

Infants School Accommodation

JOHNSTOWN

Drainage Strategy Report

HAF-JPS-XX-XX-RP-C-0001

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Document History

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1 Introduction

1.1 Commission

In April 2021 Wynne Construction, on behalf of Wrexham County Borough Council appointed JP Structural Design (JPS) to undertake this Drainage Strategy Report in support of a Full Detailed Planning Application for the erection of temporary accommodation at the existing Infants school in Johnstown, Wrexham. The purpose of the temporary accommodation is to house pupils from the Junior school whilst a significant improvement and extension scheme is undertaken. Upon completion of that scheme, all pupils will relocate to the main campus and this site will effectively be decommissioned.

1.2 Existing Site

The existing school site covers a rectangular area at the end of Melyd Avenue of approximately 0.6 Ha as shown on the site information drawing in Appendix A. The erection of the temporary cabins will increase the impermeable area by circa 350m².

1.3 Existing Drainage

On-site investigations have suggested that the site is served by a mixture of combined drainage system and soakaways. The combined drainage ultimately discharges to Welsh Waters 150mm diameter foul public sewer system crossing the site from the direction of Plas Hafan.

Appendix B contains a copy of the public sewer record drawing and Appendix C a sketch of the existing site drainage systems.

1.4 Existing Flood Design

As stated above, the site covers an area of approximately 0.6 Ha. In accordance with the NRW Developers Advice Maps (shown in Appendix A,) the site is located within Flood Zone A – Land having less than 1 in 1000 annual probability of river or sea flooding. The NRW Flood Risk Map is also shown and has confirmed the site to be free from any flood concerns.

Due to the topography of the area, the risk of flooding from adjoining properties or roads is considered minimal, and therefore, the management of the surface water run-off generated by the post development site will be the principal flood risk associated with this scheme.

1.5 Proposed Development

As stated the scheme consists of the erection of temporary teaching accommodation whilst the improvement scheme to the existing junior school is undertaken.

Based upon the latest development plans for the additional impermeable area generated by the proposals will be approximately 350m² as shown on the impermeable area plan. The drainage proposals drawings are contained in Appendix D and surface water drainage calculations are contained in Appendix E.

2 Drainage Proposals

2.1 Foul Drainage

Whilst it is acknowledged that there will be an increase in the peak forward flow and volume of foul drainage by locating more pupils at the site, the impact to the public sewer network is considered minimal as these pupils would normally be attending the junior school approximately 300m away. As there are only 4 additional WCS and WHBs included within the temporary accommodation, the peak forward flow will remain relatively consistent.

2.2 Surface Water Drainage

It is acknowledged that the satisfactory collection, control and discharge of storm water is now a principle planning and design consideration. Part H of the Building Regulations 2002 recommends that surface water run-off shall discharge to one of the following, listed in order of priority:

- a) an adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable,
- b) a watercourse, or, where that is not reasonably practicable,
- c) a sewer.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local run-off profile by using systems that can either attenuate

2.3 Ground Infiltration

It is acknowledged that the existing site currently disposes of surface water through soakaways and it is has therefore been assumed that the additional run off from the temporary cabins can be managed in this manner.

2.4 Discharge to Watercourse

There is not a watercourse adjacent to the site and subsequently a connection will not be achievable without crossing 3rd party land.

2.5 Surface Water Calculations

As depicted on the historical borehole shown on the Site Information drawing, the new soakaway is expected to be formed on 'brown and dark brown fine to coarse Gravel and coarse Sand with occasional thin clay layers.

We have therefore assumed a typical infiltration rate of 5×10^{-5} m/s and calculations are included in Appendix E to demonstrate the required soakaway size to cater for the 1 in 30 year event, noting that no climatic factor has been applied due to the temporary nature of the scheme.

3 Recommendations & Conclusions

3.1 Recommendations

At detailed design stage we would recommend that percolation testing in accordance with the BRE365 digest is undertaken to verify the on-site infiltration rate and the design adjusted accordingly.

