PRELIMINARY SURFACE WATER DRAINAGE STRATEGY

Erection of 49 Dwellings (Outline)
including Access

Land at Pont Adam Crescent,
Ruabon, LL14 6EG

Prepared for Castlemead Group Ltd by
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Contents

Section		Page
1.	Introduction	1
2.	The Site	2
3.	Flood Risk	2
4.	Technical Guidance Requirements	3
5.	Percolation Tests	4
6.	Conclusionss	4

Document 1 Percolation Tests provided by Kane Design

1. Introduction

1.1 This report considers the surface water drainage issues associated with the planning application for 49 dwellings on Land at Pont Adam Crescent, Ruabon, LL14 6EG.

1.2 The preliminary surface water drainage strategy has been developed to assess the viability of effectively draining the proposed residential development.

1.3 The outline strategy is designed to inform a sustainable approach and will be supplemented with a detailed drainage strategy as part of any future Reserved Matters planning application.

2. The Site

2.1 The site is a roughly rectangular shaped field covering approximately 1.63 hectares

2.2 The site currently comprises a parcel of overgrown land on the urban fringe.

2.3 The land is generally open, but there are a number of individual mature trees along with areas of scrub trees within the site and along the eastern, southern and western site boundaries

2.3 The land slopes to the southern boundary with the A539 Llangollen Road

3. Flood Risk

3.1 A floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

3.2 The site is shown to be outside the Environment Agency's Indicative Floodplain which shows the 0.1% annual probability flooding and an extract of the Environment Agency mapping is shown below.

3.3 There will be no detrimental impact upon any future occupiers of the development through flood risk and the development of the site will not result in the loss of flood storage capacity

3.4 The development fulfils the criteria within Technical Advice Note 15 Development and Flood Risk.

4. Technical Guidance Requirements

4.1 TAN 15 Development and Flood Risk states that the aim should be for new development not to create additional run-off when compared with the undeveloped situation, and for redevelopment to reduce run-off where possible.

4.2 In accordance with TAN15, Sustainable Drainage Systems (SuDS) should be specified wherever possible to manage surface water.

4.3 A hierarchical approach should be taken to the design of the surface water drainage system with priority given to:

- Prevention – the use of good site design to prevent run off (e.g. rainwater re-use or harvesting).
- Source Control – control of run off at or near the source (e.g. soakaways, infiltration beds, green roofs, pervious paving, etc.).
- Site Controls – management of water run off in a local area or the site (i.e. routing of surface water to large soakaways or attenuation basins/structures).

4.4 Approved Document H of the current Building Regulations sets out a hierarchy for disposal of surface water from new development, as listed below in order of preference:

- Infiltration via soakaway or other infiltration device;
- Watercourse; and,
- Sewer.

5. Percolation Tests

5.1 Percolation Tests in accordance with BRE 365 guidelines have been provided by Kane Design of 15 Winchester Way, Gresford, Wrexham, LL12 8HH and these are attached as Document 1.

5.2 The two trial pits tested had different results and these are shown within the report.

5.3 Clay deposits were found within the two trial pits, although it is apparent that the depth differs across the site

5.4 Trial Pit 2 drained satisfactorily and the report suggests further investigations and trial pits to provide an infiltration map across the site

6. Conclusions

6.1 It is recommended that surface water is discharged via infiltration techniques.

6.2 The percolation tests demonstrate that there are areas within the site which are capable of accommodating surface water drainage

6.3 At the detailed application stage, further investigations and trial pits will be undertaken in order to provide an infiltration map across the site. This will then be used to create a detailed surface water drainage plan for the development.

6.4 This additional information will be prepared and presented at the Reserved Matters application stage in consultation with the sewerage undertaker and the Environment Agency.

6.5 On the basis of the Preliminary Surface Water Drainage Strategy, and the Percolation Tests undertaken it is clear that the site is suitable for development.

