

**Meridian Community  
Primary School,  
Roderick Avenue,  
Peacehaven, East Sussex,  
BN10 8BZ.**

**Flood Risk Assessment**

June 2016

16057

## Meridian Community Primary, School, Peacehaven

Flood Risk Assessment



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**Issued By:** Ellis Structures Ltd  
49B Cliffe High Street  
Lewes  
East Sussex BN7 2AN  
Tel (01273) 470088  
Email: [contact@ellisstructures.com](mailto:contact@ellisstructures.com)  
Website: [www.ellisstructures.com](http://www.ellisstructures.com)

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Prepared by	Trevor Hayward		24/06/2016	Senior Civil Engineer

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## 1. EXECUTIVE SUMMARY

This is a site specific Flood Risk Assessment for the proposed new classroom extension of Meridian Community Primary School, Roderick Avenue, Peacehaven, East Sussex. The development site lies within Flood Zone 1 as defined by NPPF which means that the site has a minimal risk of being flooded from fluvial sources and as such is acceptable for built development of a mix use nature.

The proposed redevelopment involves the construction of 12 new classrooms, some car parking spaces, paving and some new landscaping.

The school site has a redline boundary area of 20576 m<sup>2</sup> or (2.05 ha). The new classroom extension has an area of 805 m<sup>2</sup> (0.0805 ha).

The peak runoff was calculated for a range of storm durations up to and including a 6 hour storm for the 1 year event and the 100 year event and the results are contained in the table below.

Return Period	<i>Post-Development Flows</i>
1 Year	14.8 l/s
30 Year	35.1 l/s
100 Year	44.3 l/s

The proposed development will result in an increase in the impermeable surface area and surface water runoff at the site. All surface water will be discharged on site through infiltration systems. The new infiltration systems will include replacing existing old systems.

The flood risk assessment and drainage strategy for the new development is compliant with NPPF. It assesses the flood risk at the site for various forms of flooding and ensures that the development does not increase flood risk at the site or surrounding areas.

## 2. INTRODUCTION

Ellis Structures Ltd has been commissioned by Emcor to undertake a Flood Risk Assessment (FRA) for the proposed classroom extension, at Meridian Community Primary School, Roderick Avenue, Peacehaven, East Sussex.

The object of this report is to ensure that the proposed development does not increase flood risk at the site or elsewhere, and that the surface water design avoids, reduces and

delays the discharge of rainfall to public sewers and watercourses in accordance with National Planning Policy Framework (NPPF).

This report will identify and quantify the flood risk to and from the site, outline possible mitigation of the flood risk on site, and outline the drainage strategy, all in accordance with the NPPF and the local plan.

### 3. SITE LOCATION & DESCRIPTION

#### 3.1. Location

The site is located in Roderick Avenue, Peacehaven, East Sussex, at the junction with Lorraine Road. The approximate National Grid Reference for the site is 541347,102503. See the site location plan in Figure 1 below.

