

Mr Coles
C/O Symonds and Sampson
89 Crane St
Salisbury
SP1 2PU

01 March 2017
Our Ref: SYSA/16/D1268

Dear Mr Coles

RE: LAND AT ALDINGBOURNE FARM SHOP, NYTON ROAD, PO20 3TX

1. Background

- a. Instructions were received from Mr Coles of Symonds and Sampson to prepare a retrospective drainage appraisal for the development of a site at Aldingbourne Farm Shop, Nyton Road, PO20 3TX.
- b. The appraisal has been prepared to support approved planning application Ref: AL/47/14/PL for 4 No. permanent plots for travelling and a pony paddock. The site is access via an existing belmouth off Nyton Road (currently serving the Farm Shop) and will be served by a new unkerbed access road and associated hard standing.
- c. The development is located next to 2 No. existing developments known as The Birches and Nyton Stables (Farm Shop).
- d. Information contained on the planning authority's website has been reviewed as part of this appraisal.
- e. At the time of writing it shall be noted that the majority of the hardstanding area have already been constructed and the factual evidence cited in this report is based upon the information provided by the client.

2. Development Description & Location

- a. The site is located in a predominantly agricultural area.
- b. The site is currently classified as 'greenfield' is of the order of 3.35ha with an impermeable area of 170m² (Farm Shop Only). The site falls generally north-east to south-west towards Aldingbourne.

P.T.O

3. Groundwater

- c. The Environment Agency (EA) mapping shows that the development is located within a Source Protection Zone 2c (sub-surface activity).
- d. The site is also shown to be within a secondary aquifer and a 'major aquifer low' designation for groundwater vulnerability.

4. Geology

- a. The BGS website shows the site confirms the following bedrock geology:
 - * *Seaford Chalk Formation - Chalk. Sedimentary Bedrock formed approximately 84 to 89 million years ago in the Cretaceous Period. Local environment previously dominated by warm chalk seas.*
- b. An intrusive site investigation has not been undertaken within the site.
- c. Seasonal groundwater monitoring has not been undertaken within the site.
- d. The client has confirmed that historic excavations a soil comprising topsoil overlaying, silty, gravels and chalk.
- e. Infiltration testing has been undertaken by the client in order to design the foul treatment plants for each dwelling. Whilst this information has not been supplied, based on the geology encountered, we have assumed that an average infiltration rate of 1×10^{-3} will be achieved.

5. Existing Drainage Regime

- a. The subject site is not formally drained at present, being rough ground.
- b. It is understood that there are no existing surface water sewers close to the site.
- c. It is understood that there are no existing foul water sewers close to the site.
- d. It is understood that the run-off is naturally drained partially by infiltration. Ultimately, exceedance run-off will flow south-westerly towards Aidingbourne overland to lower lying land.
- e. The existing run-off rate (Q_{80r}) has been calculated using Microdrainage (ICOP SUDS) to be 7.1 l/s. The Greenfield run-off volume is calculated to be 735.356m³ (Based on Microdrainage, SPR of 32.28%).

6. Proposed Surface Water Drainage

- a. There have recently been 2 No. developments adjacent to the site known as The Birches and Nylon Stables (Farm Shop). It is evident that both developments have been implemented utilising a simple surface water drainage strategy utilising SUDS techniques (infiltration). Both sites have been constructed whereby all external hardstand areas are constructed as a shallow permeable pavement system. Furthermore this has been

accepted by Arun DC and the relevant planning conditions relating to drainage have been discharged.

- b. The SUDS manual and Building Regulations sets out a hierarchy of drainage methods to ensure that developments maximise the use of sustainable drainage techniques. In short, this hierarchy favours infiltration methods of disposal over other methods such as watercourses or sewers.
- c. Given the above information, it is reasonable to conclude that infiltration methods of drainage will operate successfully.
- d. Surface water storage will be provided by using the voids available in the sub base of a permeable/porous paving construction. This will ensure the storage is available should groundwater levels become elevated.
- e. The pre & post development impermeable areas have been assessed as follows:

Existing (Farm Shop Roof)	170m ²
Proposed (Farm Shop & x4 Dwellings)	650m ²
Difference	480m ²

- f. The permeable pavement has been installed over an area of the order of 12533m² with a 450mm construction depth comprising 300mm (min) sub-base material (chalk) with a 150mm (min) compacted gravel running surface (road scalpings mix).
- g. Micro Drainage calculations show that for a 1 in 100 year +40% critical storm the porous pavement significantly exceeds the storage requirements to drain the entire site.
- h. The strategy above will ensure that there is no increase in the amount of run-off leaving the site, therefore there will be no increase in the risk of flooding from this source either on or off of the site.

