

TECHNICAL NOTE – OLDANDS FARM BE.126.19.PL

DRAINAGE PLANNING CONDITIONS

Project name Land at Phase 1A (LIDL Plot), Oldlands Farm
 Project no. 1620010196
 Client Lidl Great Britain Ltd.
 Version 01
 To Arun District Council
 From Ramboll UK Ltd
 Copy to -

Prepared by Cynthia Conger-Thompson
 Checked by Chris Leigh
 Approved by Mark Dewson

Date 25/06/2020

1620010196 – LAND AT PHASE 1A (LIDL PLOT), OLDLANDS FARM

This technical note has been prepared in response to the Arun District Council (ADC) planning conditions in order to address and discharge the drainage related items from the Local Planning Authority.

The corresponding planning conditions listed as item no. 6,7,8 & 12 on the planning permission letter with Application Ref: BE/126/19/PL dated 18 March 2020 for the site named above are recorded and addressed below with the drainage consultant's corresponding responses noted below.

For clarity, please also refer to the following Appendices enclosed within this statement.

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Appendix A - 1620003993-H-RP-1A-0500-201 – Drainage Strategy Report

Appendix B – Drainage Layout & Details

1620003993-RAM-0500-01A-DR-CR-20001 – Drainage Layout

1620003993-RAM-0500-01A-DR-CR-20002 – Drainage Catchment
 Layout

1620003993-RAM-0500-01A-D-CR-20101 – Attenuation Pond Detail
 WSCC Standard Construction Details

Appendix C – Copy of Application for Ordinary Watercourse Land Drainage
 Consent

Appendix D – Drainage and SUDs Operation & Maintenance Strategy

Appendix E – Groundwater monitoring results

Therefore, by providing this technical note and the attached documents, the drainage planning conditions imposed on the site will be closed out and should be considered appropriate for Local Authority / Building Control approval.

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Planning Conditions:

Condition 6

"Development shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDS Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual ground water levels. No building / No part of the extended building shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W SP1, W DM1, W DM2 and W DM3 of the Arun Local Plan. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works."

The latest drainage plan drawing. no. 1620003993-RAM-0500-01A-DR-CR-20001Rev. P04 shown in Appendix B, demonstrates that the overall surface water discharge from site is restricted to 3.7 l/s (greenfield run-off rate) which is the final outfall discharge rates at the headwall. The surface water flows are restricted prior to the headwall outfall from manhole SWMH9 via hydrobrake and include attenuation storage within the upstream network by means of a balancing pond.

The Proposed Site Drainage Strategy Report document ref: 3993-H-RP-1A-0500-201 dated 8 July 2019 (Appendix A) establishes sites drainage proposals, design criteria and demonstrates that the surface water drainage has been designed based on best practice design guidance including the Sewers for Adoption (SFA) 7th Ed., Building Regulations Part H Approved document and CIRIA 753 The SUDS Manual guidance.

Condition 7

"The development shall not proceed until details have been submitted to and approved in writing by the Local Planning Authority for any proposals: to discharge flows to watercourses; or for the culverting, diversion, infilling or obstruction of any watercourse on or adjacent to the site. Any discharge to a watercourse must be at a rate no greater than the pre-development run-off values. No construction is permitted, which will restrict current and future landowners from undertaking their riparian maintenance responsibilities in respect to any watercourse or culvert on or adjacent to the site.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W DM1, W DM2 and W DM3 of the Arun Local Plan. And to ensure that the duties and responsibilities, as required under the Land Drainage Act 1991, and amended by the Flood and Water Management Act 2010, can be fulfilled without additional impediment following the development completion. It is considered necessary for this to be a pre-commencement condition to protect existing watercourses prior to the construction commencing."

Please refer to the completed and signed Ordinary Watercourse Application form (dated June 2020) attached in Appendix C. The application has been submitted to Arun District Council Land Drainage Engineer for decision and approval.

Condition 8

"Development shall not commence until full details of the maintenance and management of the surface water drainage system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life. Upon completed construction of the surface water drainage system, the owner or management company shall strictly adhere to and implement the recommendations contained within the manual."

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W DM1, W DM2 and W DM3 of the Arun Local Plan. It is considered necessary for this to be a pre-commencement condition to ensure that the future maintenance and funding arrangements for the surface water disposal scheme are agreed before construction commences."

The network contains SUD's features such as the balancing ponds, hydrobrake chamber as well as traditional drainage that requires maintenance. The drainage network will require inspections of the pond, drainage channels/gullies, pipe runs, manholes and catch pits. It is likely that debris from fallen leaves or litter may enter and clog the drainage system if inspections and maintenance are not carried out. A detailed Drainage and SUDs Operation & Maintenance Plan for the site drainage has been provided and will be implemented by the site occupier (see Appendix D).

Condition 12

"Construction of the development shall not commence until details of the proposed means of foul water & sewerage disposal have been submitted to, and approved in writing by, the Local Planning Authority in consultation with Southern Water"

Reason: To prevent development from contributing to or being put at unacceptable risk from or being adversely affected by unacceptable levels of water pollution in accordance with the NPPF, and to prevent pollution of groundwater in accordance with Policy D DM1 of the Arun Local Plan."

Together with this Technical Note and the following documents appended, the concerns regarding the proposed means of foul water and sewerage disposal are addressed. Refer to the Drainage Strategy report in Appendix A and the Proposed Drainage Layout in Appendix B which illustrates and demonstrates the sites foul water design and discharge proposals. It is understood the existing pumping station to the southwest of the plot that serves the entire Oldlands Farm site has sufficient spare capacity for discharge to the public sewer.

Appendix A - 1620003993-H-RP-1A-0500-201 – Drainage Strategy Report

Intended for
Planning

Document type
Report

Date
08 July 2019

OLDLANDS FARM PHASE 1A, LIDL SITE, BOGNOR REGIS DRAINAGE STRATEGY

OLDLANDS FARM PHASE 1A, LIDL SITE, BOGNOR
REGIS
DRAINAGE STRATEGY

Revision PO1
Date 08/07/2019
Made by Brett White
Checked by Chris Leigh
Approved by Mark Dewson
Description Planning

Ref 3993-H-RP-1A-0500-201

Revision History

Rev	Date	Purpose/Status	Document Ref.	Comments
P01	08/07/19	PRELIMINARY	3993-H-RP-1A-0500-201	FOR COMMENT

Prepared by:



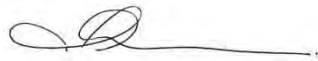
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APPENDICES

Appendix 1
Drainage Layout Plan

Appendix 2
Microdrainage Surface Water Simulatiuon Results

Appendix 3
Foul Water Flow Rate Calculations

1. INTRODUCTION

This drainage design strategy is to support the planning submission for the Oldlands Farm Phase 1A development. This report should not be relied upon exclusively for decision making purposes and should be read in conjunction with other Engineer's reports, specifications and drawings in addition to all other relevant reports, drawings and specifications.

The site is located to the south of the A259, Bognor Regis Relief Road north of Bognor Regis, West Sussex.

The site (Phase 1A) comprises a cut to fill earthworks plateau as a result of flood compensation works completed in a previous stage of works and has a drainage ditch running along the north eastern boundary. The commercial development of Phase 1A - LIDL Site will comprise of one unit with surrounding car parking and a service yard. The unit will measure 2,125 square metres gross surrounded by a carpark for 149 car spaces. The future occupier in this development will be LIDL.