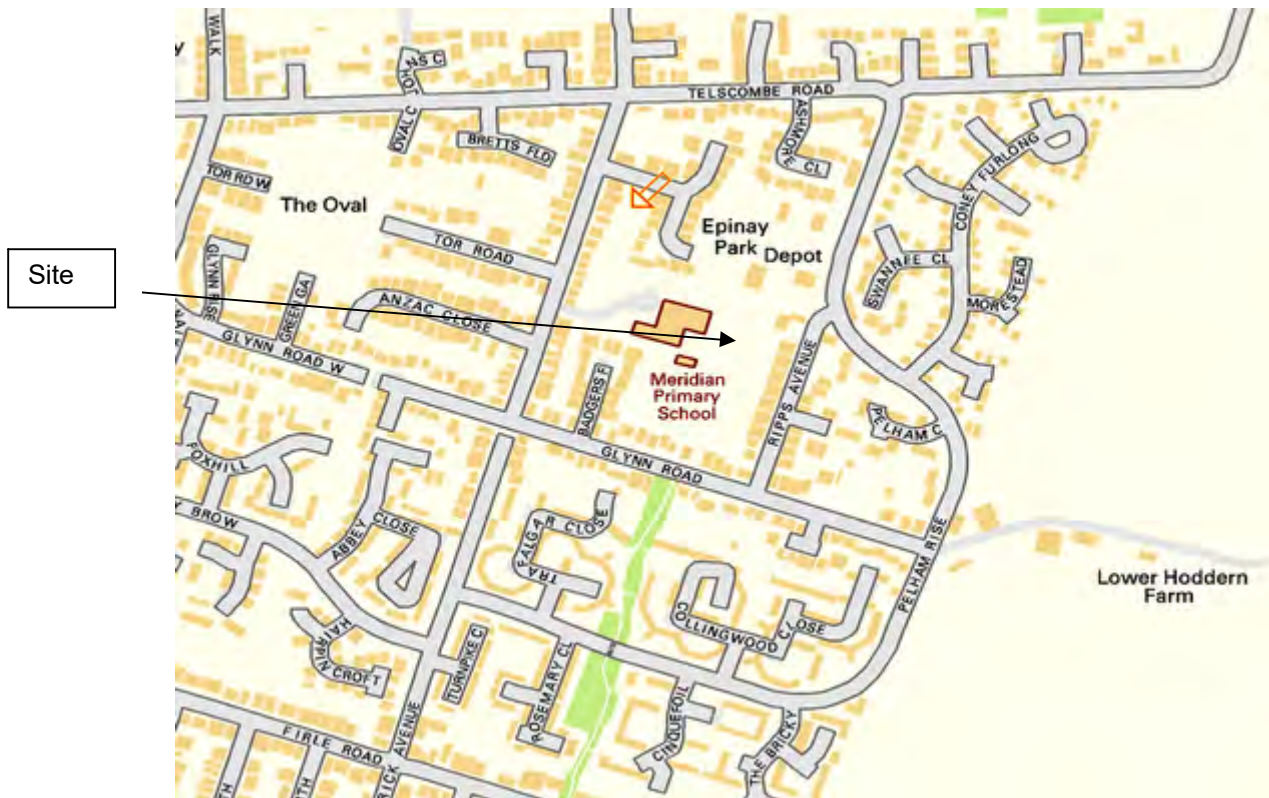


Figure 1 – Site Location Plan

### 3.2. Description

The site is in the grounds occupied by Meridian Community Primary School, to the north of Peacehaven. The site is bounded by housing to the east, Cripps Avenue to the east, Glynn Road to the south, and Roderick Avenue to the west. On the north side there is housing to Mount Caburn Crescent, and a park. In the north east corner there is a yard to industrial buildings in Pelham Rise. The school site is approximately "L" shaped and has dimensions of approximately 177m along the north leg, and 147m down the east leg. The site has a red line boundary area of 20576m<sup>2</sup> (2.05ha). The new classrooms occupy an area of 805m<sup>2</sup> on the east side of the main school building.

### 3.3. Topography

A topographic survey undertaken by Maltby Land Surveys Limited dated February 2016 shows the ground levels fall to the east and to the south. At the north west corner of the site, the levels are in the region of 67.10m AOD, and 9.50m AOD, 63.25 in the north east corner, and 55.77 in the south east corner. The average gradients at the site are 1 in 46 along the north boundary and 1 in 20 along the east boundary.

### 3.4. Existing Surface Water Drainage

Surface water from the existing buildings, including the playground, parking and access roads discharge to soakaways within the site.

The pre-development site for the new classrooms comprises a total impermeable surface area of 78% approximately 482m<sup>2</sup> (0.0482ha) of Brownfield land. Surface water runoff from the whole site is in the order of 8.9l/s and is based on a 1 in 1 year return storm event of 5 minutes duration

**Table 1: Pre-Developed Impermeable Areas Split**

Contributing Area			Total Area
Roofs	Hard Standing	Grassed Areas	
0 m <sup>2</sup>	482 m <sup>2</sup>	323 m <sup>2</sup>	805 m <sup>2</sup>

**Table 2: Pre-Developed Impermeable Areas Split Site Runoff**

Contributing Area	Surface Water Runoff(l/s)		
	1 Year	30 Year	100 Years
805 m <sup>2</sup>	8.9	21.2	26.8

Note: Based on 5 minute rainfall intensity

## **4. GEOLOGY, HYDROGEOLOGY AND HYDROLOGY**

### **4.1. Geology**

British Geological Survey (BGS) map reference (Sheet 319/334) for the area indicates that the site is underlain by Lambeth Group clays and silts, over Newhaven Chalk.

