Project No: 23161

Project: Lower Rackery,
near Llay
Wrexham
LL12 0AG

Subject: Drainage Statement

Date: 17th April 2024 (Issue 04)

FLOOD FLOW LTD

CONSULTING CIVIL AND STRUCTURAL ENGINEERS

36 Holdenbrook Close
Leigh
WN7 2HL

Tel 07940 523819
Website: www.floodflow.co.uk
Email: mail@floodflow.co.uk

1.0 GENERAL

This drainage statement has been prepared to support a planning application for the conversion of a agricultural building to a residential dwelling (barn conversion).

The site is currently featuring an existing barn as shown below.

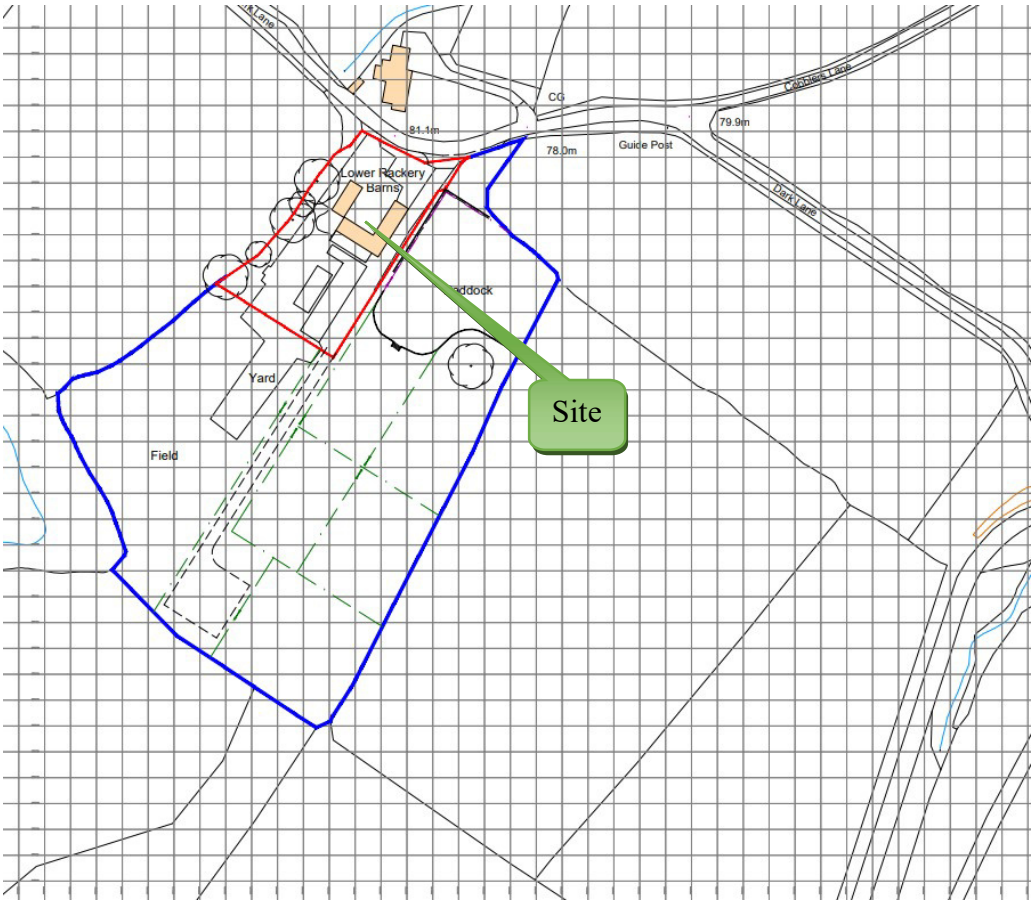


Figure 1 – Site Location Plan

2.0 DRAINAGE DESIGN

2.1 Surface Water Drainage

2.1.1 Flood Risk

Flood risk map show high risk of surface water flooding.

LOWER RACKERY, DARK LANE, BURTON, ROSSETT, WREXHAM, LL12 0AG

Very low risk	**Flooding from rivers** Risk less than 0.1% chance each year
Very low risk	**Flooding from the sea** Risk less than 0.1% chance each year
Very low risk	**Flooding from surface water and small watercourses** Risk less than 0.1% chance each year

Table 2 – Flood Risk (Source: Natural Resouces Wales)



Figure 3 – Flood Map (Source: Natural Resouces Wales)

2.1.2 Drainage Strategy

1st Choice - Discharge to Soakaway

In accordance with the Building Regulations hierarchy for the disposal of surface water drainage, the initial consideration will be for a soak-a-way system.

Percolation tests have not been carried out at the development site. From online soil data using the BGS website it states Till, Devensian - Diamicton superficial deposits.

In view of the low permeability of the soils indicated at the site, soak-a-ways are not considered a viable option for the proposed development.

2nd Choice - Discharge to Watercourse

The second consideration is disposal of surface water to watercourses/ ditches. There are ditches running to the north of the proposed development site and should be considered as the preferred option for the drainage design – see Figure 4 below.

