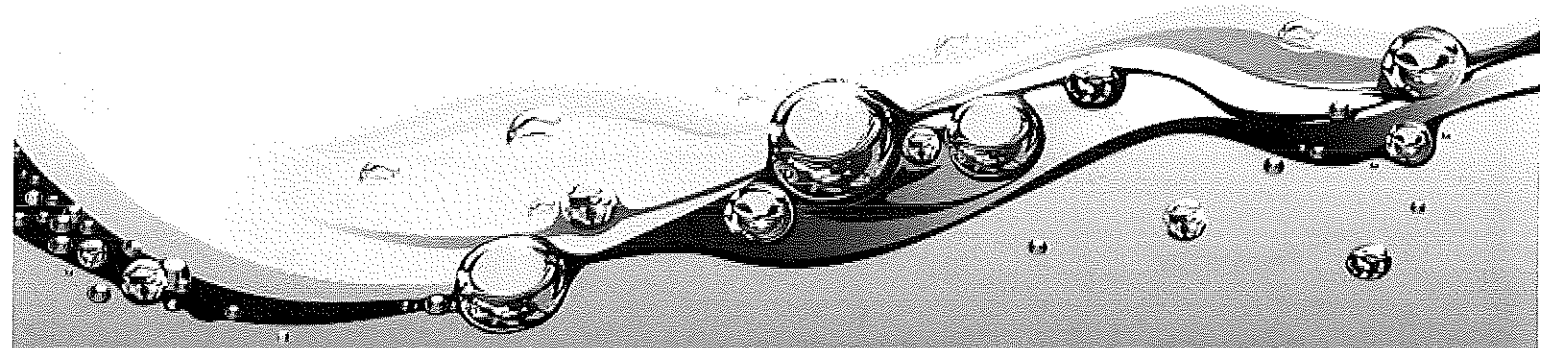
waterco consultants

Appendix 2
Outline Surface Water Strategy

Bromfield Road, Ludlow

Outline Surface Water Strategy

July 2014



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INFORMATION AND VERIFICATION RECORD

CLIENT:

Tesni Homes

SCHEME:

Bromfield Road, Ludlow

Residential / Commercial development

INSTRUCTION:

The instruction to carry out this Outline Surface Water Strategy was received from John Beardsell of Tesni Homes (formerly WCE Properties).

ISSUE HISTORY:

Issue Date	Comment/ Revisions
02/07/2014	First Issue

DOCUMENT REVIEW & APPROVAL

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Reviewed by	Aled Williams BSc (Hons)
Approved by	Dr Deepak B Kharat BE MTech PhD MCIWEM CWEM CSci

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A – Hard surfaces area sketch plan

1 Introduction

1.1 Waterco Ltd have been instructed to prepare an Outline Surface Water Strategy in respect of a proposed residential (210 properties) and commercial development at land off Bromfield Road, Ludlow. The total site area is approximately 10.6ha.

1.2 This document has been prepared in support of an outline planning application to identify the order in which surface water run-off from the site should be further assessed for sustainability.

1.3 The site comprises of greenfield land where the topography falls towards the River Corve.

1.4 Part of the site is within Flood Zone 2 and Flood Zone 3 as defined by the Environment Agency. A Flood Risk Assessment 'w1366-140120-FRA' and addendum 'w1366-140327-FRA Addendum' prepared by Waterco contains further information. The proposed housing area is outside of the Flood Zones.

2 Proposed site permeable / impermeable areas

2.1 The site's hard surfaces are divided into three categories which are roofs, private driveways and highways. These areas are shown in Appendix A and a summary is provided below.

Surface type	Surface area
Roofs	13,175 sq. m
Private driveways	11,360 sq. m
Highways	12,562 sq. m

3 Surface Water Management

Overall Design Philosophy

3.1 Part H of the Building Regulations sets out the preferred methods for disposal of surface water, in order of priority: soakaway, watercourse; sewer.

3.2 Disposal of surface water to ground is to be investigated first, followed by disposal to the River Corve. Disposal of surface water to sewer should not need to be investigated.

3.3 The different impermeable areas, roofs, driveways and highways can be drained separately.

Disposal via Infiltration Techniques

3.4 Disposal of surface water via infiltration techniques may be a viable option.

3.5 Infiltration devices should not be built in ground where the water table reaches the bottom of the soakaway at any time of the year. Presence of ground water is to be investigated further.

3.6 Soakaways should be sited at least 5m away from buildings and adopted roads. The proposed layout may need to be reconsidered.

