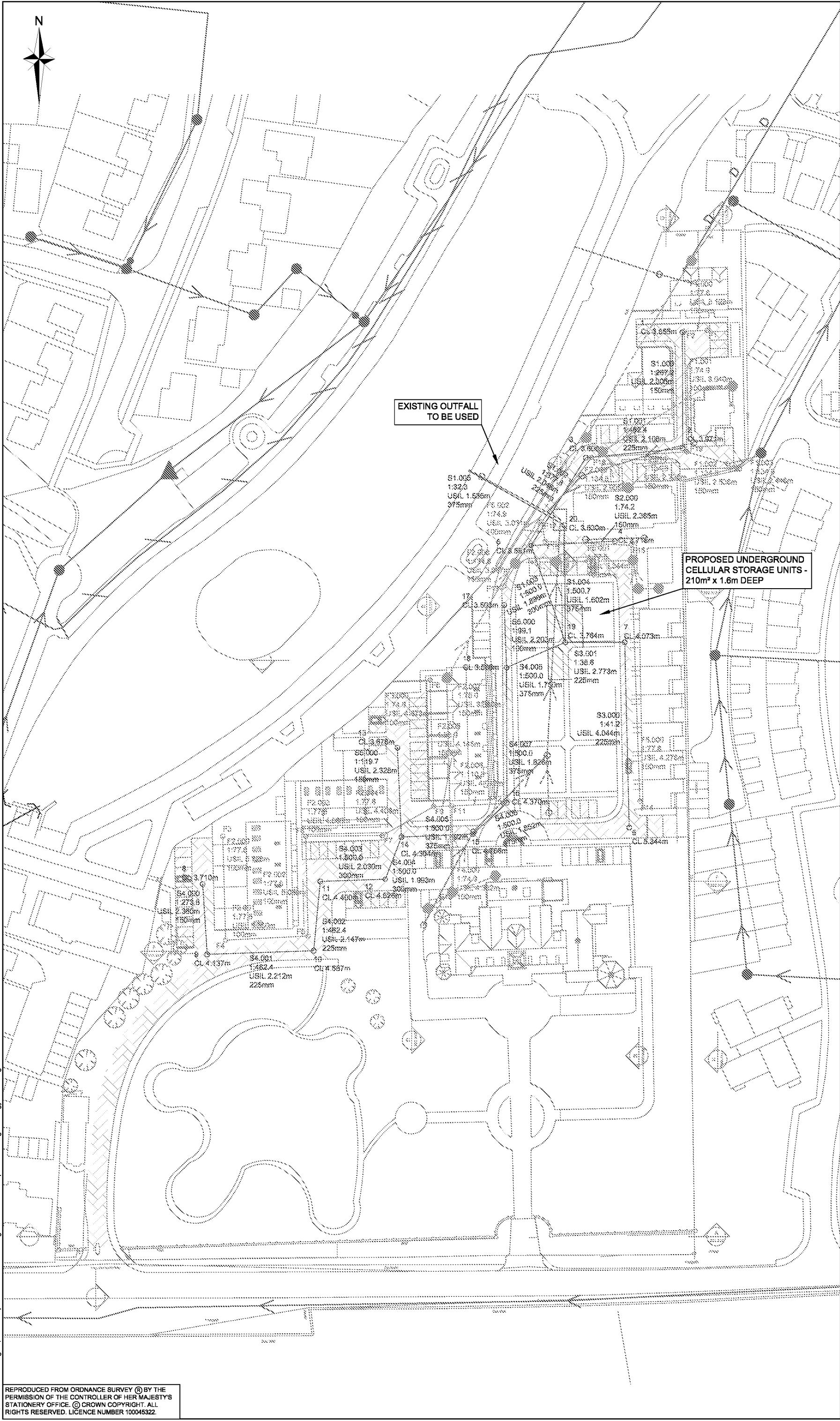




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KEY:

EXISTING:

- APPROXIMATE SITE BOUNDARY
- EXISTING PRIVATE SURFACE WATER PIPE
- EXISTING PRIVATE SURFACE WATER MANHOLE
- EXISTING PRIVATE TANK
- EXISTING PUBLIC SURFACE WATER PIPE
- EXISTING PUBLIC SURFACE WATER MANHOLE
- EXISTING PRIVATE FOUL WATER PIPE
- EXISTING PRIVATE FOUL WATER MANHOLE
- EXISTING PUBLIC FOUL WATER PIPE
- EXISTING PUBLIC FOUL WATER MANHOLE
- EXISTING PUBLIC FOUL RISING MAIN

