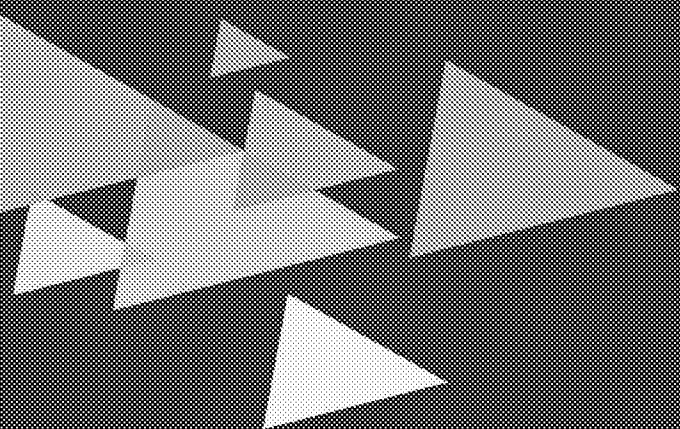




Littlehampton Golf Club
Flood Risk Assessment
For
Matthews (Sussex) Limited

Document Control Sheet

Flood Risk Assessment

Littlehampton Golf Course, 170 Rope Walk, Littlehampton, BN17 5DL

Matthews (Sussex) Limited

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
26/05/17	1 st Issue	MD	NJ
13/06/17	Final	MD	NJ

Motion
84 North Street
Guildford
GU1 4AU



Contents

1.0	Executive Summary	1
2.0	Introduction	2
3.0	Legislative and Policy Framework.....	3
4.0	Development Setting.....	5
5.0	Flood Risk Appraisal	7
6.0	Flood Risk Mitigation	9
7.0	Summary and Conclusions	10

Appendices

A	Site Location Plan
B	BGS Borehole Records
C	Environmental Agency Flood Mapping
D	Topographical Survey
E	Proposed Development Masterplan

1.0 Executive Summary

- 1.1 This Flood Risk Assessment has been prepared on behalf of Matthews (Sussex) Limited to identify any change or increase in flood risk at Littlehampton Golf Course due to the proposed filling of an existing depression, as well as the raising of a bund along the eastern boundary of the development area.
- 1.2 The application site is located approximately 450 metres to the south of Littlehampton Railway Station and falls within the administrative boundaries of West Sussex County Council (WSCC) as the Lead Local Flood Authority (LLFA).
- 1.3 Based on the EA's Flood Map, the site is shown to be located in Flood Zone 3b. Table 3 of PPG sets out the flood risk vulnerability classifications for different types of development. The proposals are classified as a water-compatible development under the definition of 'Amenity open space, nature conservation and biodiversity, outdoor sports and recreation'. Table 3 of PPG confirms that water-compatible development is appropriate in flood zone 3b.
- 1.4 The filling of the existing depression will decrease ponding in this area and provide a useable surface for the golf course.
- 1.5 The raising of ground levels along the eastern boundary will provide protection of the public outside of the golf course.
- 1.6 The report follows the formal requirements of a NPPF flood risk assessment for the purposes of completeness. This report has demonstrated that the proposed filling of the existing depression, as well as the raising of the existing bund at Littlehampton Golf Club will not increase the flood risk on or off site to or from the development area.

2.0 Introduction

- 2.1 This Flood Risk Assessment has been prepared on behalf of Matthews (Sussex) Limited to identify any change or increase in flood risk at Littlehampton Golf Course due to the proposed filling of an existing depression, as well as the raising of a bund along the eastern boundary of the development area.
- 2.2 This FRA has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) with due regard to other relevant flood risk legislation and policy.
- 2.3 The following sources of information were utilised in establishing the baseline conditions and preparing this report:
- ✧ National Planning Policy Framework (Communities and Local Government, March 2012)
 - ✧ Planning Practice Guidance (Department for Communities and Local Government (DCLG), 6 March 2014) ([accessed April 2017](#))
 - ✧ Flood and Water Management Act 2010 (DEFRA, 2010)
 - ✧ West Sussex County Council – Preliminary Flood Risk Assessment (May 2011)
 - ✧ Environment Agency (EA) website www.environment-agency.gov.uk (April 2017)
 - ✧ Interim Code of Practice for Sustainable Drainage Systems (DEFRA National SuDS Working Group, 2004)
 - ✧ British Geological Survey website www.bgs.ac.uk (April 2017)
 - ✧ Proposed Site Layout (Maltby Surveys Limited LGC-101)

Aims and Objectives

- 2.4 The purposes of the Report are as follows:
- (i) *To show that flood risk can be managed so that the site will not be subject to unacceptable flood risk.*
 - (ii) *To demonstrate that there will not be increased risk of flooding off site.*
 - (iii) *To demonstrate that wastewater and surface water runoff from the proposed development have satisfactory and achievable disposal strategies.*
- 2.5 Motion's assessment of potential flood impacts and their significance in this report is based on available baseline information references as listed above, and takes into account the proposed land use, mitigation measures and design features.

3.0 Legislative and Policy Framework

Flood & Water Management Act

- 3.1 The Flood and Water Management Act 2010 (FWMA) received Royal Assent on 8th April 2010. The Act was introduced to enforce some of the key proposals set out within UK Government flood and water strategies along with UK Government's response to the Sir Michael Pitt's Review of the Summer 2007 floods.
- 3.2 All lead local flood authorities, including West Sussex County Council have a responsibility under the FWMA to develop, maintain, apply and monitor the application of, a strategy for local flood risk in their area. Local flood risk is defined as flood risk arising from surface run-off, groundwater and ordinary watercourses (i.e. non main rivers).
- 3.3 Relevant to site, the FWMA will encourage the uptake of sustainable drainage systems (SuDS) by removing the automatic right to connect to sewers and providing for Lead Local Flood Authorities to adopt SuDS for new developments.

Preliminary Flood Risk Assessment

- 3.4 The lead local flood authority has a responsibility under the Flood Risk Regulations 2009 to prepare a Preliminary Flood Risk Assessment, which provides a high level summary of potentially significant local flood risk based on available and readily derivable information. West Sussex County Council PFRA published in May 2011, compiles information on significant local flood risk which is flood risk originating from sources other than main rivers, the sea and large reservoirs and principally meaning flood risk from surface runoff, ground water and ordinary water watercourses.