Access to the site will be provided on the western boundary and a separate access specifically for the service yard will be provided on the eastern boundary. The total area for the commercial development (Phase 1A – LIDL Site) will be 1.074 hectares.

The plan below (Figure 1) shows the boundary for Phase 1A – LIDL Site in red, service yard nib in green, and an approximate location of the drainage ditch in blue.



Figure 1: Site Plan

The topography of the site consists of 0.5m to 1.1m of made ground underlain by river and marine deposits with a chalk base at depths between 2.7m and 15m below ground level. Monitoring data has indicated that the groundwater table is standing at approximately 0.5m AOD. This area has undergone land raising associated with the building of the industrial units adjacent. Previous ground water levels are known to have been between 1.2m AOD in the north of the site and up to 3m AOD to the south.

The north-eastern ditch indicated in Figure 1 will provide the new outfall for the development drainage networks. The outfall rate into the ditch will be controlled through an attenuation pond, and an hydrobrake system which will be provided adjacent to the ditch. The use of infiltration will not be permitted due to the high ground water table present.

The maximum discharge rate from impermeable areas of the site development shall be limited to 3.7l/s as calculated from the ICP SuDS mean annual flood flow rate equation.

2. DRAINAGE STRATEGY

The drainage scope of works includes the design of surface water drainage, below ground foul water drainage and the SuDS strategy and design.

2.1 General

The following information has been used in the preparation of the planning proposal:

- Architect drawing 1821-LE-101.3 by LDA Chartered Architects
- Flood Risk Assessment by MJA Consulting
- Ground Investigation Report by Hydrock

The following documents have been used in the drainage design analysis:

- Building Regulations - Part H
- BS EN 752: Drain and Sewer Systems outside buildings: hydraulic design and environmental considerations
- BS EN 12056-2:2000 Gravity drainage systems inside buildings
- CIRIA C753: The SuDs Manual

2.2 Proposed Surface Water Drainage Strategy

The commercial development area is to be self-contained from a surface water drainage standpoint with the exception of a single outlet into the existing Oldlands Farm ditch in the north east of the site. Source control will be used in the form of an attenuation pond and hydrobrake to manage the flow discharging to Oldlands Farm ditch so that the drainage system replicates the natural drainage regime as closely as possible, thus reducing the impact on receiving watercourses.

There will be two separate surface water drainage systems working independently for each unit within the development area. Each system will consist of gullies, linear drains and underground pipes that will direct flow towards the attenuation pond where it will combine.

2.2.1 Building Surface Water Strategy

Roof runoff will be collected by traditional guttering and downpipe systems before connecting to the subsurface piped networks which share its use with the car park drainage system.

For the building unit it is assumed that 50% of the roof runoff will be collected on the north-western side and the other 50% on south-eastern side.

2.2.2 Car Park Surface Water Strategy

The LIDL unit and associated car park will have a standalone drainage network from the eastern surrounding land, which will have future construction. Runoff from roads and parking areas will drain via gullies and linear channels that will link to their main storm systems. The individual system can be maintained with no conflict on future construction to the eastern part of the site.

2.2.3 Attenuation Pond

The attenuation pond has been designed as a dry landscape pond and will cater for all storm events up to and including for the 1 in 100 year + 40% climate change events in accordance with Environment Agency and West Sussex County Council requirements. The discharge from the attenuation pond will be restricted to a maximum discharge rate of 3.7l/s (QBar) to the Oldlands Farm Ditch. The pond will be sealed with an impermeable membrane to prevent site runoff infiltrating into made ground and creating stability issues.

The attenuation requirements for the site have been estimated using a hydraulic model developed using Microdrainage software. This is based on the following parameters:

- Total impermeable area: 1.074ha;
- A maximum discharge rate of 3.8 l/s;
- Return period of 100 years + 40% allowance for climate change
- Attenuation requirement of $\approx 825 \text{ m}^3$

2.3 Proposed Foul Water Drainage Strategy

It is proposed that the foul water discharge will drain via gravity through a piped network before discharging into the new foul drainage network running underneath the new private estate road along the site perimeter, which in turn will discharge into the existing pumping station under adopted with Southern Water.

The foul network drainage design is based on the total flow rate calculations as supplied in Appendix 3. There is assumed to be sufficient capacity within the existing pumping station to cater for the design flows required as per the wider Oldlands Farm site drainage strategy.

3. WATER QUALITY

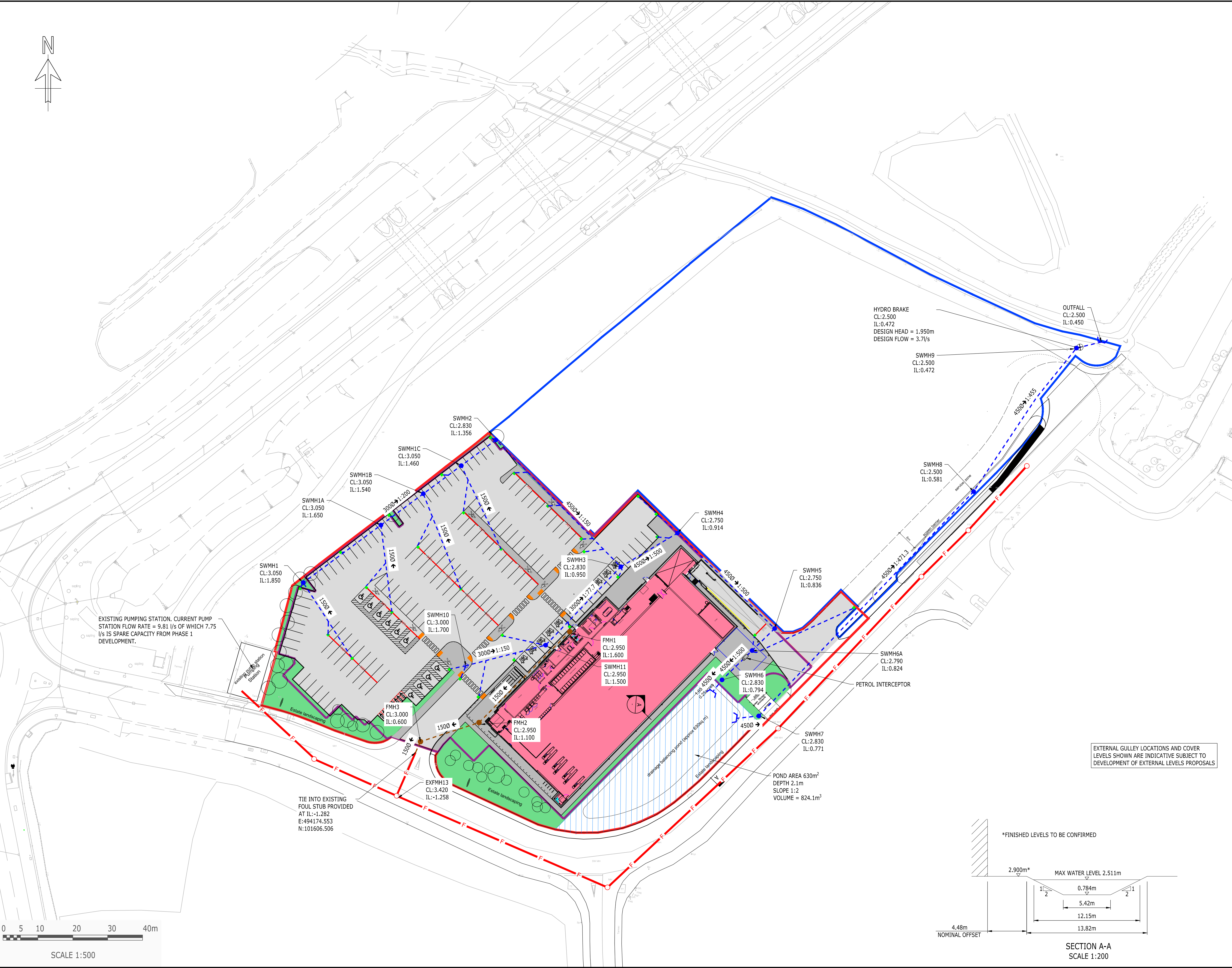
Fuel interceptors will be provided for each drainage network prior to discharging to the attenuation pond. The pond will also provide additional reduction of contaminants ensuring that the water is sufficiently clean before entering the Oldlands Farm ditch.

