PRICE & MYERS

Haberdashers' Aske's Boys' School: New Pre-Preparatory School

Planning Condition Report

Prepared by: **Billie Bonham BEng**
Reviewed by: **Kirsty Burwood MEng CEng MICE**

Job Number: **28833**

Date	Revision	Notes/Amendments/Issue Purpose
August, 2021	1	To discharge planning conditions 13 and 14
August, 2021	2	To discharge planning conditions 13 and 14

Introduction

This statement has been compiled to discharge the drainage planning condition for the proposed development of a new Pre-Preparatory school for boys, associate hardstanding and formalising the Butterfly Lane car park extension, ref: 20/1200/LBC. This report should be read in conjunction with the drainage layout drawing which has been appended to the rear of this document.

Planning Conditions

Condition 13

The development permitted by this planning permission shall be carried out in accordance with the approved surface water drainage assessment carried out by Price & Myers Consulting Engineers job number 28833 Revision 4, dated November 2020 and the LLFA Comments Response revision 1 dated November 2020, and the following mitigation measures:

1. *Limiting the surface water run-off generated by the critical storm events so that it will not exceed the surface water run-off rate of 6 l/s during the 1 in 100 year event plus 40% of climate change event.*
2. *Providing storage to ensure no increase in surface water run-off volumes for all rainfall events up to and including the 1 in 100 year + climate change event providing a minimum of 595 m^3 (or such storage volume agreed with the LLFA) of storage volume in permeable paving.*
3. *Discharge of surface water from the private network to the ditch north of the site via existing culvert under Butterfly Lane.*

The mitigation measures shall be fully implemented prior to occupation and subsequently in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Condition 14

No development shall take place until a detailed surface water drainage scheme for the site based on the approved drainage strategy and sustainable drainage principles, has been submitted to and approved in writing by the local planning authority. The drainage strategy should demonstrate the surface water run-off generated up to and including 1 in 100 year + climate change critical storm will not exceed the run-off from the undeveloped site following the corresponding rainfall event. The scheme shall subsequently be implemented in accordance with the approved details before the development is completed.

1. *Full condition survey of the piped section of the outfall and full details of any required remediation activities.*
2. *Detailed engineered drawings of the proposed SuDS features including cross section drawings, their size, volume, depth and any inlet and outlet features including any connecting pipe runs.*
3. *Full post-development network calculations for all storm events up to and including the 1 in 100 year + 40% climate change event. Also to include half drain down times for all attenuation features.*
4. *Final detailed management plan to include arrangements for adoption and any other arrangements to secure the operation of the scheme throughout its lifetime.*

Surface Water Run-off

The original Flood Risk Assessment and SuDS Strategy set out the proposed discharge rates from the development, referenced in Table 1.

Storm Event	Existing Run-off (0.903ha hardstanding) (l/sec)	Greenfield Run-off Rates (0.968 hardstanding) (l/sec)	Proposed Flow Rate for Pre-Prep, Associated Hardstanding and car park (0.968ha hardstanding) (l/sec)	Percentage Reduction
Qbar	-	5.91	6.0	-
1 in 1 year	83.39	5.02	6.0	93%
1 in 30 year	204.82	13.59	6.0	97%
1 in 100 year	266.45	18.85	6.0	98%

Table 1: Existing and Proposed Discharge Rates

The proposed site works are split into two different areas. The discharge rate from Butterfly Lane car park is proposed to be restricted to 2 l/sec by a Hydrobrake flow control. The Pre-Preparatory school and surrounding hardstanding is proposed to be restricted to 4 l/sec via a pumping chamber due to connection levels. The total proposed surface water run-off from the development will equate to 6 l/sec.

Surface Water Attenuation Volume

Permeable paving and green roofs are proposed in the development. The green roofs cannot be included in the attenuation calculations due to the sloping nature of the proposed roof. The surface water is proposed to be attenuated in the permeable paving subbase. The surface water drainage is divided into two separate networks.

Butterfly Lane Car Park

The car park is to be attenuated within the Cellweb subbase (full extent of Cellweb TBC). The required depth of subbase to provide sufficient storage is 225mm deep.

Attenuation provided = A x 30% x d

where, A = area of car park

30% = void ratio of granular subbase

d = depth of subbase

Attenuation provided = 1602m^2 x 30% x 0.225m = 108m^3

Pre-Preparatory School and Associated Hardstanding

The school building and associated hardstanding is proposed to be attenuated within the permeable paving build up in the granular subbase. The required depth of subbase to provide sufficient storage is 430mm deep in all areas apart from the Sports England tracks which have 300mm deep subbase.

Attenuation provided = A x 30% x d

where, A = area of permeable paving

30% = void ratio of granular subbase

d = depth of subbase

Attenuation provided (Sports England facilities) = 1505m^2 x 30% x 0.430m = 194m^3

Attenuation provided (remaining areas) = 4508m^2 x 30% x 0.300m = 405m^3

Total Attenuation Provided:
108m^3 (car park) + 194m^3 (Sports England facilities) + 405m^3 (remaining area) = **707m^3 (total)**

Discharge Route and CCTV Survey

The car park and Pre-Prep surface water discharges at restricted rates into the existing pond network. This ultimately discharges into the surface water culvert underneath Butterfly Lane and into the ditch in Aldenham Estate's land.

A full CCTV survey of the culvert and outfall was carried out and a remedial works schedule was produced by the surveyor. The suggested remedial works will be carried out to ensure outfall is working at its full capacity. Details have been appended to the report.

SuDS Detailed Drawings

The previously proposed swale has been omitted due to its depth and impact on the existing tree root protection zones. Due to the depth, the swale would have to be at least 9m wide to meet the 1 in 3 side slopes requirement and this would damage the existing tree roots, therefore a piped connection to the existing swale has been proposed instead.

The outfall into the existing swale will be via a brick headwall to match the existing headwalls into the ponds.

Drainage strategy drawings and details can be found appended to this report.

Surface Water Calculations

Full calculations for the car park and Pre-Prep drainage networks have been carried out in Microdrainage and have been attached. The modelling shows that there is no flooding for the 1 in 30 year storm event and only small amounts (totalling 0.88m^3) for the 1 in 100 year storm event. There is flooding for the 1 in 100 year + 40% climate change allowance storm event which will follow the exceedance route paths in the attached plan.

The half drain time is not easily modelled in Microdrainage for attenuation features so a calculation has been done below to provide a half drain time for the overall attenuation volume:

Volume of permeable paving attenuation = 707m^3
Half of volume of permeable paving attenuation = 353.5m^3
Total discharge rate = 6l/s

Therefore, half drain time of permeable paving = (353.5 x 1000) / 6 = 58917 secs = 16hrs 22mins

The drain down time is less than 24 hours, therefore, the half drain time is deemed acceptable.

SuDS Maintenance Strategy

The successful implementation and operation of a SuDS system depends on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan. The SuDS will be maintained by the school's existing maintenance team and will form part of the overall maintenance regime for the site.

SuDS Element	Maintenance		
	Activity	**Required Action**	**Typical Frequency**
Green Roofs	**Monitoring / Inspections**	Inspect all components including soil substrate, vegetation, drains, irrigation systems, membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
		Inspect soil substrate for evidence of erosion channels and identify any sediment sources	
		Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	
		Inspect underside of roof for evidence of leakage	
	Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Half yearly and annually or as required
		During establishment i.e. year one, replace dead plants as required	Monthly -but usually responsibility of manufacturer
		Post establishment, replace dead plants where > 5% of coverage	Annually in autumn
		Remove fallen leaves and debris from deciduous plant foliage	Half yearly or as required
		Remove nuisance and invasive vegetation, including weeds	
		Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	
	Remedial Actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
		If drain inlet has settled, cracked or moved, investigate and repair as appropriate	

SuDS Element	Maintenance		
	Activity	**Required Action**	**Typical Frequency**
Permeable Paving	**Monitoring / Inspections**	Initial inspection	Monthly for three months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 hours after large storms in first six months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	Annually
	Regular Maintenance	Brushing and vacuuming -standard cosmetic sweep over whole surface	Once a year after autumn leaf fall
		Rubbish and litter removal	As required
	Remedial Actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
		Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required