PROPOSED:

- PROPOSED UNDERGROUND CELLULAR STORAGE UNITS
- PROPOSED SURFACE WATER PIPE
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER PIPE
- PROPOSED FOUL WATER MANHOLE
- PROPOSED PERVIOUS PAVEMENT

A	ACCESS GATE ADDED	JPG	JM	SRB	12.02.14
Rev	Amendments	Dm	Chk	App	Date

Odyssey Markides

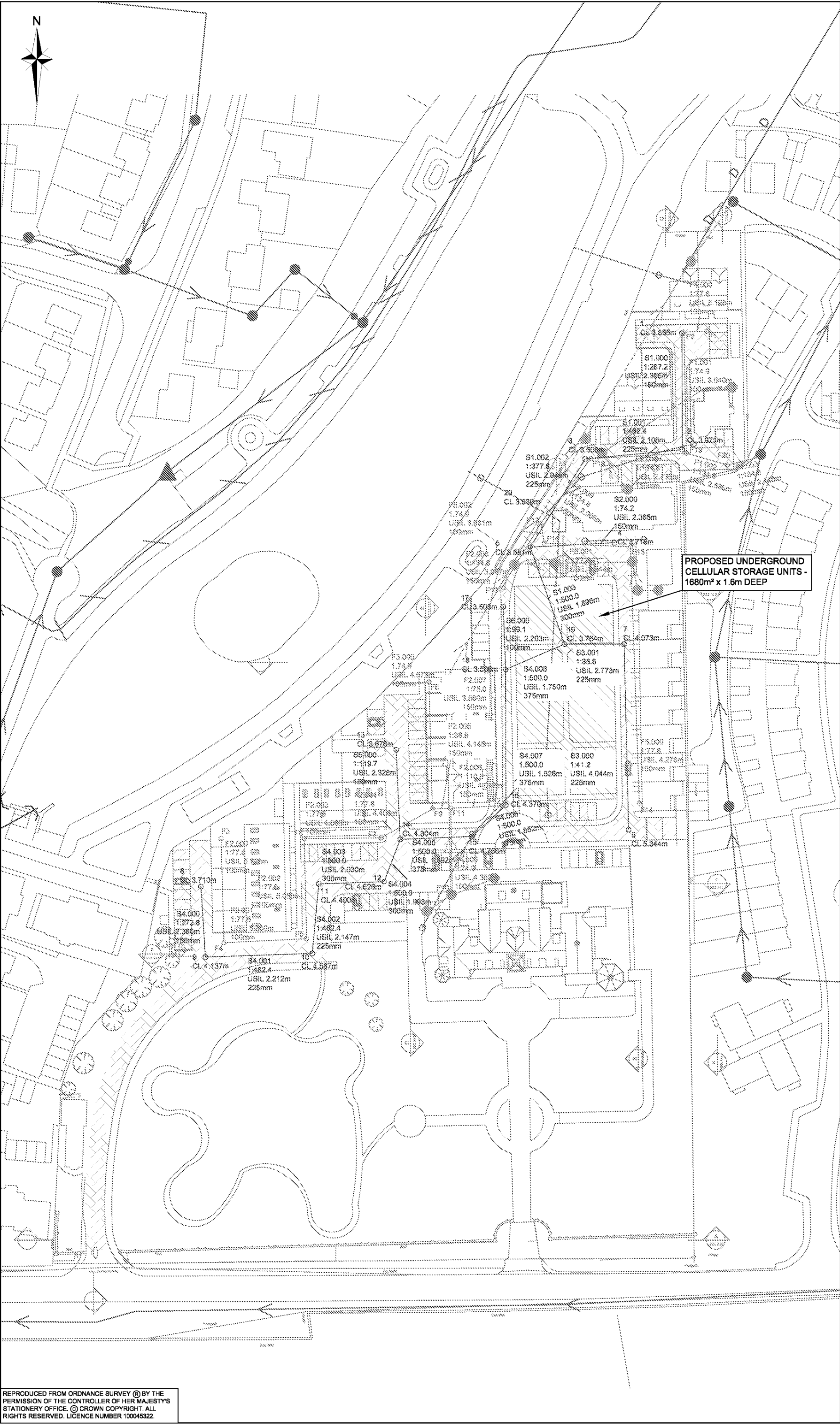
Elizabeth House
38 York Road
London
SE1 7HQ