Gulley's and outfall manholes are to contain sumps to ensure capture of solids prior to outfall.

4. CONCLUSION

- The surface water network for the LIDL building, car park and service area is designed to convey and store surface water from the site for a 1 in 100-year storm plus a 40% allowance for climate change.
- An individual drainage network will be provided for the unit and its surrounding areas before out falling to the attenuation pond.
- This Greenfield runoff rate is limited to 3.8l/s and is maintained through the use of an attenuation pond and hydrobrake flow restriction system.
- The foul water network uses a gravity-based system connecting to the foul drainage network located within the private estate road and directed to the pumping station.
- Fuel separators will be used to treat against any contaminants picked up within surface water runoff from the car park areas.

APPENDIX 1 DRAINAGE LAYOUT PLAN



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- NOTES
- DO NOT SCALE FROM THIS DRAWING.
 - ALL DIMENSIONS ARE METRES UNLESS OTHERWISE STATED.
 - ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE STATED.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
 - RAIN WATER PIPE AND FOUL CONNECTIONS FROM BUILDING TO CONNECT TO NEAREST MANHOLE VIA INSPECTION CHAMBER. POSITIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE.
 - ALLOWANCE TO BE MADE FOR 8NO. INSPECTION CHAMBERS (4500 POLYPROPYLENE INSPECTION CHAMBER) FOR FOUL CONNECTIONS PER BUILDING AND ASSOCIATES UNDER SLAB PIPE WORK (CAST IRON)
 - ALL SURFACE WATER PIPES TO BE MADE FROM POLYPROPYLENE TWIN WALL PLASTIC.
 - ALL FOUL WATER PIPES TO BE MADE FROM VITRIFIED CLAY.
 - ALL MANHOLE COVERS WITHIN THE CARRIAGEWAY TO BE CLASS D400 TO BS EN 124 AND ALL OTHER COVERS TO BE 8125 LOAD RATING.

- — — — — SURFACE WATER DRAINAGE
— — — — — FOUL WATER DRAINAGE
● MANHOLE (SURFACE WATER)
● MANHOLE (FOUL WATER)
■ GULLY
— LDC LINEAR CONCRETE DISHED CHANNEL
— PETROL INTERCEPTOR
— HYDRO-BRAKE
— HEADWALL
— EXISTING FOUL WATER DRAINAGE

P03	PRELIMINARY	30/08	BW	MRO
P02	PRELIMINARY	02/07	BW	MRO
P01	PRELIMINARY	28/06	BW	MRO
Rev	Description	Date	By	App

PRELIMINARY

OLDLANDS FARM
BOGNOR REGIS

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PHASE 1A - LIDL SITE
DRAINAGE LAYOUT

Project No:	Scale (@A1):	Drawn:	Date:
1620003993	1:500	BW	JUN.19
Drawing No:	Rev:		
RAM-0500-01A-DR-CR-20001	P03		

APPENDIX 2

MICRODRAINAGE SURFACE WATER SIMULATION RESULTS

Summary of results

- Total impermeable area: 1.074ha;
- 3.8l/s allowable surface water discharge rate;
- Allowance of 40% climate change in accordance with current guidance.
- Return Period (Years) 1 in 100 + 40% CC
- Attenuation pond storage volume: 824m³
- No flooding for 1 in 1, 1 in 30 and 1 in 100 storm events

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240 Blackfriars Road London SE1 8NW		
Date 02/07/2019 11:24 File	Designed by BWHIT Checked by	
Micro Drainage		Source Control 2018.1
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.400 Area (ha) 1.074 Urban 0.000 SAAR (mm) 718 Region Number Region 7 Results l/s QBAR Rural 3.8 QBAR Urban 3.8 Q100 years 12.0 Q1 year 3.2 Q30 years 8.5 Q100 years 12.0		
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Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	1	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	19.000	Volumetric Runoff Coeff.	0.750
Ratio R	0.350	PIMP (%)	100
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200
		Maximum Backdrop Height (m)	1.500
		Min Design Depth for Optimisation (m)	0.900
		Min Vel for Auto Design only (m/s)	0.75
		Min Slope for Optimisation (1:X)	500

Designed with Level Soffits



Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	3.050	1.200	Open Manhole	1200	1.000	1.850	300				
2	2.830	1.474	Open Manhole	1350	1.001	1.356	450	1.000	1.506	300	
10	3.000	1.300	Open Manhole	1200	2.000	1.700	300				
11	2.950	1.450	Open Manhole	1200	2.001	1.500	300	2.000	1.525	300	25
3	2.830	1.880	Open Manhole	1500	1.002	0.950	450	1.001	0.975	450	25
								2.001	1.100	300	
4	2.750	1.836	Open Manhole	1500	1.003	0.914	450	1.002	0.914	450	
5	2.750	1.914	Open Manhole	1500	1.004	0.836	450	1.003	0.836	450	
6	2.830	2.036	Open Manhole	1500	1.005	0.794	450	1.004	0.794	450	
POND	2.900	2.116	Open Manhole	1500	1.006	0.784	450	1.005	0.784	450	
7	2.830	2.059	Open Manhole	1500	1.007	0.771	450	1.006	0.771	450	
8	2.500	1.919	Open Manhole	1500	1.008	0.581	450	1.007	0.581	450	
9	2.500	2.028	Open Manhole	1500	1.009	0.472	450	1.008	0.472	450	
Outfall	2.500	2.050	Open Manhole	0		OUTFALL		1.009	0.450	450	

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Micro Drainage	Network 2018.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	1	3.050	1.850	0.900	Open Manhole	1200
1.001	o	450	2	2.830	1.356	1.024	Open Manhole	1350
2.000	o	300	10	3.000	1.700	1.000	Open Manhole	1200
2.001	o	300	11	2.950	1.500	1.150	Open Manhole	1200
1.002	o	450	3	2.830	0.950	1.430	Open Manhole	1500
1.003	o	450	4	2.750	0.914	1.386	Open Manhole	1500
1.004	o	450	5	2.750	0.836	1.464	Open Manhole	1500
1.005	o	450	6	2.830	0.794	1.586	Open Manhole	1500
1.006	o	450	POND	2.900	0.784	1.666	Open Manhole	1500
1.007	o	450	7	2.830	0.771	1.609	Open Manhole	1500
1.008	o	450	8	2.500	0.581	1.469	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	68.802	200.0	2	2.830	1.506	1.024	Open Manhole	1350
1.001	57.114	150.0	3	2.830	0.975	1.405	Open Manhole	1500
2.000	26.224	150.0	11	2.950	1.525	1.125	Open Manhole	1200
2.001	31.099	77.7	3	2.830	1.100	1.430	Open Manhole	1500
1.002	18.127	500.0	4	2.750	0.914	1.386	Open Manhole	1500
1.003	39.039	500.0	5	2.750	0.836	1.464	Open Manhole	1500
1.004	21.068	500.0	6	2.830	0.794	1.586	Open Manhole	1500
1.005	9.624	1000.0	POND	2.900	0.784	1.666	Open Manhole	1500
1.006	12.875	1000.0	7	2.830	0.771	1.609	Open Manhole	1500
1.007	89.540	471.3	8	2.500	0.581	1.469	Open Manhole	1500
1.008	49.597	455.0	9	2.500	0.472	1.578	Open Manhole	1500