National Planning Policy Framework

- 3.5 The National Planning Policy Framework (NPPF) aims to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at high risk.
- 3.6 All land in England and Wales is classified into three main Flood Zones which refer to the probability of river or sea flooding (ignoring the existence of defences). The three Flood Zones are:
- ✧ Flood Zone 1 (Low Probability) – less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%);
 - ✧ Flood Zone 2 (Medium Probability) – having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) in any year or having between a 1 in 200 and 1 in 1000 annual probability of sea flooding in any year (0.5% - 0.1%) ;
 - ✧ Flood Zone 3a (High Probability) – having a 1 in 100 or greater annual probability of river flooding (≥1%) or having a 1 in 200 or greater annual probability of sea flooding (≥0.5%); and
 - ✧ Flood Zone 3b (the Functional Floodplain) – having a 1 in 20 or greater annual probability of river flooding. The zone comprises land where water has to flow or be stored in times of flood.
- 3.7 NPPF states that a FRA must be undertaken for all developments greater than 1 hectare, located within the floodplain (Flood Zone 2 or 3) and/or suffers from drainage problems, to highlight and assess the significance of all forms of flooding to the proposed development and to assess any potential the development may have on increasing flooding in other areas.
- 3.8 The site is just under 1 hectare (based on Maltby Surveys Limited drawing LGC-101).
- 3.9 Additionally the site falls entirely within flood zone 3b according to the Environment Agency (EA) Product 4 flood mapping. However the EA has confirmed that all flooding within the vicinity of the site is a result of tidal flooding. The EA Product 4 package and correspondence can be seen in **Appendix C**.

- 3.9 As before mentioned the site falls entirely within flood zone 3b according to the Environment Agency (EA) Product 4 flood mapping. However the EA has confirmed that all flooding within the vicinity of the site is a result of tidal flooding. The EA Product 4 package and correspondence can be seen in **Appendix C**.
- 3.10 In February 2016, the Environment Agency updated its climate change allowance variables to better reflect the flooding from overland flow, river basins, fluvial and pluvial flooding. Making use of these allowances within Flood Risk Assessments helps to minimise vulnerability and provide resilience to flooding and coastal change in the future. The climate change allowances are predictions of anticipated change for:
- » Peak river flow by river basin districts;
 - » Peak Rainfall Intensity (previously 30%, currently 40%);
 - » Sea level rise; and
 - » Offshore wind speed and extreme wave height.
- 3.11 These allowances are based on climate change projections and different scenarios of carbon dioxide (CO₂) emissions to the atmosphere. There are different allowances for different epochs of time over the next century.
- Lead Local Flood Authority*
- 3.12 As of April 2015, the Lead Local Flood Authority (LLFA) became a statutory consultee on all major planning applications. The LLFA is required to assess planning applications in respect of surface water drainage and sustainable drainage systems. West Sussex County Council are the Lead Local Flood Authority for the Littlehampton area.
- 3.13 West Sussex County Council were contacted for a detailed information request regarding historic flood events – such as ground water and surface water flooding, this report will be updated once a response has been received, if necessary.

4.0 Development Setting

Site Location and Description

- 4.1 The application site is located approximately 450 metres to the south of Littlehampton Railway Station and falls within the administrative boundaries of Arun District Council (ADC) and West Sussex County Council (WSCC).
- 4.2 A site location map is provided as Figure 3.1, the site boundary is shown in red.

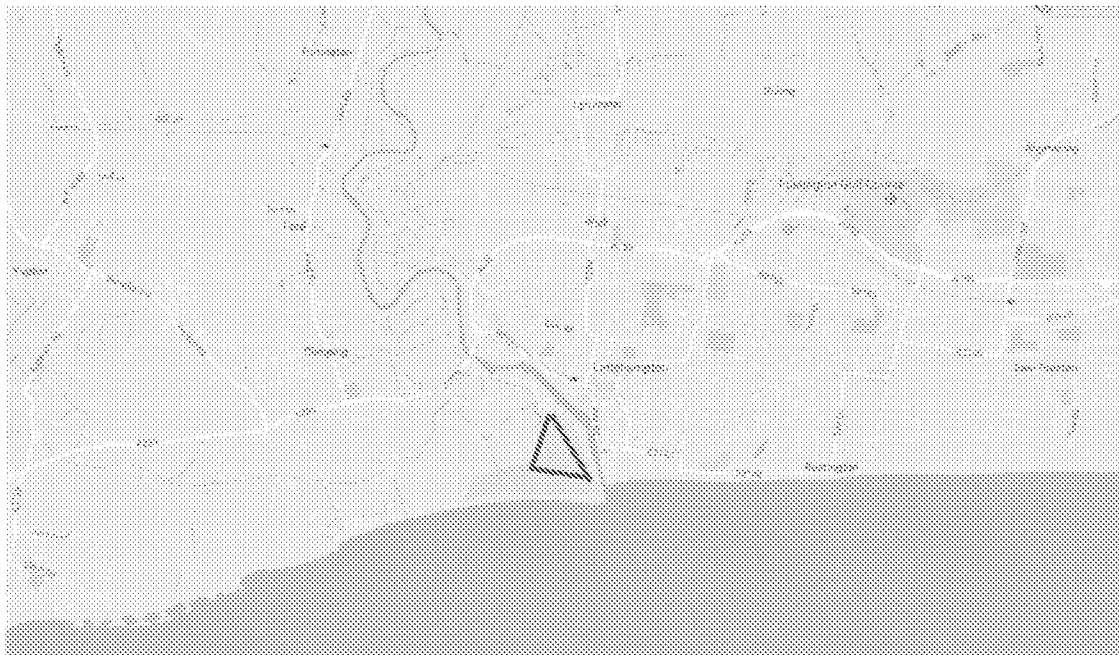


Figure 3.1 - Site Location Plan

Topography

- 4.3 The site is located approximately 350m north west from the mouth of the River Arun.
- 4.4 A topographical survey of the site was undertaken by Maltby Surveys Ltd, their drawing reference LGC-100 is attached as **Appendix D**.
- 4.5 The topographical survey reveals that the site is relatively flat, with levels ranging from 4.5m at its highest to 1.5m at its lowest.

Development Proposals

- 4.6 The redevelopment proposals are for the filling of an existing depression and raising the level of the existing bund along the eastern boundary by up to 5.5m separating the site from Rope Walk.
- 4.7 The existing development is predominantly permeable unmade ground. The proposed design will not reduce this permeable area as suitable fill material will be imported to the site.
- 4.8 Development proposals can be seen in **Appendix E**.

Flood Zone

- 4.9 Based on the EA's Flood Map, the site is shown to be located in Flood Zone 3b. Table 3 of PPG sets out the flood risk vulnerability classifications for different types of development. The proposals are classified as a water-compatible development under the definition of 'Amenity open space, nature conservation and biodiversity, outdoor sports and recreation'. Table 3 of PPG confirms that water-compatible development is appropriate in flood zone 3b.

- 4.10 The Environment Agency Flood Map for Planning can be seen in **Appendix C**.

Geology

- 4.11 The British Geological Survey (BGS) online Geoindex Mapping identifies the underlying bedrock geology correlates to the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation – all primarily composed of chalk.
- 4.12 The BGS mapping identifies superficial deposits of Raised Marine Deposits (Clay, Silt, Sand and Gravel) within the immediate area.
- 4.13 Borehole records from the surrounding area have been obtained from the BGS online index, these can be seen in **Appendix B**.