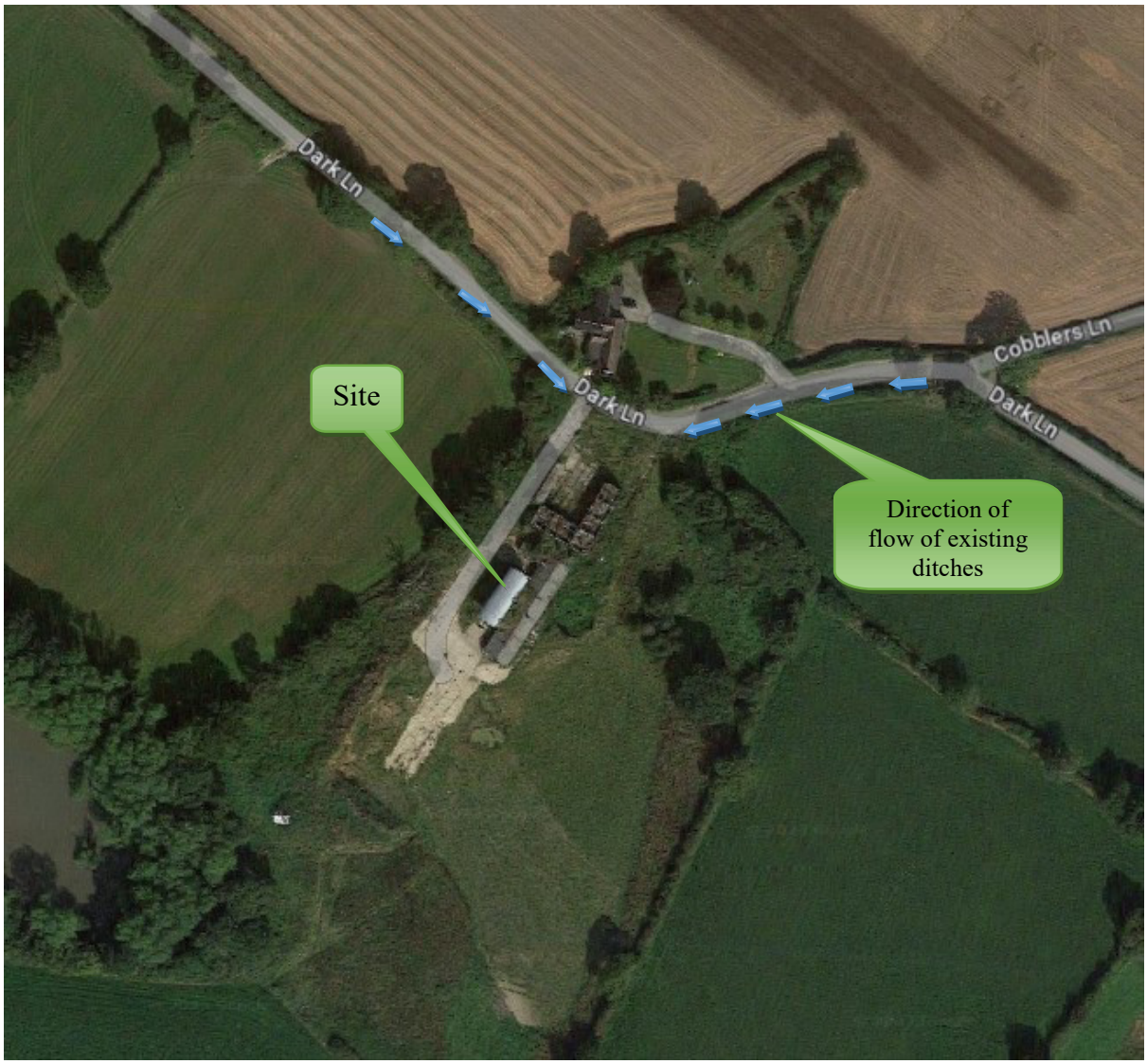


Figure 4.1 – Location of Watercourse



Figure 4.2 – Long Section

3rd Choice - Discharge to Sewer

The third option in the drainage hierarchy is to discharge into the existing public sewers. From investigations of the surrounding area there are no public sewers within an economically viable distance from the proposed development.

Surface water from the existing barn naturally falls towards the ditch located adjacent to the site. The impermeable area for the proposed development has been calculated at 1695m^2, which is less than that of the existing. Therefore, attenuation proposed for the development has been calculated to accommodate climate change.

The surface water runoff of 24.2 l/s generated from the existing buildings and pave areas has been calculated using the modified rational method, existing impermeable area of 2495m^2, a rainfall rate of 50mm/hr and 30% betterment.

The volume of storage has been calculated at 47m^3 using the proposed discharge rate and a proposed impermeable area of 1695m^2 has been used to estimate the required attenuation in Appendix C.