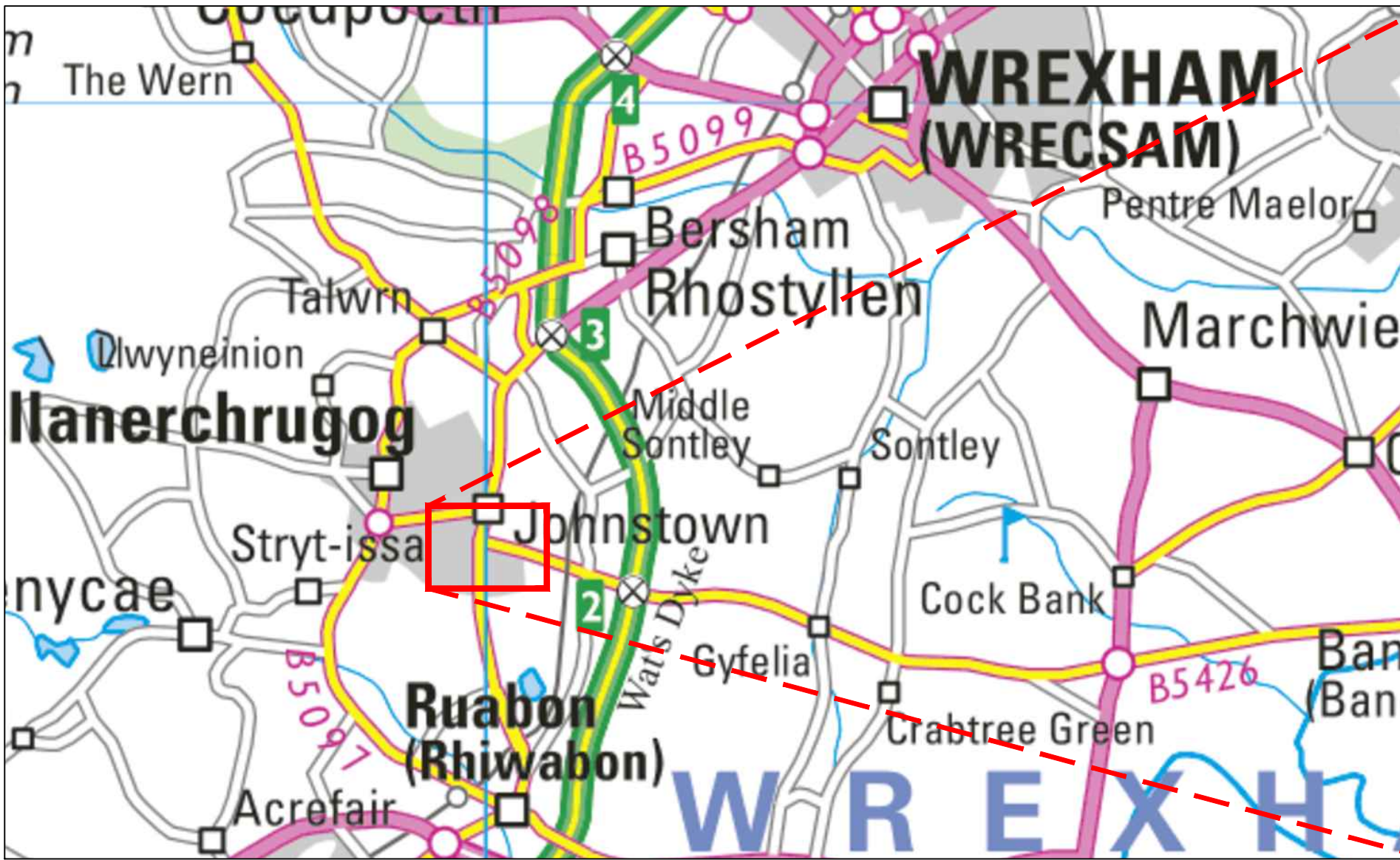
.