3.7 Infiltration tests are to be carried out to BRE Digest 365 prior to the detailed design of the scheme.

3.8 If the infiltration tests are successful, the local authority highways department would need to be consulted over the drainage design for the adoptable highways.

Discharge to Watercourse

3.9 Discharge from the site to the River Corve would need to be restricted. The pre-development 1 year return period peak runoff rate calculated using the combination of IOH124 method and rational method equates to 51 litres per second approximately. Calculations are included in the Flood Risk Assessment cited previously.

3.10 The exact maximum allowable runoff rate and locations of discharge are to be agreed with the Environment Agency.

3.11 The Environment Agency require surface water runoff for a 100 year flood to be retained on site however below ground drainage may be designed for 30 year flood capacity with exceedance flows retained on roads, other unhabited areas or lagoons which can recede back into the drainage system for controlled discharge to the watercourse at the end of a storm event [refer to EA document "Rainfalll runoff management for developments" (Report – SC030219)]. The "National Planning Policy Framework" requires a 30% climate change increase adjustment to be applied to the design flows.

3.12 An estimation of storage volumes required has been calculated using a simplified Rational method and the results are tabulated below. This MUST NOT be used for design.

Surface type	Storage volume estimate for certain Design Storm Return Periods (assuming 51 l/s unrestricted discharge)	
	1 in 30 year	1 in 100 year (+30% CCA)
Roof areas	204.0 cu. m	469.2 cu. m
Private driveways	159.0 cu. m	368.2 cu. m
Highways	188.0 cu. m	434.6 cu. m
All combined	1024.0 cu. m	2117.2 cu. m

3.13 Sealed below ground attenuation tanks or pipes could be sited within the flood zone.

3.14 Where discharge is to the River Corve, pumped or siphoned discharge drains and / or backflow protection must be considered for extreme rainfall events to protect the proposed development.

Rainwater harvesting

3.15 Roof water can be collected and used for toilet-flushing and outdoor uses. This would reduce potable water use typically by about a third and would reduce surface water discharge. Rainwater tanks could include some attenuation.

4 Conclusions

4.1 The options in order and to be investigated further are:

- Disposal of all surface water to ground via infiltration techniques.
- Partial disposal of surface water to ground in priority of private driveways using permeable paving systems; roof drainage using soakaways and carriageway using permeable paving systems.
- Partial or complete discharge to watercourse with limited discharge and on-site storm attenuation as required in the form of large diameter trunk drains and / or offline tank storage. Attenuation could also be incorporated in rainwater harvesting tanks.

4.2 It should be noted that the layout should only be finalised after the drainage has been designed to ensure sufficient space is allowed for soakaways and / or attenuation.

5 Recommendations

5.1 Carry out infiltration tests to BRE Digest 365 across the site but outside the Flood Zones and assess the viability of soakaways.

5.2 If and where soakaways are viable, design the size of the soakaways for roof drainage, design the permeable paving for private driveways and consult the highway authority about the highway design.

5.3 Where soakaways are not viable, assess the surface water areas to be discharged to the River Corve and consult with the Environment Agency to agree discharge rates and locations and design the required attenuation.