Hydrogeology

- 4.14 According to the Environment Agency's online mapping, the site is not shown to be located within a groundwater source protection zone.
- 4.15 The BGS aquifer maps for superficial deposits shows the site is underlain by a Secondary A Aquifer.
- 4.16 Additionally, the BGS Aquifer Map for bedrock deposits shows the site is underlain by a Principal bedrock designated aquifer.

Hydrology

- 4.17 The EA's flood map indicates the site is not located within a Surface Water Safeguard Zone (SuSgZ).
- 4.18 The groundwater levels are based on BGS borehole logs.

5.0 Flood Risk Appraisal

Introduction

- 5.1 This section provides an appraisal of each form of flooding, potential pathways, flood risk, and a review of any relevant historic flooding evidence obtained.

Fluvial Flooding

- 5.2 Fluvial sources include rivers, streams and ditches. Fluvial flooding occurs when the receiving catchment inflow in the river exceeds the flow capacity of the river channel. Rainfall intensity and duration, groundwater levels and overland flow directly contribute to the overwhelming of river channel capacity which forces waters to spill into the adjacent floodplain. This effect has been analysed UK wide by the EA to identify existing development within the floodplain, and inform the design of new development in the floodplain.

- 5.3 Littlehampton Golf Course lies adjacent to the River Arun, but flood defences protect the site against flooding from the river. It should also be noted that the site lies within the Tidal extent of the River Arun.

Coastal, Tidal & Estuarial Flooding

- 5.4 Coastal, tidal and estuarial flooding is caused by high tides and extreme weather conditions impacting land in the vicinity of the sea and estuaries.
- 5.5 The proposed development is located near to the sea and a tidal influenced watercourse. Therefore, the development is at risk of coastal, tidal and estuarial flooding. This has been confirmed by the Environment Agency. However due to the nature of the works there will not be an increase in flood risk resulting from the proposals.

Groundwater Flooding

- 5.6 Groundwater flooding commonly occurs during wet winter months after long periods of rainfall, where groundwater levels are seasonally high and exceed the capacity of the aquifers, rising above the surface topsoil.
- 5.7 Groundwater flooding is likely to occur in low-lying areas underlain by regional aquifers of commonly chalk or sandstone. The EA groundwater online mapping shows the site to lie within a Secondary A Designated Aquifer for both the superficial deposits and is in very close proximity to a primary aquifer at bedrock level.
- 5.8 The Environment Agency online mapping confirms that the site is located within a Major Aquifer High (MAH).
- 5.9 The EA online mapping shows the site is not located within a groundwater source protection zone.
- 5.10 The site is considered to be at a low risk from groundwater flooding according to the EA groundwater maps accessible online.

Flooding from Overland Flow/Pluvial Flooding

- 5.11 Flooding from overland flow occurs when intense rainfall is unable to infiltrate into the ground or enter drainage systems resulting in localised flooding in low spots that provide no means of outfall.
- 5.12 The governments 'Risk of Flooding from Surface Water' map shows that there is a very minimal to no risk of surface water flooding within the proposed redevelopment area.
- 5.13 The Long Term Risk of Flooding mapping can be seen in **Appendix C**.

Flooding from Artificial Drainage Systems

- 5.14 In order to control and convey surface water runoff from impermeable surfaces in urban areas, underground surface water sewers or combined sewers (foul and surface water) are often utilised in urban areas. Pipes, culverts etc have a finite capacity and therefore pose a risk of flooding due to the risk of siltation, blockage or collapse.
- 5.15 Southern Water has been contacted and the report will be updated once a response has been received.

Flooding from Infrastructure Failure

- 5.16 Infrastructure can be designed to store, carry and protect the flow of water. For example, reservoirs store water, a canal stores/transfers water and a flood defence protects land from flood water. Failure of these water related infrastructure forms can cause flooding.
- 5.17 The Flood Warning Information Service (a government funded service allowing users to view detailed flood information and mapping online) shows that the site is not located within an area at risk of reservoir or canal flooding.

6.0 Flood Risk Mitigation

Introduction

- 6.1 This section details the proposed management and mitigation design measures implemented to avoid, reduce or control the potential flood risk associated with the site.
- 6.2 When carrying out a FRA it is essential to put into perspective any theoretical analysis with the reality of the physical system in place. It is impossible (practically as well as economically) to implement mitigation measures which will never fail.
- 6.3 The proposals do not affect the existing hardstanding areas and surfaces that generate surface water run-off. As such no mitigation measures need to be designed.

Pollution Prevention Measures

- 6.4 To date, no areas of contaminated land have been identified within the proposed development area, this is to be confirmed at the detailed design stage.
- 6.5 Any stocks of materials, oils and fuels used onsite will be stored in a manner preventing spillage and seepage to ground. Wastewater will not be freely discharged to the ground or watercourses. Any hydrocarbons and chemical spillages will be thoroughly cleaned by excavation of the polluted ground and disposed of to a licensed waste depot.

Mitigation against Flood Risk to the Development from Offsite Land

- 6.6 The risk of flooding from offsite land is shown to be a minimal along Rope Walk based on the government flood warning surface water flooding maps.
- 6.7 Refer to **Appendix C** for the government long term flood risk mapping.

Residual Flood Risk

- 6.8 To deal with the residual risk of blockage to all on-site drainage features, the land owner or end user will ensure maintenance of their respective drainage system in line with the manufacturer's recommendations by the production of a Maintenance Management Plan.
- 6.9 This will ensure that over the lifetime of the proposed development the drainage system will be properly maintained to ensure proper functionality.

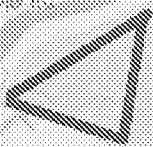
Flood Risk Mitigation Summary

- 6.10 This section has shown that the potential risk of flooding at the proposed development is very low.

7.0 Summary and Conclusions

- 7.1 This Flood Risk Assessment has been produced by Motion on behalf of Matthews (Sussex) Limited to support a planning application for the proposed filling of a depression and the raising of a bund along the eastern boundary of the site.
- 7.2 This report demonstrates that the development proposals satisfy the requirements of NPPF with regard to flood risk and surface water run-off management.
- 7.3 The site is categorised as falling within Flood Zone 3 and the EA has confirmed that flooding on site is due to Tidal effects.
- 7.4 The raising of land for the proposed bund and the filling of the depression will not result in an increase in flood water levels in the local area as the site is located within a coastal flood plain.
- 7.5 The proposals will not result in the loss of any coastal flood plain storage capacity and the EA has confirmed that no flood compensation is required.
- 7.6 This report demonstrates that there is a minimal risk of flooding from groundwater, surface water, fluvial and infrastructure sources.
- 7.7 The information in this report has demonstrated that the proposed filling of the existing depression, as well as the raising of the existing bund at Littlehampton Golf Club will not increase the flood risk on or off site to or from the development area.