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Micro Drainage	Network 2018.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	o	450	9	2.500	0.472	1.578	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	7.201	327.3	Outfall	2.500	0.450	1.600	Open Manhole	0

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Online Controls for Storm

Orifice Manhole: 7, DS/PN: 1.007, Volume (m³): 5.4

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 0.771

Hydro-Brake® Optimum Manhole: 9, DS/PN: 1.009, Volume (m³): 11.2

Unit Reference MD-SHE-0079-3700-1950-3700	Sump Available	Yes
Design Head (m) 1.950	Diameter (mm)	79
Design Flow (l/s) 3.7	Invert Level (m)	0.472
Flush-Flo™	Calculated Minimum Outlet Pipe Diameter (mm)	100
Objective Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface	

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.950	3.7	Kick-Flo®	0.702	2.3
Flush-Flo™	0.343	2.9	Mean Flow over Head Range	-	2.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.3	0.600	2.7	1.600	3.4	2.600	4.2	5.000	5.7	7.500	7.0
0.200	2.7	0.800	2.5	1.800	3.6	3.000	4.5	5.500	6.0	8.000	7.2
0.300	2.9	1.000	2.7	2.000	3.7	3.500	4.9	6.000	6.3	8.500	7.4
0.400	2.9	1.200	3.0	2.200	3.9	4.000	5.2	6.500	6.5	9.000	7.6
0.500	2.8	1.400	3.2	2.400	4.1	4.500	5.5	7.000	6.7	9.500	7.8

Storage Structures for Storm Tank or Pond Manhole: POND, DS/PN: 1.006 Invert Level (m) 0.784 <table> <tr> <th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr> <tr> <td>0.000</td><td>184.0</td><td>1.050</td><td>389.0</td><td>2.100</td><td>630.0</td></tr> </table>						Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	0.000	184.0	1.050	389.0	2.100	630.0
Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)												
0.000	184.0	1.050	389.0	2.100	630.0												
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Ramboll UK Ltd		Page 7
240 Blackfriars Road London SE1 8NW		
Date 02/07/2019 13:59 File OLDLANDS FARM - PHASE 1A - LIDL SITE.MDX	Designed by BWHIT Checked by CLEIGH	
Micro Drainage	Network 2018.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	15 Winter	100	+40%	30/15 Winter				2.751	0.601	0.000	0.35		26.4	FLOOD RISK	
1.001	2	15 Winter	100	+40%	30/15 Summer				2.677	0.871	0.000	0.55		132.9	FLOOD RISK	
2.000	10	15 Winter	100	+40%	30/15 Summer				2.702	0.702	0.000	0.18		14.2	FLOOD RISK	
2.001	11	15 Winter	100	+40%	30/15 Summer				2.688	0.888	0.000	0.59		67.3	FLOOD RISK	
1.002	3	15 Winter	100	+40%	30/15 Summer				2.550	1.150	0.000	2.87		279.2	FLOOD RISK	
1.003	4	1440 Winter	100	+40%	30/15 Summer				2.514	1.150	0.000	0.15		19.2	FLOOD RISK	
1.004	5	1440 Winter	100	+40%	30/15 Summer				2.513	1.227	0.000	0.18		19.0	FLOOD RISK	
1.005	6	1440 Winter	100	+40%	30/15 Summer				2.511	1.268	0.000	0.31		24.7	SURCHARGED	
1.006	POND	1440 Winter	100	+40%	30/15 Summer				2.511	1.277	0.000	0.09		5.5	SURCHARGED	
1.007	7	960 Winter	100	+40%	30/15 Summer				2.537	1.316	0.000	0.03		4.6	FLOOD RISK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm																
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	8	1440 Winter	100	+40%	1/240 Winter				2.389	1.358	0.000	0.03		3.7	FLOOD RISK	
1.009	9	1440 Winter	100	+40%	1/120 Summer				2.387	1.465	0.000	0.03		3.6	FLOOD RISK	

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APPENDIX 3

FOUL WATER FLOW RATE CALCULATION

LIDL

2007 PLANNING APPLICATION ESTIMATED FOUL FLOWS

Application Form		Suggested dry weather flow rates			No	DWF	(6 DWF + 10 %) (PEAK)	Cut off - 0.93
		Litres per day				L/S	L/S	
A1	Shops	1	General Housing	800	per property	0.000	0.00	L/S
A2	Financial and professional services	2	School	80	per pupil	0.000	0.00	0.00
A3	Restaurants and cafes	3	Assembly Hall	10	per seat	0.000	0.00	(SfA 7 estimation for comparison)
A4	Drinking Establishments	4	Cinema	10	per seat	0.000	0.00	
A5	Hot food takeaways	5	Theatre	10	per seat	0.000	0.00	
B1(a)	Office (other than A2)	6	Sports Hall	80	per person	0.000	0.00	
B1(b)	Research and Development	7	Hotel	550	per room	0.000	0.00	
B1(c)	Light industrial	8	Guest House	200	per room	0.000	0.00	
B2	General industrial	9	Motel	300	per room	0.000	0.00	
B8	Storage or distribution	10	Holiday apartments	150	per person	0.000	0.00	
C1	Hotels and halls of residence	11	Leisure park	220	per person	0.000	0.00	
C2	Residential institutions	12	Caravan park standard	250	per space	0.000	0.00	
D1	Non-residential institutions	13	Caravan park serviced	450	per space	0.000	0.00	
D2	Assembly and Leisure	14	Camping Site standard	200	per space	0.000	0.00	
Other		15	Camping Site serviced	350	per space	0.000	0.00	
	Nursing Care Homes	16	Public house	150	per seat	0.000	0.00	
		17	Restaurant	270	per seat	0.000	0.00	
		18	Drive in restaurant	380	per seat	0.000	0.00	
		19	Hospital	750	per bed	0.000	0.00	Total Foul
		20	Nursing Home	375	per bed	0.000	0.00	0.60
		21	Offices	750	per 100 m ²	0.000	0.00	FOUL
		22	Shopping centre	400	per 100 m ²	2125	0.098	
		23	Warehouse	150	per 100 m ²	0.000	0.00	
		24	Commercial premises	300	per 100 m ²	0.000	0.00	
		25	Manufacturing unit	550	per 100 m ²	0.000	0.00	

ESTIMATIONS USED:

