

RUSHBY BREWSTER
CONSULTING CIVIL & STRUCTURAL ENGINEERS

OUTLINE DRAINAGE STRATEGY

FOR

**Proposed Residential Development
Mary Rose House
Woolston Road
Leigh Park
Hampshire**

Client:

PMC Construction and Development
Services Ltd
106 Queens Road
Portsmouth
Hampshire
PO2 7NE

Architect:

Martin Ralph Group

Issue		A	B
Issued By	Allen Rushby		
Date	May 2012		
Purpose	Planning		
Approved By	SB		

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Directors: Allen Rushby IEng, AMI StructE; Stephen Brewster BSc (Hons), CEng, MICE

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 - b) PMC 177/SK02 - Site Plan showing proposed impermeable areas
3. BRE Global Code For Sustainable Homes SUR1
4. Drawing PMC 177/501 - Proposed Foul and Surface Water Drainage Strategy

1. Introduction

It is proposed to re-develop the site at Mary Rose House, Woolston Road, Leigh Park to provide new residential accommodation of 25 No. total flats and houses. Rushby Brewster Associates have been instructed by PMC Construction and Development Services Ltd to prepare a drainage strategy for foul and surface water disposal to accompany the planning application.

2. The Site

The site is located off Woolston Road, Leigh Park and is currently occupied by Mary Rose House with associated access drive and parking areas.

Total site area is 4648sq m(0.46ha). The site Ground Investigation report prepared by Structural Soils Ltd indicates a ground water table is present at between 2.0 and 2.6m below existing ground level and that soakaways are unlikely to be suitable for disposal of surface water.

3. Proposed Development

It is proposed to re-develop the site to provide new residential accommodation of flats and houses with associated parking and landscaped areas. Review of the Southern Water sewer asset plans confirms that existing foul and surface water sewers are located along the North East verge of Woolston Road. (see Appendix). It is assumed that both these sewers are utilised for the disposal of foul and surface water from the existing building.

4. Proposed Drainage Strategy for the Site

4.1 Surface Water

In accordance with the requirements of 'Code for Sustainable Homes' the objective will be to reduce run-off from hard surfaces of the new development to a figure which is less than that of the existing development. Run-off from the proposed development will be calculated to include 30% increase due to the future effects of climate change.

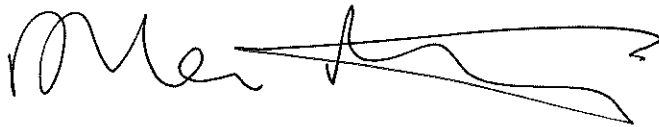
Calculations have been produced for the pre-development and post development (+30%) surface water run-off and these are included within the Appendix.

The proposed drainage strategy will utilise Sustainable Drainage Techniques (SUDS) for all parking and roadway areas to both reduce surface water run-off to levels less than the pre-development condition and to deal with issues relating to surface water quality of discharge.

The design criteria for sizing these features will accommodate peak run-off for a 1 in 100 year storm event.

4.2 Foul Water

Foul water flows from the proposed development will be carried through the site and connect into the public foul sewer located in Woolston Road.

A handwritten signature in black ink, appearing to read 'A W Rushby', with a long horizontal stroke extending to the right.

A W Rushby I Eng. AM I Struct E
For and on behalf of Rushby Brewster

APPENDICES

- 1.** Southern Water Sewer Plan
- 2.** Calculations for Surface Water Run-off.
Site Plan showing existing impermeable areas
Site Plan showing proposed impermeable areas
- 3.** BRE Global Code for Sustainable Homes SUR1.
- 4.** Site Plan showing proposed foul and Surface water
Drainage Strategy.



CALCULATIONS

RUSHBY | BREWSTER

CONSULTING CIVIL AND STRUCTURAL ENGINEERS

Job Title	Job No.		Sht. No.	
MARY ROSE HOUSE LEIGHT PARK	PMC 177.			
Element	Prepared	Date	Checked	Date
	AR	MAY '12		

SITE DETAILS

TOTAL SITE AREA = 4648 m²

PRE-DEVELOPMENT SITE IMPERMEABLE AREAS = 2307 m²

POST-DEVELOPMENT SITE IMPERMEABLE AREAS = 1324 m²

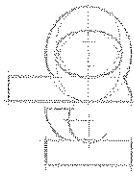
ALL EXTERNAL PARKING AREAS TO BE CONSTRUCTED
IN PARALLEL WITH

IN ACCORDANCE WITH CODE FOR SUSTAINABLE HOMES.

