

17th September 2021.

FAO Neil Hutchinson
Owen Ellis Architects
Stanley Hall,
Edmund Street
Liverpool,
L3 9NG

Dear Sirs

Re: Drainage Statement for Proposed Residential Development
Aspinall St, Prescott, Liverpool L34 5QQ.

The following information summarises the proposals for Surface water strategy and Foul water from the proposed development. The site is located at east side of Aspinall St a sloping site and was formerly a large single storey commercial unit and adjacent business centre. The site is approximately 0.16 hectares of which approximately 0.132 hectares is proposed to be roof or to be external hard surfacing. The area falls in Zone 1 for FRA Zoning as the development is less than 1Ha is currently residential and change of use poses no more vulnerability in risk and no site-specific FRA is therefore required. However, the following information does confirm that the risk due to onsite flooding has been fully considered and designed out.

The proposed drainage system has been considered in relation to the National Planning Policy Framework sections for drainage, and the Non-Statutory Technical Standards for Sustainable Drainage Systems and we have followed the sequence of steps that should be considered in relation to the drainage of the site namely to adopt a Sustainable system that free drains to ground subject to filtration test suitability.

It is believed that the existing combined sewer runs down Aspinall St and the existing site drainage is likely also combined and final discharge line is located between the two existing buildings on site.

We propose to discharge SW via a soakaway to the lower portion of the rear car parking area in the South of the site. Infiltration tests for the ground in the location of the proposed SW soakaway location are to be carried out prior to developing the scheme considered as a means of disposing of surface water from the site. The site has a fall of approximately 2m down Aspinall St and the proposed new residential development has 2 blocks which are currently set with grades to suit the levels accordingly.



The proposed Impermeable areas of site SW discharging to the proposed Soakaway are approximately 1315m² (0.132Ha). Based on Rainwater data taken from H.R.Wallingford data of 20mm/hr the allowance for 100yr storm with 30% with and our calculations with a reasonable filtration rate of 0.0007m/sec into underlying materials requires an open geotextile wrapped crate system within the rear area to achieve a minimum volume of 60.4m³ at 9.0 x 4.5 x 1.6dp illustrated on 2097-D01, a suitable maintenance schedule with annual inspections is recommended.

Should the infiltration tests prove unsuitable the attached drawing also shows an Option 2 for a suitably sized attenuation storage tank similar to the soakaway system is required in tandem with a Aquabrake to limit flow from the site. In conjunction with table 6.1 of the LA Policy Guidance a 50% reduction from existing SW run off is required. Existing positively drained areas have been calculated at 1136m² from Site survey and based on the FER data of <20mm/hr we confirm this existing runoff is equivalent to 6.3L/sec.

For Option 2 we therefore propose utilising an aqua break in new manhole prior to discharge to the combined drain at a maximum of 3L/sec subject to UU approval. Our calculations show this to require a min volume of 57m³ and the tank to be constructed in crated system in same location as proposed soakaway.

Please find attached calculation sheets and search information in support of the statements listed above for Option 1 and 2.

With regards to the foul drainage, we propose discharge from the two residential buildings via existing discharge pipework into Aspinall St with potential for upgrading this once exposed and its true size and depth investigated. Discharge calculations are attached with this document suggesting a peak flow rate to the main FW sewer in Aspinall St of 4.8L/sec based on 18 No Residential units.

The attached proposed layout drawing 2097-D01 indicates the drainage proposals to be considered for discharge of planning conditions. I trust this information is helpful and look forward to discussing these proposals in due course.