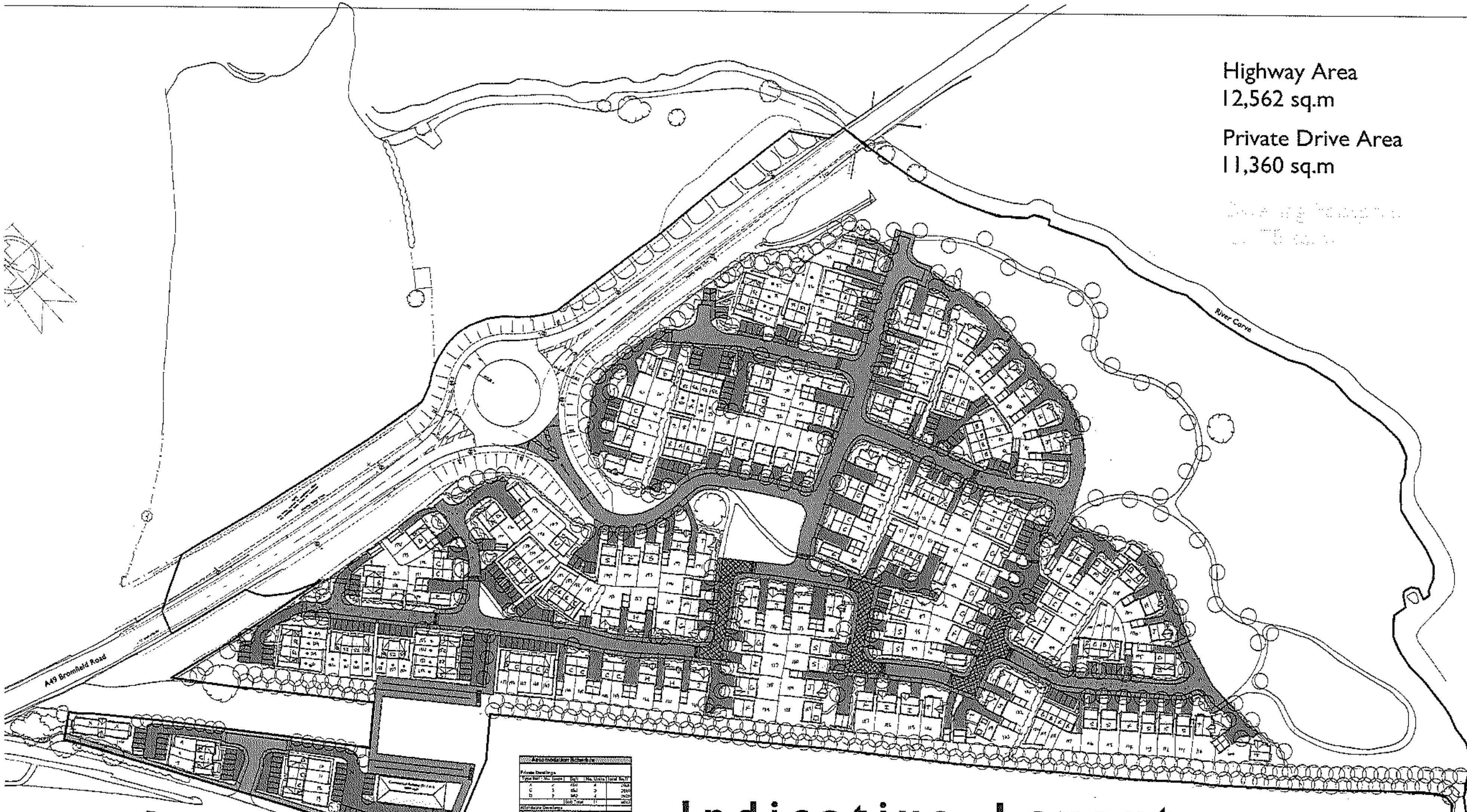
5.4 Exceedance flows should also be considered and the layout of the site designed for 100 year exceedance flow to be retained on site without flooding buildings; and flooded areas have suitable escape route back to controlled discharge to River Corve.

Appendix

A – Hard surfaces area sketch plan

Highway Area
12,562 sq.m

Private Drive Area
11,360 sq.m



Accomodation Schedule				
Private Dwellings				
Type Ref	No. Beds	Sqft	No. Units	Total Sq.ft
B	2	590	32	18880
C	3	853	45	38385
D	3	982	16	15712
E	3	905	10	9050
F	4	1080	11	11880
G	4	1260	8	10080
H	4	1343	10	13430
I	4	1300	7	9100
J	4	1390	9	12510
M	5	1760	4	7040
S	3	1050	12	12600
T	4	1300	8	10400
		Sub Total	172	169067
Affordable Dwellings				
Type Ref	No. Beds	Sqft	No. Units	
S2	2	764	13	9932
S3	3	890	12	10680
		Sub Total	25	20612
Total			197	189679

Accomodation Schedule				
Private Dwellings				
Type Ref	No. Beds	Sqft	No. Units	Total Sq.ft
A	2	[illegible]	4	[illegible]
C	3	853	[illegible]	[illegible]
D	3	982	4	[illegible]
		Sub Total	[illegible]	[illegible]
Affordable Dwellings				
Type Ref	No. Beds	Sqft	No. Units	Total Sq.ft
A	2	635	[illegible]	[illegible]
		Sub Total	[illegible]	[illegible]
Total			[illegible]	[illegible]

Indicative Layout
Bromfield Road, Ludlow

This drawing illustrates a sketch proposal only and as such is subject to detailed site investigation including ground conditions/contaminants, drainage, design and planning/density negotiations. The layout may be based upon an enlargement of an o.s. sheet or other small scale plans and its accuracy will need to be verified by survey. Full risk assessment under CDM Regulations has not been undertaken.

nb.no account has been taken of any services laid on or around the boundaries of the site.

nb.this layout takes no account of any trees on or around the boundaries of the site.