CALCULATE SURFACE WATER RUNOFF RATES AND VOLUMES
TO INCLUDE 30% ADDITIONAL ALLOWANCE FOR CLIMATE
CHANGE TO POST-DEVELOPMENT CONDITION.

EFFECTIVE SITE IMPERMEABLE AREA FOR POST-
DEVELOPMENT CONDITION = $1324 \times 1.30 = 1721 \text{ m}^2$

SEE SPREADSHEETS FOR RUNOFF.



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Facsimile: 01489 890005

Job Title	MARY ROSE HOUSE, WOOLSTON ROAD, LEIGH PARK	Job No.	PMC177	Sht. No.
	PRE-DEVELOPMENT SITE	Prepared	AWR	Date
	DESIGN RAINFALL RATES	Checked		Date

Impermeable Area = 2307 m²

Storm Duration	M5 Rainfall mm	1 in 1 year					1 in 100 year				
		Z2	Rainfall mm	Intensity mm/hr	SW Runoff l/s	Runoff vol. m ³	Z2	Rainfall mm	Intensity mm/hr	SW Runoff l/s	Runoff vol. m ³
5 min	7.1	1.02	7.2	86.9	55.69	16.71	1.84	13.1	156.8	100.46	30.14
10 min	10.1	1.03	10.4	62.4	40.00	24.00	1.91	19.3	115.7	74.17	44.50
15 min	12.3	1.03	12.7	50.7	32.47	29.23	1.95	24.0	95.9	61.48	55.33
30 min	15.7	1.03	16.2	32.3	20.73	37.31	2.00	31.4	62.8	40.24	72.44
1 hr	20.0	1.03	20.6	20.6	13.20	47.52	2.03	40.6	40.6	26.02	93.66
2 hrs	24.5	1.03	25.2	12.6	8.09	58.22	2.01	49.2	24.6	15.78	113.61
4 hrs	29.9	1.03	30.8	7.7	4.93	71.05	1.97	58.9	14.7	9.44	135.89
6 hrs	33.8	1.03	34.8	5.8	3.72	80.32	1.94	65.6	10.9	7.00	151.27
10 hrs	38.9	1.02	39.7	4.0	2.54	91.54	1.90	73.9	7.4	4.74	170.51
24 hrs	49.6	1.02	50.6	2.1	1.35	116.72	1.81	89.8	3.7	2.40	207.11