Appendix A



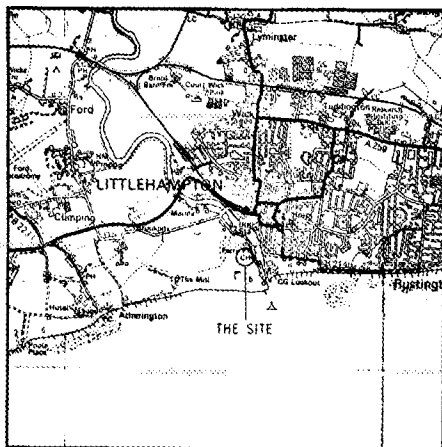
Appendix B

Project **LITTLEHAMPTON GOLF CLUB**

Project No. **85-S223**

~~TO 00 SW / 79~~

~~0059 0161~~



SITE LOCATION PLAN

SCALE 1:50,000

Tp 008w 79

ARTISAN'S BAR AND
MACHINE SHOP

18th GREEN

BH1
NEW
CLUBHOUSE
BH2

PUTTING
GREEN

SAILING CLUB

EXISTING BOUNDARY
FENCE

OLD CLUBHOUSE
POSITION

1st
TEE
REMAINING
PROFESSIONAL'S
SHOP

CLIENT:

LITTLEHAMPTON GOLF CLUB

PROJECT:

PROPOSED CLUB HOUSE

DRAWING TITLE:

BOREHOLE LOCATION PLAN

SCALE:

Approx. 1:1250

DATE:

OCT 1985

geotechnics

JOB N°
85-5223

FIG. N°

5

BOREHOLE RECORD

B.G.S

Project				Client				Borehole			
PROPOSED CLUB HOUSE				LITTLEHAMPTON GOLF CLUB				Sheet 1 of 2			
Location				Engineer				Project No.			
BOPK WALK, LITTLEHAMPTON, SUSSEX				CONCISE DESIGNS				85-5223			
Sampling				Properties				Strata			
Depth	Sample Type	Depth of Casing	Depth to Water	Strength KN/m ²	IV %	SPT N	Description	Depth	Legend	Level Site Datum	
GL - 0.90	B						Brown silty clayey sand and gravel, gravel being flint			100.00	
							MADE GROUND	0.90			
1.00 - 1.45	JS	1.00				6	Loose brown sand with flint gravel	1.20			
1.45 - 2.00	B		1.90				Loose brown slightly silty fine to medium SAND. Sand mainly quartz, with some shell fragments.	1.65			
2.00 - 2.65	JS	2.00	2.25			4	Very loose grey silty fine to medium SAND. Sand gradually coarsening downwards. Occasional small lenses of brownish grey very sandy silty organic clay from 2.70-3.10	3.10			
2.65 - 3.30	B		3.10					3.40			
3.30 - 4.25*	JS	3.30				8	Soft laminated brownish grey sandy silty organic clay.				
4.00	N						Loose grey slightly clayey, silty fine to medium SAND with occasional thin layers of organic clay.				
4.25 - 5.00	B						Strong odour (possibly organic)				
5.00 - 6.15*	JS	5.00					Black silty clayey spongy PEAT. Small amount of green vegetation present.	5.50			
			6.30			10	Loose flint GRAVEL with sand.	6.30			
6.15 - 7.00	B						Fine brown mottled grey very sandy silty CLAY/very clayey silty SAND.				
7.00	N						Structureless remoulded CHALK containing gravel sized lumps of intact chalk and flint. Some discolouration.				
7.00 - 7.55	JS	7.00				8					
7.55 - 8.00	B						CHALK GRADE V				
8.00 - 8.45	JS	8.00				14					
8.45 - 9.50	B						Partially weathered CHALK. Recovery in gravel and cobbles of intact chalk and flint. Joints filled with soft remoulded chalk. Slight discoloration.	7.80			
9.50 - 9.95	JS	9.00				16	CHALK GRADE IV				
9.95 - 11.00	B										
Ground Water							Remarks		Boring		
Depth of Borehole	Depth of Casing	Depth after 20 mins	Depth of Water	Date	Time	Depth of Hole	Depth to Water	1	2	Plant	
3.10	3.10	2.25	3.80	20.9.85	11.00	2.60		Rods sank 0.6 under hammer weight		PILCON 1500	
6.30	6.30	1.90	NS					Rods sank 0.7 under hammer weight		DP/PH	
							Type and Diameter	Depth			
							Cable tool	150 mm	12.55		
							Start Date	19.9.85			
							Finish Date	20.9.85			

Symbols and abbreviations are explained on the accompanying key.

geotechnics

BOREHOLE RECORD

Project: PROPOSED CLUB HOUSE Client: LITTLEHAMPTON GOLF CLUB Borehole: 1
 Location: ROSE WALK, LITTLEHAMPTON, SUSSEX Engineer: CONCISE DESIGN Sheet: 2 of 2
 Project No: 85-5223

Sampling Properties Strata

Depth	Sample Type	Depth of Casing	Depth to Water	Strength kN/m ²	W %	SPT N	Description	Depth	Legend	Level	Site Data
9.95 - 11.00	US	9.00				22	CHALK GRADE IV Rubbly to blocky unweathered CHALK Some infilling in joints	10.50		100.00	
11.00 - 11.60	US	9.00				22	CHALK GRADE III	12.30			
11.60 - 12.20	US	9.00				28	Blocky weathered CHALK	12.65			
12.20 - 12.65	US	9.00					END OF BOREHOLE				

Ground Water							Remarks	String
Depth of Borehole	Depth of Casing	Depth after 20 mins	Depth Sealed	Date	Time	Depth of Hole	Depth to Water	Plant
								PILCON 1500
								DS/PN
								Type and Diameter
								Depth
								Cable Tool
								150 mm
								12.65
								Start Date
								19.9.85
								Finish Date
								20.9.85

Symbols and abbreviations are explained on the accompanying map.

geotechnics

BOREHOLE RECORD

Project: PROPOSED CLUB HOUSE Client: LITTLEHAMPTON GOLF CLUB Borehole: 2
 Location: ROPE WALK, LITTLEHAMPTON, SUSSEX Engineer: CONCISE DESIGN Sheet: 1 of 1
 Project No: 85-5223