The design criteria for network modelling to be used for the site is:

- 1 in 30 year no surcharging of the surface water network.
- 1 in 100 year (plus climate change 40% in accordance with TAN15) will be contained within the attenuation, and the volume has been indicated for the development site.
- The roof water for the proposed development will also enter the combined public sewer.
- A bypass separator upstream of the proposed attenuation structure is not considered a requirement due to the size of the parking area for the proposed development.

2.2 Foul Drainage

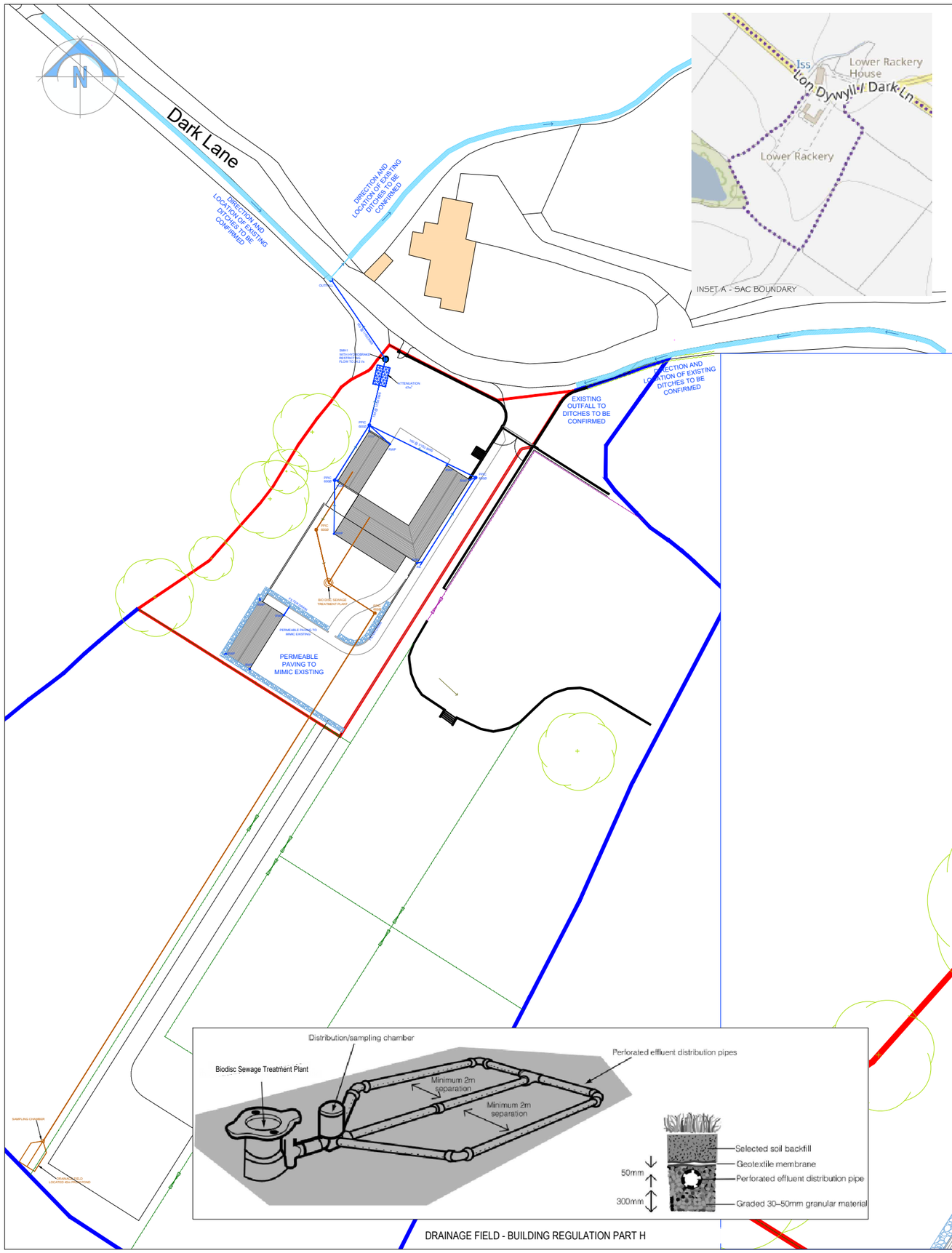
The foul drainage for the proposed development is to be connected into a proposed Bio Disc sewage treatment plant with chemical dosing equipment (BioDisc +P) as shown on the drainage layout. The disc filter will be specified for the removal of phosphates as part of the treatment process.