Ratio of 60 minute to 2 day rainfalls for 5 year return period r = 0.4

M5 rainfalls are calculated from Table 1 BRE Digest 365 using Factor Z1

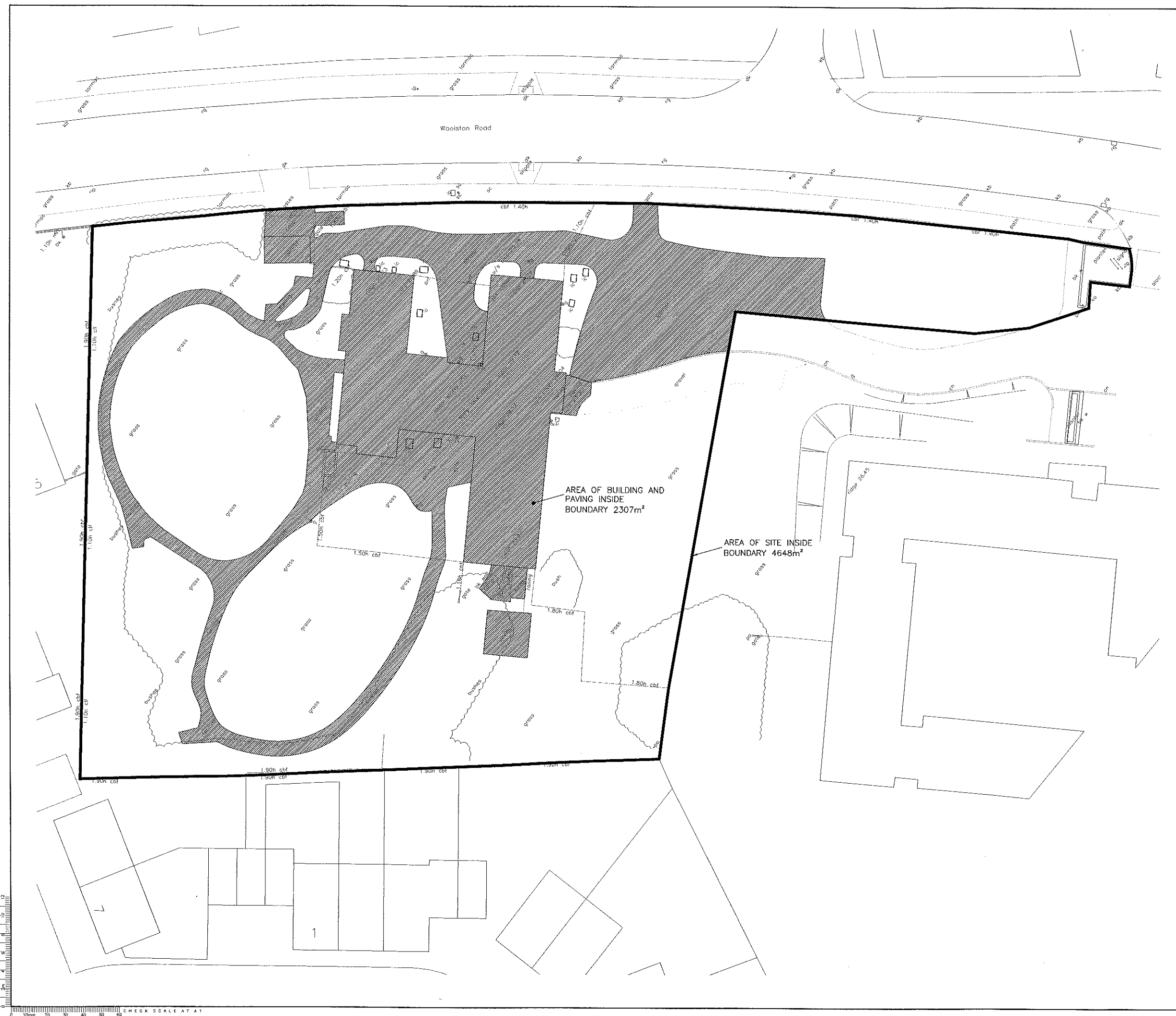


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(Includes 30% additional allowance for climate change)

0.4Ratio of 60 minute to 2 day rainfalls for 5 year return period $r =$

M5 rainfall is calculated from Table 1 BRE Digest 365 using Factor Z1



NOTES

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2. All figured dimensions to be taken in preference to scaled dimensions.

3. Any discrepancies between this drawing and other information is to be brought to the attention of the Engineer prior to the commencement of the works on site.

4. The Main Contractor shall be responsible for the setting out and accuracy of all dimensions.

5. The Contractor is to ensure the stability and structural integrity of the existing property at all times during works and is to be responsible for all propping and shoring as required.

6. It is the Contractors sole responsibility for ascertaining safe disposal of any off-site excavated spoil. No claim resulting from abnormal tip requirements will be entertained.

P1	24.05.12	PRELIMINARY ISSUE FOR COMMENT	JH
MR:	Date	Revised	By:

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**ace**
architectural engineering planning environmental

Cert: 950148

Client
PMC CONSTRUCTION

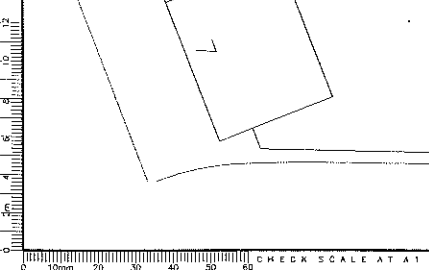
Architect
THE MARTIN RALPH GROUP

Project Title
**MARY ROSE HOUSE
WOOLSTON ROAD
LEIGH PARK
HAMPSHIRE**

Drawing Title
EXISTING PAVED AREAS

Scale 1:200	Project Size A1	Date MAY 2012	Drawn by JH	Check by AWR
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Project No. PMC177	Drawing No. SK01	Rev. <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table>	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10			