Table 2: SuDS Maintenance Strategy

Attachments

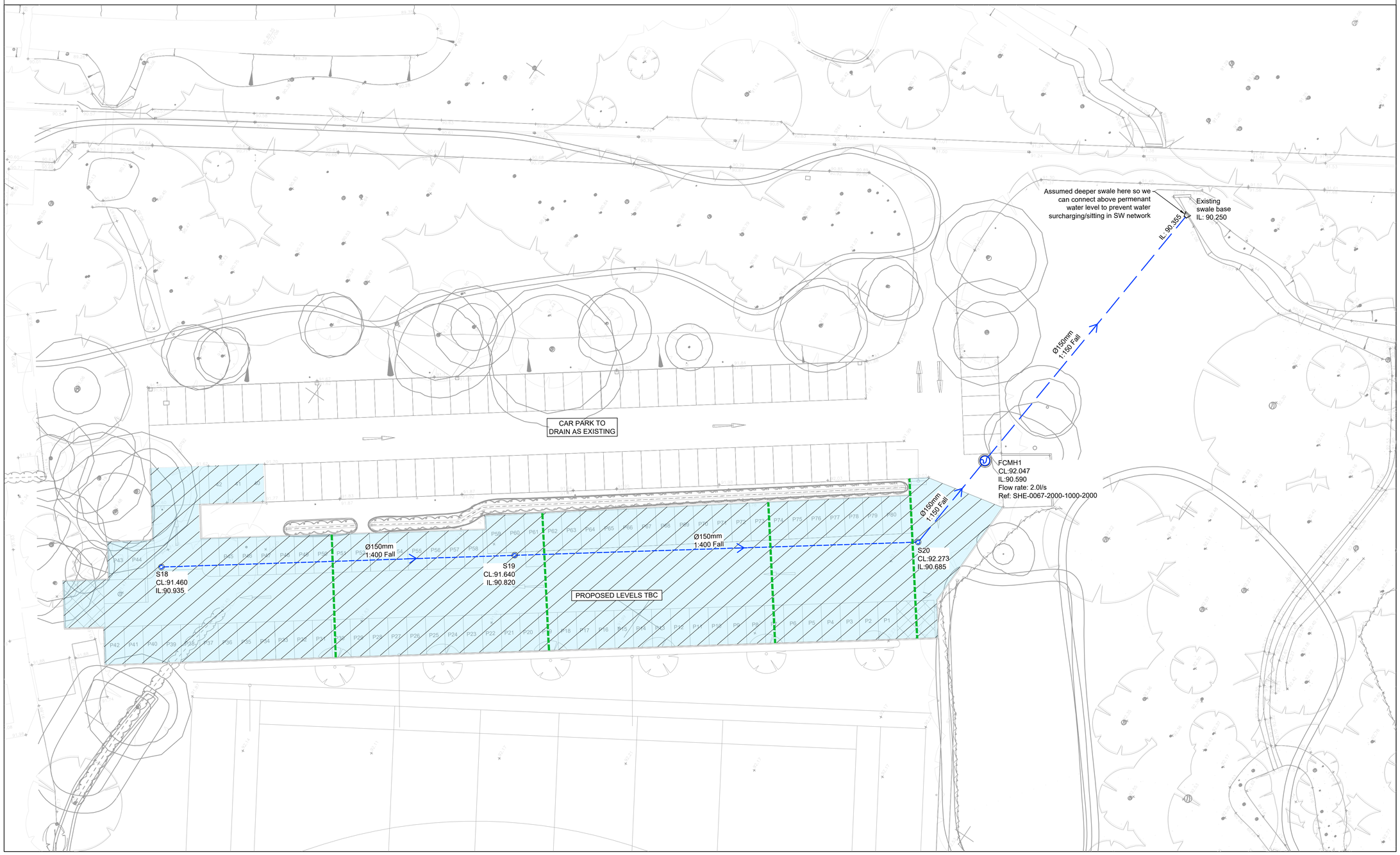
Drawings:
Below Ground Drainage Layout Sheet 1 (28833-6001_P08)
Below Ground Drainage Layout Sheet 2 (28833-6002_P10)
External Works Build-ups Sheet 1 (28833-7100_P07)
External Works Build-ups Sheet 2 (28833-7101_P01)
Exceedance Route Plan (28833-SK6001_4)

Calculations:
Microdrainage calculations (Car Park and Pre-Prep building)

Reports:
CCTV survey and remedial works required

HEALTH & SAFETY	
List of site specific or unusual hazards relevant to the drawing: (Must be read in conjunction with the CDM risk register.)	
Excavations	Excavation for manholes Contractor to ensure adequate edge protection to excavations for workers and plant and to ensure sides of excavations are sufficiently stable or shored up. Contractor to restrict access into areas where excavations are being carried out.
Sewer Connections	Working with live sewers Extra care must be taken when dealing with live sewers to ensure there is no adverse effect to the existing drainage.
Existing Services	Working alongside/near existing services. Extra care must be taken when working/digging near existing services. A survey should be carried out prior to works commencing to determine the exact location of existing services.

KEYPLAN
SCALE 1:2500



NOTES :

1. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and specialists' drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check that this drawing has been printed to the intended scale this bar should be 50mm long @ A1 or 25mm long @ A3.
3. Health & Safety :
   All specific drawing notes are to be read in conjunction with the project "Information Pack" and "Site Rules".
4. For general notes refer to Drawing No. 28833 / GN01

DRAINAGE LEGEND	
New SW Drain	
Perforated Pipe	
Step in sub-base to accomodate change in levels	

DRAINAGE KEY	
S1	Surface Water Manhole Chamber
FCMH1	Flow Control Chamber (SW only)
	Headwall
	Permeable paving - Cellweb or similar approved

ABBREVIATIONS	
IL	- Invert Level
CL	- Cover Level

Rev	Date	Drawn	Eng	Amendment
P08	17.08.21	DLa	BB	Issued for Information
P07	10.04.21	DLa	BB	Stage 4 Issue
P06	19.02.21	DLa	BB	Draft Stage 4 Issue
P05	29.01.21	DLa	BB	Issued for Planning
P04	20.11.20	DLa	BB	Issued for Planning
P03	23.07.20	DLa	BB	Issued for Planning
P02	02.06.20	DLa	BB	Issued for Planning
P01	22.05.20	DLa	BB	Issued for Comment

HABERDASHERS' PRE-PREPARATORY SCHOOL FOR BOYS

BELOW GROUND DRAINAGE LAYOUT SHEET 1

Status
FOR INFORMATION
NOT FOR CONSTRUCTION

Drawn DLa	Eng BB
Scales 1:250 at A1	1:500 at A3
Drawing No 28833 / 6001	Rev P08

PRICE & MYERS
Consulting Engineers
37 Alfred Place
London
WC1E 7DP
020 7631 5128
mail@pricemyers.com
www.pricemyers.com

DRAINAGE LEGEND

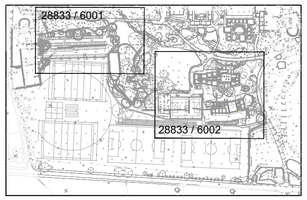
- New FW Drain
- New SW Drain
- Perforated Pipe
- Dished Channel
- Existing SW Drain
- Existing FW Drain
- Existing Combined Drain
- Rising Main
- Demolished/Abandoned

DRAINAGE KEY

RWP	Rainwater Down Pipe
FWP	Foul Waste Pipe
RE	Rodding Eye
FG	Floor Gully
SG	Shower Gully (By Others)
RG	Road Gully
BD	Backdrop inlet to manhole with invert level of rodding access
S1	Surface Water Manhole Chamber
F1	Foul Water Manhole Chamber
SWPC01 FWPC01	Pumping Station Manhole Chamber
SD	Slot Drain
	Permeable paving
	Permeable paving - Cellweb or similar approved

ABBREVIATIONS

IL	- Invert Level
CL	- Cover Level
RA	- Above Ground Rodding Access
REIL	- Rodding Eye Invert Level
NRV	- Non-Return Valve



KEYPLAN
SCALE 1:5000

Existing surface & foul water drainage network confirmed by Kenclean CCTV survey. Report no. B023HABE dated 28th October 2020

Dish channel to collect water from car park and discharge to gullies

ExIC1 CL:92.700 IL:91.800

ExSW3 CL:92.810 IL:92.060

SWPC01 CL:92.250 Lowest Inlet IL:89.970 Sump IL:89.250 Flow rate: 4.0l/s Vent pipe & electric supply by others.

FWPC01 CL: 92.250 Lowest Inlet IL: 90.220 Sump IL: 88.750 24 hour storage provided: 6.5m³ Flow rate: 4.0l/s Vent pipe & electric supply by others.

RE CL:92.920 IL:92.500

Hand dug excavation in root protection areas

BUILDING TO DRAIN AS EXISTING

S14 CL:92.300 IL:90.010
S17 CL:92.100 IL:90.395
S16 CL:92.100 IL:91.195
S15 CL:92.100 IL:91.355
F01 CL:92.150 IL:90.735
F02 CL:92.150 IL:90.695
F04 CL:92.150 IL:90.560
F05 CL:92.150 IL:90.445
F06 CL:92.150 IL:91.000
F07 CL:92.150 IL:90.910
F08 CL:92.150 IL:90.900
F09 CL:92.150 IL:90.250
S13 CL:92.150 IL:90.130
S12 CL:92.040 IL:90.300
S11 CL:91.950 IL:90.350
S10 CL:91.800 IL:90.495
S03 CL:91.960 IL:90.645
S02 CL:92.000 IL:90.970
S01 CL:92.070 IL:91.220
S04 CL:92.400 IL:91.770
S05 CL:92.400 IL:91.250
S07 CL:92.000 IL:90.805
S06 CL:92.000 IL:91.275
S08 CL:91.800 IL:91.300
S09 CL:91.800 IL:90.905

RE CL:93.000 IL:91.475
RE CL:92.125 IL:91.415
RE CL:92.150 IL:91.400
RE CL: 92.125 IL: 91.535
RE CL: 92.125 IL: 90.785
RE CL: 92.125 IL: 91.535
RE CL: 92.125 IL: 91.535

Ø150mm 1:150 Fall
Ø150mm 1:100 Fall
Ø150mm 1:12 Fall
Ø150mm 1:120 Fall
Ø150mm 1:30 Fall
Ø150mm 1:140 Fall
Ø150mm 1:100 Fall
Ø150mm 1:5 Fall
Ø150mm 1:137 Fall
Ø100mm 1:70 Fall
Ø100mm 1:22 Fall
Ø100mm 1:20 Fall
Ø100mm 1:40 Fall

FFL:92.150
SSL:91.985

Subbase to fall to perforated pipe. Minimum fall 1:200

Subbase to continue further than pitch surface to ensure water is collected in underdrain

REFER TO CONTINUATION BELOW FOR SPORTS FACILITIES

REFER TO DRAINAGE LAYOUT ABOVE

REIL: CL:92.200 IL:91.500

Fall

HEALTH & SAFETY

List of site specific or unusual hazards relevant to the drawing: (Must be read in conjunction with the CDM risk register.)

Excavations	Excavation for manholes Contractor to ensure adequate edge protection to excavations for workers and plant and to ensure sides of excavations are sufficiently stable or shored up. Contractor to restrict access into areas where excavations are being carried out.
Sewer Connections	Working with live sewers Extra care must be taken when dealing with live sewers to ensure there is no adverse effect to the existing drainage.
Existing Services	Working alongside/near existing services. Extra care must be taken when working/digging near existing services. A survey should be carried out prior to works commencing to determine the exact location of existing services.

NOTES :

1. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and specialists' drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check that this drawing has been printed to the intended scale this bar should be 50mm long @ A1 or 25mm long @ A3.
3. Health & Safety : All specific drawing notes are to be read in conjunction with the project "Information Pack" and "Site Rules".
4. For general notes refer to Drawing No. 28833 / GN01
5. All FWPs, SGs & FGs TBC by M&E. All RWPs TBC by Architect
6. Surface course varies, refer to IID proposed landscape drawing.