Appendices

- Appendix A – Flood Flow Drawing Number 23161.001 E – Drainage Layout.
- Appendix B – Flood Maps (Source: Natural Resources Wales)
- Appendix C – Surface water runoff and attenuation calculations.
- Appendix D – Check Your Flood Risk
- Appendix E – Kingspan Bio Disc with Chemical Dosing Equipment Certificate



APPENDIX A



LEGEND

- SITE BOUNDARY
- SMH — SURFACE WATER MANHOLE
- SURFACE WATER PIPE
- PPIC — POLYPROPYLENE INSPECTION CHAMBER - SW
- PPIC — POLYPROPYLENE INSPECTION CHAMBER - FW
- FMH — FOUL WATER MANHOLE
- FOUL WATER PIPE
- CMH — COMBINED WATER MANHOLE
- COMBINED WATER PIPE
- EXSMH — EX SURFACE WATER MANHOLE
- EX SURFACE WATER PIPE
- EXFMH — EX FOUL WATER MANHOLE
- EX FOUL WATER PIPE
- EXMH — EX COMBINED SEWER MANHOLE
- EX COMBINED SEWER PIPE
- PROPOSED ATTENUATION (PRIVATE)

DRAINAGE NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS DRAWINGS AND SPECIFICATIONS.

DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON THE DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED AND VERIFIED ONSITE.

ALL DRAINAGE WORKS TO BE IN ACCORDANCE WITH THE CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY (CESWI) AS INCLUDED IN SEWERS FOR ADOPTION 7TH EDITION, THE REQUIREMENTS OF APPROVED DOCUMENT H (2015 EDITION), BUILDING REGULATIONS 2000 AND THE DETAILS PROVIDED ON THE CONTRACT DRAWINGS.

THE CONTRACTOR MUST SURVEY THE RETAINED DRAINAGE AND REPORT THE LINE, LEVEL AND CONDITION OF THE EXISTING DRAINAGE TO THE ENGINEER. WE WOULD RECOMMEND THAT THE EXISTING DRAINAGE TO BE SURVEYED IS CLEANSED BEFORE UNDERTAKING THESE WORKS.

ANY REDUNDANT MANHOLES ARE TO BE BROKEN OUT AND BACKFILLED WITH A APPROVED COMPACTED GRANULAR MATERIAL. REDUNDANT PIPES ARE TO BE FILLED WITH A 10:1 PFA/CEMENT MIX OR BROKEN OUT AND BACKFILLED WITH A APPROVED COMPACTED GRANULAR MATERIAL.

ALL FOUL AND SURFACE WATER DRAINS UP TO AND INCLUDING 300MM DIAMETER ARE TO BE VITRIFIED CLAY SUCH AS HEPWORTH SUPERSLEVE/SUPERSEAL OR SIMILAR APPROVED (BS EN 295-1). ALL PIPES GREATER THAN 300MM DIAMETER TO BE CONCRETE CLASS 120 (BS EN 1916:2002). ALL CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS EN 1917.

AS AN ALTERNATIVE (SUBJECT TO THE CLIENTS APPROVAL) THE CONTRACTOR MAY USE STRUCTURAL WALLED PIPES (WISA 4-35-01 & BS EN 13476) SUCH AS;

- POLYSEWER - POLYPIPE BUILDING PRODUCTS - SIZE 150mm TO 300mm
- QUANTUM- MARLEY - SIZE 150mm TO 300mm
- ULTRARIB - UPONOR - SIZE 150mm TO 300mm
- ULTRARIB - WAVIN - SIZE 150mm TO 300mm
- RIDGISEWER - POLYPIPE CIVILS LTD - SIZE 400mm TO 900mm
- WEHOLITE - ASSET INTERNATIONAL - SIZE 450mm TO 3000mm

PIPES LAID WITHIN VEHICLE TRAFFICKED AREAS WITH LESS THAN 900mm OF COVER SHALL BE SURROUNDED IN CLASS Z BEDDING. PIPES LESS THAN 300mm BELOW THE UNDERSIDE OF A GROUND FLOOR SLAB SHALL BE SURROUNDED IN CLASS Z BEDDING. WHERE CLASS Z BEDDING IS USED AS A SURROUND A COMPRESSIBLE MATERIAL MUST BE PLACED AT EVERY PIPE JOINT. ALL OTHER PIPES ARE TO BE LAID IN A CLASS S BEDDING.

ALL DRAINAGE MUST BE PROTECTED DURING CONSTRUCTION WHERE INTERMEDIATE COVER IS LESS THAN 900mm.

WHERE FOUL AND SURFACE DRAINS/SEWERS CROSS WITHIN 100mm OF EACH OTHER CONCRETE PROTECTION (CLASS Z BEDDING) MANY BE REQUIRED TO PREVENT ANY POTENTIAL CONTAMINATION.

ALL COVER LEVELS ARE APPROXIMATE ONLY. ALL MANHOLE COVERS TO BE SET AT THE PROPOSED FINISHED PAVEMENT OR FLOOR LEVEL. REFER TO THE ARCHITECTS PROPOSED LEVELS DRAWING FOR LEVEL CONFIRMATION.

FOR TYPICAL MANHOLE CONSTRUCTION DETAILS, PIPE BEDDING/TRENCH DETAILS AND OTHER ASSOCIATED DRAINAGE DETAILS. REFER TO SGI TYPICAL DETAILS DRAWING.