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MR	Date	Revision	By

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**ace**
architectural engineering construction environment

**UKAS**
CONSTRUCTION
CERT. 55148

Client
PMC CONSTRUCTION

Architect
THE MARTIN RALPH GROUP

Project Title
**MARY ROSE HOUSE
WOOLSTON ROAD
LEIGH PARK
HAMPSHIRE**

Drawing Title
PROPOSED PAVED AREAS

Scale 1:200	Paper Size A1	Date MAY 2012	Drawn by JH	Check by AHR
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Project No. PMC177	Drawing No. SK02	Rev. P1
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	Code for Sustainable Homes – November 2010	
	Mandatory Requirements Summary Template – Sur 1	

Category 4: Surface Water Runoff

Sur 1 Summary Template – November 2010 Version

Introduction

This template can be used to demonstrate compliance with the criteria specified in Sur 1 in the Code for Sustainable Homes (for the November 2010 version). The form can be used by the Code Assessor to aid in assessing the Sur 1 issue and can be provided as supporting evidence **in addition** to the items listed in the schedule of evidence for Sur 1. Completing this template is optional.

National policy documents have been used to set the standards for the mandatory element of Sur 1. PPS25 Development and Flood Risk (ODPM, 2006) and the SuDS manual are two of the key documents used. Further reading is listed in the References section of the Technical Guide.

Instructions

Where submitting this template as supporting evidence for a Code assessment please ensure that the **assessor completes the contact details (page 2)** and the **appropriately qualified professional completes the rest of the template**, ensuring that it is signed and dated.

If the form is incomplete and / or unsigned it will not be accepted as evidence supporting a Code assessment.

The Technical Guide states the calculation methodologies to be used to demonstrate compliance with some aspects of the criteria, for example the greenfield runoff rates. Although flexibility in choice of methodology is available for some of the criteria, best practice methodologies should always be used. If required, information regarding applicable calculation methodologies can be found in the SUDS Manual (CIRIA, 2007). Reputable software, such as Microdrainage, can be used for calculation purposes

The below sections to be completed by the Assessor

Contact Details

Consultant/engineer details

Company Name

Company Address

Contact Name

Contact Telephone Number

Developer/client details

Company Name

Company Address

Contact Name

Contact Telephone Number

Development details

Development Name

Development Address

BRE Reference Number

Client Reference Number (if
applicable)

Number of dwellings on the site:

	Code for Sustainable Homes – November 2010	
	Mandatory Requirements Summary Template – Sur 1	

All of the following sections of the template to be completed by the Engineer / Consultant		
MANDATORY REQUIREMENTS		
Appropriately Qualified Professional		
1.	☒ I can confirm that I am an appropriately qualified professional in line with the Code definition. ¹	
Assessment Information		
2.	For sites containing a mixture of non-Code and Code assessed dwellings there are several assessment options for Sur 1. The first would be to assess the whole site (including the non-Code dwellings) under the Code criteria. The second would be to demonstrate with several separate reports that each group of Code dwellings (and the associated sub catchments serving those dwellings) on the site have met the criteria individually. Please tick one of the following boxes;	
	☐ A. The site contains a mixture of Code and non-Code dwellings and the whole site has been assessed under the Sur 1 criteria including any associated sub catchments serving these dwellings.	
	OR	
	☐ B. The site contains a mixture of Code and non-Code dwellings and there is more than one assessed area for Sur 1 within the site boundary. Please write the number of assessed areas within the site in the space provided below (you will need to complete this template for each assessed area) ² . Number of assessed areas:	
	OR	
	☒ C. The site only contains Code assessed dwellings and the associated sub catchment serving those dwellings.	
Site Information		
3.	A. Please provide the site area ³ (delete units of measurement as applicable)	4648 m ² / ha
	B. Please provide the impermeable area of the site pre-development (delete units of measurement as applicable)	2807 m ² / ha
	C. Please provide the impermeable area of the site post development (delete units of measurement as applicable)	1324 m ² / ha
Special Cases⁴		
4.	Please tick the relevant box below to identify where a special case applies for the site:	

¹ Refer to the technical guide for details on the definition of an appropriately qualified professional.