Yours Faithfully



Stephen Huddleston
IEng AMIStructE
Director



Flood map for planning

Your reference
Aspinall St

Location (easting/northing)
346817/392700

Created
17 Sep 2021 11:19

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

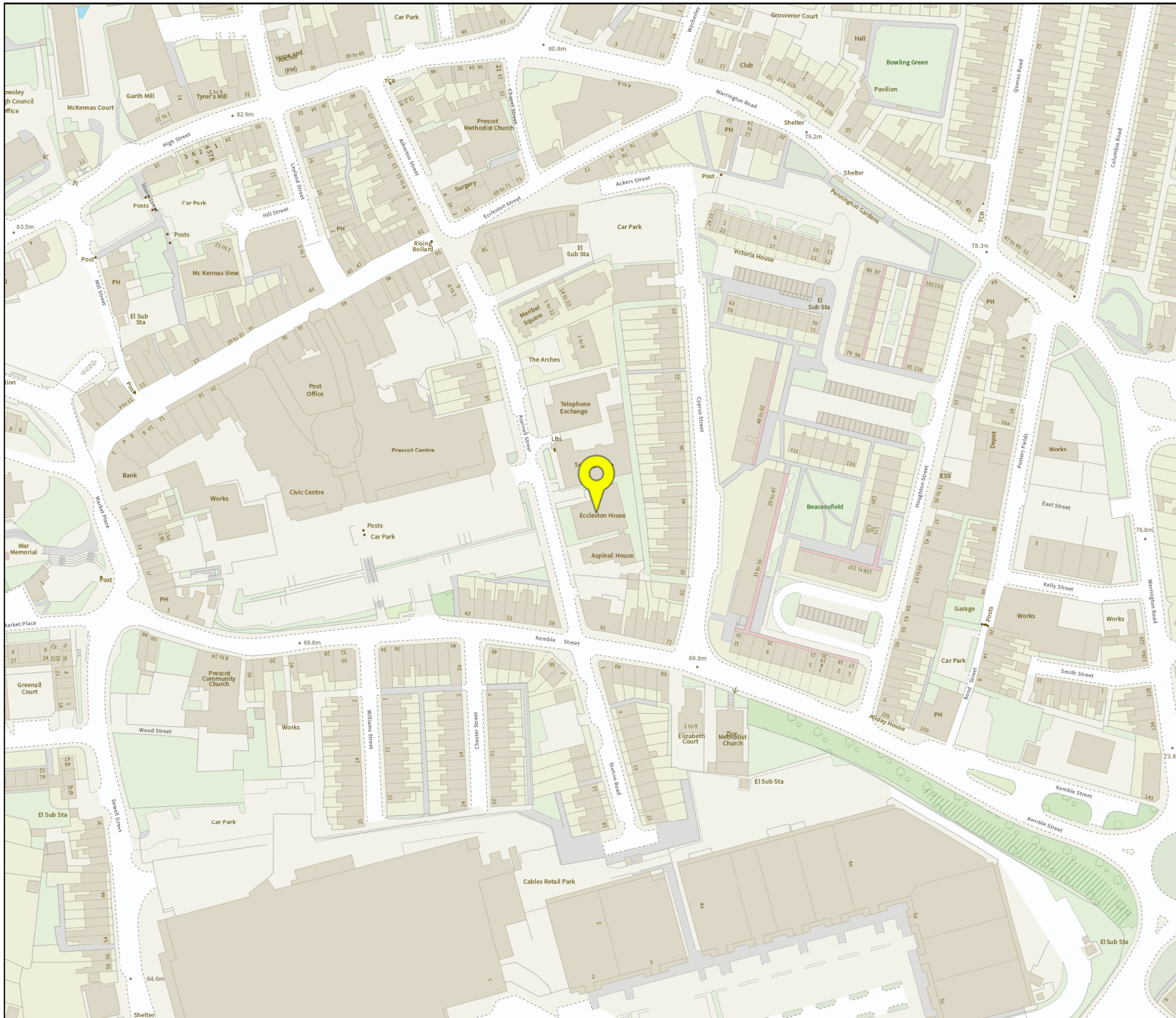
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Aspinall St

Location (easting/northing)

346817/392700

Scale

1:2500

Created

17 Sep 2021 11:19



Selected point



Flood zone 3



Flood zone 3: areas benefitting from flood defences



Flood zone 2



Flood zone 1



Flood defence



Main river



Flood storage area



SWH Design Services Tel: 07587185683 – Off Tel No: 07849928319  6 Columbus Quay, Liverpool 3 4DB swh.design.ltd@gmail.com	Project Aspinall St - Residential Development				Job no. 2097	
	Calcs for New SW Soakaway				Start page no./Revision 1	
	Calcs by AF	Calcs date 17/09/2021	Checked by SH	Checked date 17/09/2021	Approved by	Approved date

SWH Design Services

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area Liverpool
 Impermeable area drained to the system A = **1315.0** m²
 Return period Period = **100** yr
 Ratio 60 min to 2 day rainfall of 5 yr return period r = **0.400**
 5-year return period rainfall of 60 minutes duration M5_60min = **17.0** mm
 Increase of rainfall intensity due to global warming p_{climate} = **30** %

Soakaway / infiltration trench details

Soakaway type Rectangular
 Minimum depth of pit (below incoming invert) d = **1600** mm
 Width of pit w = **4500** mm
 Length of pit l = **9000** mm
 Percentage free volume V_{free} = **95** %
 Soil infiltration rate f = **70.0** × 10⁻⁶ m/s
 Wetted area of pit 50% full a_{s50} = l × d + w × d = **21600000** mm²

Table equations

Inflow I = M100 × A
 Outflow O = a_{s50} × f × D
 Storage S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
5	0.37	8.3	1.87	15.4	20.27	0.45	19.81
10	0.52	11.6	1.94	22.4	29.43	0.91	28.52
15	0.63	14.0	1.97	27.6	36.33	1.36	34.97
30	0.80	17.8	2.01	35.7	46.97	2.72	44.25
60	1.00	22.1	2.02	44.7	58.75	5.44	53.31
120	1.21	26.7	2.00	53.2	70.02	10.89	59.13
240	1.45	32.0	1.95	62.5	82.16	21.77	60.39
360	1.60	35.4	1.93	68.3	89.77	32.66	57.11
600	1.79	39.6	1.89	75.0	98.65	54.43	44.22
1440	2.24	49.5	1.81	89.8	118.09	130.64	0.00

Required storage volume S_{req} = **60.39** m³

Soakaway storage volume S_{act} = l × d × w × V_{free} = **61.56** m³

PASS - Soakaway storage volume

Time for emptying soakaway to half volume t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 5hr 32min 51s

PASS - Soakaway discharge time less than or equal to 24 hours

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the storage volume requirements that are needed 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). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site characteristics

Total site area (ha):	0.16
Significant public open space (ha):	0
Area positively drained (ha):	0.16
Impermeable area (ha):	0.132
Percentage of drained area that is impermeable (%):	83
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.16
Net impermeable area for storage volume design (ha):	0.13
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:

Urban creep allowance factor:

Volume control approach:

Interception rainfall depth (mm):

Maximum flow rate (l/s):

Methodology

esti

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	2	2
SPR:	0.3	0.3

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	63
Rainfall 100 yrs 12 hrs:	--	80.85
FEH / FSR conversion factor:	1.05	1.05
SAAR (mm):	885	885
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q_{BAR} for total site area (l/s):	0.38	0.38
Q_{BAR} for net site area (l/s):	0.38	0.38

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	3	3
1 in 30 years (l/s):	3	3
1 in 100 year (l/s):	3	3

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	57	57
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	57	57

This report was produced using the storage estimation tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.