ALL FOUL AND SURFACE WATER CONNECTIONS TO BE 100MM DIAMETER UNLESS STATED. ALL EXTERNAL GULLY CONNECTIONS AND CHANNEL DRAIN SUMP/GULLY CONNECTIONS TO BE 150mm DIAMETER UNLESS STATED. ALL GULLY AND CHANNEL DRAIN OUTLETS TO BE TRAPPED AND RODDABLE. ALL INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.

CHANNELS DRAINS TO BE FITTED WITH A HEALGUARD CAST IRON GRATING. GRATINGS TO BE TO LOAD CLASS D400 SPECIFICATION UNLESS OTHERWISE AGREED. LINEAR CHANNELS TO HAVE A 200mm MINIMUM CONCRETE BED AND HAUNCH.

ALL FOUL STACKS AND RWP'S TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT SIZE TO BE IN ACCORDANCE WITH DOCUMENT H AND SITED ABOVE ANY CONNECTED GROUND FLOOR APPLIANCE SPILL LEVEL.

ALL CONNECTIONS PASSING THROUGH FOUNDATION BASES AND/OR EDGE BEAMS TO BE WITHIN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150mm FROM FACE OF THE CONCRETE.

ALL MANHOLE COVERS LOCATED WITHIN THE ROAD AND CAR PARKING AREAS TO BE D400 CLASS. COVERS WITHIN HARD AND SOFT LANDSCAPED AREAS WITH PEDESTRIAN TRAFFIC ONLY TO BE B125 CLASS. COVERS LOCATED WITHIN BLOCK/SLAB PAVING AREAS TO BE RECESSED TO SUIT THE PROPOSED PAVING AND OF THE APPROPRIATE GRADE. ALL INTERNAL COVERS TO BE RECESSED WITH DOUBLE SEALED BOLT DOWN COVERS SUCH AS HOWE GREEN 5000 SERIES OR SIMILAR APPROVED.

CHANNELS WITHIN TYPE 1 & 2 MANHOLES MUST USE PRE-FORMED CLAYWARE SECTIONS FOR PIPES UP TO AND INCLUDING 300mm DIAMETER. CHANNELS TO BE SET AT THE APPROPRIATE INCOMING AND OUTGOING PIPE GRADIENTS.

ALL MANHOLES CONNECTIONS TO BE FORMED AT SOFFIT TO SOFFIT UNLESS OTHERWISE STATED. ALL BRANCH CONNECTIONS TO BE MADE WITH SWEPT BENDS IN THE DIRECTION OF FLOW IN THE MAIN SEWER.

INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON AND COORDINATED BY THE ARCHITECTIM&E CONSULTANT.

EXTERNAL LINEAR CHANNEL DRAINS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND SHALL DISCHARGE VIA TRAPPED RODDABLE GULLY UNITS UNLESS ADVISED OTHERWISE.

THE TYPE AND SIZE OF THE SEPARATOR IS SPECIFIED ON THIS DRAWING AND SHALL BE A CLASS 1 TYPE. IT SHALL BE INSTALLED IN COMPLETE ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS AND VENTED VIA 75mmØ PIPE WORK. THE INTERCEPTOR REQUIRES POWER FOR THE HIGH LEVEL OIL ALARM AND THE ARRANGEMENT SHALL BE INTRINSICALLY SAFE AND EXPLOSION PROOF. THE CONTRACTOR SHALL PROVIDE THE REQUIRED DUCTING & CABLING TO INTERNAL MONITORING POSITION TOGETHER WITH AUDIO AND VISUAL MONITORING UNIT ALL IN ACCORDANCE WITH BS7671:2008 +A1:2011

ALL RWP AND SVP POSITIONS ASSUMED, TO BE CONFIRMED

DRAINAGE FIELD - BUILDING REGULATION PART H

RESIDUAL RISKS

REV.	DESCRIPTION	DRAWN	APPROVED	DATE
E	REVISED DRAINAGE FIELD LOCATION	AJ	JJ	17/04/24
D	REVISED DRAINAGE FIELD LOCATION	AJ	JJ	15/04/24
C	HOLDING TANK ADDED FOR BIODISC DISCHARGE	AJ	JJ	12/04/23
B	DRAINAGE FIELD RELOCATED	AJ	JJ	26/03/24
A	AMENDED EXISTING DITCH LOCATION AND PROPOSED OUTFALL.	AJ	JJ	27/09/23

STATUS

PLANNING

FLOOD FLOW LTD
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
TEL: 07940523819
WEBSITE: www.floodflow.co.uk
EMAIL: mail@floodflow.co.uk