3sq mtrs = 1 seat in restaurant/bar
10sq mtrs = 1 hotel room

Appendix B – Drainage Layout & Details

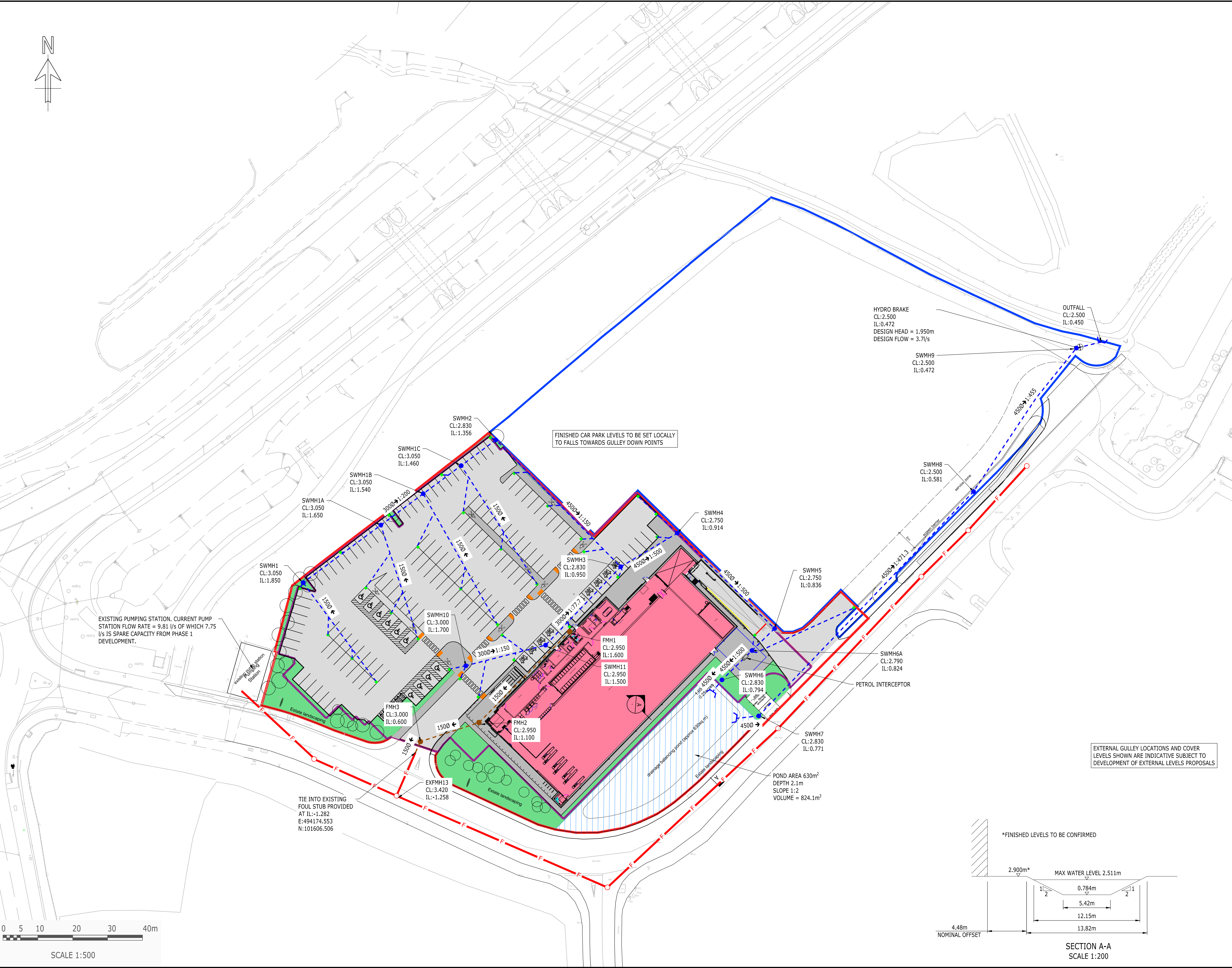
1620003993-RAM-0500-01A-DR-CR-20001 – Drainage Layout

1620003993-RAM-0500-01A-DR-CR-20002 – Drainage Catchment

Layout

1620003993-RAM-0500-01A-D-CR-20101 – Attenuation Pond Detail

WSCC Standard Construction Details



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 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
 - RAIN WATER PIPE AND FOUL CONNECTIONS FROM BUILDING TO CONNECT TO NEAREST MANHOLE VIA INSPECTION CHAMBER. POSITIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE.
 - ALLOWANCE TO BE MADE FOR 8NO. INSPECTION CHAMBERS (4500 POLYPROPYLENE INSPECTION CHAMBER) FOR FOUL CONNECTIONS PER BUILDING AND ASSOCIATES UNDER SLAB PIPE WORK (CAST IRON)
 - ALL SURFACE WATER PIPES TO BE MADE FROM POLYPROPYLENE TWIN WALL PLASTIC.
 - ALL FOUL WATER PIPES TO BE MADE FROM VITRIFIED CLAY.
 - ALL MANHOLE COVERS WITHIN THE CARRIAGEWAY TO BE CLASS D400 TO BS EN 124 AND ALL OTHER COVERS TO BE B125 LOAD RATING.

Legend:

- SURFACE WATER DRAINAGE
- FOUL WATER DRAINAGE
- MANHOLE (SURFACE WATER)
- MANHOLE (FOUL WATER)
- GULLY
- LDC
- PETROL INTERCEPTOR
- ⊕ HYDRO-BRAKE
- HEADWALL
- EXISTING FOUL WATER DRAINAGE

P04	PRELIMINARY	09/09 2019	CL	MRD
P03	PRELIMINARY	30/08 2019	BW	MRD
P02	PRELIMINARY	02/07 2019	BW	MRD
P01	PRELIMINARY	28/06 2019	BW	MRD
Rev	Description	Date	By	App

PRELIMINARY

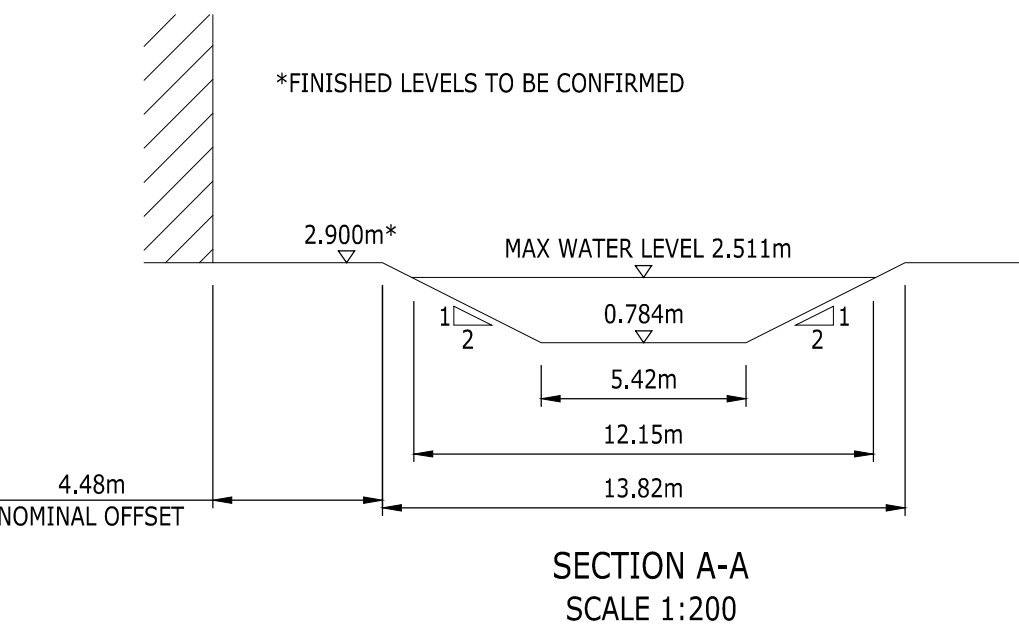
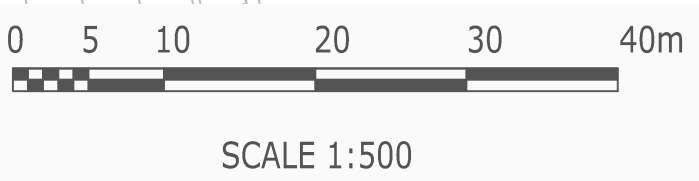
OLDLANDS FARM
BOGNOR REGIS