Document 1

Percolation Tests provided by Kane Design

KANE DESIGN

15 Winchester Way
Gresford
Wrexham
LL12 8HH

SOAKAWAY RESULTS AND CALCULATIONS
for
LAND AT PONT ADAM
RUABON, WREXHAM, LL14 6EG

18 June 2014

Client:

Scheme ref: 1242
Report ref: 1242SWA

SOAKAWAY RESULTS AND CALCULATIONS FOR
LAND AT PONT ADAM, RUABON, WREXHAM LL14 6EG

1.0 Introduction

1.1 Soakaway tests were requested by Castlemead Homes at the location of a proposed residential development and undertaken by Kane Design / Alan Kane on 18 June 2014.
This site is Greenfield, approximately 170m x 115m at widest, heavily overgrown, mostly with grass. Site levels range from 137-119m, falling from west to east.

1.2 Weather on the test day was hot and dry

1.3 Two trial pits were partially filled with water and the time taken to empty recorded. In accordance with B.S. 365, the time to empty from 75% to 25% was computed, and from this a soil infiltration rate was calculated.

1.4 This was compared with the B.S. 363 criteria for the acceptance of soakaways, namely:

- The effective pit depth (depth beneath incoming pipework) must be able to contain a worst-in-30 year storm, all storm durations up to 6 hours.
- The pit must half-empty within 24 hours.

Typical soakaway designs are included using the obtained infiltration rates

2.0 Limitations:

Two tests were undertaken, with each trial pit filled once, and readings recorded. These tests were limited by time constraints, but do give an overview of the ability of the site to soak. All measurements are approximate.

These test results do not remove the need for a site investigation. Comments on the trial pit composition are visual from site, and there is no detailed analysis.

For detailed design, the Highway Authority are likely to ask for tests in proposed roads at intervals of about 50m. They may want to be present for these tests. The full B.S. 363 testing criteria is for each test to be repeated three times.

This report has only considered 2 locations. Detailed design would require about 10 tests, to give a good mapping of the entire site.

3.0 Results.

Test 1: 3.4 x 1.0m x 1.95m average depth

Approximate log:	0-300	topsoil
	600-	clay

Infiltration rate: 5.5 X 10-7m3/s

Based on the recorded results, this will not meet B.S. 365 standards. It will not half-empty within 24 hours
Constraints meant that readings were terminated after several hours, and not the ideal 24-hour scenario for highway-authority tests. Nor was it filled / emptied three times as they recommend.
There is a possibility that a full detailed test might provide results that are just within the band of acceptability.
However, based on the limited results obtained, it will not work.

Test 2: 2.8 x 1.0m x 1.65m average depth.

Approximate log:	0-300/600 mm	topsoil
	600-1300mm	clay
	1300mm-	clay / gravel

Infiltration rate: 2.33 X 10-5m3/s

This soakaway will drain satisfactorily to B.S. 365 standards.

Based on this infiltration rate of 1.69 X 10-5m3/s, and draining an area of 200m2:

A soakaway size of 1200mm diameter rings, with an effective depth of 1.2m (beneath incoming pipe) would empty in 8.22 hours.
Required storm storage is 2.74m3, and 3.11m2 is available.

It is worth pointing out that the water in this soakaway was initially not draining / draining very slow, but then quickly emptied. This could suggest the clay layer was broken through revealing a drainable material underneath.

4.0 Summary

Trial pit 1, at the low end of the site, did not drain
Trial pit 2, at a site midpoint, drained satisfactorily

From the above, we know there is an area of the site that does drain, although it is not at the site low point.
For design, further site investigation is required to build up an infiltration map, indicating which areas soak and which do not. At present, locations and extents are unknown.
It might be that a deeper soakaway at trail pit 1 might produce results, if the clay can be penetrated.

The purpose of this document is to prove that there are areas where soakaways do work, therefore removed the major issues connected with draining surface water to public sewers (assuming they will accept it), and the cost of over-size storage pipes and large diameter manholes.

The “worst-storm-in 100 years, plus 30% climate change” must also be considered.
At design stage this can be accommodated in several ways, such as:

- Deeper soakaways.
- Designated emergency flood zones such as public open spaces, car parks.