Telephone: 0207 636 9444
Fax: 0207 636 1108
E: enquiries@odysseymarkides.com
W: www.odysseymarkides.com

Job Title		
RUSTINGTON, LITTLEHAMPTON		
Drawing Title		
PROPOSED DRAINAGE STRATEGY OPTION 2 - POSITIVE OUTFALL		
Client		
DANIEL WATNEY		
Scale	Date	Designed
1:500 @A1	NOV '14	MP
Drawn	Checked	Approved
MP	JM	SRB
Job No	Drawing No	Rev
14-185	14-185-203	A

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4. IT IS ASSUMED ALL EXISTING DRAINAGE WILL BE REMOVED AS REQUIRED.

5. SOAKAWAY SIZE BASED ON ASSUMED SOAKAWAY RATE OF 5.6x10⁻⁵ m/s.

KEY:

EXISTING:

APPROXIMATE SITE BOUNDARY

EXISTING PRIVATE SURFACE WATER PIPE

EXISTING PRIVATE SURFACE WATER MANHOLE

EXISTING PRIVATE TANK

EXISTING PUBLIC SURFACE WATER PIPE

EXISTING PUBLIC SURFACE WATER MANHOLE

EXISTING PRIVATE FOUL WATER PIPE

EXISTING PRIVATE FOUL WATER MANHOLE

EXISTING PUBLIC FOUL WATER PIPE

EXISTING PUBLIC FOUL WATER MANHOLE

EXISTING PUBLIC FOUL RISING MAIN

PROPOSED:

PROPOSED UNDERGROUND CELLULAR STORAGE UNITS

PROPOSED SURFACE WATER PIPE

PROPOSED SURFACE WATER MANHOLE

PROPOSED FOUL WATER PIPE

PROPOSED FOUL WATER MANHOLE

PROPOSED PERVIOUS PAVEMENT

A

ACCESS GATE ADDED

JPG

JM

SRB

12.02.14

Rev

Amendments

Dr

Chk

App

Date

Odyssey

Markides

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Fax: 0207 636 1108

E: enquiries@odysseymarkides.com

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Job Title

RUSTINGTON,
LITTLEHAMPTON

Drawing Title

PROPOSED DRAINAGE STRATEGY
OPTION 1 - SOAKAWAYS

Client

DANIEL WATNEY

Scale

1:500 @A1

Date

NOV '14

Designed

MP

Drawn

MP

Checked

JM

Approved

SRB

Job No

14-185

Drawing No

14-185-202

Rev

A

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APPENDIX J



Supplementary Requirements for Surface Water Drainage Proposals

Any proposed surface water scheme must consider sustainable drainage principles.

SuDS Selection

The following destinations must be considered for surface runoff in order of preference:

1. Discharge into the ground (infiltration);
2. Controlled discharge to a surface water body;
3. Controlled discharge to a surface water sewer.

Surface water must not be discharged into the foul sewer system. Infiltration structures include soakaways, basins, swales and permeable paving. Discharge to surface water bodies and surface water sewers must be restricted to an agreed rate.

SuDS selection hierarchy based on:

CIRIA C697 - The SuDS Manual

BS8582:2013 – Code of Practice for Surface Water Management for Development Sites

Approved Document H of the Building Regulations

Infiltration Drainage Design

Infiltration rates for soakage structures are to be based on percolation tests undertaken in the winter period at the location and depth of the proposed structures. The percolation tests must be carried out in accordance with BRE 365, CIRIA R156 or a similar approved method, and cater for the 1 in 10 year storm event between the invert of the lowest entry pipe into the infiltration structure and the base. For the purpose of design, the percolation rate must be applied to the sides of the infiltration structure only and the rate for the base must be zero. This does not apply to infiltration basins or permeable pavements, whereby the percolation rate is applied to the base only. There must be provision to ensure that there is capacity in the system to contain the 1 in 100 year storm event plus 30% on stored volumes, as an allowance for climate change. The infiltration structure should also drain 50% of its total volume in 24 hours or less for both the 1 in 10 and 1 in 100 year (plus 30%) storm events, in order to provide spare capacity for subsequent storms.