3.2 Conclusions

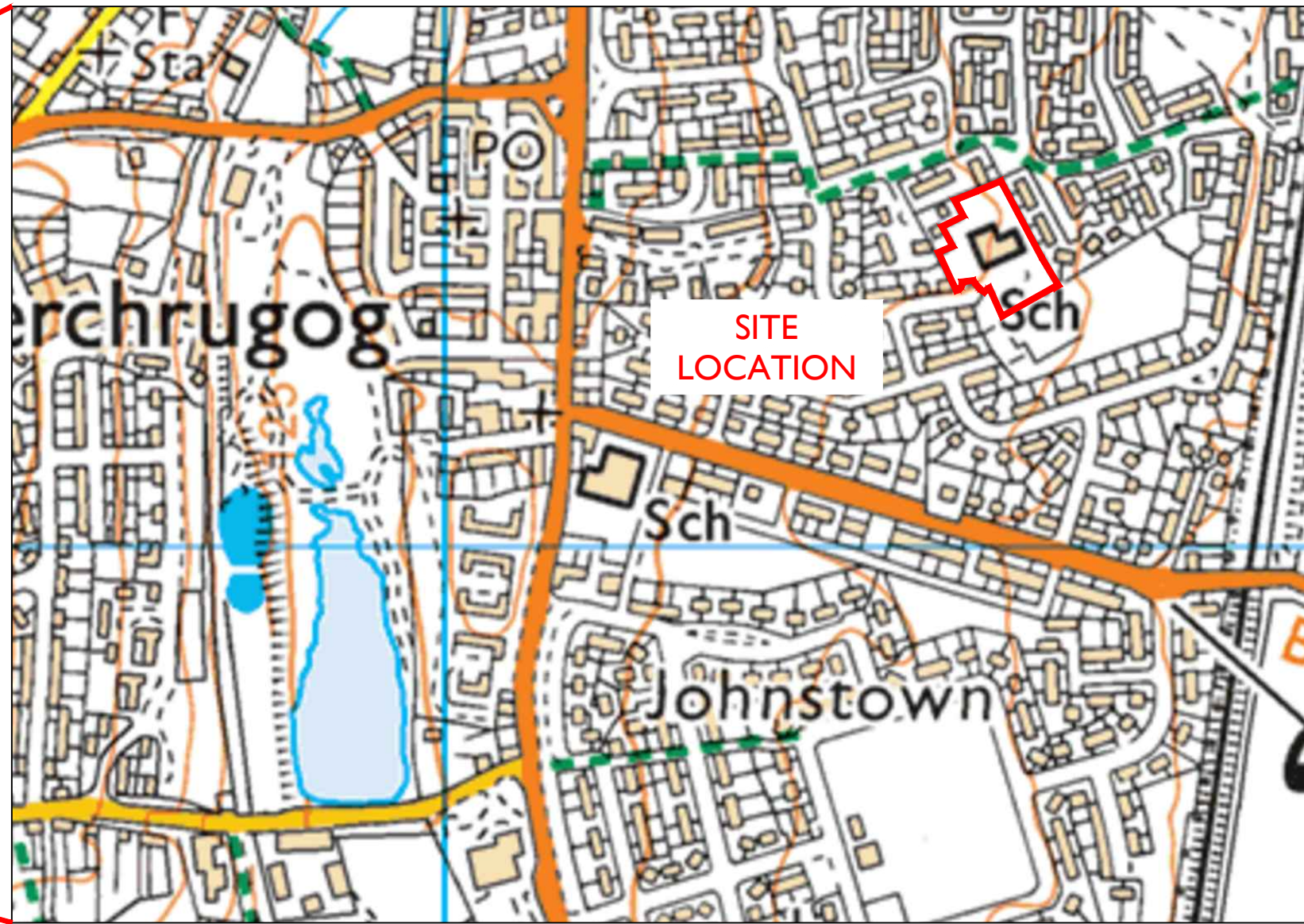
The proposed site is free from any existing flood risk and there are suitable method of disposal for surface water run-off generated by the proposed development. We would expect the proposed development to be free from general objections in respect to draining the site.

