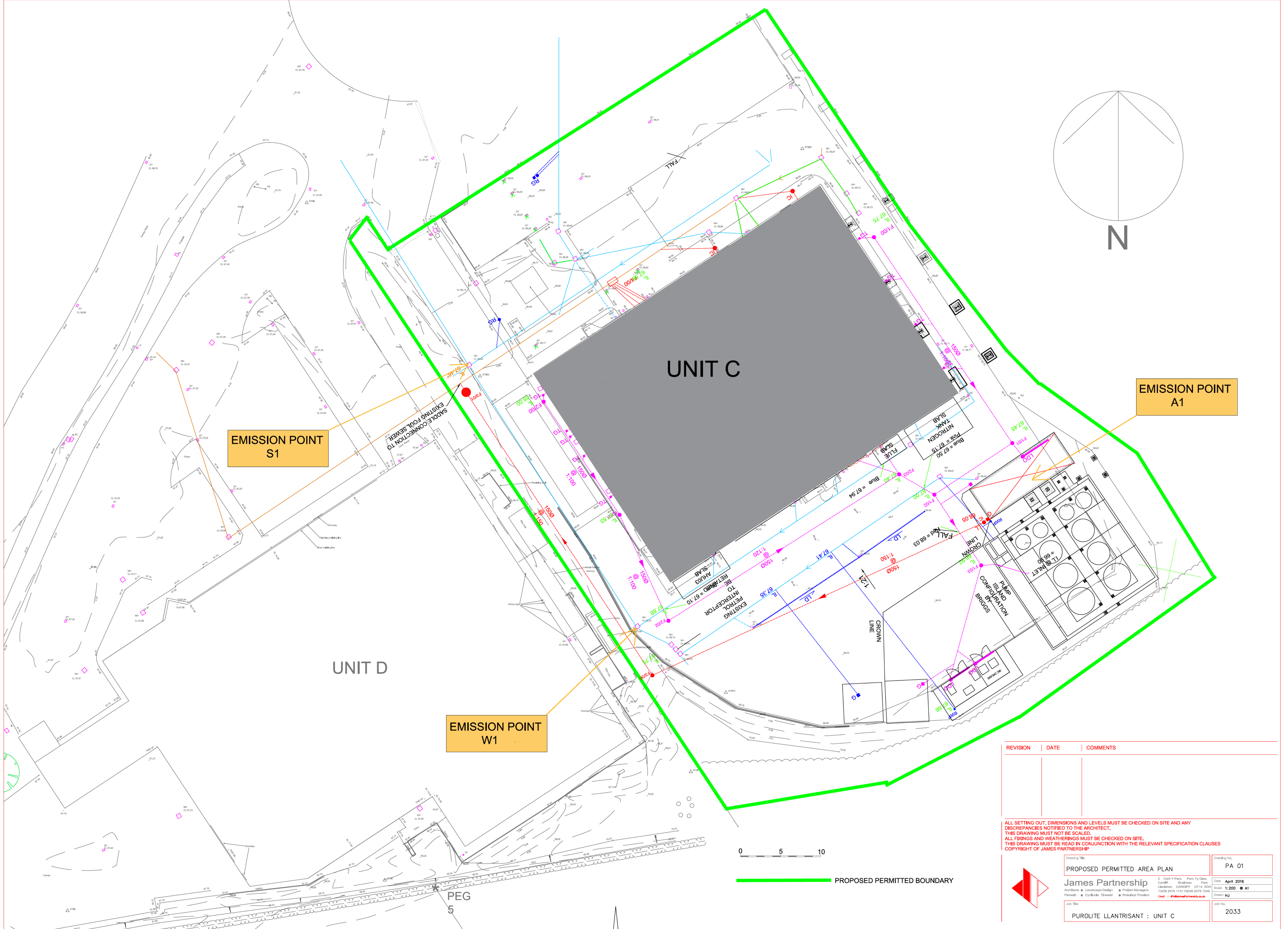
Title: Flood Risk Plan

Reference number: SPC0055/Flood Risk Plan/V2/Purolite

Date: May 2022

Produced by: Shann Pitts Consulting Limited

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REVISION	DATE	COMMENTS

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THIS DRAWING MUST NOT BE SCALED.
ALL FIXINGS AND WEATHERINGS MUST BE CHECKED ON SITE.
THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION CLAUSES
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Drawing Title	PROPOSED PERMITTED AREA PLAN	Drawing No.	PA 01
Architect	James Partnership	Date	April 2016
Project Managers	2 - Gwyl Y Parc, Parc Ty Glas, Cardiff, Wales	Scale	1:200 ● A1
Project Managers	1509 2075 1151 P509 2075 1248	Drawn	HJ
Job Title	PURILITE LLANTRISANT : UNIT C	Job No.	2033