² It would aid the QA process to provide a site plan highlighting each assessment area and highlighting which area is being assessed in this report.

³ The site area will include all areas within the boundaries of the site, including both permeable and impermeable areas. If box 2B has been ticked, the 'site area' will be only that for which this template demonstrates compliance.

⁴ Refer to the Technical Guide for details on the supporting evidence required to demonstrate compliance with these special cases. This evidence must be provided to demonstrate how the special case is being met.

☒	A. The impermeable area has decreased as a result of the development, and the mandatory element of this issue has been met by default.												
☐	B. A minimum flow rate or maximum storage requirement has been set by the sewerage undertaker (or other statutory body).												
☐	C. Planning approval has been granted for the detailed drainage strategy prior to the Code requirement being set for the development.												
☐	D. The assessed dwelling is directly connected to existing infra-structure which pre-dates the Code requirement.												
5. Tick one or both of the following to confirm if some or all of the highways will be omitted from the impermeable areas in the calculations for one of the following reasons ⁵ :													
☐	A. The highways are being adopted												
☒	B. The Code dwellings are being built beside existing highways.												
SECTION 1: Peak Rate of Runoff													
6.	<table border="1"> <tr> <td>A. Pre-development peak rate of runoff for the 1 year return period event⁶</td> <td>55.69</td> <td>l/s</td> </tr> <tr> <td>B. Post-development peak rate of runoff for the 1 year return period event⁶ (this figure must be less than or equal to A, except where the 5l/s rule has been used)</td> <td>41.54</td> <td>l/s</td> </tr> <tr> <td>C. Pre-development peak rate of runoff for the 100 year return period event⁶</td> <td>100.46</td> <td>l/s</td> </tr> <tr> <td>D. Post-development peak rate of runoff for the 100 year return period event⁶ (this figure must be less than or equal to C, except where the 5l/s rule has been used)</td> <td>74.94</td> <td>l/s</td> </tr> </table>	A. Pre-development peak rate of runoff for the 1 year return period event ⁶	55.69	l/s	B. Post-development peak rate of runoff for the 1 year return period event ⁶ (this figure must be less than or equal to A, except where the 5l/s rule has been used)	41.54	l/s	C. Pre-development peak rate of runoff for the 100 year return period event ⁶	100.46	l/s	D. Post-development peak rate of runoff for the 100 year return period event ⁶ (this figure must be less than or equal to C, except where the 5l/s rule has been used)	74.94	l/s
A. Pre-development peak rate of runoff for the 1 year return period event ⁶	55.69	l/s											
B. Post-development peak rate of runoff for the 1 year return period event ⁶ (this figure must be less than or equal to A, except where the 5l/s rule has been used)	41.54	l/s											
C. Pre-development peak rate of runoff for the 100 year return period event ⁶	100.46	l/s											
D. Post-development peak rate of runoff for the 100 year return period event ⁶ (this figure must be less than or equal to C, except where the 5l/s rule has been used)	74.94	l/s											
7.	Please tick this box to confirm that the 5l/s rule has been applied where the peak rates of runoff have increased post development, but are still equal to or less than 5l/s.												
8.	If, post-development, it was necessary to reduce the peak rate of runoff to meet the Code criteria, please provide a brief explanation below describing how the peak rate was reduced. For example, 'soakaways reduce the peak rate of runoff to pre-development levels'. ⁷												

⁵ Refer to the technical guide for details on when an adoptable road can be omitted from the assessment.

⁶ Peak rate of runoff calculations should be carried out for the range of storm durations up to and including the 6 hour storm. The peak rate of runoff for the storm event will then be the 'worst case' runoff rate for the range of storm durations. The climate change allowance should be added only to the post development calculations.

⁷ Note that detailed documentary evidence (as per the schedule of evidence table in the Technical guide) is required to demonstrate how the peak rate of runoff has been reduced.