Client

MR & MRS PHILLIPS

Project

PROPOSED DEVELOPMENT AT
LOWER RACKERY BARNS, DARK LANE
BURTON, LL11 0AG

Title

INDICATIVE DRAINAGE LAYOUT

Drawn	AJ	Checked	JJ
Date	25/09/23	Date	25/09/23
Scale	1:200 & 1:500	A1	

Drawing number 23161-001 E



APPENDIX B

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

23161 Appendix B1 - flood-map-1



Legend

Flood Risk from Rivers
- High
- Medium
- Low

Flood Risk from the Sea
- High
- Medium
- Low

Flood Risk from Surface Water & Small Watercourses
- High
- Medium
- Low

Main Rivers

Scale at A3: 1:5,000

Date: 22/09/2023

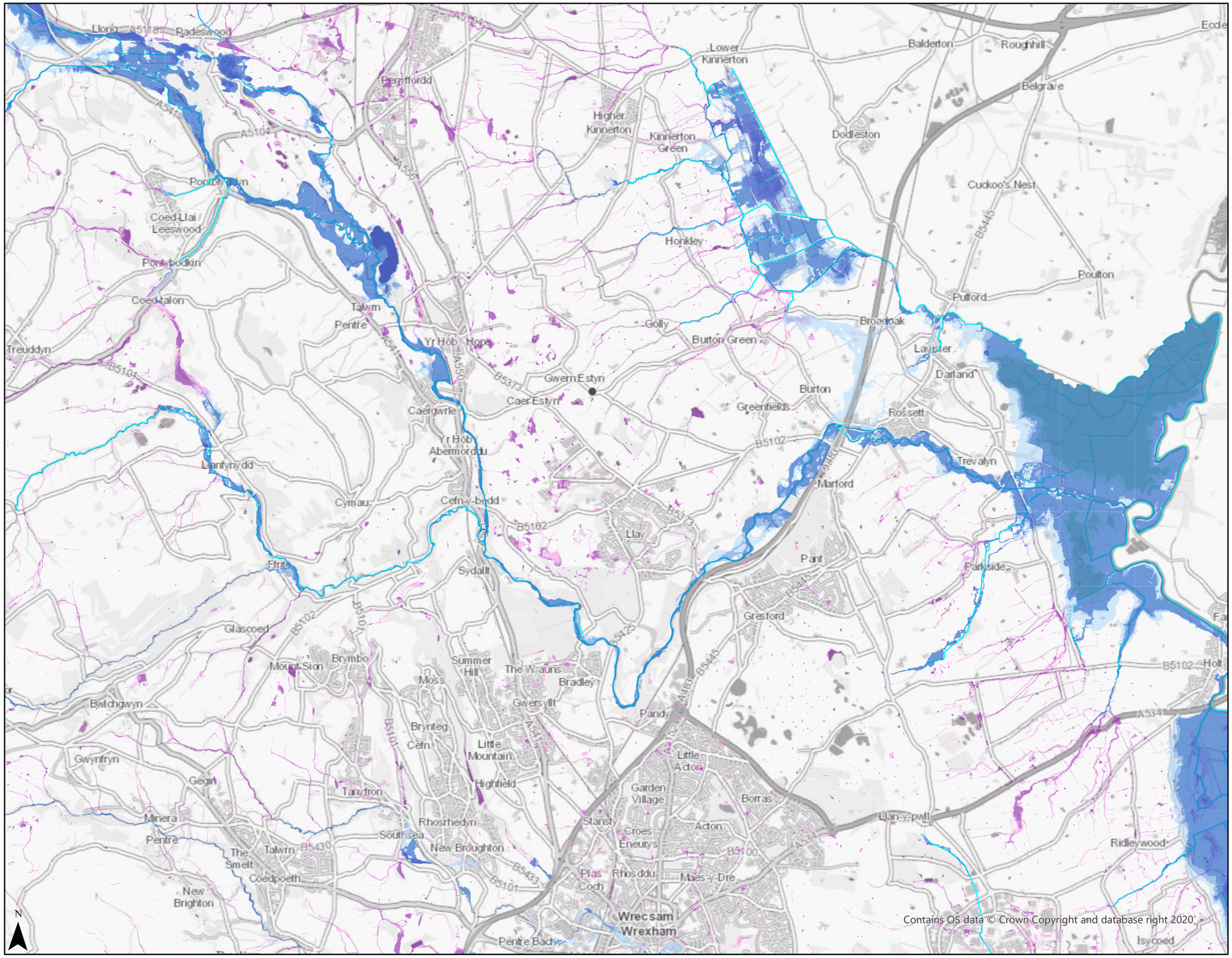
0.2 0.1 0 0.2
km

British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

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Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