Rev	Date	Drawn	Eng	Amendment
P10	17.08.21	DLa	BB	Issued for Information
P09	28.06.21	DLa	BB	Issued for Information
P08	28.04.21	DLa	BB	Stage 4 Issue
P07	10.04.21	DLa	BB	Stage 4 Issue
P06	19.02.21	DLa	BB	Draft Stage 4 Issue
P05	29.01.21	DLa	BB	Issued for Planning
P04	20.11.20	DLa	BB	Issued for Planning
P03	23.07.20	DLa	BB	Issued for Planning
P02	02.06.20	DLa	BB	Issued for Planning

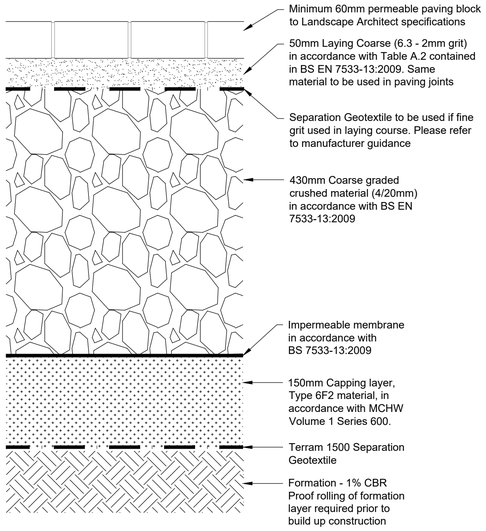
HABERDASHERS' PRE-PREPARATORY SCHOOL FOR BOYS

BELOW GROUND DRAINAGE LAYOUT SHEET 2

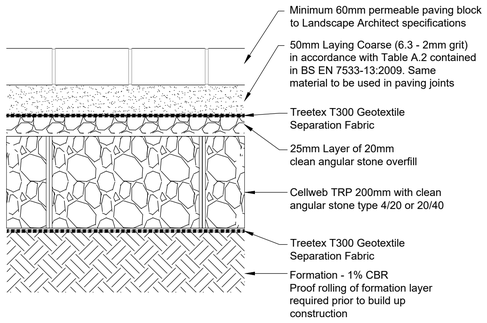
Status
FOR INFORMATION
NOT FOR CONSTRUCTION

Drawn	DLa	Eng	BB
Scales	1:250 at A1		1:500 at A3
Drawing No	28833 / 6002	Rev	P10

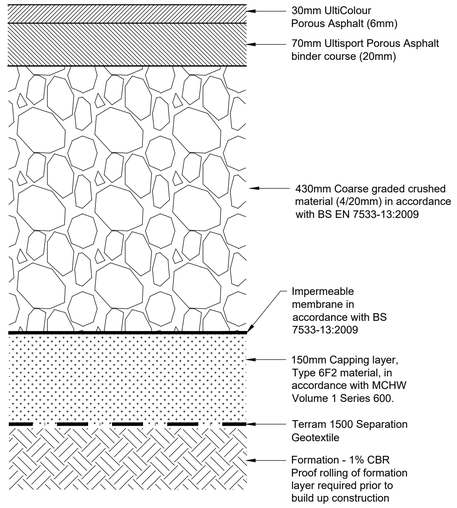
PRICE & MYERS
Consulting Engineers
37 Alfred Place
London
WC1E 7DP
020 7631 5128
mail@pricemyers.com
www.pricemyers.com



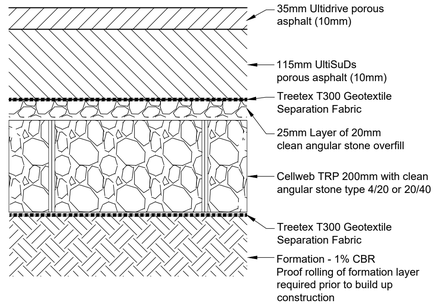
S1A - PERMEABLE BLOCK PAVING - CATEGORY A (PEDESTRIAN LOADING)



S1B - PERMEABLE BLOCK PAVING CELLWEB ROOT PROTECTION SYSTEM (PEDESTRIAN LOADING)



S2A - COLOURED PERMEABLE ASPHALT (PEDESTRIAN LOADING)



S2B - PERMEABLE ASPHALT CAR PARK CELLWEB ROOT PROTECTION SYSTEM

(LOADING TO NOT EXCEED 3.5 TONNE VEHICLES AS PER MANUFACTURER'S REQUIREMENTS)

S2C - PERMEABLE SPORT SPECIFIC ASPHALT (PEDESTRIAN LOADING)

S3 - IMPERMEABLE ASPHALT SHARED PARKING & ASSOCIATED ACCESS AREAS (HAVING FREQUENT USE BY COMMERCIAL VEHICLES)

NOTES :

1. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and specialists' drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check that this drawing has been printed to the intended scale this bar should be 50mm long @ A1 or 25mm long @ A3.
3. Health & Safety : All specific drawing notes are to be read in conjunction with the project "Information Pack" and "Site Rules".
4. For general notes refer to Drawing No. 28833 / GN01
5. CBR value taken from CBR tests carried out as part of the Ground Investigation by Johnson, Poole and Bloomer Consultants, report reference UB238/MAK/JCB/GF, dated: December 2020.
6. All material within 450mm of finished surface to be non frost susceptible.
7. Surface course, binder course and base course in accordance with BS EN 13108.
8. Sub-base material in accordance with MCHW Volume 1 Series 800.
9. Capping materials in accordance with MCHW Volume 1 Series 600.
10. Road formation to be checked for soft spots. Soft spots to be removed and replaced with Type 1 material or Type 6F2 capping material.
11. All build up number references relate to IID Architect's drawing 1498-IID-XX-00-DR-A-1114 P2 and P&M external works layout 28833-7001 and 7002

Rev	Date	Drawn	Eng	Amendment
P07	10.04.21	DLa	BB	Stage 4 Issue
P06	19.02.21	DLa	BB	Draft Stage 4 Issue
P05	25.11.20	DLa	BB	Issued for Planning
P04	14.10.20	DLa	BB	Issued for Information
P03	18.09.20	DLa	BB	Issued for Stage 3
P02	23.07.20	DLa	BB	Issued for Planning
P01	02.06.20	DLa	BB	Issued for Planning

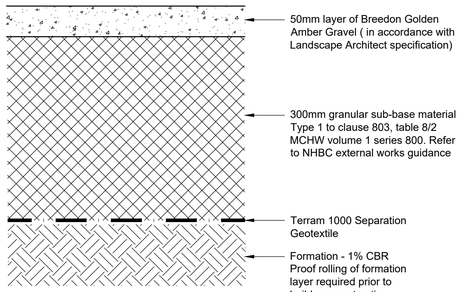
HABERDASHERS' PRE-PREPARATORY SCHOOL FOR BOYS

EXTERNAL WORKS BUILD-UPS

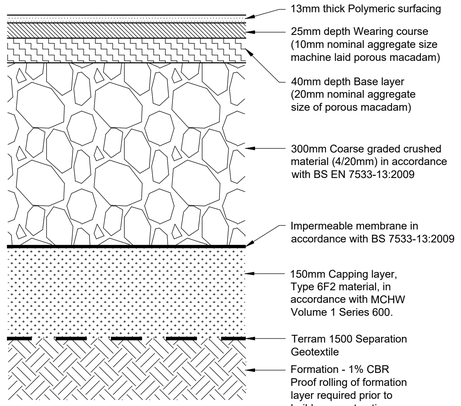
Status
STAGE 4
NOT FOR CONSTRUCTION

Drawn DLa	Eng BB
Scales 1:5 at A1 UNO	1:10 at A3 UNO
Drawing No 28833 / 7100	Rev P07

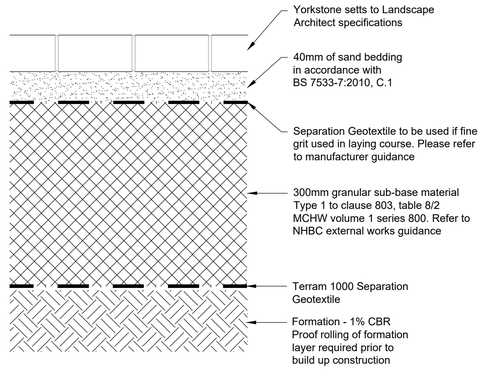
PRICE& MYERS
Consulting Engineers
37 Alfred Place
London
WC1E 7DP
020 7631 5128
mail@pricemyers.com
www.pricemyers.com



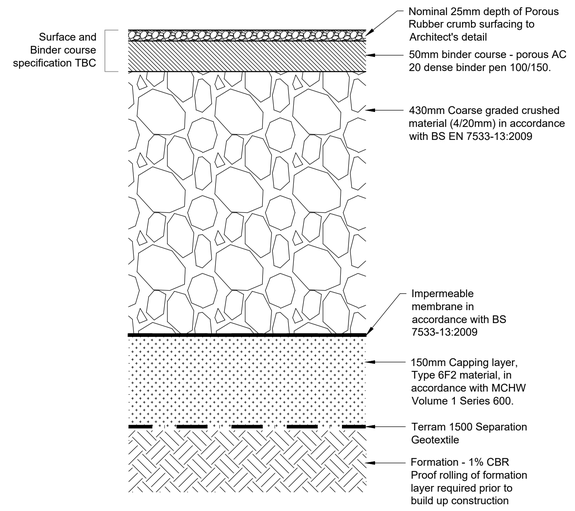
S4 - COMPACTED GRAVEL PATH (PEDESTRIAN LOADING)