	N/A ☒
9.	Please tick this box to confirm that the post development peak rate of runoff calculations include an allowance for climate change in accordance with current best practice (PPS25, 2006). ☒
10.	Please tick one of the following boxes as applicable to this site:
☐	A. This is a greenfield site and is less than 50 ha therefore runoff rate calculations have been carried out in accordance with the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994). The pro rata method on the size of catchment detailed in table 4.2 of the SuDS manual has been used.
☐	B. This is a greenfield site of 50 to 200 ha therefore runoff rate calculations have been carried out in accordance with the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994).
☐	C. This is a greenfield site of more than 200 ha (or where there is a preference to do so and the catchment is considered suitable for its application) therefore runoff rate calculations have been carried out in accordance with the 'Flood estimation handbook' (Centre for Ecology and Hydrology, 1999).
☐	D. This is a greenfield site of more than 200ha where the Flood Estimation handbook is considered inappropriate for the development therefore the IH Report 124 has been used.
☒	E. This is a brownfield site and runoff rates have been calculated in accordance with current best practice simulation modelling.
☐	F. This is a Brownfield site where the pre development surface water drainage system is not known therefore the runoff rates have been calculated using the Greenfield runoff model ticked above (please tick the relevant methodology), but using soil type 5.

SECTION 2: Volume of Runoff

Section 2A

11. ☒ Please tick this box to confirm that the following post development volume of runoff calculations include an allowance for climate change in accordance with current best practice (PPS25, 2006).

☒ Please tick this box to confirm that the following volume of runoff calculations are for the 100 year event of 6 hour duration.

12.	A. Pre-development volume of runoff	151.27	m ³
	B. Volume of runoff caused by the new development prior to mitigation	112.85.	m ³
	C. Additional predicted volume of rainwater caused by the new development prior to mitigation (= 12B – 12A)	0	m ³
	D. If the answer to 12C is greater than zero, please provide a brief explanation below describing how you have reduced the additional volume discharged from the developed site, for example, 'soakaways will infiltrate all of the additional volume':		
	N/A ☐ (criterion 2A cannot be satisfied, see section 13) Please provide the additional volume of runoff discharged from the site when all (if any) mitigation measures described in 12D are in place.		

13. A. Where there is an increase in the volume of runoff as a result of the development and criteria 2A cannot be satisfied via infiltration or other SuDS techniques (as listed below), please provide an explanation below (evidence to support the reasoning should be provided in the hydrological report):

Soakaways:

Porous/Pervious paving:

Rainwater re-use harvesting:

Green Roof:

Other surface infiltration techniques:

N/A ☐ (all additional volumes of run-off have been dealt with)

Section 2B

- 14.** Where it has not been possible to reduce all of the additional volume by infiltration or other SuDS techniques, the volume of runoff should be discharged in accordance with one of the following rates of runoff, whichever is the higher. Please tick one of the boxes below to confirm the level of flow control that has been achieved:
- ☐ A. The peak discharge rate has been reduced to pre development 1 year peak flow rate
- Please state the pre development 1-year peak flow rate l/s
- OR**
- ☐ B. The peak discharge rate has been reduced to the site's estimated mean annual flood flow rate (Qbar).
- Please state Qbar: l/s
- OR**
- ☐ C. The peak discharge rate has been reduced to 2l/s/ha.
- Please state the peak discharge rate at 2l/s/ha: l/s
- OR**
- ☐ D. The limiting discharge rate requires a flow rate of less than 5l/s at a discharge point, therefore a flow rate of up to 5l/s has been used.

SECTION 3: Designing for Local Drainage System failure

15. ☒ Tick here to confirm that the consequences of system failure caused by extreme rainfall, lack of maintenance, blockage or other causes, have been considered and evaluated fully and there will be no increased risk to dwellings either on or off site.⁸

AWARDING OF CREDITS: WATER QUALITY CRITERIA⁹

16. ☐ A. Tick here to confirm that there will be no discharge from the developed site for rainfall depths up to 5 mm. Please provide a brief explanation below describing how the runoff from rainfall depths up to 5 mm will be prevented from leaving the site:
- ☒ B. Tick here to confirm that the runoff from all hard surfaces shall receive an appropriate level of treatment in accordance with the SuDS Manual to minimise the risk of pollution to the receiving watercourse. Please provide a brief explanation below describing how the hard surfaces will receive an appropriate level of treatment:
- ROADWAY AND PARKING AREAS TO BE
CONSTRUCTED USING POROUS PAVING

⁸ Refer to the technical guide for details on the evidence that would be required to demonstrate that this has been considered fully.