23161 Appendix B1 - flood-map-2

Legend

Flood Risk from Rivers
- High
- Medium
- Low

Flood Risk from the Sea
- High
- Medium
- Low

Flood Risk from Surface Water & Small Watercourses
- High
- Medium
- Low

Main Rivers

Scale at A3: 1:50,000

Date: 22/09/2023

2 1 0 2
km

British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

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APPENDIX C

FLOOD FLOW LTD

CONSULTING CIVIL AND
STRUCTURAL ENGINEERS

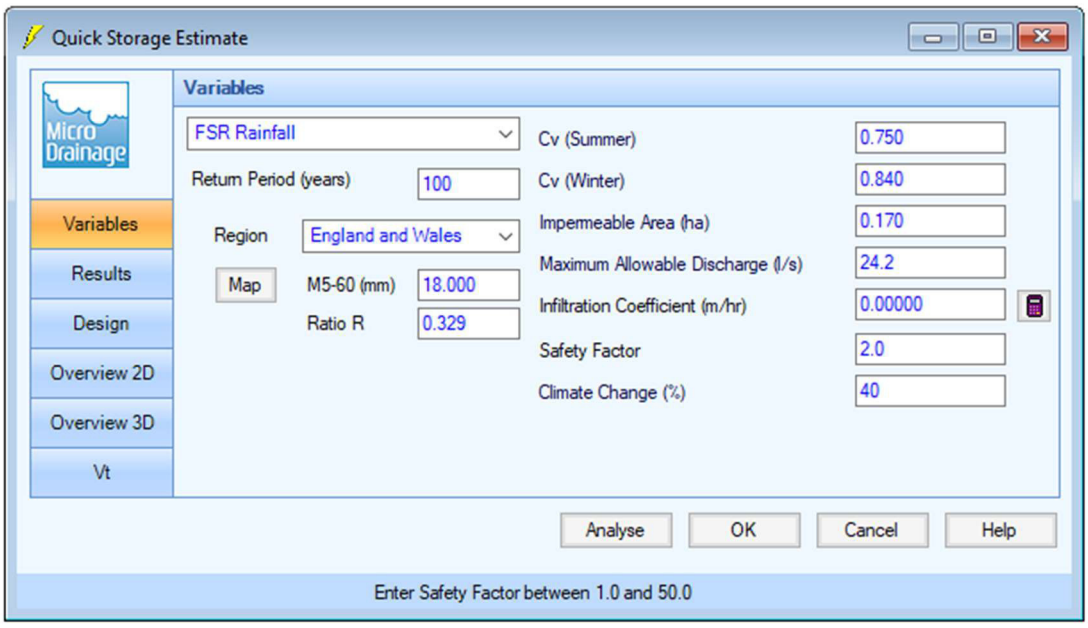
Tel 07940 523819
Website: www.floodflow.co.uk
Email: mail@floodflow.co.uk

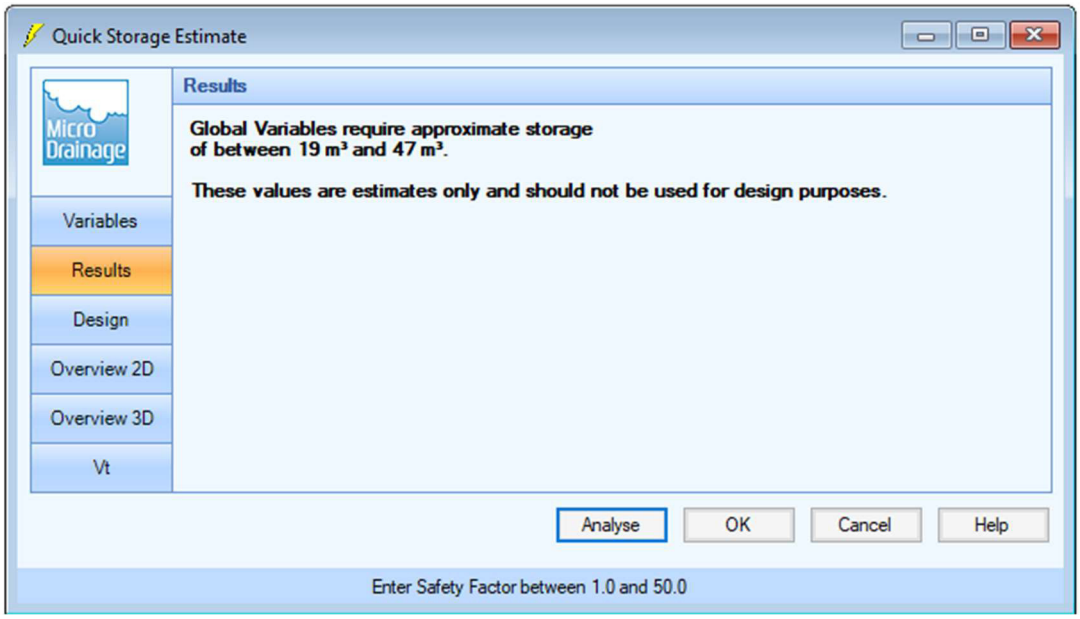
23161 Lower Rackery, near Llay, Wrexham, LL12 0AG

Surface Water Runoff & Attenuation

The discharge rate has been calculated at 24.2l/s has been used to calculate the required attenuation.

Attenuation







APPENDIX D

https://check-your-flood-risk.naturalresources.wales 07/09/2023 13:30

Flood risk report for the area within 10 metres of:

LOWER RACKERY, DARK LANE, BURTON, ROSSETT, WREXHAM, LL12 0AG

Very low risk	**Flooding from rivers** Risk less than 0.1% chance each year
Very low risk	**Flooding from the sea** Risk less than 0.1% chance each year
Very low risk	**Flooding from surface water and small watercourses** Risk less than 0.1% chance each year

The risk levels are: High, Medium, Low and Very low.