Sampling				Properties				Strata			
Depth	Sample Type	Depth of Cast	Depth to Water	Strength (kN/m ²)	W %	SPT N	Description	Depth	Legend	Level	OO
0.00 - 1.00	B						Turf over fine brown very sandy silty CLAY with pockets of sand.	0.80			
1.00 - 1.45	JS	1.00				5	Loose brown silty fine to medium SAND with pockets of fine dark brown very sandy silty clay, and very occasional rounded medium gravel sized flint.	2.20			
1.45 - 2.00	B										
2.00 - 2.45	JS	2.00	2.20			5	Loose grey slightly silty fine to medium SAND with some flint gravel.	2.90			
2.45 - 3.00			2.70								
3.00 - 3.45	JS	3.00				10	Loose brownish grey silty fine to medium SAND with much flint gravel.	3.50			
3.45 - 4.00	B										
4.00 - 4.45	C	4.00				21	Medium dense grey flint sandy GRAVEL. Gravel mainly coarse with fine and medium gravel, and occasional cobbles.				
4.45 - 5.00	B						Becoming med. sandy from 4.00	4.80			
5.00 - 5.45	S	5.00				6	Loose dark grey quartzitic medium SAND with fine to coarse gravel sized flint fragments.				
5.45 - 6.00	B						Becoming medium dense at 5.50.				
6.00 - 6.85	JS*	6.00				13		7.10			
6.85 - 7.20	S										
7.20 - 7.60	JS	7.20				5	Soft structureless CHALK containing small lumps of intact chalk.	8.00			
7.60 - 7.90	B						CHALK GRADE VI				
7.90 - 8.35	JS	7.50				9	Structureless reconstituted CHALK containing gravel sized lumps and cobbles of intact chalk.				
8.35 - 8.80											
8.80 - 9.25	JS	7.50				10	CHALK GRADE V	9.25			
END OF BOREHOLE											

Ground Water								Remarks	Boring	
Depth: Start	Depth of Casing	Depth after 20 mins	Depth Sealed	Date	Wt. per cm	Depth of Hole	Depth to Water		Plant	PILCON 1500
2.70	2.70	2.20	NS					* Rods sank 0.40 m under weight of haneer	Crew	DF/PN
									Type and Diameter	Depth
									Cable Incl	
									150 mm	9.25
									Start Date	20.8.85
									Finish Date	20.8.85