PROPOSED DEVELOPMENT at PONT ADAM, RUABON, WREXHAM, LL14 6EG

KANE DESIGN | **JOB NUMBER:** **1242**

SOAKAWAY RESULTS | **CLIENT** **Castelemead Homes**

18 June 2014 **AK** | **PAGE 1 / 2**

SOAKAWAY REFERENCE : **TRIAL PIT 1**

Test details

Date Wed 18 June 2014

Weather: Hot sunny

	TIME	DEPTH TO WATER(m	DEPTH OF WATER IN PIT(mm)
	11.13am	1.60	350
START	11.17am	1.60	350
	11.40am	1.60	350
	11.55am	1.62	330
	12.10pm	1.62	330
	12.25pm	1.62	330
	12.35pm	1.63	320
END	14.15pm	1.63	320

PIT SIZE	(m)
Length	3.4
Width	1.0
Average Depth	1.95
PIT AREA (m	3.40
Location:	Close to site low point

TOTAL TIME **182** minutes

CALCULATED:

V25 25%

V75 75%

TIME TO FALL FROM 75% to 25% (mins)

	ACTUAL	INTERPLOATED
TIME (mins)	TIME	DEPTH (mm)
45.5		330.00
136.5		320.00
91		10.00

CALCULATION:

INFILTRATION RATE = f = V = Effective Storage Volume between 75% and 25% full

T= Time taken to drain above X AP

where AP = 50% internal surface area, including base:

= 11.98 m2

SOAKAWAY	**PIT AREA**	FROM ABOVE **Depth 25%**	**Depth 75%**	CALCULATED **V (V75-V25) x PIT AREA**	**T**	CALCULATED **AP**	**f (Infiltration rate)**	
	m2	mm	mm	m3	minutes	m2		
1	3.40	330.00	320.00	0.034	91.00	11.98	**5.20E-07**	m3/second

PROPOSED DEVELOPMENT at PONT ADAM, RUABON, WREXHAM, LL14 6EG

KANE DESIGN | **JOB NUMBER:** **1242**

SOAKAWAY RESULTS | **CLIENT** **Castelemead Homes**

18 June 2014 **AK** **PAGE 2/2**

SOAKAWAY REFERENCE : **TRIAL PIT 2**

Test details

Date Wed 18 June 2014

Weather: Hot sunny

	TIME	DEPTH TO WATER(m	DEPTH OF WATER IN PIT(mm)
START	11.32am	1.50	150
	11.37am	1.50	150
	11.47am	1.52	130
	12.10pm	1.61	40
	12.17pm	1.61	40
END	12.32pm	1.65	0

PIT SIZE	(m)
Length	2.8
Width	1.0
Average Depth	1.65
PIT AREA (m	2.80

TOTAL TIME **60** minutes

CALCULATED:		TIME (mins)	ACTUAL TIME	INTERPLOATED DEPTH (mm)
V25	25%	15		176.00
V75	75%	45		40.00
TIME TO FALL FROM 75% to 25% (mins)		30		136.00