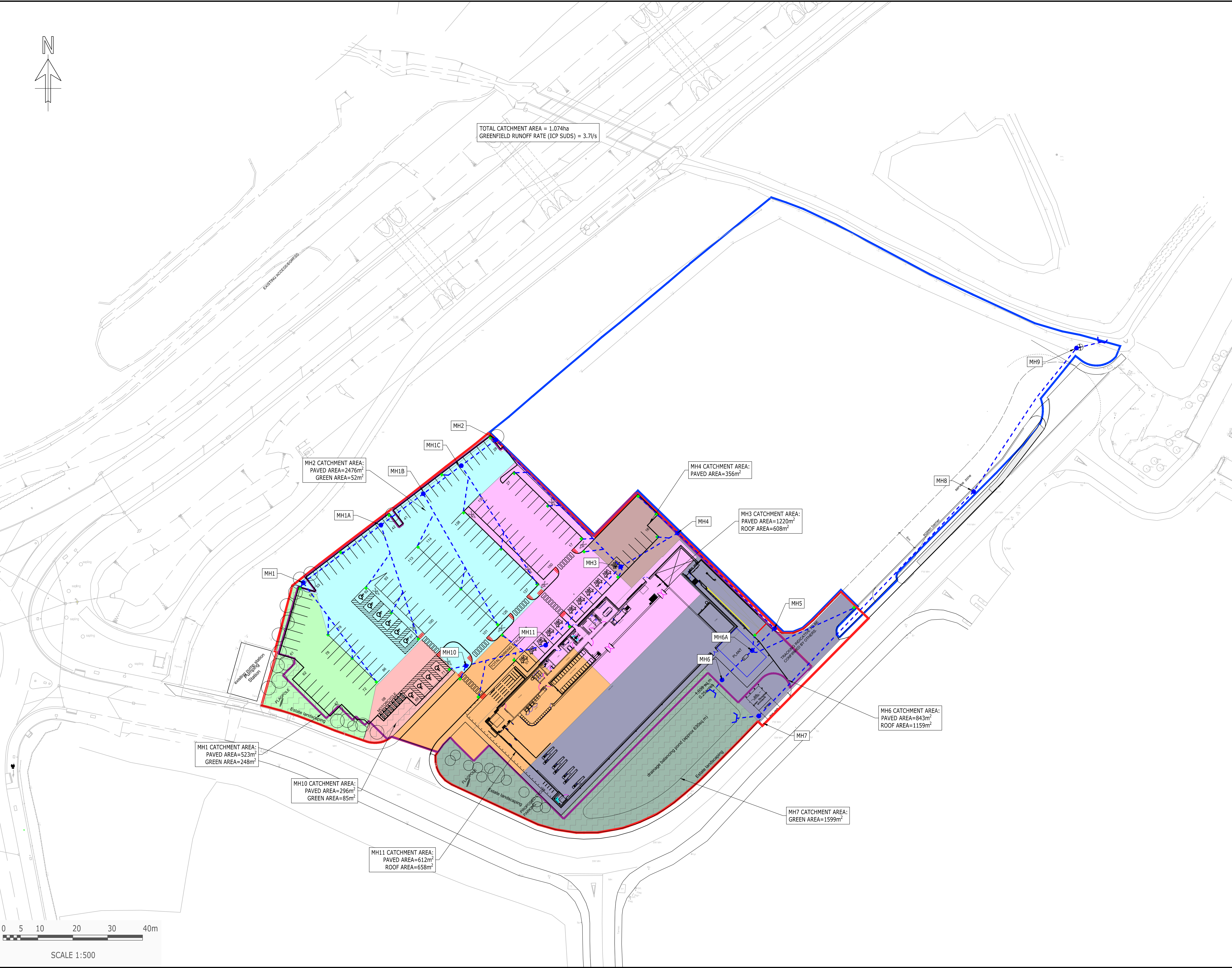
RAMBOLL

tel 023 8081 7500 fax 023 8081 7600 southampton@ramboll.co.uk
www.ramboll.co.uk

PHASE 1A - LIDL SITE
DRAINAGE LAYOUT

Project No:	Scale (@A1):	Drawn:	Date:
1620003993	1:500	BW	JUN.19
Drawing No:	Rev:		
RAM-0500-01A-DR-CR-20001	P04		





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 - REFER TO DRAINAGE LAYOUT DRAWING: RAM-0500-01A-DR-CR-00001
 - PAVED AND ROOF AREAS ASSUMED TO BE 100% IMPERMEABLE AND GREEN AREAS ASSUMED TO BE 30% IMPERMEABLE.

GREEN AREA (30% CATCHMENT)

MH1 CATCHMENT AREA

MH2 CATCHMENT AREA

MH3 CATCHMENT AREA

MH4 CATCHMENT AREA

MH6 CATCHMENT AREA

MH7 CATCHMENT AREA

MH11 CATCHMENT AREA

MH12 CATCHMENT AREA

P04	PRELIMINARY	09/09 2019	CL	MRO
P03	PRELIMINARY	30/08 2019	BW	MRO
P02	PRELIMINARY	02/07 2019	BW	MRO
P01	PRELIMINARY	28/06 2019	BW	MRO
Rev	Description	Date	By Chk	App

PRELIMINARY

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PHASE 1A - LIDL SITE

DRAINAGE CATCHMENT LAYOUT

Project No: 1620003993	Scale (øA1): 1:500	Drawn: BW	Date: JUN.19
Drawing No: RAM-0500-01A-DR-CR-20002	Rev: P04		

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- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

KEY:

- LIDL SITE BOUNDARY
- SERVICE YARD NIB
- SURFACE WATER DRAINAGE
- FOUL WATER DRAINAGE
- MANHOLE (SURFACE WATER)
- MANHOLE (FOUL WATER)
- GULLY
- LINEAR CONCRETE DISHED CHANNEL
- PETROL INTERCEPTOR
- HYDRO-BRAKE
- HEADWALL
- EXISTING FOUL WATER DRAINAGE

P04	PRELIMINARY	30/08/2019	CL	MRO
P03	PRELIMINARY	11/07/2019	CL	MRO
P02	PRELIMINARY	02/07/2019	BW	MRO
P01	PRELIMINARY	28/06/2019	BW	MRO
Rev	Description	Date	By	App