Appendix C

Basic view ☒ Detailed view

 Flood risk from rivers or the sea

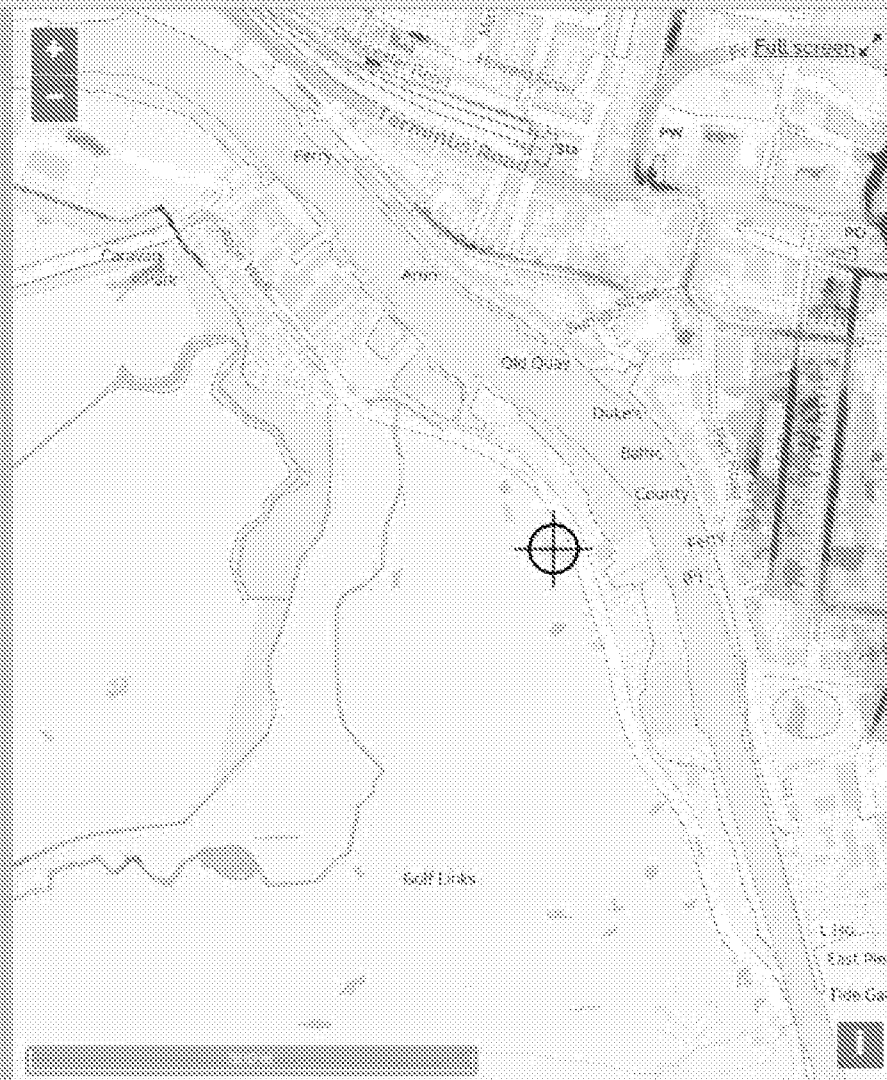
☐ Extent of flooding

 Flood risk from surface water

☒ Extent of flooding

 Flood risk from reservoirs

☐ Extent of flooding



Flood risk



High



Medium



Low

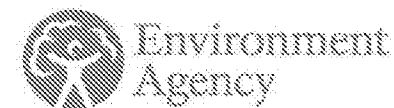
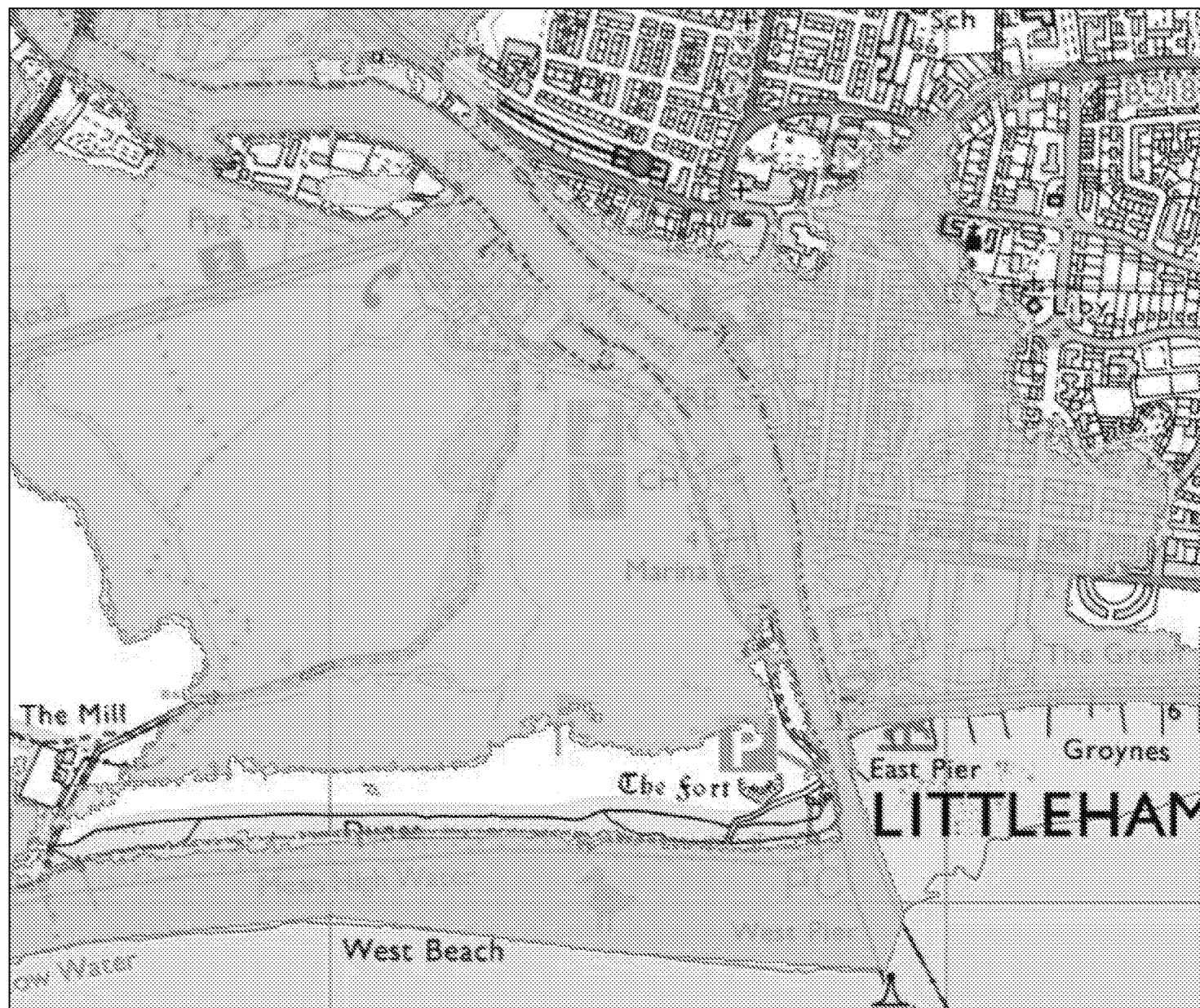


Very low



Location of the
postcode you
entered

Flood Map for Planning (Rivers and Sea). Centred BN17 5DL. Created 22/02/2017.



Scale 1: 10,000



Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

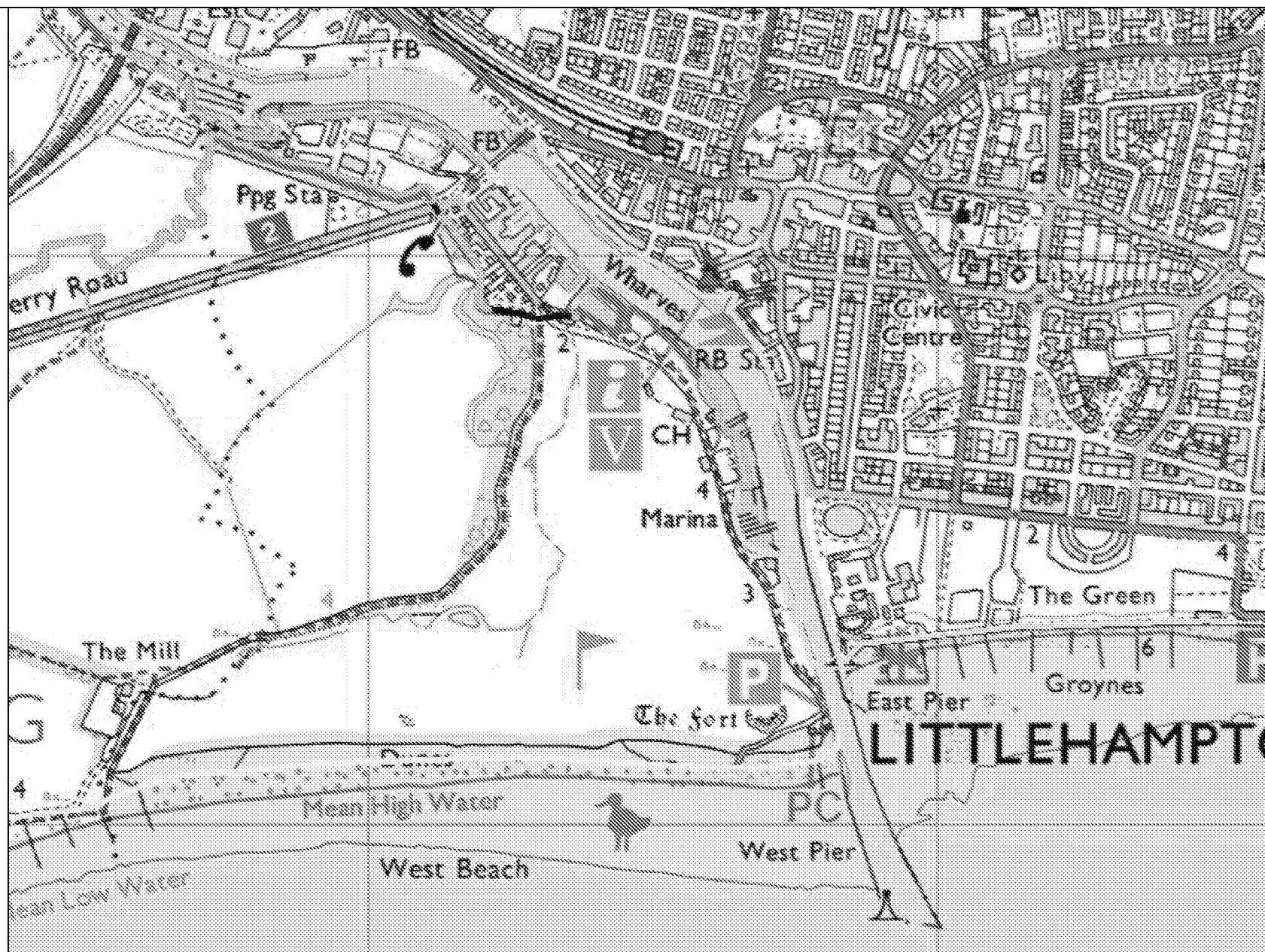
© Crown Copyright and database rights 2017. Ordnance Survey 100024198

Flood Defence Locations. Centred BN17 5DL. Created 22/02/2017.