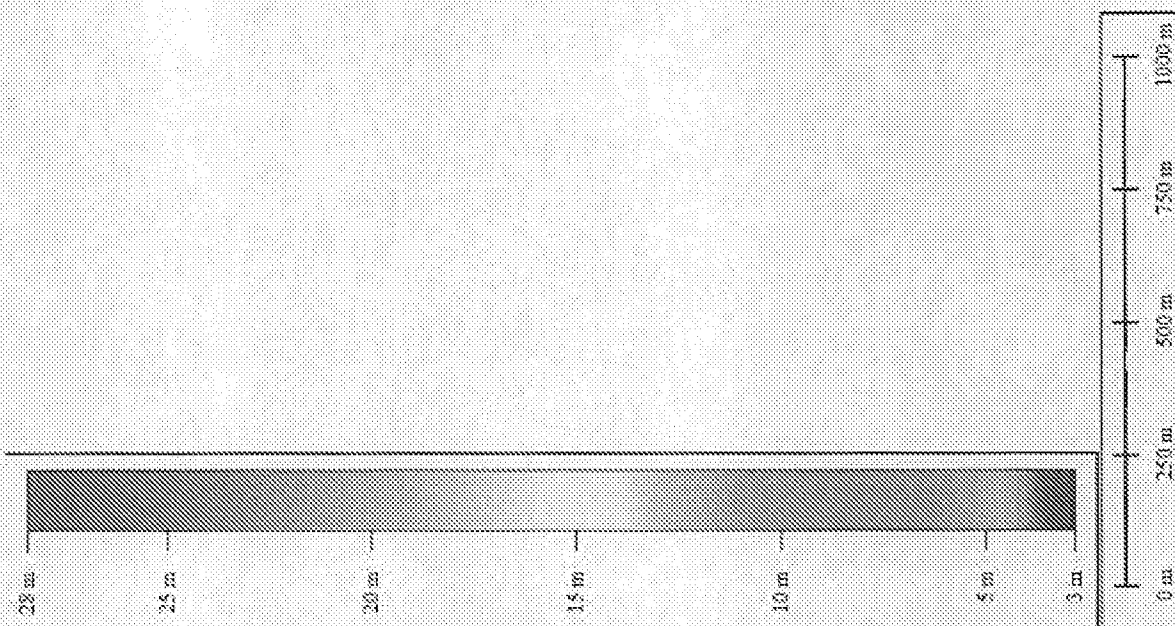
In summary the proposed development will result in an increase in impermeable area, which will be mitigated by utilising SUDS techniques to mimic the existing scenario. We can be assured of this strategy being suitable given the reliance of the adjacent development information.