Any infiltration drainage design must include adequate winter groundwater monitoring data to determine the highest winter groundwater table. Residential developments in excess of five properties will require ground water monitoring to be carried out between October and March inclusive. The extent of monitoring required for smaller developments will be subject to agreement with the Council's Engineers.

Adequate freeboard must be provided between the base of the soakaway structure and the highest recorded groundwater level identified in that location.

Restricted Discharge

Discharge to a watercourse or surface water sewer must be restricted to the estimated mean greenfield runoff rate (Q_{bar}) by means of a controlled outflow (or restricted to existing runoff rates for brownfield sites). This can be derived from IH124 or a similar approved method. Any storage design must be submitted with groundwater monitoring data where applicable to ensure there will be no detrimental effect on the structure or storage. Storage areas are preferred to be in an 'open' form such as ponds, rather than underground tanks.

Flow Exceedance Routes

The drainage design should show flow routes through the proposed development, demonstrating where surface water will be conveyed for three types of flow:

1. Low flow routes

Regular flow from source control features such as permeable pavements should travel in low flow channels through the development in a controlled way contributing to landscape quality.

2. Overflows

In the event of local blockages or surcharge a simple overflow arrangement should allow water to bypass the obstruction and return to the management train sequence until conditions return to normal.

3. Exceedance routes

When SuDS are overwhelmed by exceptional rainfall, then exceedance routes are required to protect people and property. These provide unobstructed overland flow routes from the development and should be considered for all drainage schemes. Exceedance routes should also be protected from future changes in land use.

Culverting a Watercourse

Culverting (piping) a watercourse is not advised unless there is no alternative. The resulting reduction in storage volume, flow capacity and habitat potential would be unacceptable. Culverted watercourses are also more difficult to maintain due to the limited accessibility.

Land Drainage Consent must be sought from the Lead Local Flood Authority (West Sussex County Council), or its agent (Arun District Council – land.drainage@arun.gov.uk), prior to starting any works (temporary or permanent) that affect the flow of water in the watercourse. Such works may include culverting, channel diversion and the installation of trash screens.

The development layout must take account of any existing watercourses (open or culverted) to ensure that future access for maintenance is not restricted.

See also:

Land Drainage Act 1991 (amended 1994)

Maintenance and Management

Ditches and watercourses should retain a three metre easement with access that allows for its future maintenance.

Details of the maintenance and management of the SuDS system are to be set out in writing in a site specific maintenance manual. This manual shall include details of the financial management and arrangements for the replacement of components at the end of the manufacturers recommended design life. This document is then to be submitted as part of the planning process.

References

The Building Regulations 2000
Drainage and waste disposal
Approved document H
ISBN: 1-859462-08-1

Building Research Establishment,
Soakaway Design – Digest 365 (BRE 365)
ISBN: 1 86081 604 5, 1991

Centre for Ecology and Hydrology
Flood Estimation for Small Catchments - IH Report 124
Marshall, D.C.W. & Bayliss, A.C.
ISBN: 0948540621, 1994

CIRIA
C697 The SUDs Manual
Woods-Ballard, B.; Kellagher, R. et al
ISBN: 978-0-86017-697-8, 2007

CIRIA
R156 Infiltration Drainage – Manual of Good Practice
Bettess, R.
ISBN: 0 86017 457 3

British Standards Institution
BS8582:2013 – Code of Practice for Surface Water Management for Development Sites
ISBN: 978 0 580 76700 5

Marcin Pachwicewicz

From: Paul Cann [REDACTED]
Sent: 11 November 2014 11:19
To: Marcin Pachwicewicz
Cc: Thomas Callaway; kevin macknay
Subject: RE: Surface Water Drainage - Redevelopment of Rustington Convalescent Home, Sea Road, Rustington

Hi Marcin

We do not have any records of flooding on or in close proximity of the site. The Lead Local Flood Authority (West Sussex County Council) should also be consulted as they may have records. I have copied in this email to the relevant contact.