Legend

Defences

-  Embankment
-  Wall
-  Flood Gate
-  Demountable Defence
-  Bridge Abutment
-  High Ground
-  Beach
-  Barrier Beach
-  Promenade
-  Quay
-  Cliff
-  Dunes
-  Culvert







Environment
Agency

N



Legend

- Site Nodes
- Site Boundary
- Main River
- 5% AEP (Defended Tidal)
- 0.5% AEP (Defended Tidal)
- 0.1% AEP (Defended Tidal)
- 0.5% AEP (2070) NPPF (Defended Tidal)
- 0.5% AEP (2115) NPPF (Defended Tidal)

Scale: 1:10,000

00.250.5

Kilometers





Environment
Agency

N


Legend

-  Site Nodes
-  Site Boundary
-  Main River
-  5% AEP (Un defended Tidal)
-  0.5% AEP (Un defended Tidal)
-  0.1% AEP (Un defended Tidal)
-  0.5% AEP (2070) NPPF (Un defended Tidal)
-  0.5% AEP (2115) NPPF (Un defended Tidal)

Scale: 1:10,000



00.250.5
Kilometers

Product 4 Flood Risk Data Requested by: Georges Mikhael
Site: BN17 5DL, Littlehampton

Table 1: Water Levels: Tidal Undefended

Node Reference	NGR		Modelled Flood Levels in Metres				
	Eastings	Northings	Undefended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	502355	101778	3.06	3.20	3.59	4.33	3.34
2	502499	101726	3.06	3.20	3.59	4.33	3.34
3	502334	101588	3.06	3.20	3.59	4.33	3.33
4	502533	101569	3.06	3.20	3.59	4.33	3.34
5	502294	101434	3.05	3.20	3.59	4.33	3.33
6	502474	101410	3.06	3.20	3.59	4.33	3.33
7	502636	101371	3.06	3.20	3.59	4.33	3.34

Table 2: Water Levels: Tidal Defended

Node Reference	NGR		Modelled Flood Levels in Metres				
	Eastings	Northings	Defended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	502355	101778	-	-	2.76	3.65	2.18
2	502499	101726	-	-	2.76	3.65	2.18
3	502334	101588	-	1.82	2.76	3.65	2.18
4	502533	101569	-	-	2.76	3.65	2.18
5	502294	101434	-	-	2.76	3.65	2.17
6	502474	101410	-	-	2.76	3.65	2.18
7	502636	101371	-	1.35	2.76	3.65	1.53

Table 3: Water Depth: Tidal Undefended

Node Reference	NGR		Modelled Flood Depth in Metres				
	Eastings	Northings	Undefended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	502355	101778	1.43	1.57	1.96	2.67	1.71
2	502499	101726	1.05	1.19	1.58	2.32	1.33
3	502334	101588	1.63	1.78	2.17	2.91	1.91
4	502533	101569	1.16	1.30	1.69	2.43	1.44
5	502294	101434	0.95	1.09	1.48	2.22	1.23
6	502474	101410	2.17	2.31	2.70	3.44	2.45
7	502636	101371	1.74	1.88	2.27	3.01	2.02

Office Address: Guildbourne House, Chatsworth Road, Worthing BN11 1LD.
 Customer services line: 03708 506 506. Email: enquiries@environment-agency.gov.uk
www.gov.uk/government/organisations/environment-agency

Table 4: Water Depth: Tidal Defended

Node Reference	NGR		Modelled Flood Depth in Metres				
	Eastings	Northings	Defended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	502355	101778	-	-	1.13	2.02	0.55
2	502499	101726	-	-	0.75	1.64	0.18
3	502334	101588	-	0.39	1.34	2.23	0.75
4	502533	101569	-	-	0.86	1.75	0.28
5	502294	101434	-	-	0.65	1.54	0.06
6	502474	101410	-	-	1.87	2.76	1.29
7	502636	101371	-	0.03	1.44	2.33	0.21

All levels taken from: River Arun to East Head (2D) model, completed in 2016 by JBA Consulting.

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Produced on 22/02/2017

Appendix D



LEGEND

BANKING **WALL**

BUSHES & HEDGES **BUILDING**

TREES **OPEN SIDED BUILDING**

GATES **GLASS ROOFED**

CONTOURS

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD HEIGHT	AHH	MARKER	MKR
ARCH HEAD LEVEL	AHL	MONITORING WELL	MW
ARCH SPRINGER HEIGHT	ASH	NOTICE BOARD	NB
ARCH SPRINGER LEVEL	ASL	NAME PLATE	NP
AIR VALVE	AV	OVERHEAD WIRES	OHW
BED LEVEL	BL	PARKING METER	PM
BELISHA BEACON	BB	RIDGE LEVEL	RL
BOLLARD	B	ROOF LEVEL	RL
BRITISH TELECOM BOX	BTB	ROAD SIGN	RS
BRITISH TELECOM MANHOLE	BTMH	RODDING EYE	RE
BRICKWORK	BKWK	RETAINING WALL	RTW
BUS STOP	BS	RAIN WATER PIPE	RWP
CABLE TV	CATV	SLUICE VALVE	SV
COVER LEVEL	CL	STOP COCK	SC
CABLE MARKER	CM	SOFFIT LEVEL	SOF
COLUMN	Col	STRUCTURAL SLAB LEVEL	SSL
CONCRETE POST	CP	TREE STUMP	ST
SAVES LEVEL	SAV	SOIL AND VENT PIPE	SVP
ELECTRICAL COVER	ELEC	THRESHOLD LEVEL	THL
ELECTRICITY CONTROL BOX	ECB	TELEGRAPH POLE	TP
ELECTRICITY POLE	EP	TELEPHONE CALL BOX	TCB
EARTH ROD	ER	TOP OF KERB	TK
FLOWER BED	FB	TURNSTILE	TS
FINISHED FLOOR LEVEL	FFL	TRAFFIC LIGHT	TL
FIRE HYDRANT	FH	TOP OF WALL	TW
FLOOR LEVEL	FL	UNABLE TO LIFT	UTL
FLAG STAFF	FS	UNABLE TO SURVEY	UTS
GAS PIPE	GP	VENT PIPE	VP
GAS VALVE	GV	WATER METER	WM
GULLY	G	WATER LEVEL	WL
GATE STOP	GS	WASH OUT	WO
INSPECTION COVER	IC	WASTE PIPE	WP
INVERT LEVEL	IL	WATER TANK	WT
LAMP POST	LP	WATER VALVE	WV

FENCES

BARBED WIRE FENCE	BWF	LARCH LAP FENCE	LLF
CORRUGATED IRON FENCE	CIF	METAL RAILING FENCE	MRF
CLOSE BOARD FENCE	CBF	POST AND CHAIN FENCE	PCF
CHAIN LINK FENCE	CLF	PICKET FENCE	PIF
CHESTNUT PALING FENCE	CPF	POST AND RAIL FENCE	PRF
FENCE POST	FPO	POST AND WIRE FENCE	PWF
INTERWOVEN FENCE	IWF	STEEL PALISADE SECURITY FENCE	SPSF
IRON RAILING FENCE	IRF	TUBULAR STEEL RAIL FENCE	TSRF

REV. NOTES

A

ISO 9001 REGISTERED

ISO 14001 REGISTERED

Notes:

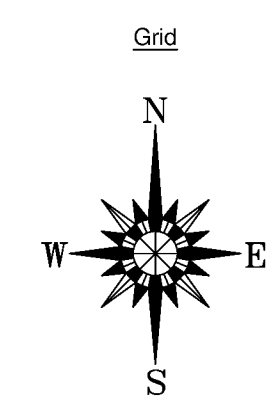
Grid and levels relate to OS GPS Active Network.
Sheet is North orientated unless stated.