A soils investigation carried out by Ashdown Site Investigation Ltd carried out in April 2016 confirmed the Lambeth Group sandy clays over White Chalk Group. The report dated May 2016 concluded that foundations could be formed in the sandy clays, groundwater was not encountered, and that the underlying Chalk was suitable for infiltration systems.

### **4.2. Hydrogeology**

The Environment Agency Groundwater Map indicates that the site is not located within a groundwater protection zone.

### **4.3. Hydrology**

The nearest hydrological feature to the site is the River Ouse located about 4km to the east of the site and which flows in a southerly direction.

The site lies wholly within an Environment Agency Flood Zone 1 as defined by NPPF which means that the site has a minimal risk of being flooded from fluvial sources. The site is acceptable for built development of educational nature. The development is considered to have a more vulnerability classification and the development is considered appropriate under Table D.3 of NPPF.





**Figure 2 Environment Agency Flood Map for Rivers and Sea Flooding**

*(Reproduced from Environment Agency digital map data  
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## 5. PROPOSED DEVELOPMENT

The proposed development is for 12 new classrooms and minor alterations to the existing school, based on the plans prepared by Mackellar Schwerdt Architects submitted for planning approval, as shown in Appendix A.

The new classroom proposal will have an impermeable surface area of 805m<sup>2</sup> (0.0805ha) out of a redline boundary area of 20579m<sup>2</sup> (2.06ha).

The table below summarises the post-development areas for the site.

**Table 3: Post-Developed Area Split**

Impermeable Areas	Area
Roof	581 m <sup>2</sup>
Forecourt	0 m <sup>2</sup>
Paving	224 m <sup>2</sup>
Soft landscape and Permeable Paving	0m <sup>2</sup>
<b>Total</b>	<b>805 m<sup>2</sup></b>

## 6. DRAINAGE STRATEGY

The drainage design strategy proposed is to retain as much of the existing foul and surface water drainage network servicing the whole of the site, but provide a new gravity foul and surface water drainage to service the development. Existing undersized soakaways too close to the new structure will be rebuilt designed to modern standards including a 30% increase for climate change.

### 6.1. Surface Water

The drainage strategy for the proposed development is based on a conventional drainage pipe system with the inclusion of Sustainable Urban Drainage Systems (SUDS) source control methods using soakaways. Soakaways will be designed using data from soil permeability tests undertaken on the site.

The drainage system will be designed in accordance with the latest British Standards and Building Regulations, and SUDS Manual CIRIA C697. Climate change will be accounted for by a 30% increase in rainfall intensity.

The SUDS techniques listed in the table below are all viable options that could be considered at detail design stage.

**Table 4: Viable SUDS Techniques**

SuDS		Comments
Source control (rainwater harvesting, water butts, green roofs, rain gardens)	✓	Suitability would depend on final layout, costs and visual acceptability.

SuDS		Comments
Swales (shallow grass ditches)	X	Limited available space.
Filter trench	X	Limited available space.
Porous surfacing/	✓	Would depend on final layout.
Soakaway	✓	
Balancing Pond	X	No available space.
On site storage	✓	Storage is possible in over-sized drainage pipes and shallow "Stormcell" type storage.

## 6.2. Foul Water

A public FW sewer passes around the north and east boundaries of the site. The FW drainage from the school discharges to this sewer. Generally it is intended that all foul water generated by the new classrooms will be disposed of through a new gravity pipe network and discharge into the Southern Water public sewer via a new connection.

## 7. DRAINAGE DESIGN

The following catchment hydraulic characteristics have been used in determining the drainage design for the site and the relevant catchment characteristics maps for the site have been included below.

**Table 5: Catchment Hydraulic Characteristics**

Characteristics	Values
Region	7
M5-60	19 mm
ratio ( r )	0.35
Soil	3
Runoff Coefficient	0.75 - 0.85

### 7.1. Post Development Peak Rate of Runoff

The site post-development peak rates of runoff have been calculated for a 1, 30 & 100 year event using the IoH124 Report and the Wallingford Procedure. The peak runoff was calculated for a range of storm duration up to and including a 6 hour storm and a 30% allowance on rainfall intensities due to climate change in accordance with NPPF.