S6 - TARTAN SPORTS PITCH

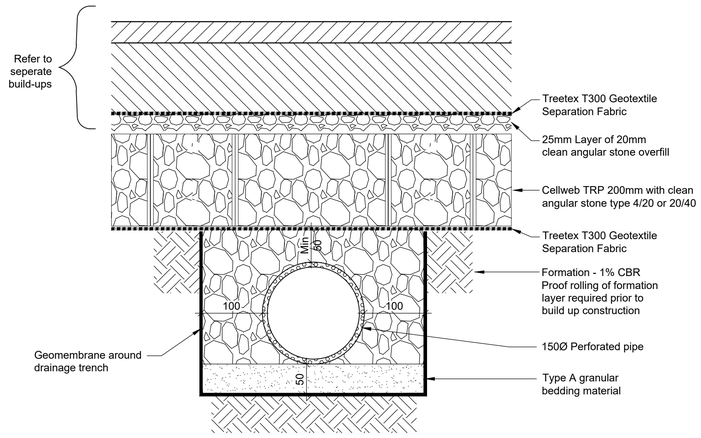


S9 - YORKSTONE SETTS - CATEGORY A (PEDESTRIAN LOADING)



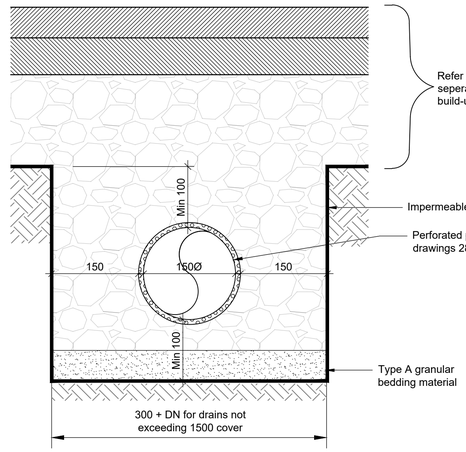
S10 - RUBBER CRUMB BUILD-UP (PEDESTRIAN LOADING)

Build up to Manufacturer's specification

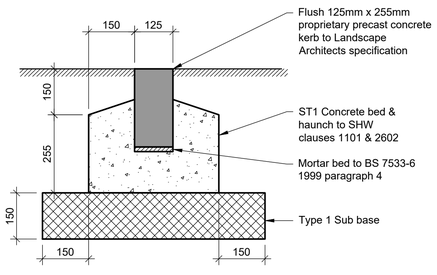


UNDERDRAIN PIPE TO S1B & S2B - PERMEABLE ASPHALT CAR PARK

CELLWEB ROOT PROTECTION SYSTEM

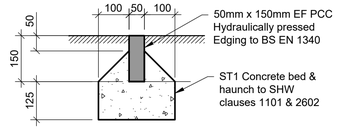


UNDERDRAIN PIPE TO S1 & S2 PERMEABLE PAVING DETAIL



K1 & K2- KERB DETAIL

SCALE 1:10



K3 - KERB DETAIL

SCALE 1:10

NOTES :

1. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and specialists' drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check that this drawing has been printed to the intended scale this bar should be 50mm long @ A1 or 25mm long @ A3.
3. Health & Safety :
   All specific drawing notes are to be read in conjunction with the project "Information Pack" and "Site Rules".
4. For general notes refer to Drawing No. 28833 / GN01
5. CBR value taken from CBR tests carried out as part of the Ground Investigation by Johnson, Poole and Bloomer Consultants, report reference UB238/MAK/JCB/GF, dated: December 2020.
6. All material within 450mm of finished surface to be non frost susceptible.
7. Surface course, binder course and base course in accordance with BS EN 13108.
8. Sub-base material in accordance with MCHW Volume 1 Series 800.
9. Capping materials in accordance with MCHW Volume 1 Series 600.
10. Road formation to be checked for soft spots. Soft spots to be removed and replaced with Type 1 material or Type 6F2 capping material.
11. All build up number references relate to IID Architect's drawing 1498-IID-XX-00-DR-A-1114 P2 and P&M external works layout 28833-7001 and 7002

Rev	Date	Drawn	Eng	Amendment
P01	10.04.21	DLa	BB	Stage 4 Issue

HABERDASHERS' PRE-PREPARATORY SCHOOL FOR BOYS

EXTERNAL WORKS BUILD-UPS SHEET 2

Status
STAGE 4
NOT FOR CONSTRUCTION

Drawn	DLa	Eng	BB
Scales	1:5 at A1 UNO		1:10 at A3 UNO
Drawing No		Rev	
28833 / 7101		P01	

PRICE& MYERS
Consulting Engineers
37 Alfred Place
London
WC1E 7DP
020 7631 5128
mail@pricemyers.com
www.pricemyers.com

BUTTERFLY LANE

MFL BLOCK

MATHS & BATES HALL

THE BOURNE BUILDING

MUSIC SCHOOL

+90.89

+90.20

+91.43

+91.62

+91.74

+91.80

91.80+

+91.93

EXISTING CAR PARK TARMAC

RETAIN HEDGE ROW AND LAMP POSTS

91.89+

+91.62

+91.83

+91.97

+91.98

9 EVCPs

ACCESS PATH TO PRE-PREP SCHOOL

PROPOSED BUTTERLY LANE CAR PARK LEVELS TO BE RAISED, EXACT LEVELS TBC

BALL NETTING

LOW LAMP POST LIGHTING TO MATCH EXISTING

EXISTING HEDGE TO BE ENHANCED WITH NEW BEECH HEDGE AND TREES

BOLLARD LIGHTING ALONG ACCESS PATH

MAIN ENTRANCE

PREPARATORY SCHOOL

ROUND HOUSE LIBRARY

+92.69

RETAIN 8 EXISTING PARKING SPACES

10 NEW PARKING BAYS INC 2 DISABLED BAYS

+92.59

PREP & PRE PREP SCHOOL SHARED PLAY

92.53+

+93.19

MAIN ENTRANCE

+92.58

RECEPTION EXTERNAL PLAY

+92.21

2NO. SECURE CYCLE STANDS

+92.31

+92.23

PLAY COURT

92.27+

PRE-PREP SCHOOL

RECEPTION PLAY IN THE WOODS

YR 1 & 2 EXTERNAL PLAY

+92.07

+91.96

+92.09

+92.13

FENCE WITH PLANTED SCREEN

+91.97

EXTEND EXISTING BEECH HEDGING AROUND RECEPTION PLAY

+91.98

RUNNING TRACK

BOLLARD LIGHTING ALONG ACCESS PATH

DELIVERIES ACCESS

COACH PARK

EXISTING PITCH MARKINGS

GROUNDSMAN ACCOMMODATION

PENNES CHANGING ROOM

HIGH JUMP

SHOT PUT

+91.69

+91.73

+91.56

+91.52

+91.60

+91.51

+91.37

+91.45

SPORTS PITCH

+91.50

+91.21

+91.35

+91.13

+91.11

+91.25

ALDENHAM ROAD

KEY

+ 30.00 Spot Level

Exceedence flow path

NOTE: EXCEEDANCE FLOW PATHS BASED ON EXISTING SITE LEVELS. EXACT ROUTES TBC FOLLOWING COMPLETION OF FINAL LEVELS STRATEGY.

PRICE & MYERS

Job No.	28833	Page	SK 6001	Rev	4
Date	28/01/2021	Eng	BB	Chd	--
Job	Haberdashers' Pre-Prep - Exceedence Flow Paths				

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)	100	PIMP (%)	100
M5-60 (mm)	20.100	Add Flow / Climate Change (%)	0
Ratio R	0.425	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.144	4-8	0.599	8-12	0.025

Total Area Contributing (ha) = 0.769

Total Pipe Volume (m³) = 10.674

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	12.524	0.795	15.8	0.017	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	23.964	0.160	150.0	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	25.255	1.105	22.9	0.045	4.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.08	92.150	0.017	0.0	0.0	0.0	2.55	45.1	2.3
S1.001	50.00	4.57	91.355	0.040	0.0	0.0	0.0	0.82	14.5	5.4
S2.000	50.00	4.20	92.350	0.045	0.0	0.0	0.0	2.12	37.4	6.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.002	24.499	0.750	32.7	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	18.583	0.180	103.2	0.024	4.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	28.153	0.250	112.6	0.063	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.002	31.377	0.275	114.1	0.037	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.003	24.776	0.250	99.1	0.053	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	6.143	0.400	15.4	0.047	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	19.592	0.800	24.5	0.075	4.00	0.0	0.600	o	150	Pipe/Conduit	
S5.000	52.217	0.520	100.4	0.175	4.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	5.226	0.900	5.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	12.705	0.085	149.5	0.023	4.00	0.0	0.600	o	150	Pipe/Conduit	
S6.001	58.463	0.390	149.9	0.012	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.002	63.092	0.450	140.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.000	59.677	0.398	150.0	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	61.025	0.407	149.9	0.055	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.002	14.431	0.096	150.3	0.061	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.002	50.00	4.80	91.195	0.117	0.0	0.0	0.0	1.77	31.2	15.9
S3.000	50.00	4.31	91.400	0.024	0.0	0.0	0.0	0.99	17.5	3.3
S3.001	50.00	4.81	91.220	0.087	0.0	0.0	0.0	0.95	16.7	11.8
S3.002	50.00	5.37	90.970	0.124	0.0	0.0	0.0	0.94	16.6«	16.8
S3.003	50.00	5.77	90.645	0.177	0.0	0.0	0.0	1.01	17.8«	24.0
S1.003	50.00	5.81	90.395	0.341	0.0	0.0	0.0	2.58	45.7«	46.2
S4.000	50.00	4.16	91.800	0.075	0.0	0.0	0.0	2.04	36.1	10.2
S5.000	50.00	4.87	91.770	0.175	0.0	0.0	0.0	1.00	17.7«	23.7
S5.001	50.00	4.89	91.250	0.175	0.0	0.0	0.0	4.21	74.4	23.7
S6.000	50.00	4.26	91.275	0.023	0.0	0.0	0.0	0.82	14.5	3.1
S6.001	50.00	5.45	91.190	0.035	0.0	0.0	0.0	0.82	14.5	4.7
S6.002	50.00	6.69	90.800	0.035	0.0	0.0	0.0	0.85	15.0	4.7
S7.000	50.00	5.22	91.300	0.000	0.0	0.0	0.0	0.82	14.5	0.0
S7.001	50.00	6.46	90.902	0.055	0.0	0.0	0.0	0.82	14.5	7.4
S7.002	50.00	6.75	90.495	0.116	0.0	0.0	0.0	0.82	14.4«	15.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.003	9.273	0.062	149.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.002	15.997	0.107	149.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.003	18.441	0.123	149.9	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	6.685	0.045	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	11.932	-2.115	-5.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.003	50.00	6.94	90.350	0.151	0.0	0.0	0.0	0.82	14.5«	20.4
S5.002	50.00	7.27	90.288	0.326	0.0	0.0	0.0	0.82	14.5«	44.1
S5.003	50.00	7.64	90.087	0.352	0.0	0.0	0.0	0.82	14.5«	47.7
S4.001	50.00	7.78	90.040	0.428	0.0	0.0	0.0	0.82	14.5«	57.9
S1.004	50.00	9.92	89.995	0.769	0.0	0.0	0.0	0.09	1.6«	104.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.017	0.017	0.017
1.001	User	-	100	0.023	0.023	0.023
2.000	User	-	100	0.045	0.045	0.045
1.002	User	-	100	0.032	0.032	0.032
3.000	User	-	100	0.024	0.024	0.024
3.001	User	-	100	0.063	0.063	0.063
3.002	User	-	100	0.037	0.037	0.037
3.003	User	-	100	0.053	0.053	0.053
1.003	User	-	100	0.047	0.047	0.047
4.000	User	-	100	0.075	0.075	0.075
5.000	-	-	100	0.175	0.175	0.175
5.001	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.023	0.023	0.023
6.001	-	-	100	0.012	0.012	0.012
6.002	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.000	0.000	0.000
7.001	-	-	100	0.055	0.055	0.055
7.002	-	-	100	0.061	0.061	0.061
6.003	-	-	100	0.000	0.000	0.000
5.002	-	-	100	0.000	0.000	0.000
5.003	User	-	100	0.026	0.026	0.026
4.001	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.769	0.769	0.769