Maltby Surveys Ltd

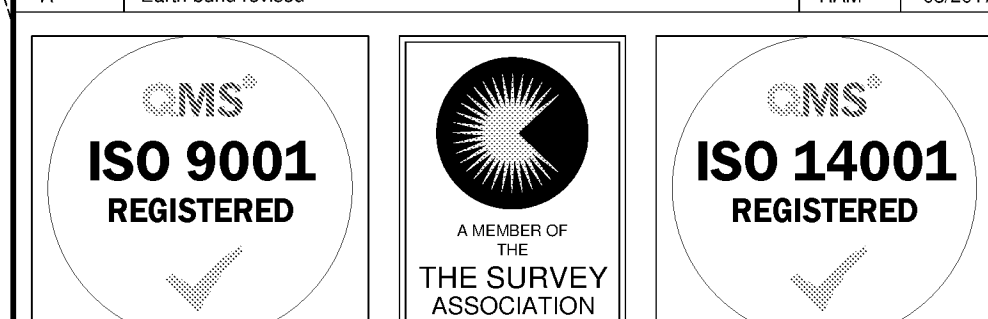
2 QUEENS ROAD
HAYWARDS HEATH
WEST SUSSEX
RH16 1EB
Tel: 01444 416246
Fax: 01444 417697
E-Mail: mls@maltbysurveys.com
WebSite: http://www.maltbysurveys.com

SURVEYED	OS	CLIENT
DRAWN	DAC	MATTHEWS GROUP
CHECKED	RM	SCALE
RICS		1/1000 (A1 Sheet)
LITTLEHAMPTON GOLF CLUB		
EXISTING GROUND LEVELS		
Job No	Rev	Drawing Number
LGC		LGC-100
Date :	FEB 2017	

Appendix E

[illegible]

REV.	NOTES	DWN	DATE
B A	Earth bund revised Earth bund revised	RAM RAM	04/2017 03/2017



Notes:

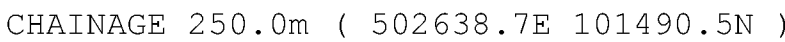
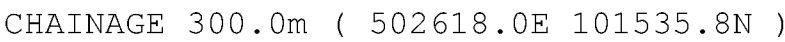
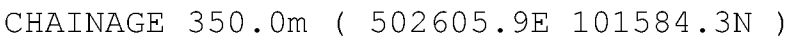
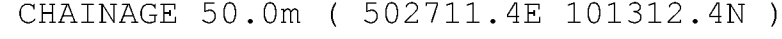
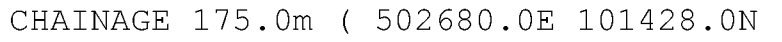
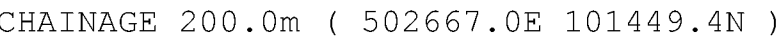
Grid and levels relate to OS GPS Active Network.
Sheet is North orientated unless stated.

Maltby Surveys Ltd

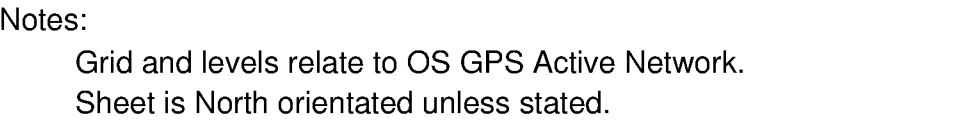
2 QUEENS ROAD
HAYWARDS HEATH
WEST SUSSEX
RH16 1EB
Tel: 01444 416246
Fax: 01444 417697
E-Mail: MLS@maltbysurveys.com
WebSite: <http://www.maltbysurveys.com>

SURVEYED	OS	MATTHEWS GROUP
DRAWN	DAC	
CHECKED	RM	
 RICS	SCALE	
	1/500 (A0 Sheet)	
LITTLEHAMPTON GOLF CLUB		
TOPOGRAPHICAL SURVEY		
Job No	Rev	Drawing Number
LGCB	B	LGCB-101
Date:	FEB 2017	

STATE OF TEXAS,
COUNTY OF DALLAS.



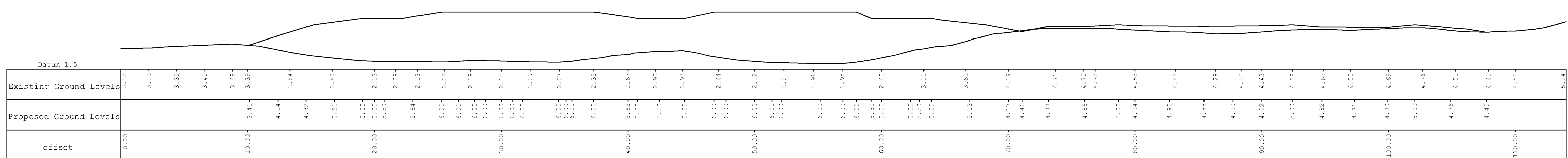
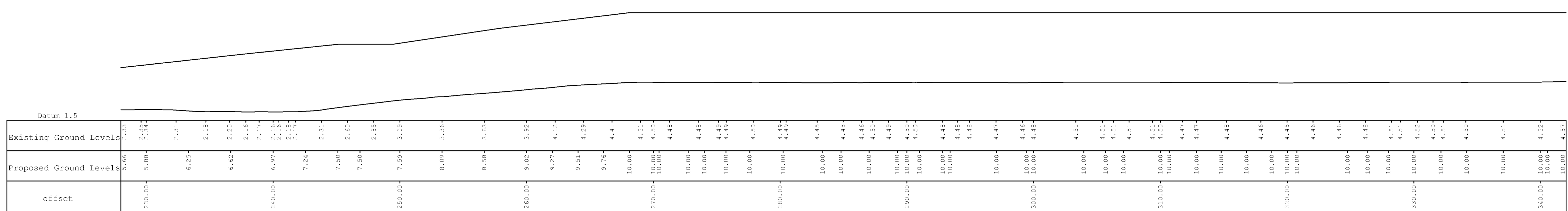
REV.	NOTES	DWN	DATE
A	Earth Bund Amended	RAM	04/2017



SURVEYED	OS	CLIENT
DRAWN	DAC	MATTHEWS GROUP
CHECKED	RM	
		SCALE
		1/200 (A1 Sheet)

PROPOSED EARTH BUND CROSS SECTIONS

Job No	Rev	Drawing Number
LGC	A	LGC-300
Date :	APR 2017	



ARUN DISTRICT COUNCIL LU/S20/17/PL