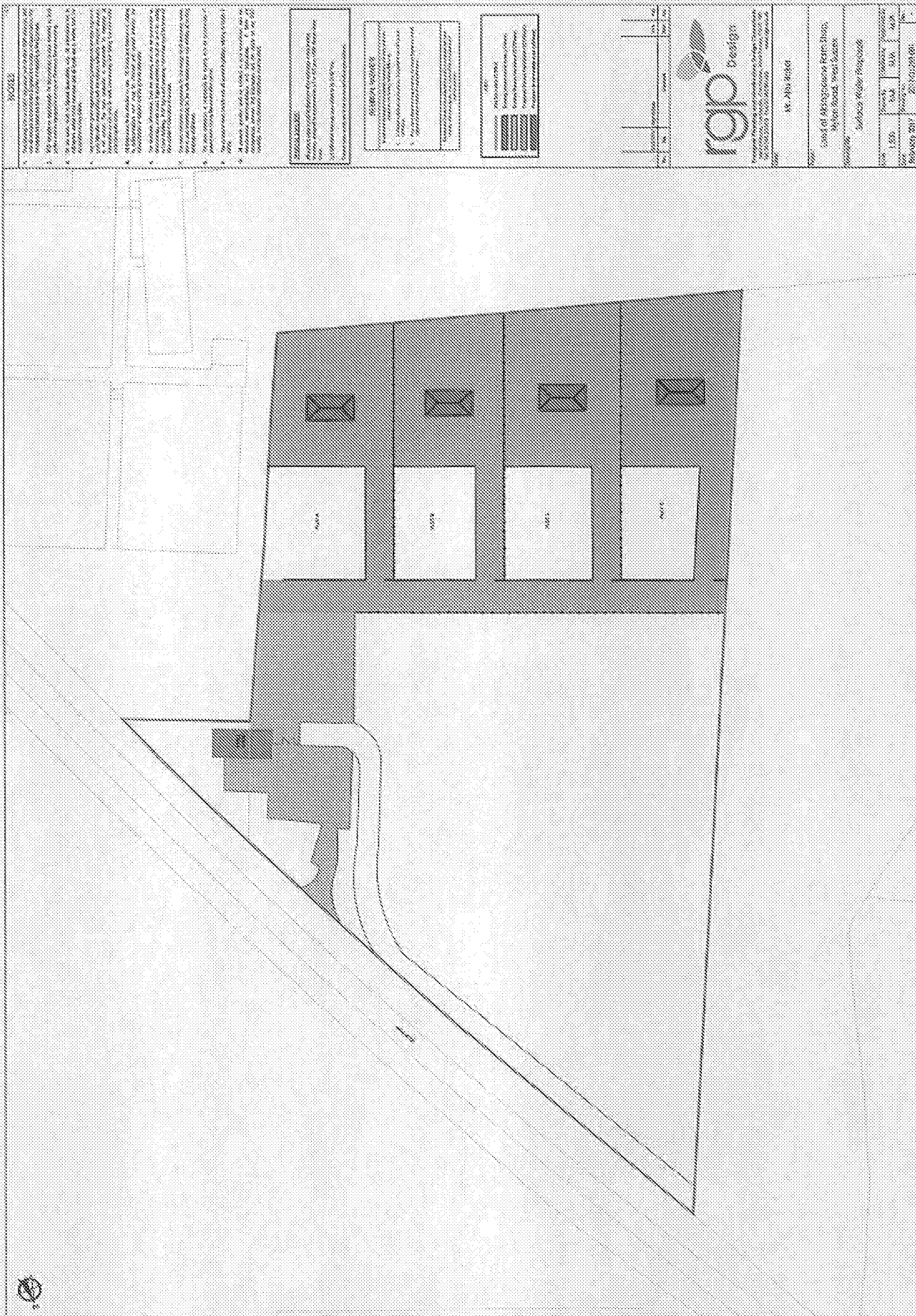
Yours sincerely,

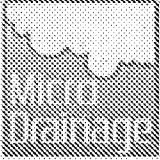


Mark Akmenkalns
RGP Design Ltd

Encl. LIDAR, Dwg 001, Greenfield Run-off/Vol, Porous Pavement Simulation (Microdrainage)





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ICP SUDS Mean Annual Flood

Input

Return Period (years): 100 EEAR (mm): 780 Urban 0.000
Area (ha): 3.380 Soil 0.300 Region Number Region 7

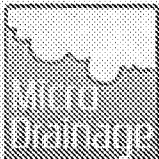
Results l/s

QEAK Rural 7.3
QEAK Urban 7.1

Q100 years 22.6

Q1 year 6.0
Q50 years 16.1
Q100 years 22.6

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Greenfield Runoff Volume

FEB Data

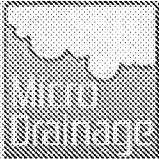
Return Period (years)	100
Storm Duration (mins)	360
Region England and Wales	
MI-60 (mm)	19.900
Ratio R	0.326
Areal Reduction Factor	1.00
Area (ha)	3.380
SKAS (mm)	768
CWI	115.839
Urban	0.000
SFR	30.800