**Table 6: Pre & Post Development Peak Rate of Runoff**

<b>Return Period</b>	<b><i>Post-Developed Area</i></b> <b><i>(805m<sup>2</sup>)</i></b>
1 Year	14.8 l/s
30 Year	35.1 l/s
100 Year	44.3 l/s

The proposed development will result in an increase in the new impermeable surface area and the resulting surface water runoff of 67% of the previously developed site.

## **8. ASSESSMENT OF FLOOD RISK**

### **8.1. Introduction**

The aim of the study is to undertake a flood risk assessment that meets the requirements of NPPF and the Environment Agency by identifying the flood risk posed to and from the development from all sources and by scoping flood management measures that could feasibly be used to ensure that the development is safe in the event of a flood.

This section provides a review on flood risk associated with the development of the site and summarises the flood risk issues at the development. Specifically, it seeks to satisfactorily meet the criteria of NPPF.

### **8.2. Assessment of Flood Risk**

Environment Agency guidance on the requirements for undertaking a Flood Risk Assessment (FRA) for planning applications for developments greater than 1 ha in Flood Zones 1 are as follows:-

- Information about the surface water disposal measures already in place and their state of maintenance.
- An assessment of the volume of surface water run-off likely to be generated from the proposed development.
- Proposals for surface water management according to sustainable drainage principles, with the aim of not increasing, and where practicable reducing, the rate of runoff from the site as a result of the development.
- Allowance in design for how climate change will affect the probability and development proposal.

- Consideration of the proposal relative to any existing Strategic Flood Risk Assessment carried out by the local authority.
- Confirmation as to whether Environment Agency consent is needed for any aspect of the work, and whether this has been applied for or not.

### **8.3. Flood Risk Assessment**

This site specific Flood Risk Assessment has been carried out in accordance with the policies stated in NPPF and those on flood risk in the Local Development Framework (LDF). Climate change has been taken into account in the assessment of the design of the surface water drainage network for the proposed development and is based on a 30% increase in rainfall intensities, which is in accordance with Table 5 B2 of NPPF for a development life span of 100 years.

The FRA identifies the likelihood of the proposed development being affected by various forms of flooding throughout its proposed lifetime and the likelihood of the proposed development increasing flood risk to adjacent properties.

### **8.4. Potential Sources of Flooding**

This section of the report will identify the risks from the different forms of flooding identified in NPPF.

The development site is located within a Zone 1 flood risk area. This means that the development site has a minimal risk of being flooded from fluvial sources. Other forms of flooding to the site have a low flood risk.

### **8.5. Tidal and Fluvial Flooding**

The nearest designated main river is the River Ouse, which is located 4km east of the site.

The Environmental Agency map in Figure 2 indicates there is no perceived risk of tidal or fluvial flooding.

### **8.6. Flooding from Groundwater**

The site is not located within the extent of the Ground Water Source Protection and lies in an area designated as a Major Aquifer High. The Lewes District Council Strategic Flood Risk Assessment does not indicate any risk of groundwater flooding.

### **8.7. Flooding from Sewers**

There is a public FW sewer running along the north and east boundaries of the site, and there are FW sewers in the neighbouring roads. The Lewes District Council Strategic Flood Risk Assessment indicates that there has not been historical sewer flooding in the area.

The private drainage system within the site is designed to cater for the 1 in 100 year storm event plus 30% climate change factor. The development has reduced the surface water runoff to the public sewer and as a result there will be no perceived risk of sewer

flooding at the site.

### **8.8. Flooding from Reservoirs, Canals and Other Artificial Sources**

The Environment Agency map shows that there is no risk of flooding from reservoirs or canals'

### **8.9. Surface Water Flooding**

The level of impermeable surface area has increased. The implementation of infiltration systems will provide sustainability. There is no perceived risk of flooding from surface water at the site.

### **8.10. Flooding Issues from Off Site**

There is no perceived risk of flooding from off-site developments.

### **8.11. Mitigation Measures**

The proposed drainage system has been designed using good design practice. This together with the use of silt traps, will result in a reduction of the peak surface water runoff and volume providing an effective storm water management at the site.

## **9. CONCLUSION**

This site specific Flood Risk Assessment has been carried out in accordance with the policies stated in NPPF and those on flood risk in the Local Development Framework (LDF). Climate change has been taken into account in the design of the surface water drainage network for the proposed development, and is based on a 30% increase in rainfall intensities, which is in accordance with Table 5 B2 of NPPF for a development life span of 100 years.