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	SRE4	150	0.500	0.595	Unclassified	300	0	0.500	Unclassified
S1.001	SS15	150	0.595	0.755	Unclassified	450	0	0.595	Unclassified
S2.000	SRE5	150	0.500	0.705	Unclassified	450	0	0.500	Unclassified
S1.002	SS16	150	0.755	1.505	Unclassified	450	0	0.755	Unclassified
S3.000	SRE3	150	0.550	0.700	Unclassified	300	0	0.550	Unclassified
S3.001	SS01	150	0.700	0.880	Unclassified	450	0	0.700	Unclassified
S3.002	SS02	150	0.880	1.155	Unclassified	450	0	0.880	Unclassified
S3.003	SS03	150	1.205	1.555	Unclassified	450	0	1.205	Unclassified
S1.003	SS17	150	1.555	2.105	Unclassified	450	0	1.555	Unclassified
S4.000	SDC	150	0.350	1.150	Unclassified	300	0	0.350	Unclassified
S5.000	SS04	150	0.480	1.000	Unclassified	450	0	0.480	Unclassified
S5.001	SS05	150	1.000	1.540	Unclassified	450	0	1.000	Unclassified
S6.000	SS06	150	0.575	0.660	Unclassified	1200	0	0.575	Unclassified
S6.001	SJCT	150	0.660	1.050	Unclassified	1200	0	0.660	Unclassified
S6.002	SS07	150	1.050	1.450	Unclassified	1200	0	1.050	Unclassified
S7.000	SS08	150	0.350	0.748	Unclassified	1200	0	0.350	Unclassified
S7.001	SS09	150	0.748	1.155	Unclassified	1200	0	0.748	Unclassified
S7.002	SS10	150	1.155	1.401	Unclassified	1200	0	1.155	Unclassified
S6.003	SS11	150	1.450	1.602	Unclassified	1200	0	1.450	Unclassified
S5.002	SS12	150	1.602	1.819	Unclassified	450	0	1.602	Unclassified
S5.003	SS13	150	1.913	2.186	Unclassified	450	0	1.913	Unclassified
S4.001	SS14	150	2.105	2.110	Unclassified	450	0	2.110	Unclassified
S1.004	SSWPC1	150	0.550	2.105	Unclassified	1200	0	2.105	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	92.810	92.110	92.060	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	15
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Storm Duration (mins)	30
Ratio R	0.425		

Online Controls for Storm

Non Return Valve Manhole: SS11, DS/PN: S6.003, Volume (m³): 3.1

Pump Manhole: SSWPC1, DS/PN: S1.004, Volume (m³): 2.7

Invert Level (m) 89.995

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0000	0.900	4.0000	1.700	4.0000	2.500	4.0000
0.200	4.0000	1.000	4.0000	1.800	4.0000	2.600	4.0000
0.300	4.0000	1.100	4.0000	1.900	4.0000	2.700	4.0000
0.400	4.0000	1.200	4.0000	2.000	4.0000	2.800	4.0000
0.500	4.0000	1.300	4.0000	2.100	4.0000	2.900	4.0000
0.600	4.0000	1.400	4.0000	2.200	4.0000	3.000	4.0000
0.700	4.0000	1.500	4.0000	2.300	4.0000		
0.800	4.0000	1.600	4.0000	2.400	4.0000		

Storage Structures for Storm

Porous Car Park Manhole: SRE4, DS/PN: S1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	30.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	92.270	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS15, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.570	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SRE5, DS/PN: S2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	30.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.470	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS16, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.570	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SRE3, DS/PN: S3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.470	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS01, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.470	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS02, DS/PN: S3.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.470	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS03, DS/PN: S3.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	145.0	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.470	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS17, DS/PN: S1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.5	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.570	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS04, DS/PN: S5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	35.0
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	486.1	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.860	Cap Volume Depth (m)	0.430

Porous Car Park Manhole: SS06, DS/PN: S6.000

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30
Membrane Percolation (mm/hr)	1000	Invert Level (m)	91.275
Max Percolation (l/s)	63.9	Width (m)	23.0
Safety Factor	2.0	Length (m)	10.0

Porous Car Park Manhole: SS06, DS/PN: S6.000

Slope (1:X)	200.0	Evaporation (mm/day)	3
Depression Storage (mm)	5	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SJCT, DS/PN: S6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	11.5
Max Percolation (l/s)	31.9	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.620	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SS09, DS/PN: S7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	55.0
Max Percolation (l/s)	152.8	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.420	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SS10, DS/PN: S7.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	61.0
Max Percolation (l/s)	169.4	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	90.495	Cap Volume Depth (m)	0.300

Porous Car Park Manhole: SS13, DS/PN: S5.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	22.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	61.1	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.570	Cap Volume Depth (m)	0.430

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	15
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SRE4	60 Winter	1	+0%				
S1.001	SS15	120 Winter	1	+0%	1/15 Winter			
S2.000	SRE5	1440 Winter	1	+0%				
S1.002	SS16	120 Winter	1	+0%	1/15 Summer			
S3.000	SRE3	240 Winter	1	+0%	1/120 Winter			
S3.001	SS01	240 Winter	1	+0%	1/15 Summer			
S3.002	SS02	240 Winter	1	+0%	1/15 Summer			
S3.003	SS03	240 Winter	1	+0%	1/15 Summer			
S1.003	SS17	120 Winter	1	+0%	1/15 Summer			
S4.000	SDC	15 Summer	1	+0%	30/15 Summer	100/15 Summer		
S5.000	SS04	30 Winter	1	+0%	30/15 Summer			
S5.001	SS05	60 Winter	1	+0%	1/15 Summer			
S6.000	SS06	60 Winter	1	+0%	100/480 Winter			
S6.001	SJCT	30 Winter	1	+0%	30/1440 Winter			
S6.002	SS07	30 Winter	1	+0%	30/480 Winter			
S7.000	SS08	120 Winter	1	+0%	100/360 Winter			
S7.001	SS09	30 Winter	1	+0%	30/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE4	92.167	-0.133	0.000	0.02		1.0	OK	
S1.001	SS15	91.610	0.105	0.000	0.10		1.4	SURCHARGED	
S2.000	SRE5	91.769	-0.731	0.000	0.00		0.0	OK	
S1.002	SS16	91.608	0.263	0.000	0.07		2.2	SURCHARGED	
S3.000	SRE3	91.571	0.021	0.000	0.14		2.3	SURCHARGED	
S3.001	SS01	91.572	0.202	0.000	0.22		3.5	SURCHARGED	
S3.002	SS02	91.574	0.454	0.000	0.23		3.7	SURCHARGED	
S3.003	SS03	91.582	0.787	0.000	0.24		4.0	SURCHARGED	
S1.003	SS17	91.605	1.060	0.000	0.15		5.8	SURCHARGED	
S4.000	SDC	91.862	-0.088	0.000	0.36		12.1	OK	3
S5.000	SS04	91.881	-0.039	0.000	0.77		13.3	OK	
S5.001	SS05	91.723	0.323	0.000	0.18		10.6	SURCHARGED	
S6.000	SS06	91.302	-0.123	0.000	0.07		1.0	OK	
S6.001	SJCT	91.225	-0.115	0.000	0.12		1.7	OK	
S6.002	SS07	90.834	-0.116	0.000	0.11		1.6	OK	
S7.000	SS08	91.300	-0.150	0.000	0.00		0.0	OK	
S7.001	SS09	90.965	-0.087	0.000	0.30		4.3	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S7.002	SS10	720 Winter	1	+0%	1/120 Winter				90.720
S6.003	SS11	720 Winter	1	+0%	1/15 Summer				90.720
S5.002	SS12	60 Winter	1	+0%	1/15 Summer				91.705
S5.003	SS13	60 Winter	1	+0%	1/15 Summer				91.665
S4.001	SS14	120 Winter	1	+0%	1/15 Summer				91.641
S1.004	SSWPC1	120 Winter	1	+0%	1/15 Summer				91.623