This area:

- Does not benefit from flood defences
- Has no recorded flooding

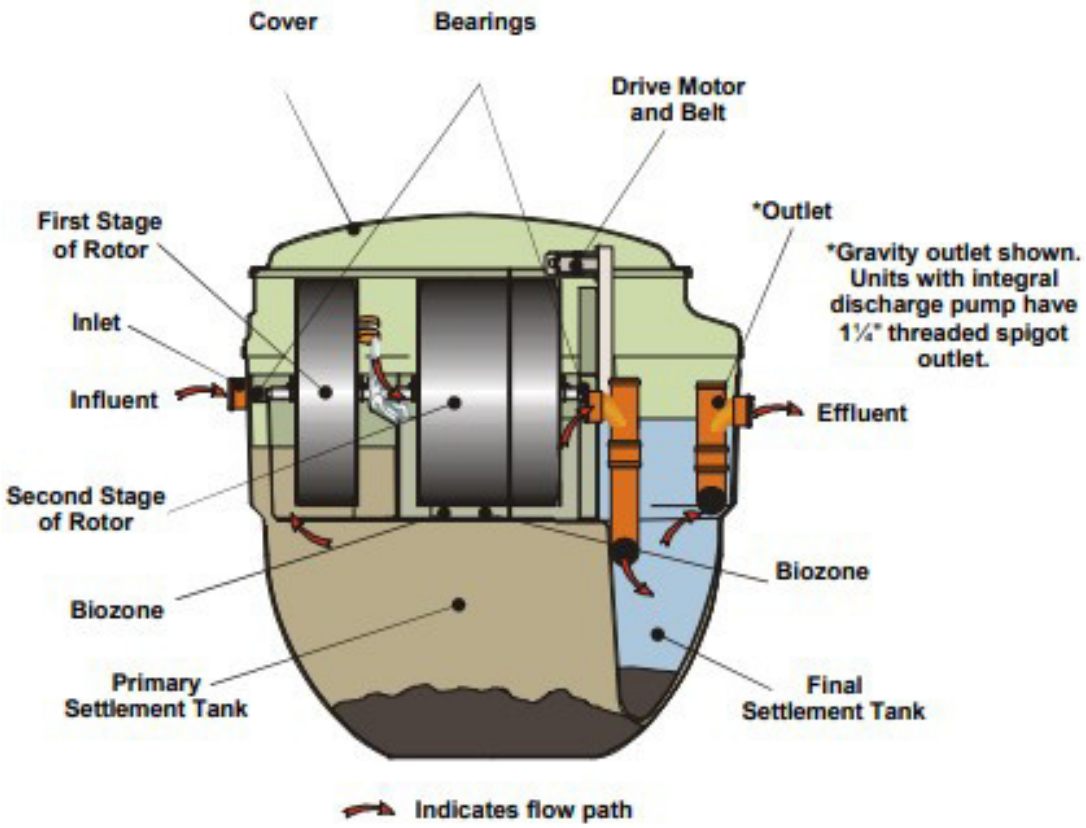
This risk level takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.

Please note

We cannot give the flood risk for individual buildings because this depends on building features and other local factors like drainage conditions.



APPENDIX E



Director: Jason.Jones B.Eng (Hons) MCIHT NMICE,
Associate Director: Adam John Jones B.Eng (Hons) MEng CIWEM

Flood Flow Ltd Registered in England and Wales No. 5548911

Certificate

353.02C02

Kingspan Water & Energy Ltd.
College Road North, Aston Clinton, Aylesbury, HP22 5EW, UK

EN 12566-3, Annex B
Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system BioDisc +P
Rotating Biological Contactor (RBC) in a GRP tank with chemical dosing equipment

Test report PIA2019-353B47.02
This test certificate is a revised version of test certificate no. 353.02C01.

Nominal organic daily load (influent)	0.28 kg BOD_5/d		
Nominal hydraulic daily load	0.9 m³/d		
Material	GRP		
Treatment efficiency		Efficiency	Effluent
(nominal sequences)	COD	95.9 %	31 mg/l
	BOD_5	98.0 %	6 mg/l
	N_{tot}*	71.1 %	17.9 mg/l
	NH_4-N*	92.1 %	3.0 mg/l
	P_{tot}	95.4 %	0.3 mg/l
	SS	95.6 %	15 mg/l
Electrical consumption	1.5 kWh/d		

**determined for temperatures ⩾ 12 ° C in the bioreactor*

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
Hergenrather Weg 30
52074 Aachen
Germany

This document replaces neither the declaration of performance nor the CE marking.

PIA - Sustainable Certification

geprüft - tested- testé

Notified Body No.: 1739

DAkkS Deutsche Akkreditierungsstelle D-PL-17712-01-00

Martina Wermter December 2020