The proposed development plans includes new infiltration systems in some part replacing existing systems, and silt traps. There will be no increase in the surface water runoff and volume discharging from the site.

# **Appendix A-**

# **Architects Drawing**



**Proposed Ground Floor Plan**  
1:100

RevID	ChID	Change Name	Date

**MACKELLAR SCHWERDT**  
architects

The Old Library  
Albion Street, Lewes, East Sussex BN7 2ND  
email: info@mackellararchitects.co.uk  
tel: 01273 480608

STATUS: **FOR PLANNING**  
CLIENT: **Emcor UK Ltd**

PROJECT NAME: **Meridian School Peacehaven**  
LOCATION: **Peacehaven**

DRAWN BY: **SJD**  
CHECKED BY: **SK**  
SCALE: **1:100**  
SHEET SIZE: **A1**  
DRAWING TITLE: **Proposed Ground Floor Plan**

DRAWINGS: **Proposed Ground Floor Plan, Scale Bar**  
DRAWING NUMBER: **8830 / P.115** REVISION: **-**

**FOR PLANNING**

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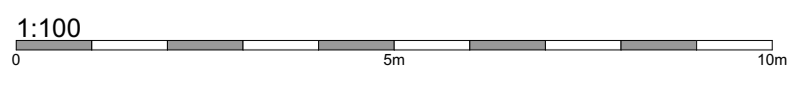
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Do not scale this drawing.

The Contractor is responsible for checking all dimensions on site.  
Report any discrepancies, errors or omissions to the Architects immediately.

The Contractor shall ensure that all goods, materials and workmanship conform with current British Agreement Certificates, British Standards and Building Regulations, and ensure that all works are executed in full compliance with all current Codes of Practice and Regulations in respect of Health & Safety.



CAD FILE NAME: /Volumes/Current Projects/Current Projects Master/Job Files/8800/8830 Meridian Community Primary School - Extension/Drawings/Archicad /8830 Meridian Existing MK3.plt



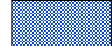




# **Appendix B-**

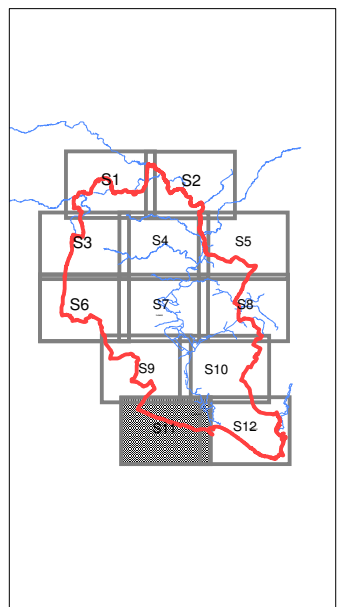
# **SFRA MAPS**



**KEY**

-  Lewes District Council Boundary
-  Watercourse
-  Functional Floodplain
-  Flood Zone 3
-  Flood Zone 2