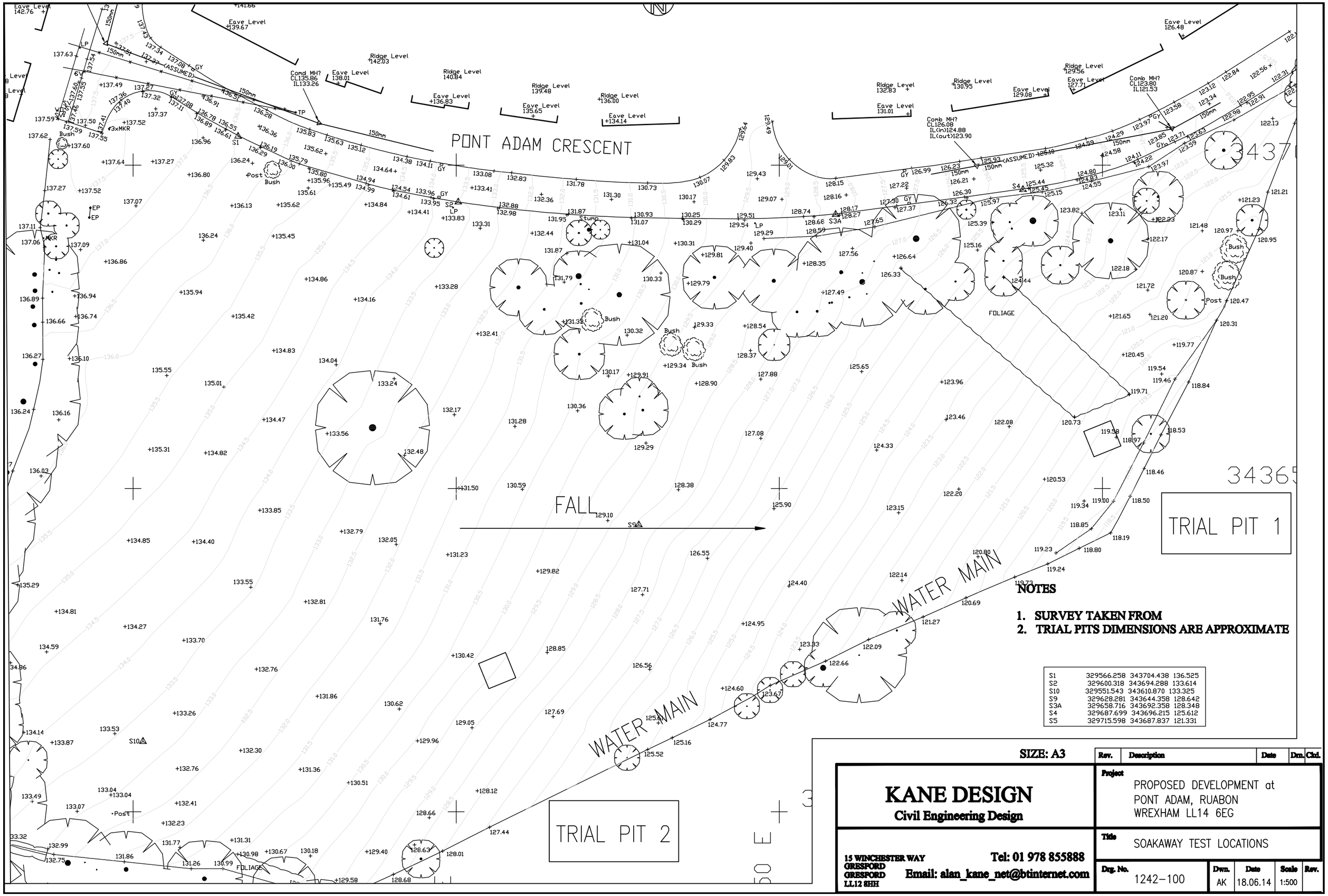
CALCULATION:

INFILTRATION RATE = f = V = Effective Storage Volume between 75% and 25% full / T= Time taken to drain above X AP

where AP = 50% internal surface area, including base:

= 9.07 m2

SOAKAWAY	**PIT AREA**	FROM ABOVE **Depth 25%**	**Depth 75%**	CALCULATED **V (V75-V25) x PIT AREA**	**T**	CALCULATED **AP**	**f (infiltration rate)**
	m2	mm	mm	m3	minutes	m2	
2	2.80	176.00	40.00	0.381	30.00	9.07	**2.33E-05** m3/second



NOTES

1. **SURVEY TAKEN FROM**
2. **TRIAL PITS DIMENSIONS ARE APPROXIMATE**

S1	329566.258	343704.438	136.525
S2	329600.318	343694.288	133.614
S10	329551.543	343610.870	133.325
S9	329628.281	343644.358	128.642
S3A	329658.716	343692.358	128.348
S4	329687.699	343696.215	125.612
S5	329715.598	343687.837	121.331

SIZE: A3

Rev.	Description	Date	Drn.	Chd.

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Project
PROPOSED DEVELOPMENT at
PONT ADAM, RUABON
WREXHAM LL14 6EG

Title
SOAKAWAY TEST LOCATIONS

Drg. No.	Drn.	Date	Scale	Rev.
1242-100	AK	18.06.14	1:500	

PIT 2 (EMPTY)

PIT 1

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