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	SS10	0.075	0.000	0.30		3.9	SURCHARGED	
S6.003	SS11	0.220	0.000	0.31		4.0	SURCHARGED	
S5.002	SS12	1.267	0.000	0.77		10.3	SURCHARGED	
S5.003	SS13	1.428	0.000	0.49		6.7	SURCHARGED	
S4.001	SS14	1.451	0.000	0.68		8.3	SURCHARGED	
S1.004	SSWPC1	1.478	0.000	0.76		4.0	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	15
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SRE4	15 Winter	30	+0%				
S1.001	SS15	240 Winter	30	+0%	1/15 Winter			
S2.000	SRE5	1440 Winter	30	+0%				
S1.002	SS16	240 Winter	30	+0%	1/15 Summer			
S3.000	SRE3	480 Winter	30	+0%	1/120 Winter			
S3.001	SS01	360 Winter	30	+0%	1/15 Summer			
S3.002	SS02	360 Winter	30	+0%	1/15 Summer			
S3.003	SS03	240 Winter	30	+0%	1/15 Summer			
S1.003	SS17	180 Winter	30	+0%	1/15 Summer			
S4.000	SDC	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S5.000	SS04	60 Winter	30	+0%	30/15 Summer			
S5.001	SS05	120 Winter	30	+0%	1/15 Summer			
S6.000	SS06	1440 Winter	30	+0%	100/480 Winter			
S6.001	SJCT	1440 Winter	30	+0%	30/1440 Winter			
S6.002	SS07	1440 Winter	30	+0%	30/480 Winter			
S7.000	SS08	1440 Winter	30	+0%	100/360 Winter			
S7.001	SS09	1440 Winter	30	+0%	30/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE4	92.196	-0.104	0.000	0.16		6.5	OK	
S1.001	SS15	91.758	0.253	0.000	0.06		0.8	SURCHARGED	
S2.000	SRE5	91.932	-0.568	0.000	0.00		0.0	OK	
S1.002	SS16	91.756	0.411	0.000	0.06		1.8	SURCHARGED	
S3.000	SRE3	91.735	0.185	0.000	0.06		0.9	SURCHARGED	
S3.001	SS01	91.735	0.365	0.000	0.12		1.9	SURCHARGED	
S3.002	SS02	91.736	0.616	0.000	0.15		2.4	SURCHARGED	
S3.003	SS03	91.738	0.943	0.000	0.24		4.1	SURCHARGED	
S1.003	SS17	91.757	1.212	0.000	0.14		5.2	SURCHARGED	
S4.000	SDC	92.160	0.210	0.000	0.71		24.0	SURCHARGED	3
S5.000	SS04	91.992	0.072	0.000	0.74		12.9	SURCHARGED	
S5.001	SS05	91.884	0.484	0.000	0.17		9.9	SURCHARGED	
S6.000	SS06	91.367	-0.058	0.000	0.20		2.6	OK	
S6.001	SJCT	91.368	0.028	0.000	0.19		2.7	SURCHARGED	
S6.002	SS07	91.369	0.419	0.000	0.20		2.9	SURCHARGED	
S7.000	SS08	91.372	-0.078	0.000	0.01		0.1	OK	
S7.001	SS09	91.372	0.320	0.000	0.07		0.9	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S7.002	SS10	1440 Winter	30	+0%	1/120 Winter				91.372
S6.003	SS11	1440 Winter	30	+0%	1/15 Summer				91.371
S5.002	SS12	120 Winter	30	+0%	1/15 Summer				91.869
S5.003	SS13	120 Winter	30	+0%	1/15 Summer				91.837
S4.001	SS14	15 Summer	30	+0%	1/15 Summer				91.807
S1.004	SSWPC1	180 Winter	30	+0%	1/15 Summer				91.784

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	SS10	0.727	0.000	0.30		4.0	SURCHARGED	
S6.003	SS11	0.871	0.000	0.31		4.0	SURCHARGED	
S5.002	SS12	1.431	0.000	0.74		9.9	SURCHARGED	
S5.003	SS13	1.600	0.000	0.60		8.1	SURCHARGED	
S4.001	SS14	1.617	0.000	1.25		15.4	SURCHARGED	
S1.004	SSWPC1	1.639	0.000	0.76		4.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	15
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SRE4	15 Winter	100	+0%				
S1.001	SS15	360 Winter	100	+0%	1/15 Winter			
S2.000	SRE5	1440 Winter	100	+0%				
S1.002	SS16	360 Winter	100	+0%	1/15 Summer			
S3.000	SRE3	480 Winter	100	+0%	1/120 Winter			
S3.001	SS01	480 Winter	100	+0%	1/15 Summer			
S3.002	SS02	480 Winter	100	+0%	1/15 Summer			
S3.003	SS03	360 Winter	100	+0%	1/15 Summer			
S1.003	SS17	360 Winter	100	+0%	1/15 Summer			
S4.000	SDC	15 Winter	100	+0%	30/15 Summer	100/15 Summer		
S5.000	SS04	60 Winter	100	+0%	30/15 Summer			
S5.001	SS05	120 Winter	100	+0%	1/15 Summer			
S6.000	SS06	1440 Winter	100	+0%	100/480 Winter			
S6.001	SJCT	1440 Winter	100	+0%	30/1440 Winter			
S6.002	SS07	1440 Winter	100	+0%	30/480 Winter			
S7.000	SS08	1440 Winter	100	+0%	100/360 Winter			
S7.001	SS09	1440 Winter	100	+0%	30/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE4	92.196	-0.104	0.000	0.21		8.5	OK	
S1.001	SS15	91.837	0.332	0.000	0.07		1.0	SURCHARGED	
S2.000	SRE5	92.046	-0.454	0.000	0.00		0.0	OK	
S1.002	SS16	91.835	0.490	0.000	0.06		1.7	SURCHARGED	
S3.000	SRE3	91.824	0.274	0.000	0.03		0.5	SURCHARGED	
S3.001	SS01	91.825	0.455	0.000	0.09		1.4	SURCHARGED	
S3.002	SS02	91.824	0.704	0.000	0.12		1.8	SURCHARGED	
S3.003	SS03	91.825	1.030	0.000	0.17		2.9	SURCHARGED	
S1.003	SS17	91.833	1.288	0.000	0.10		3.7	SURCHARGED	
S4.000	SDC	92.301	0.351	0.888	0.80		27.2	FLOOD	3
S5.000	SS04	92.032	0.112	0.000	0.71		12.4	SURCHARGED	
S5.001	SS05	91.944	0.544	0.000	0.17		9.9	SURCHARGED	
S6.000	SS06	91.547	0.122	0.000	0.22		2.9	SURCHARGED	
S6.001	SJCT	91.548	0.208	0.000	0.22		3.1	SURCHARGED	
S6.002	SS07	91.548	0.598	0.000	0.21		3.2	SURCHARGED	
S7.000	SS08	91.547	0.097	0.000	0.01		0.1	SURCHARGED	
S7.001	SS09	91.547	0.495	0.000	0.11		1.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S7.002	SS10	1440 Winter	100	+0%	1/120 Winter				91.548
S6.003	SS11	1440 Winter	100	+0%	1/15 Summer				91.548
S5.002	SS12	120 Winter	100	+0%	1/15 Summer				91.930
S5.003	SS13	120 Winter	100	+0%	1/15 Summer				91.901
S4.001	SS14	240 Winter	100	+0%	1/15 Summer				91.872
S1.004	SSWPC1	240 Winter	100	+0%	1/15 Summer				91.860

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	SS10	0.903	0.000	0.30		4.0	SURCHARGED	
S6.003	SS11	1.048	0.000	0.31		4.0	SURCHARGED	
S5.002	SS12	1.492	0.000	0.74		9.9	SURCHARGED	
S5.003	SS13	1.664	0.000	0.60		8.1	SURCHARGED	
S4.001	SS14	1.682	0.000	0.95		11.7	SURCHARGED	
S1.004	SSWPC1	1.715	0.000	0.76		4.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	15
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SRE4	15 Winter	100	+40%				
S1.001	SS15	600 Winter	100	+40%	100/15 Summer			
S2.000	SRE5	1440 Winter	100	+40%				
S1.002	SS16	600 Winter	100	+40%	100/15 Summer			
S3.000	SRE3	600 Winter	100	+40%	100/15 Summer			
S3.001	SS01	600 Winter	100	+40%	100/15 Summer			
S3.002	SS02	600 Winter	100	+40%	100/15 Summer			
S3.003	SS03	600 Winter	100	+40%	100/15 Summer			
S1.003	SS17	600 Winter	100	+40%	100/15 Summer			
S4.000	SDC	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S5.000	SS04	60 Winter	100	+40%	100/15 Summer			
S5.001	SS05	120 Winter	100	+40%	100/15 Summer			
S6.000	SS06	1440 Winter	100	+40%	100/120 Winter			
S6.001	SJCT	1440 Winter	100	+40%	100/60 Winter			
S6.002	SS07	1440 Winter	100	+40%	100/15 Summer			
S7.000	SS08	1440 Winter	100	+40%	100/15 Summer			
S7.001	SS09	1440 Winter	100	+40%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE4	92.205	-0.095	0.000	0.29		11.9	OK	
S1.001	SS15	91.986	0.481	0.000	0.06		0.8	SURCHARGED	
S2.000	SRE5	92.364	-0.136	0.000	0.02		0.7	OK	
S1.002	SS16	91.986	0.641	0.000	0.05		1.4	SURCHARGED	
S3.000	SRE3	92.002	0.452	0.000	0.03		0.4	SURCHARGED	
S3.001	SS01	92.001	0.631	0.000	0.07		1.2	SURCHARGED	
S3.002	SS02	91.997	0.877	0.000	0.09		1.5	SURCHARGED	
S3.003	SS03	91.991	1.196	0.000	0.13		2.3	SURCHARGED	
S1.003	SS17	91.984	1.439	0.000	0.10		3.7	SURCHARGED	
S4.000	SDC	92.305	0.355	5.060	0.80		27.3	FLOOD	6
S5.000	SS04	92.092	0.172	0.000	0.70		12.2	SURCHARGED	
S5.001	SS05	92.036	0.636	0.000	0.16		9.8	SURCHARGED	
S6.000	SS06	91.754	0.329	0.000	0.22		2.9	SURCHARGED	
S6.001	SJCT	91.754	0.414	0.000	0.22		3.1	SURCHARGED	
S6.002	SS07	91.754	0.804	0.000	0.21		3.2	SURCHARGED	
S7.000	SS08	91.752	0.302	0.000	0.01		0.1	SURCHARGED	
S7.001	SS09	91.752	0.700	0.000	0.11		1.6	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S7.002	SS10	1440 Winter	100	+40%	100/15 Summer				91.754
S6.003	SS11	1440 Winter	100	+40%	100/15 Summer				91.754
S5.002	SS12	120 Winter	100	+40%	100/15 Summer				92.024
S5.003	SS13	120 Winter	100	+40%	100/15 Summer				92.002
S4.001	SS14	480 Winter	100	+40%	100/15 Summer				92.009
S1.004	SSWPC1	480 Winter	100	+40%	100/15 Summer				92.009