For definitions of items included in the key, refer to the glossary



Client:  
LEWES DISTRICT COUNCIL

Project: STRATEGIC FLOOD RISK ASSESSMENT

Title:  
FLOOD RISK ZONES

Design:	GPP	Drawn:	GPP
Chk'd:	CWF	Scale:	1 in 25,000
app'd:	CWF	Date:	April 2007

**FABER MAUNSELL | AECOM**

Enterprise House  
160 Croydon Road,  
Beckenham, KENT, BR3 4DE

Tel: 0870 905 0906  
Fax: 020 8663 6723  
www.fabermaunsell.com

Dwg: 522661BER/002/S11

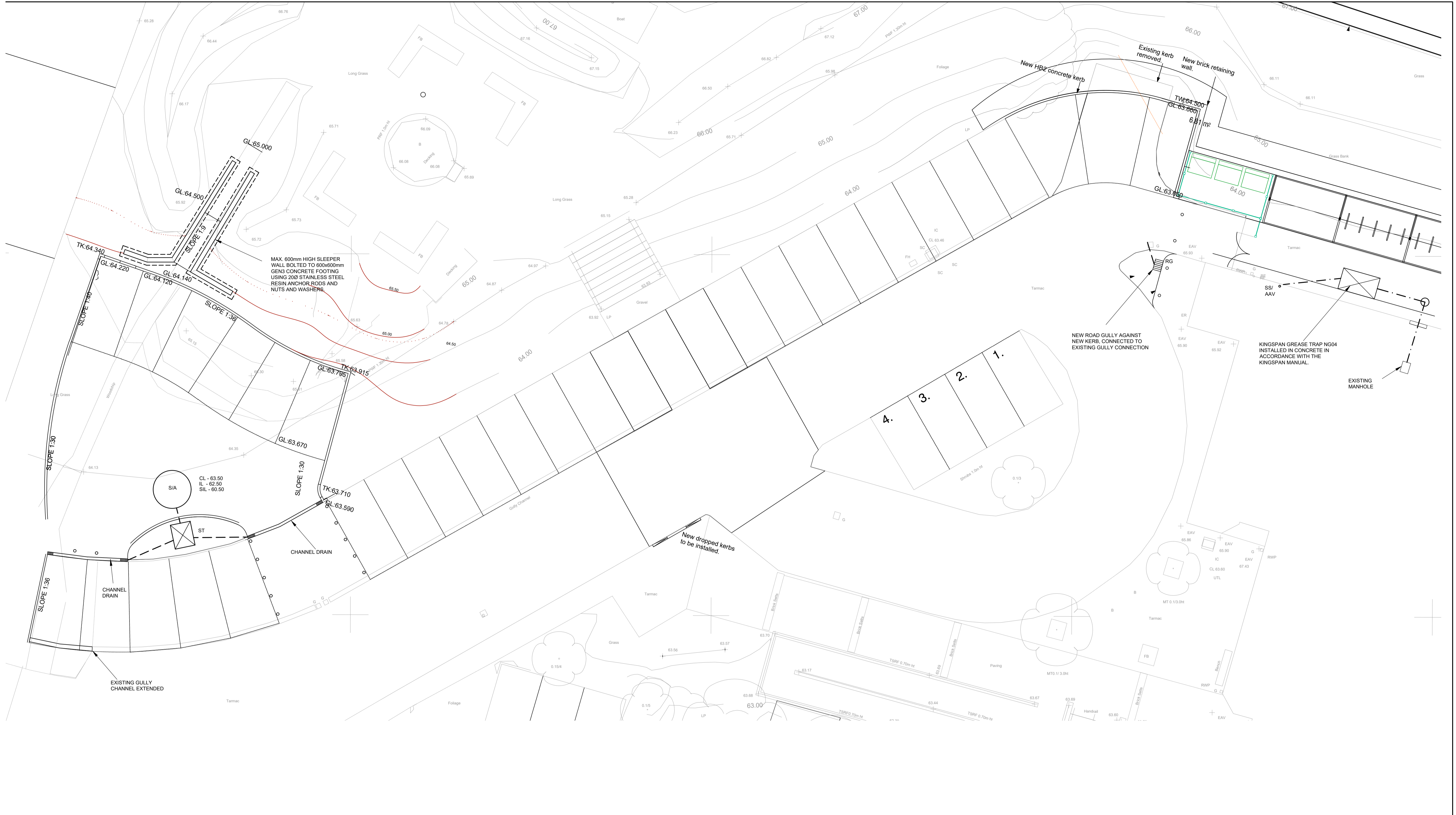
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**Figure 002/S11**