Results

Percentage Runoff (%)	32.00
Greenfield Runoff Volume (m³)	735.355

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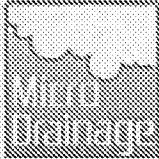
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Half Drain Time = 25 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	9.350	0.000	0.0	0.0	O K
30 min Summer	9.350	0.000	0.0	0.0	O K
60 min Summer	9.398	0.048	5.1	7.8	O K
120 min Summer	9.614	0.064	7.2	13.9	O K
180 min Summer	9.621	0.071	8.0	16.9	O K
240 min Summer	9.623	0.073	8.2	18.2	O K
360 min Summer	9.625	0.075	8.4	18.9	O K
480 min Summer	9.624	0.074	8.3	18.4	O K
600 min Summer	9.622	0.072	8.1	17.4	O K
720 min Summer	9.620	0.070	7.9	16.3	O K
840 min Summer	9.615	0.065	7.3	14.1	O K
1440 min Summer	9.606	0.056	6.3	10.6	O K
2160 min Summer	9.598	0.048	5.1	7.7	O K
2880 min Summer	9.593	0.043	4.1	6.1	O K
4320 min Summer	9.586	0.036	2.9	4.3	O K
5760 min Summer	9.581	0.033	2.2	3.3	O K
7200 min Summer	9.578	0.028	1.8	2.7	O K
8640 min Summer	9.576	0.026	1.5	2.2	O K
10080 min Summer	9.573	0.023	1.2	1.8	O K
15 min Winter	9.350	0.000	0.0	0.0	O K
30 min Winter	9.375	0.025	1.4	2.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	127.771	0.0	0		
30 min Summer	86.926	0.0	0		
60 min Summer	56.432	0.0	64		
120 min Summer	35.262	0.0	96		
180 min Summer	26.318	0.0	128		
240 min Summer	21.260	0.0	160		
360 min Summer	15.748	0.0	226		
480 min Summer	12.702	0.0	290		
600 min Summer	10.742	0.0	354		
720 min Summer	9.341	0.0	414		
840 min Summer	7.827	0.0	536		
1440 min Summer	5.532	0.0	772		
2160 min Summer	4.042	0.0	1128		
2880 min Summer	3.234	0.0	1496		
4320 min Summer	2.357	0.0	2248		
5760 min Summer	1.885	0.0	2992		
7200 min Summer	1.585	0.0	3744		
8640 min Summer	1.376	0.0	4488		
10080 min Summer	1.221	0.0	5248		
15 min Winter	127.771	0.0	0		
30 min Winter	86.926	0.0	40		
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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (L/s)	Max Volume (m³)	Status
60 min Winter	9.615	0.065	7.3	14.2	O K
120 min Winter	9.631	0.091	9.1	22.0	O K
180 min Winter	9.635	0.085	9.6	28.4	O K
240 min Winter	9.636	0.086	9.8	31.7	O K
360 min Winter	9.635	0.083	9.3	23.2	O K
480 min Winter	9.628	0.079	8.9	20.5	O K
600 min Winter	9.624	0.074	8.4	18.5	O K
720 min Winter	9.620	0.070	7.8	16.3	O K
960 min Winter	9.611	0.061	6.9	12.7	O K
1440 min Winter	9.600	0.050	5.6	8.3	O K
2160 min Winter	9.592	0.042	4.0	6.1	O K
2880 min Winter	9.588	0.038	3.2	4.8	O K
4320 min Winter	9.581	0.031	2.3	3.2	O K
5760 min Winter	9.577	0.027	1.7	2.5	O K
7200 min Winter	9.574	0.024	1.3	2.0	O K
8640 min Winter	9.572	0.022	1.1	1.6	O K
10080 min Winter	9.570	0.020	0.9	1.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.422	0.0	62
120 min Winter	35.282	0.0	98
180 min Winter	26.318	0.0	134
240 min Winter	21.260	0.0	170
360 min Winter	15.746	0.0	238
480 min Winter	12.702	0.0	302
600 min Winter	10.742	0.0	366
720 min Winter	9.361	0.0	420
960 min Winter	7.527	0.0	544
1440 min Winter	5.522	0.0	760
2160 min Winter	4.042	0.0	1124
2880 min Winter	3.234	0.0	1488
4320 min Winter	2.357	0.0	2216
5760 min Winter	1.885	0.0	2920
7200 min Winter	1.585	0.0	3672
8640 min Winter	1.375	0.0	4448
10080 min Winter	1.221	0.0	5210

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
Md-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.325	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.191

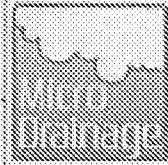
Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To: (ha)	From:	To: (ha)	From:	To: (ha)
0	4 0.063	4	8 0.063	8	12 0.063

Northgate

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Storage is Online Cover Level (m) 10.000

Infiltration Coefficient Base (m/hr)	0.33600	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	107.0
Max Percolation (l/s)	3675.0	Slope (1:1)	250.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.35	Evaporation (mm/day)	3
Invert Level (m)	9.550	Cap Volume Depth (m)	0.350

Appendix 3