⁹ Note that where the mandatory element has been met by special cases 3. C and 3.D, no credits can be achieved.

	Code for Sustainable Homes – November 2010	
	Mandatory Requirements Summary Template – Sur 1	

Signature

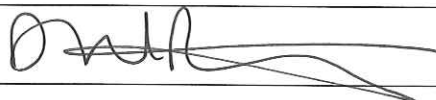
The following declaration should be signed by the appropriately qualified professional responsible for ensuring that the development meets the Sur 1 mandatory criteria and the necessary criteria to allow the awarding of credits, where applicable.

I confirm that the information provided in this document is truthful and accurate at the time of completion.

Name of Appropriately Qualified Professional:

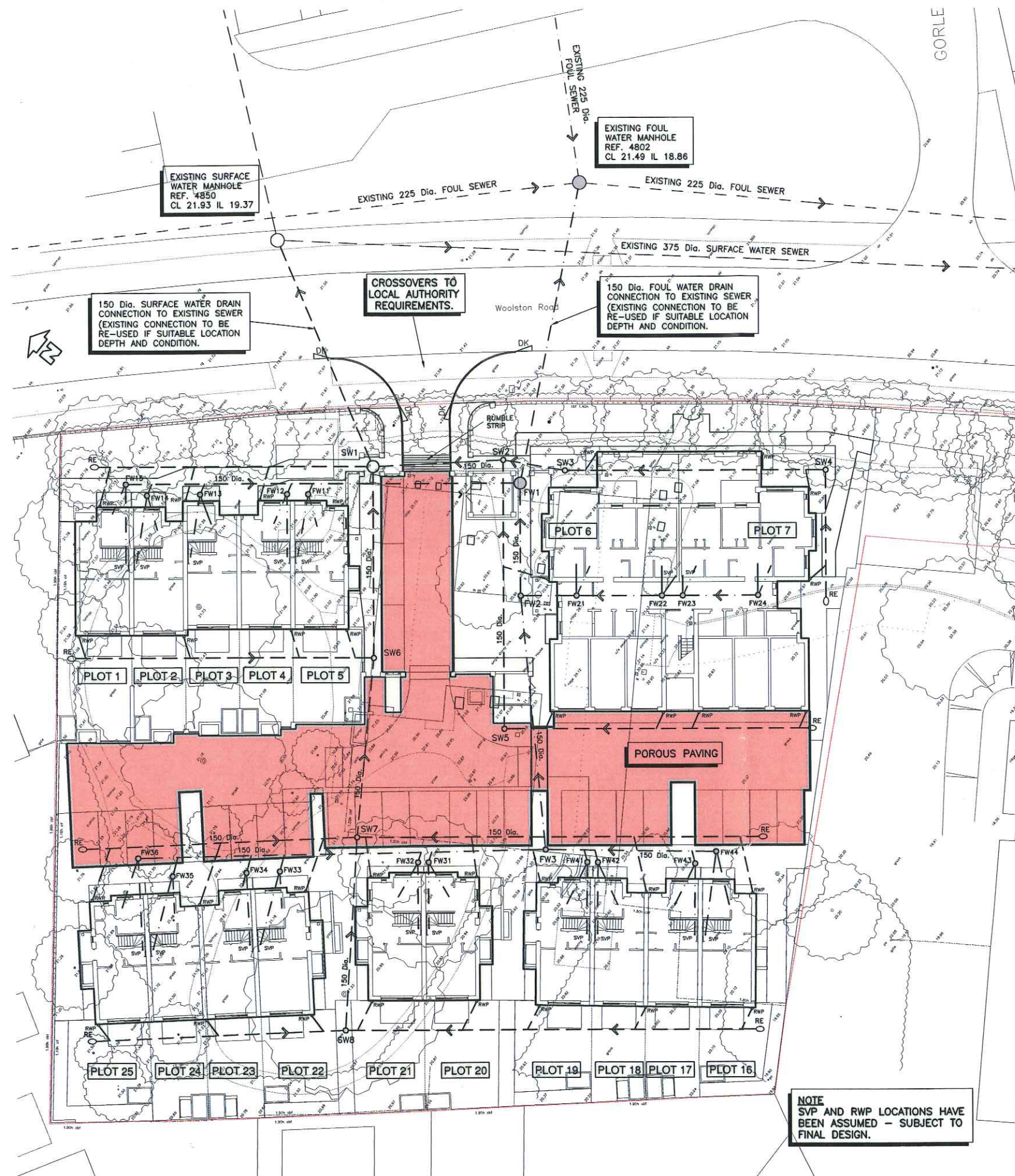
WSTBY BLOWTEL ASSOCIATES LTD

Signature of Appropriately Qualified Professional:



Date:

22-05-2012.



SITE SHOWING PROPOSED DRAINAGE AND EXTERNAL WORKS
(SCALE 1:200)

LEGEND

- SURFACE WATER MANHOLE / INSPECTION CHAMBER / ACCESS CHAMBER (SEE SCHEDULE FOR DETAILS).
- 100mm Dia. PVCu. SN4 STORM WATER DRAIN (U.N.O.).
- RWP — RAIN WATER DOWNPIPE (LOCATION AS ARCHITECTS DRGS).
- RE — RODDING EYE.
- FOUL WATER MANHOLE / INSPECTION CHAMBER / ACCESS CHAMBER (SEE SCHEDULE FOR DETAILS).
- 100mm Dia. PVCu. SN4 FOUL WATER DRAIN (U.N.O.).
- SVP — SOIL VENT PIPE / STUB STACK (LOCATION AS ARCHITECTS DRGS).
- POROUS PAVING.

- NOTES**
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- GENERAL NOTES**
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 - It is the Contractors sole responsibility for ascertaining safe disposal of any off-site excavated spoil. No claim resulting from abnormal tip requirements will be entertained.
- DRAINAGE**
- All materials and workmanship to comply with BS EN 752-1: 1998