Please note that discussions will need to be had with our coastal engineer (Roger Spencer) once you have some ideas of the proposed development and its layout, as he will need to comment from the coastal defence point of view. Please note that part of the site is within the coastal flood plain (modelled without coastal defences in place).

Regards

Paul Cann
Senior Engineer (Drainage & Coastal)

Paul Cann | Senior Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: Second Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF

Internal: 37819 | External: +44 (0) 1903 737819 | Fax: +44 (0) 1903 716019 | E-mail: Paul.Cann@arun.gov.uk
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From: Marcin Pachwicewicz [REDACTED]
Sent: 11 November 2014 10:19
To: Paul Cann
Cc: Thomas Callaway
Subject: RE: Surface Water Drainage - Redevelopment of Rustington Convalescent Home, Rustington

Good Morning Paul,

Would be possible to get a records of any flood events in that Rustington area, please?

Kind regards,

Marcin Pachwicewicz MSc Eng | Infrastructure Design Engineer
Odyssey Markides

Registered in England No. 06755228
Register Office: Tuscan House, White Hart Lane, Basingstoke, Hants RG21 4AF
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From: Paul Cann
Sent: 10 November 2015
To: Marcin Pachwicewicz
Cc: Thomas Callaway
Subject: Surface Water Drainage - Redevelopment of Rustington Convalescent Home, Rustington

Hi

As discussed, soakage to ground needs to be investigated first before other options can be considered. This investigation will need to include winter groundwater monitoring, and winter percolation tests at an appropriate depth depending on the results of the groundwater monitoring.

I enclose our guidance notes as discussed.

Regards

Paul Cann
Senior Engineer (Drainage & Coastal)

Paul Cann | Senior Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: Second Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF

Internal: 37819 | External: +44 (0) 1903 737819 | Fax: +44 (0) 1903 716019 | E-mail: Paul.Cann@arun.gov.uk

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Marcin Pachwicewicz

From: Kevin Macknay [REDACTED]
Sent: 11 November 2014 14:03
To: Marcin Pachwicewicz
Subject: FW: Surface Water Drainage - Redevelopment of Rustington Convalescent Home, Sea Road, Rustington
Attachments: EA Floodzone2 Mapping.pdf; EA Floodzone3 Mapping.pdf; ESI Ground Water Suceptability Mapping.pdf; uFMfSW_1 in 30 year event.pdf; uFMfSW_1 in 100 year event.pdf; uFMfSW_1 in 1000 year event.pdf

Marcin,

Further to Paul Cann's resent email. Please find below and attached information we have about flood risk at the above site.

We have checked our existing records and have no records of flooding at this location. This should not be taken that this site has never suffered from flooding, only that it has never been reported to us, as LLFA.

Please find attached plans showing the following:

uFMfSW 1 in 30, 1 in 100 and 1 in 1000 banding.
EA floodzones 2 and 3 for the area.
ESI Ground Water Flood Risk Map.

Based on the current ESI Ground Water Flood Risk Maps, the northern part of the site is at 'Moderate Risk' from ground water flooding and the southern part of the site is at 'High Risk' from ground water flooding.

Regards

Kevin Macknay

Kevin Macknay | Drainage Strategy Team Leader, West Sussex County Council
West Sussex Highways, Drayton Depot, Drayton Lane, Drayton, Chichester, West Sussex. PO20 2AJ
Internal: 26429 | External: +44 (0) 330 22 26429 | E-mail: kevin.macknay@westsussex.gov.uk

From: Paul Cann [REDACTED]
Sent: 11 November 2014 [REDACTED]
To: 'Marcin Pachw' [REDACTED]
Cc: Thomas Callaway; Kevin Macknay
Subject: RE: Surface Water Drainage - Redevelopment of Rustington Convalescent Home, Sea Road, Rustington

Hi Marcin

We do not have any records of flooding on or in close proximity of the site. The Lead Local Flood Authority (West Sussex County Council) should also be consulted as they may have records. I have copied in this email to the relevant contact.

I enclose our guidance notes as discussed.

Regards

Paul Cann
Senior Engineer (Drainage & Coastal)

Paul Cann | Senior Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: Second Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF

Internal: 37819 | External: +44 (0) 1903 737819 | Fax: +44 (0) 1903 716019 | E-mail: Paul.Cann@arun.gov.uk

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