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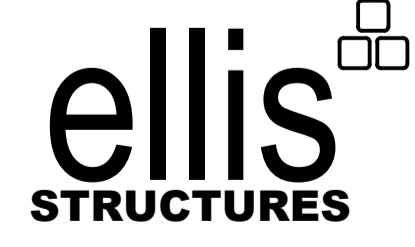
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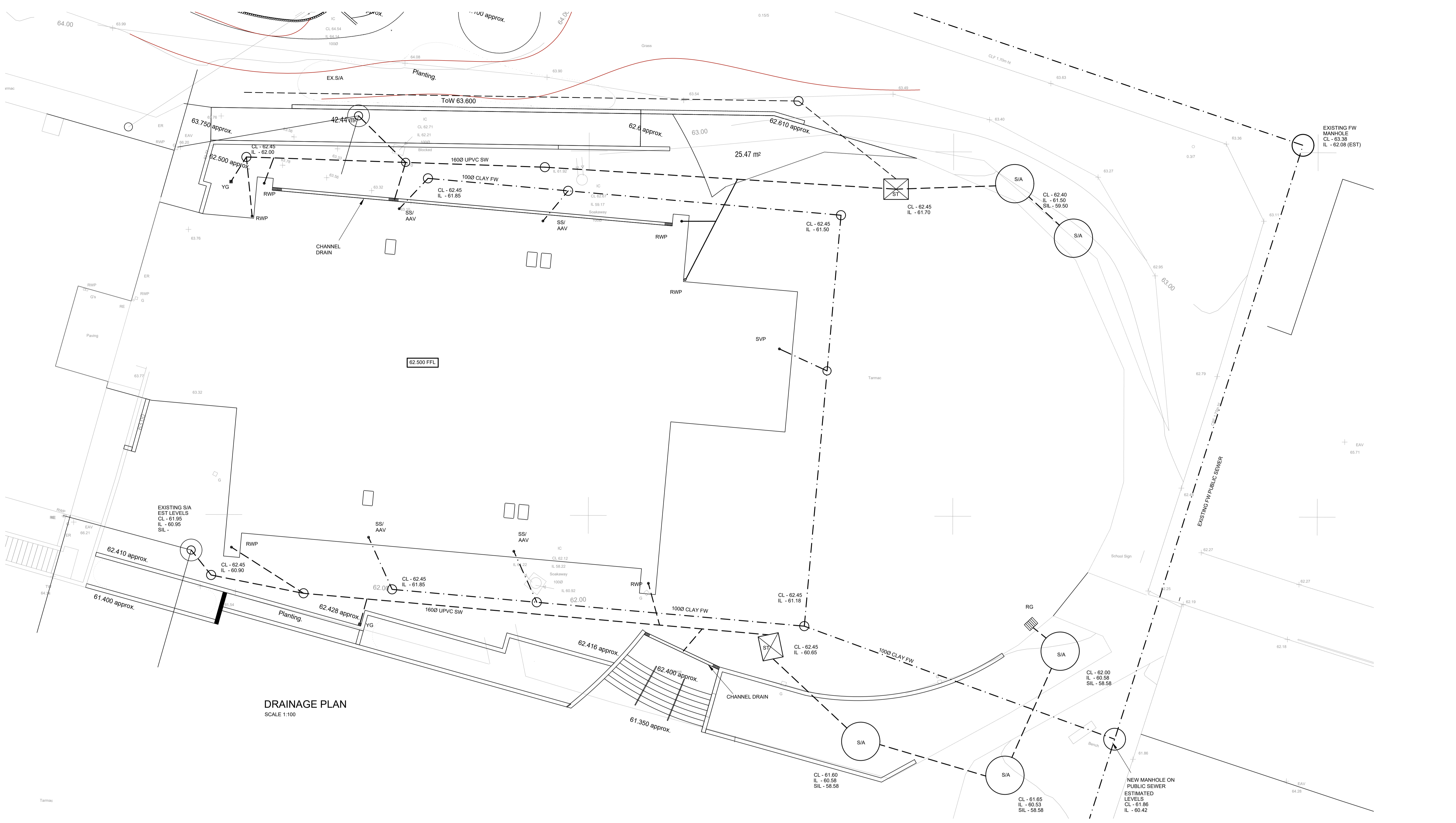
# **Drainage Drawings**



DRAINAGE PLAN  
SCALE 1:100

PRELIMINARY

-	-	TCH	-
-	-	TCH	-
rev	date	by	comment
client EMCOR			
address MERIDIAN PRIMARY PRIMARY SCHOOL PEACEHAVEN			
drawing title DRAINAGE LAYOUT SHEET 2		drawn by TCH date 16/05/16	 CHARTERED CONSULTING STRUCTURAL ENGINEERS TEL : (01273) 470088 contact@ellisstructures.com www.ellisstructures.com
scale 1:100@A1	drawing No 16057	12	
49b Cliffe High Street, Lewes East Sussex, BN7 2AN			



**DRAINAGE PLAN**  
SCALE 1:100

-	-	TCH	-
A	04/07/16	TCH	SOAKAWAYS MOVED
rev	date	by	comment
client			EMCOR
address			MERIDIAN PRIMARY PRIMARY SCHOOL PEACEHAVEN
drawing title		drawn by	TEL : (01273) 470088 contact@ellisstructures.com www.ellisstructures.com
DRAINAGE LAYOUT		TCH date 16/05/16	
scale	1:100@A1	drawing No	16057 / 20
		rev	A