PRELIMINARY

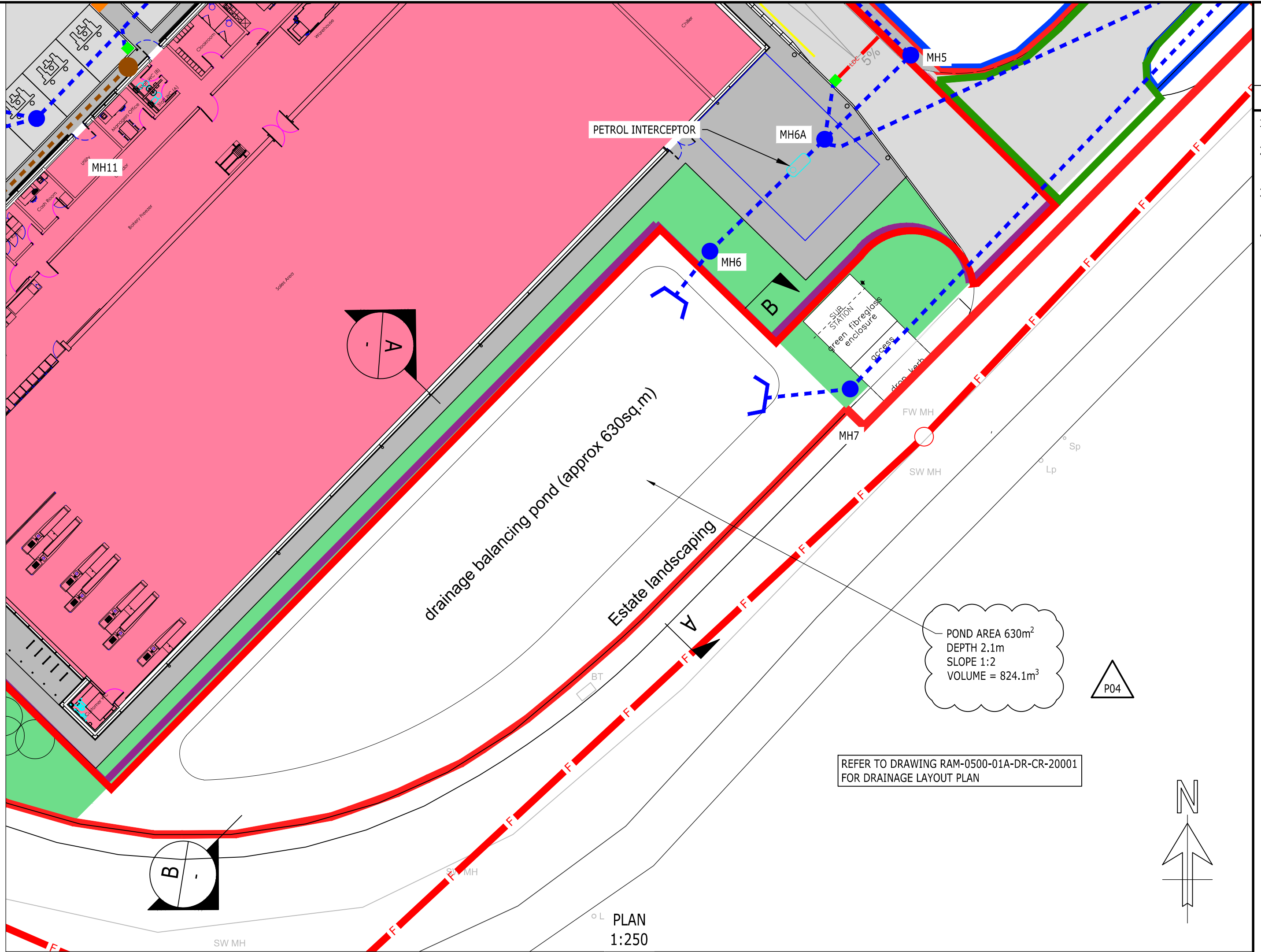
OLDLANDS FARM
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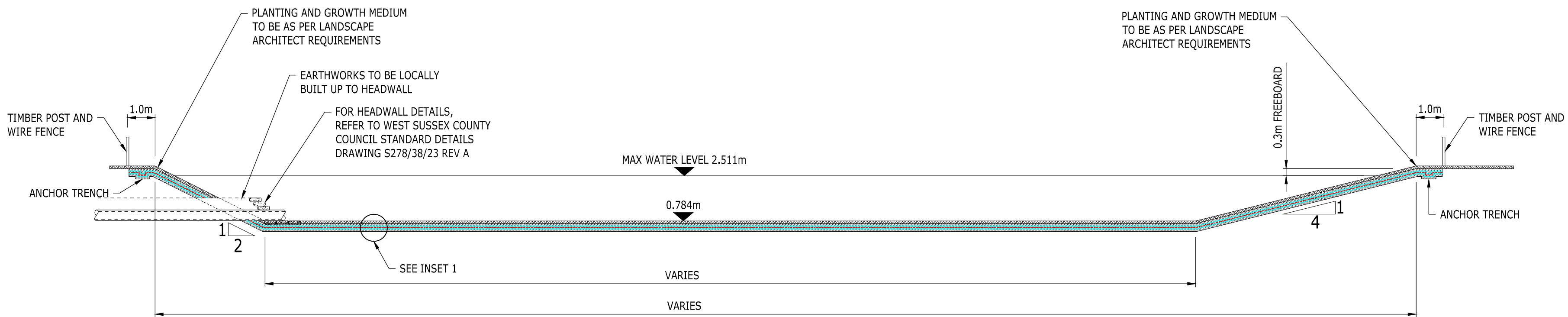
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PHASE 1A - LIDL SITE
ATTENUATION POND DETAIL

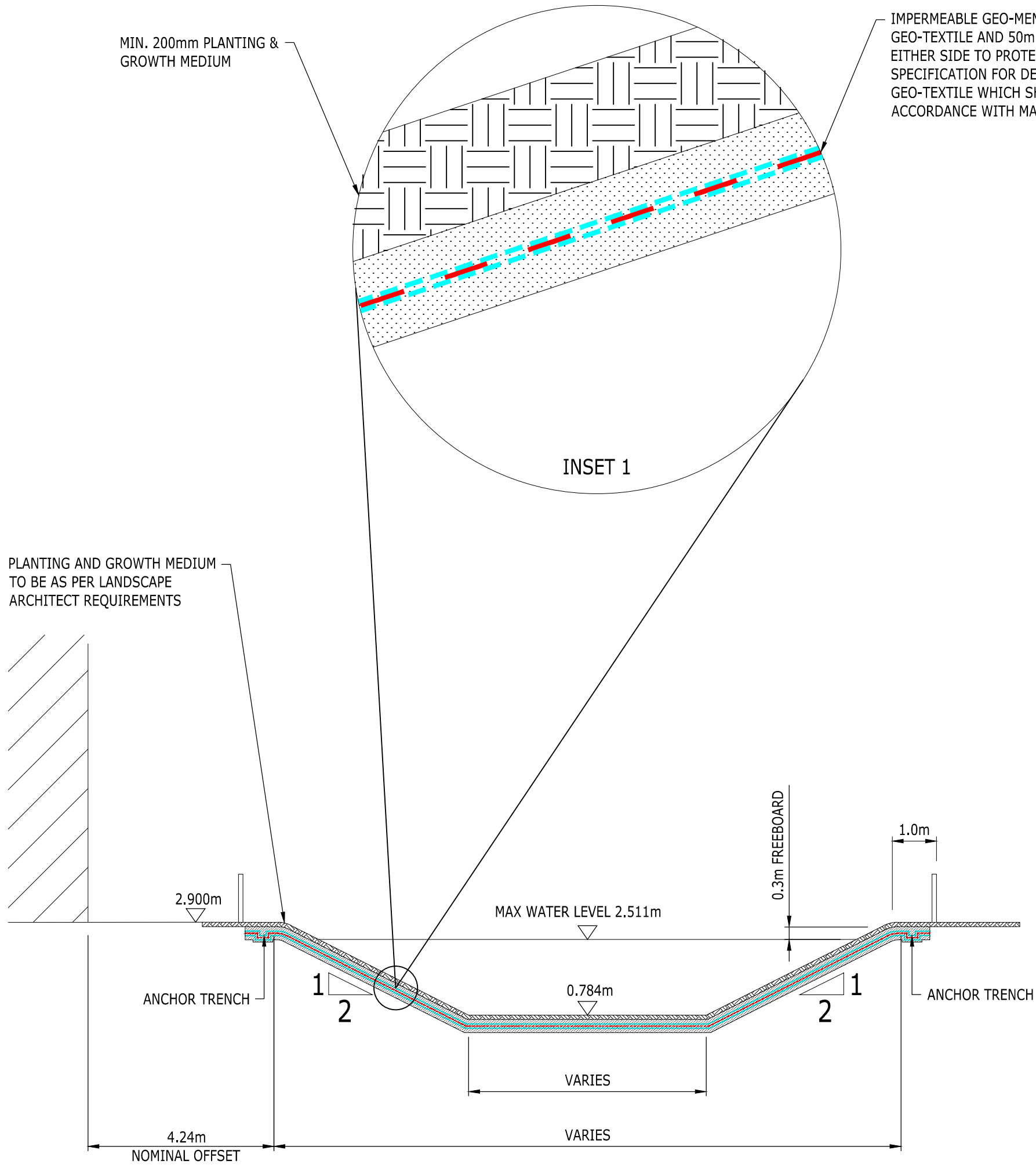
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1620003993	AS SHOWN	BW	JUN.19
Drawing No:	Rev:		
RAM-0500-01A-D-CR-20101	P04		