 - When using vitrified clay pipework with flexible joints, superstrength shall be used. All adoptable works shall use V.O. pipework. For non-adopted system PVCu-SN4 class pipework and fittings may be substituted.
 - Concrete encasement, minimum 150 bed and haunch, to be used on pipework under roads with less than 1200 cover to crown.
 - Unless otherwise stated, all pipework to be bedded and surrounded in 10mm single size aggregate up to 450mm diameter. For larger pipework, 20mm shall be used.
 - Refer to manhole schedule for sizes, covers etc.
 - All materials to comply with the relevant BS-EN, latest edition, for pipework and fittings.
 - Upon completion, all works to be thoroughly cleaned by flushing.
- HIGHWAYS**
- All works to comply with relevant County Council or Local Authority specification, as required.
 - All drainage works in adoptable areas to be in accordance with Water Authority Association 'Sewers for Adoption' - 6th Edition.

ALL DRAINAGE WORKS TO BE IN ACCORDANCE WITH WATER AUTHORITY ASSOCIATION 'SEWERS FOR ADOPTION' - 6th EDITION AND INTERIM TECHNICAL ADDENDUM FOR SEWER FOR ADOPTION 6th EDITION

P1	24.05.12	PRELIMINARY ISSUE FOR COMMENT	~						
Mk.	Date	Revision	By						
RUSHBY BREWSTER CONSULTING CIVIL AND STRUCTURAL ENGINEERS The Town House, St. George's Square, Bishops Waltham, Southampton, Hampshire, SO32 1AF E: admin@rushbybrewster.co.uk W: www.rushbybrewster.co.uk T: 01489 680004 F: 01489 680055									
ace CONSULTING ENGINEERING ARCHITECTS ENVIRONMENTAL CIVIL 000168									
Client: PMC CONSTRUCTION									
Architect: THE MARTIN RALPH GROUP									
Project Title: MARY ROSE HOUSE WOOLSTON ROAD LEIGH PARK HAMPSHIRE									
Drawing Title: PROPOSED FOUL AND SURFACE WATER DRAINAGE STRATEGY.									
Scale: 1:200	Paper Size: A1	Date: MAY 2012	Drawn by: JMB						
Project No.: PMC177	Drawing No.: 501	Rev:	Chkd. by: AWR						
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