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	SS10	1.109	0.000	0.30		3.9	SURCHARGED	
S6.003	SS11	1.254	0.000	0.31		4.0	SURCHARGED	
S5.002	SS12	1.586	0.000	0.72		9.7	SURCHARGED	
S5.003	SS13	1.765	0.000	0.57		7.8	SURCHARGED	
S4.001	SS14	1.819	0.000	0.84		10.3	SURCHARGED	
S1.004	SSWPC1	1.864	0.000	0.76		4.0	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Car Park

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.415	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Car Park

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.055	4-8	0.140	8-12	0.005

Total Area Contributing (ha) = 0.199

Total Pipe Volume (m³) = 2.636

Network Design Table for Car Park

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	21.272	0.053	401.4	0.059	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	21.272	0.053	401.4	0.034	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	27.868	0.070	398.1	0.038	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	27.868	0.070	398.1	0.039	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	13.113	0.087	150.7	0.028	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.72	90.935	0.059	0.0	0.0	0.0	0.50	8.8	8.0
S1.001	50.00	5.43	90.882	0.093	0.0	0.0	0.0	0.50	8.8«	12.6
S1.002	50.00	6.36	90.829	0.131	0.0	0.0	0.0	0.50	8.8«	17.8
S1.003	50.00	7.30	90.759	0.171	0.0	0.0	0.0	0.50	8.8«	23.1
S1.004	50.00	7.56	90.689	0.199	0.0	0.0	0.0	0.82	14.4«	27.0

Network Design Table for Car Park

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.005	37.788	0.252	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.005	50.00	8.33	90.602	0.199	0.0	0.0	0.0	0.82	14.5«	27.0

Area Summary for Car Park

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.059	0.059	0.059
1.001	User	-	100	0.034	0.034	0.034
1.002	User	-	100	0.038	0.038	0.038
1.003	User	-	100	0.039	0.039	0.039
1.004	User	-	100	0.028	0.028	0.028
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.199	0.199	0.199

Network Classifications for Car Park

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	150	0.375	0.513	Unclassified	1200	0	0.375	Unclassified
S1.001	SJCT	150	0.513	0.661	Unclassified				Junction
S1.002	S2	150	0.661	1.051	Unclassified	1200	0	0.661	Unclassified
S1.003	Sjct 2	150	1.051	1.434	Unclassified				Junction
S1.004	S3	150	1.295	1.434	Unclassified	1200	0	1.434	Unclassified
S1.005	SFCMH1	150	0.230	1.295	Unclassified	1200	0	1.295	Unclassified

Free Flowing Outfall Details for Car Park

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.005	S	90.730	90.350	90.350	0	0

Simulation Criteria for Car Park

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.100	Storm Duration (mins)	30
Ratio R	0.425		

Online Controls for Car Park

Hydro-Brake® Optimum Manhole: SFCMH1, DS/PN: S1.005, Volume (m³): 1.8

Unit Reference	MD-SHE-0064-2000-1200-2000
Design Head (m)	1.200
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	64
Invert Level (m)	90.602
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.0	Kick-Flo®	0.573	1.4
Flush-Flo™	0.282	1.8	Mean Flow over Head Range	-	1.6

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)
0.100	1.5	1.200	2.0	3.000	3.0	7.000	4.5
0.200	1.7	1.400	2.1	3.500	3.3	7.500	4.7
0.300	1.8	1.600	2.3	4.000	3.5	8.000	4.8
0.400	1.7	1.800	2.4	4.500	3.7	8.500	5.0
0.500	1.6	2.000	2.5	5.000	3.9	9.000	5.1
0.600	1.5	2.200	2.6	5.500	4.0	9.500	5.2
0.800	1.7	2.400	2.7	6.000	4.2		
1.000	1.8	2.600	2.8	6.500	4.4		

Storage Structures for Car Park

Porous Car Park Manhole: S1, DS/PN: S1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	28.0
Membrane Percolation (mm/hr)	1000	Length (m)	21.0
Max Percolation (l/s)	163.3	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.075	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: SJCT, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	16.2
Membrane Percolation (mm/hr)	1000	Length (m)	21.0
Max Percolation (l/s)	94.5	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.160	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S2, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	13.6
Membrane Percolation (mm/hr)	1000	Length (m)	28.0
Max Percolation (l/s)	105.8	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.255	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: Sjct 2, DS/PN: S1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	14.0
Membrane Percolation (mm/hr)	1000	Length (m)	28.0
Max Percolation (l/s)	108.9	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.575	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S3, DS/PN: S1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	21.5
Membrane Percolation (mm/hr)	1000	Length (m)	13.0
Max Percolation (l/s)	77.6	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.888	Cap Volume Depth (m)	0.225

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	240 Winter	1	+0%	1/30 Winter				91.141
S1.001	SJCT	60 Winter	1	+0%	1/30 Summer				91.153
S1.002	S2	60 Winter	1	+0%	1/30 Summer				91.184
S1.003	Sjct 2	60 Winter	1	+0%	1/15 Winter				91.203
S1.004	S3	60 Winter	1	+0%	1/15 Summer				91.201
S1.005	SFCMH1	60 Winter	1	+0%	1/15 Summer				91.195

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.056	0.000	0.20		1.6	SURCHARGED	
S1.001	SJCT	0.121	0.000	0.75		6.5	SURCHARGED*	
S1.002	S2	0.205	0.000	0.94		7.9	SURCHARGED	
S1.003	Sjct 2	0.294	0.000	0.87		7.6	SURCHARGED*	
S1.004	S3	0.362	0.000	0.36		4.8	SURCHARGED	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	SFCMH1	0.443	0.000	0.12		1.6	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	240 Winter	30	+0%	1/30 Winter				91.284
S1.001	SJCT	240 Winter	30	+0%	1/30 Summer				91.282
S1.002	S2	30 Winter	30	+0%	1/30 Summer				91.336
S1.003	Sjct 2	15 Winter	30	+0%	1/15 Winter				91.594
S1.004	S3	15 Winter	30	+0%	1/15 Summer				91.700
S1.005	SFCMH1	15 Winter	30	+0%	1/15 Summer				91.700

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.199	0.000	0.23		1.9	SURCHARGED	
S1.001	SJCT	0.250	0.000	0.31		2.7	SURCHARGED*	
S1.002	S2	0.357	0.000	0.91		7.6	SURCHARGED	
S1.003	Sjct 2	0.685	0.000	1.29		11.3	SURCHARGED*	
S1.004	S3	0.861	0.000	0.70		9.2	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	SFCMH1	0.948	0.000	0.13		1.9	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	240 Winter	100	+0%	1/30 Winter				91.353
S1.001	SJCT	360 Winter	100	+0%	1/30 Summer				91.351
S1.002	S2	30 Winter	100	+0%	1/30 Summer				91.375
S1.003	Sjct 2	15 Winter	100	+0%	1/15 Winter				91.624
S1.004	S3	15 Winter	100	+0%	1/15 Summer				91.858
S1.005	SFCMH1	15 Winter	100	+0%	1/15 Summer				91.858

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.268	0.000	0.22		1.8	SURCHARGED	
S1.001	SJCT	0.319	0.000	0.21		1.8	SURCHARGED*	
S1.002	S2	0.396	0.000	0.98		8.2	SURCHARGED	
S1.003	Sjct 2	0.715	0.000	1.30		11.4	SURCHARGED*	
S1.004	S3	1.019	0.000	0.92		12.1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	SFCMH1	1.106	0.000	0.14		2.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.424
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	360 Winter	100	+40%	100/15 Summer	100/120 Winter		
S1.001	SJCT	600 Winter	100	+40%	100/15 Summer			
S1.002	S2	360 Winter	100	+40%	100/15 Summer			
S1.003	Sjct 2	30 Winter	100	+40%	100/15 Summer			
S1.004	S3	15 Winter	100	+40%	100/15 Summer			
S1.005	SFCMH1	15 Summer	100	+40%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	91.477	0.392	16.698	0.48		3.9	FLOOD	12
S1.001	SJCT	91.385	0.353	0.000	0.38		3.3	SURCHARGED*	
S1.002	S2	91.490	0.511	0.000	0.27		2.3	SURCHARGED	
S1.003	Sjct 2	91.658	0.749	0.000	1.14		10.0	SURCHARGED*	
S1.004	S3	91.908	1.069	0.000	1.10		14.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Car Park

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	SFCMH1	91.929	1.177	0.000	0.15		2.0	SURCHARGED	

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

WEB PROJECT
CLICK TO OPEN THIS PROJECT

Project

Project Name: VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657
Project Status: Complete
Project Date: 02/08/2021
Lanes Division: East Anglia

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Table of Contents

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Project Information

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Client

Company: VolkerFitzpatrick Limited
Contact: Lanes Slough
Department: Slough Trading Estate
Street: 686 Stirling Road
Town or City: Slough
County: Berkshire
Post Code: SL1 4ST

Site

Company: VolkerFitzpatrick Limited
Street: Butterfly Lane
Town or City: Elstree
County: Borehamwood
Post Code: WD6 3AF

Contractor

Company: Lanes Group plc
Description: East Anglia Depot
Contact: Gavin Potts
Department: Regional Manager
Street: 11 Chester Road,
Town or City: Eaton Socon, St Neots
County: Cambridgeshire
Post Code: PE19 8YT
Phone: 01480 262000
Email: eastangliaops@lanesfordrains.co.uk

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Project Information

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Project Summary

Dear Customer,

As requested, we have recently carried out a drainage CCTV survey at the site location and our full and detailed findings are contained in the attached CCTV report which you can review at your leisure.