4 Appendices

Appendix A – Site Information



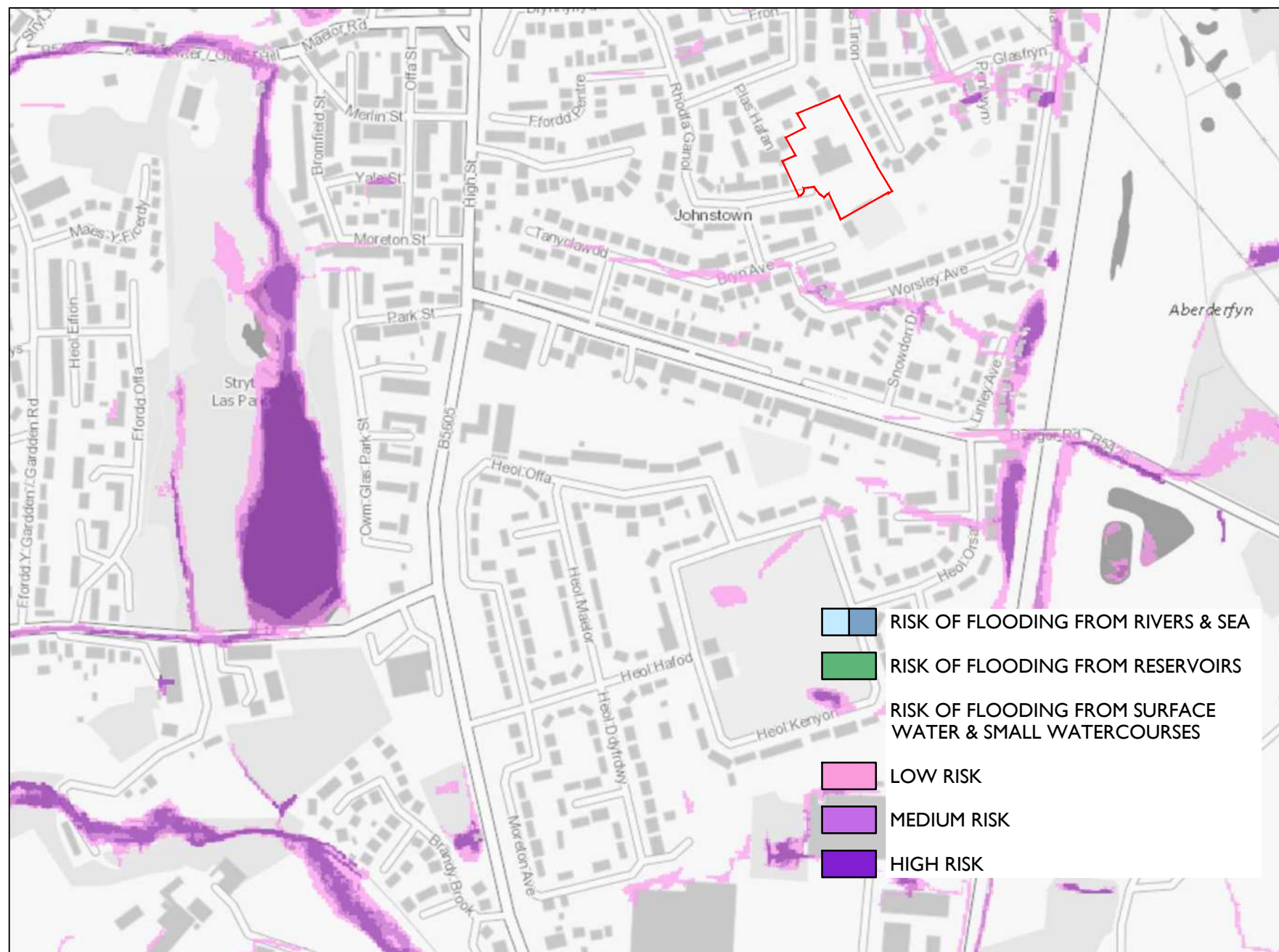
APPROX SCALE 1:50,000



APPROX SCALE 1:5,000

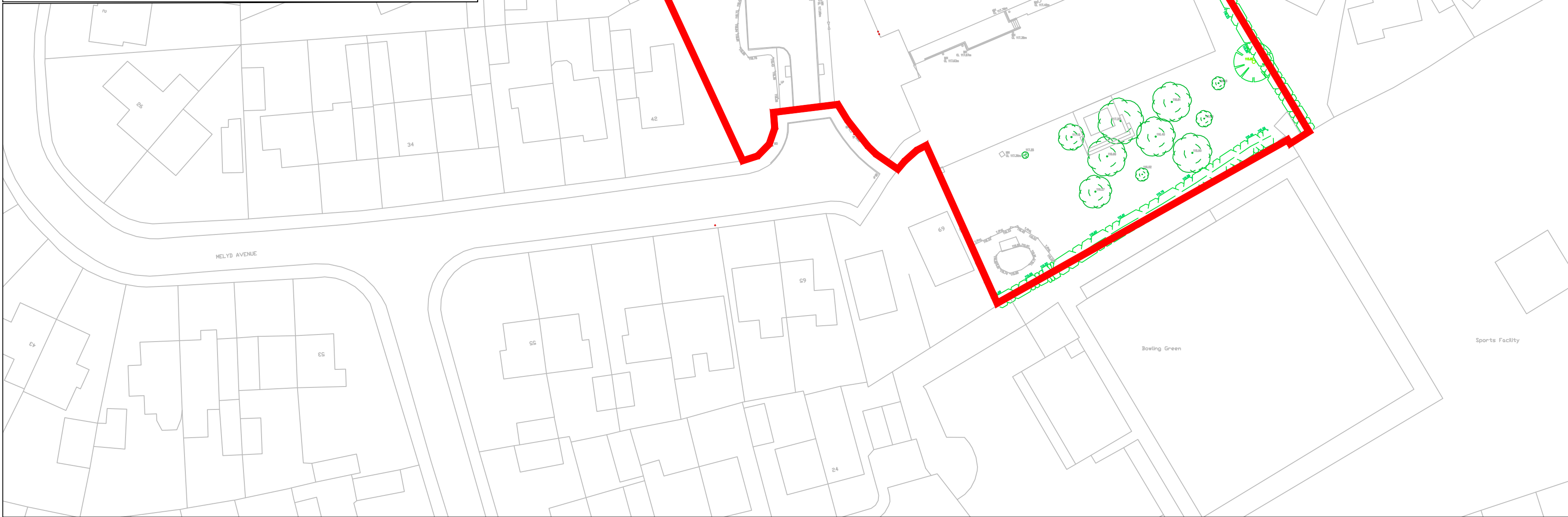


DEVELOPMENT ADVICE MAP
APPROX SCALE 1:5,000



FLOOD RISK MAP
APPROX SCALE 1:5,000

Log							Trial Pit	
Site: BAFORD TWP WREXHAM								Trial Pit No. 1
Job No. 60922								
Date: 21.10.20								
Machine Type: JCB 3c								
Vertical Scale: 1:25								
Depth	Type	Series and Timing	Ground Water	0	1	Legend	Description of Strata	Depth
m				m	m			m
0					0.50		Black friable coal dust and gravel with occasional timber and brick fragments FILL	106.72
					0.70		Brown and dark brown rounded fine to coarse GRAVEL and coarse SAND with occasional thin clay layers and coal cobbles (FILL)	
1	D1	1.00			1.20			
					1.45	0.25	Soft to fine dark grey silty CLAY with fine to coarse angular gravel fragments of coal and highly weathered sandstone (FILL)	
	D2	1.30						
	PP	1.55 c = 220kN/m ²						
	HSV	1.60 c = 100kN/m ²						
2	D3	2.00					Stiff yellow brown mottled very silty CLAY with some fine to coarse gravel and occasional cobbles	
					2.80			
							END OF TRIAL PIT	
3		* test result affected by presence of granular materials						