SECTION B-B
SCALE 1:125



SECTION A-A
SCALE 1:100



WSCC would be pleased to make full CAD versions of these drawings available to other highway authorities who may wish to use them. - Please contact: planning.services@westsussex.gov.uk

DRAWING INDEX					
No:	Title	Rev:	Creation Date:	Revision Comment:	Date Modified:
S278/38/01	Alternative Methods of Laying Kerbs	C	31.05.2012	Carriageway reinstatement requirements added	25.04.2017
S278/38/02	Approved Kerb Type Selection Sheet 1	B	31.05.2012	Drain kerb added	25.04.2017
S278/38/03	Approved Kerb Type Selection Sheet 2	A	31.05.2012	Corrected ref to CS1	28.02.2013
S278/38/04	Footway/Cycleway Type 1 & 2	B	31.05.2012	Tactile paving types added	09.09.2013
S278/38/05	Footway/Cycleway Type 3 & 4	C	31.05.2012	Footway Width increased to 2m	13.05.2014
S278/38/06	Public Footpath (Rural) Type 5	A	31.05.2012	Notes amended	13.05.2014
S278/38/07	Footway Crossover Type 1 - Residential	C	31.05.2012	Note at * added	13.05.2014
S278/38/08	Footway Crossover Type 2 - Industrial	C	31.05.2012	Note at * added	13.05.2014
S278/38/09	Service Margins	B	31.05.2012	EF edging omitted for verges abutting walls	09.09.2013
S278/38/10	Preferred Arrangement of Services with Public Highway	A	31.05.2012	Notes amended	28.02.2013
S278/38/11	Drainage - Gully A Pre-cast Concrete	D	31.05.2012	General Update	15.03.2019
S278/38/12	Drainage - Pre-cast Concrete Ring Soakaway	E	31.05.2012	General Update	15.03.2019
S278/38/13	Drainage - Type B Catchpit	E	31.05.2012	Minimum pipe diameters added	15.03.2019
S278/38/14	Drainage - Type B Vortex Flow Control	C	31.05.2012	General Update	15.03.2019
S278/38/15	Street Furniture - Rumble Strips	C	31.05.2012	Block paving to be butt jointed	25.04.2017
S278/38/16	Street Furniture - Ramp Feature	D	31.05.2012	Notes 16 added. Ramp height now 65mm	14.12.2015
S278/38/17	Street Furniture - Bollards	B	31.05.2012	Notes amended	13.05.2014
S278/38/18	Street Furniture - Tactile Crossings	A	31.05.2012	Notes amended	28.02.2013
S278/38/19	Street Furniture - Refuge Islands	D	31.05.2012	'TVL requirements' changed to 'WSCC standards'. Bollard offset and tactile dims added	14.12.2015
S278/38/20	Carriageway - Tie-in Options	B	31.05.2012	IAN 154/12 extract amended	28.02.2013
S278/38/21	Carriageway - Flexible Specification	F	31.05.2012	HRA spec added, CBR notes amended, road type thresholds added, preference for herringbone block paviour pattern.	12.04.2019
16..05.2016	Chute Gully	-	28.02.2013	Initial Issue	28.02.2013
S278/38/23	Headwall Detail - Concrete Bagwork up to 600 diam	A	25.09.2013	Exposed pipes to be UV stable	25.04.2017
S278/38/24	Headwall Detail - Engineering Brickwork up to 600 diam	A	25.09.2013	Exposed pipes to be UV stable	25.04.2017
S278/38/25	Highway Ditch detail	A	14.12.2015	Exposed pipes to be UV stable	25.04.2017
S278/38/26	Highway Swale Detail	A	14.12.2015	Exposed pipes to be UV stable	25.04.2017
S278/38/27	Highway Swale - Check dam detail	-	14.12.2015	Initial Issue	14.12.2015
S278/38/28	Trench Soakaway	A	07.11.2017	General Update	15.03.2019
S278/38/29	Filter Drain Collector	A	07.11.2017	General Update	15.03.2019
S278/38/30	Permeable Carriageway Sht 1	A	07.11.2017	General Update	15.03.2019
S278/38/31	Permeable Carriageway Sht 2	A	07.11.2017	General Update	15.03.2019
S278/38/32	Simple Headwall	A	07.11.2017	General Update	15.03.2019
S278/38/33	Pipe Bedding	A	07.11.2017	General Update	15.03.2019
S278/38/34	Cellular Storage Sht 1	A	07.11.2017	General Update	15.03.2019
S278/38/35	Cellular Storage Sht 2	A	07.11.2017	General Update	15.03.2019
S278/38/36	Pipe Junctions - Lateral Connections	A	07.11.2017	General Update	15.03.2019

H	All changes dates April 2019	MJA	MJA	12.04.19	West Sussex County Council Infrastructure Group County Hall, West Street Chichester West Sussex PO19 1RH (01243) 642105  west sussex county council	Project Name		Section 278/38 Highway Agreement Standard Details	
G	All changes dates March 2019	MJA	MJA	15.03.19		Drawing Title Drawing Index Sheet			
F	All changes dates April 2017	DJL	DJL	25.04.17					
Rev	Revision details	Chkd	Appd	Date					
Drawn: MJA			For comment		Original Drawing Size : A3 Scale : N/A Dimensions : Drawing No. S278/38/00 Rev H				
Chkd:			For tender						
Appd:			For construction						
Date: 28.02.2013			As constructed						
File ref:									
IWP Ref:									