4								
5								
Logged by: Client: ALEXANDER RUSSELL PLC								
Key to symbols: t = thickness d = depth of strata							Pit sides slightly unstable below 2.00m PP = pocket penetrometer test	



PROPOSED / EXISTING IMPERMEABLE AREA
APPROX SCALE 1:500



EXISTING SATELLITE IMAGE
APPROX SCALE 1:1,000

SITE CO-ORDINATES

OS X (Easting) 330124
OS Y (Northings) 346018
Nearest Post Code LL14 2SY
Nat Grid SJ301460 / SJ3012446018



AREAS

SITE BOUNDARY 6,120 SQ M
ADDITIONAL IMPERMEABLE AREA 350 SQ M

ZONE C1
ZONE C2
ZONE B
ZONE A

REV	DESCRIPTION	BY	CHK	APR	DATE

		CIVIL + STRUCTURAL ENGINEERS	
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PURPOSE OF ISSUE			STATUS
PRELIMINARY			SI
PROJECT			
YSGOL YR HAFOD JOHNSTOWN			
TITLE			
TEMPORARY ACCOMMODATION DRAINAGE SCHEME EXISTING LAYOUT			
CLIENT			
			
DRAWN BY	CHECKED BY	APPROVED BY	
RH	MM	JP	
DATE	SCALE (@ A1)	PROJECT NUMBER	
26.08.2021	As Shown	94001	
DRAWING NUMBER			REV
HAF-JPS-XX-XX-DR-C-0550			P01

Appendix B – Public Sewer Records



Appendix C – Existing Site Drainage



EXISTING DRAINAGE NOTES

THE LOCATION LINE & LEVEL OF ALL KNOWN EXISTING DRAINAGE PIPEWORK INDICATED ON THIS DRAWING IS APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY.

IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE AND LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS AND MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE INSTALLATIONS.

KEY

- FWS EXISTING FOUL WATER SEWER
- SWS EXISTING SW SEWER
- CFS EXISTING COMBINED SEWER
- HD EXISTING HIGHWAY DRAIN
- EXISTING FOUL DRAIN
- EXISTING SW DRAIN
- EXISTING COMBINED FLOW DRAIN



Appendix D – Proposed Drainage Drawing



NOTES

1. THE WORKS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, NATIONAL BUILDING SPECIFICATION (NBS) AND SEWERS FOR ADOPTION, 7TH EDITION.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, ARCHITECTS DRAWINGS, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
3. THE LOCATION, LINE & LEVEL OF ALL KNOWN EXISTING BURIED SERVICE MAINS AND DRAINAGE PIPEWORK INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE & LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE MAINS / DRAINAGE INSTALLATIONS.
4. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.
5. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.
6. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE MITIGATION OF ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.
7. THE CONTRACTOR SHALL MAKE ALLOWANCE FOR RAISING / LOWERING ALL EXISTING ACCESS COVERS & FRAMES TO SUIT NEW FINISHED LEVELS.
8. ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REINSTATED UPON COMPLETION OF THE WORKS. ALL SURFACE MARKINGS DAMAGED BY THE WORKS SHALL BE FULLY REINSTATED.
9. ALL SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF SITE.
10. ALL LEVELS ARE TO ORDINANCE DATUM

KEY

- FWS
- EXISTING FOUL SEWER
- EXISTING COMBINED DRAIN
- EXISTING SW DRAIN
- PROPOSED SW DRAIN
- PROPOSED FOUL DRAIN
- PROPOSED ATTENUATION CRATES
- PROPOSED RAIN WATER DOWN PIPE
- PROPOSED FOUL OUTLET

PO2	FOUL REQUIREMENTS ADDED	RH	MM	JP	27.08.2021
REV	DESCRIPTION	BY	CHK	APR	DATE

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PURPOSE OF ISSUE	PRELIMINARY	STATUS	S1
PROJECT	YSGOL YR HAFOD JOHNSTOWN		
TITLE	TEMPORARY ACCOMMODATION DRAINAGE SCHEME PROPOSED LAYOUT		
CLIENT			
DRAWN BY	RH	CHECKED BY	MM
DATE	26.08.2021	SCALE (@ A1)	1:150
DRAWING NUMBER	HAF-JPS-XX-XX-DR-C-0552		REV
		P02	



9m³ SOAKAWAY CONSISTING OF AQUA CELL 'ECO' STORAGE BLOCKS - 8 UNITS x 3 UNITS x 2 UNIT (4m x 3m x 0.8m @ 95% VOID RATIO) TO BE BACKFILLED & VENTED IN ACCORDANCE WITH MANUFACTURERS GUIDANCE & TO CATER FOR THE 30 YEAR STORM EVENT

Appendix E – Surface Water Calculations

**JPS**CIVIL +
STRUCTURAL
ENGINEERSJP Structural Design Ltd
Regus House
Chester Business Park
CH4 9QRFile: YYH Infants.pfd
Network: Storm Network
Russell Hardy
26/08/2021Page 1
Ysgol Y Hafod
Infants School
Temporary Accommodation**Design Settings**

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	30	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	30	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Depth/Area 1	0.035	4.00	117.200	8.608	81.998	1.400

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	0	0	0

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.18000	Safety Factor	2.0	Invert Level (m)	115.800
Side Inf Coefficient (m/hr)	0.18000	Porosity	0.95	Time to half empty (mins)	399

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	12.0	10.0	0.800	12.0	10.0	0.801	0.0	10.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute winter	Depth/Area 1	336	116.578	0.778	1.6	9.2581	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
360 minute winter	Depth/Area 1	Infiltration	0.3					