We have identified the need for further works and will provide a quotation which will highlight the areas of concern, the most appropriate remedial technique and all associated costings.

We would like to take this opportunity to thank you for using Lanes Group plc and I hope we can be of service to you again soon. Please visit our website for full details of all services we can provide, follow us on social media or even share details of your customer experience with us:

www.lanesgroup.co.uk

If you require any technical assistance understanding the findings of the CCTV report then please contact us at:

Cctvsupport@lanesfordrains.co.uk

Kind regards,
Lanes Group plc

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Project Information

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Project Notes

CCTV reveals issues in pipe work

Section 4: 25% Hard/compact debris

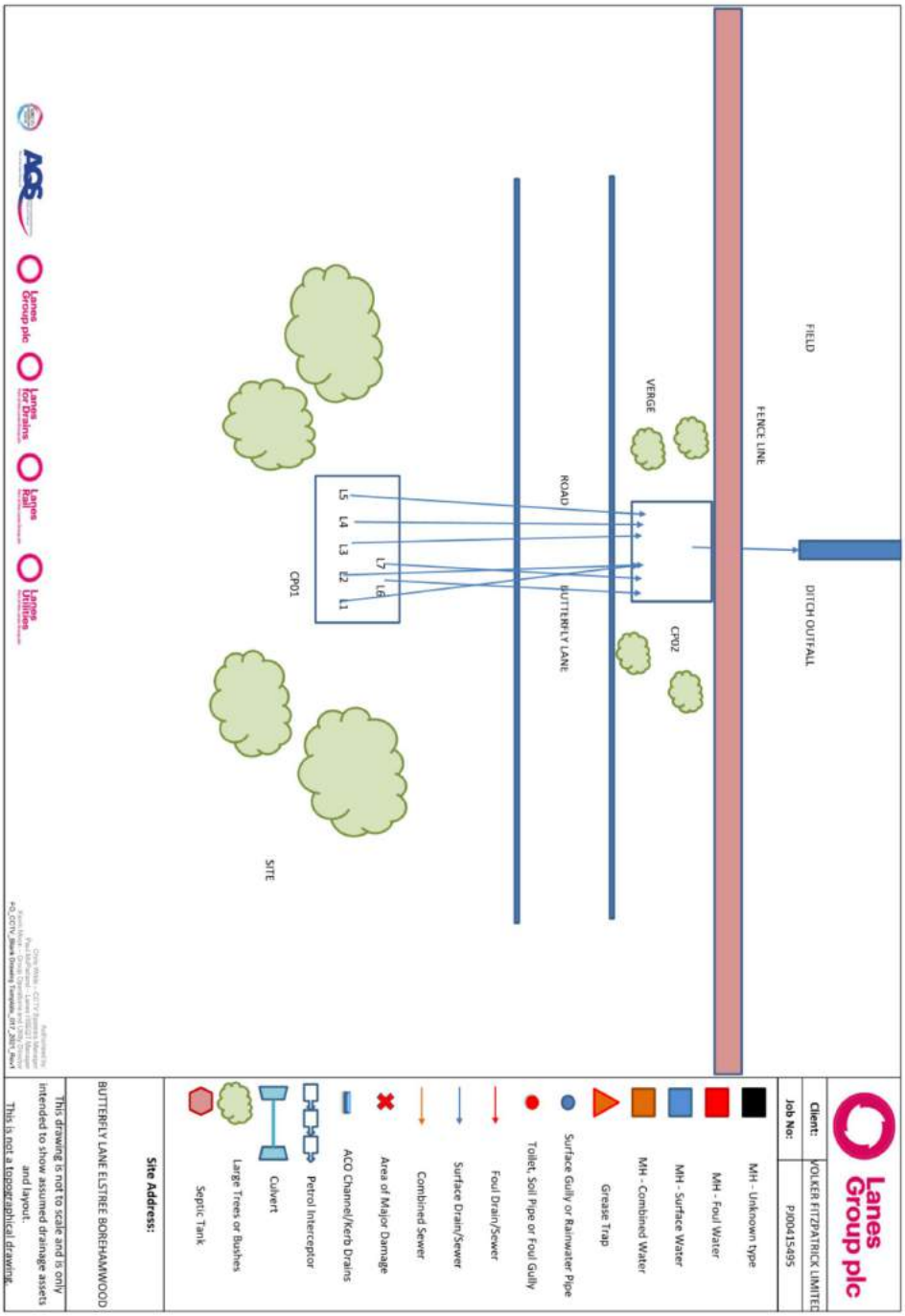
Section 5: 20% Coarse debris

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Project Information

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Project Drawing, Page 'Volkerfitzpatrick Limited - Butterfly Lane Elstree -



Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Project Pictures

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

210730_1035A-Survey

210730_1035B-Survey

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Profile

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Circular, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Pipe Material	Total Length	Inspected Length
10	Outfall	Outfall	02/08/2021	Butterfly Lane		0.00 m	0.00 m
9	Ditch	Ditch	02/08/2021	Butterfly Lane		0.00 m	0.00 m

Total: 2 Inspections x Circular 0 mm = 0.00 m Total Length and 0.00 m Inspected Length

Circular, 100 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Pipe Material	Total Length	Inspected Length
6	CP-01	L-06	02/08/2021	Butterfly Lane	Polyvinyl chloride	10.48 m	10.48 m
7	CP-01	L-07	02/08/2021	Butterfly Lane	Polyvinyl chloride	10.21 m	10.21 m

Total: 2 Inspections x Circular 100 mm = 20.69 m Total Length and 20.69 m Inspected Length

Circular, 150 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Pipe Material	Total Length	Inspected Length
1	CP01	L1	30/07/2021	Butterfly Lane	Polyvinyl chloride	10.44 m	10.44 m
2	CP01	L2	30/07/2021	Butterfly Lane	Polyvinyl chloride	12.04 m	12.04 m
3	CP01	L3	30/07/2021	Butterfly Lane	Polyvinyl chloride	12.08 m	12.08 m
4	CP01	L4	30/07/2021	Butterfly Lane	Polyvinyl chloride	11.57 m	11.57 m
5	CP-01	L-05	02/08/2021	Butterfly Lane	Polyvinyl chloride	11.08 m	11.08 m

Total: 5 Inspections x Circular 150 mm = 57.21 m Total Length and 57.21 m Inspected Length

Circular, 300 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Pipe Material	Total Length	Inspected Length
8	CP02	Downstream	30/07/2021	Butterfly Lane	Concrete	9.23 m	9.23 m

Total: 1 Inspection x Circular 300 mm = 9.23 m Total Length and 9.23 m Inspected Length

Total: 10 Inspections = 87.13 m Total Length and 87.13 m Inspected Length

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Summary

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

Number of sections	10
Total length of sections	87.13 m
Total length of inspected sections	87.13 m
Total length of abandoned inspections	0.00 m
Number of abandoned inspections	1
Number of section inspection photos	19
Number of section inspection videos	10
Number of section inspection scans	0
Number of section inclination measurements	0

PLR:	CP01X	**Upstream Node:**	CP01
Inspection Direction:	Downstream	**Downstream Node:**	L1
Inspected Length:	10.44 m	**Dia/Height:**	150 mm
Total Length:	10.44 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01
2	0.00	WL	Water level, 20% of the vertical dimension
3	10.44	CPF	Finish node, catchpit, reference: L1, Reached CP02

PLR:	CP01X	**Upstream Node:**	CP01
Inspection Direction:	Downstream	**Downstream Node:**	L2
Inspected Length:	12.04 m	**Dia/Height:**	150 mm
Total Length:	12.04 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01
2	0.00	WL	Water level, 10% of the vertical dimension
3	9.80	WL	Water level, 20% of the vertical dimension
4	11.69	CUW	Loss of vision, camera under water
5	12.04	CPF	Finish node, catchpit, reference: L2, Reached CP02

PLR:	CP01X	**Upstream Node:**	CP01
Inspection Direction:	Downstream	**Downstream Node:**	L3
Inspected Length:	12.08 m	**Dia/Height:**	150 mm
Total Length:	12.08 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01
2	0.00	WL	Water level, 20% of the vertical dimension
3	0.20	DEE	Attached deposits, encrustation from 2 o'clock to 10 o'clock, 10% cross-sectional area loss

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Summary

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

No.	m+	Code	Observation
4	10.00	WL	Water level, 40% of the vertical dimension
5	10.68	CUW	Loss of vision, camera under water
6	12.08	CPF	Finish node, catchpit, reference: L3, Reached CP02

PLR:	CP01X	**Upstream Node:**	CP01
Inspection Direction:	Downstream	**Downstream Node:**	L4
Inspected Length:	11.57 m	**Dia/Height:**	150 mm
Total Length:	11.57 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01
2	0.00	WL	Water level, 10% of the vertical dimension
3	10.74	WL	Water level, 30% of the vertical dimension
4	11.26	DECJ	Settled deposits, hard or compacted at joint, 25% cross-sectional area loss
5	11.57	CPF	Finish node, catchpit, reference: L4, Reached CP02

PLR:	CP-01X	**Upstream Node:**	CP-01
Inspection Direction:	Downstream	**Downstream Node:**	L-05
Inspected Length:	11.08 m	**Dia/Height:**	150 mm
Total Length:	11.08 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP-01
2	0.00	WL	Water level, 10% of the vertical dimension
3	1.18	WL	Water level, 5% of the vertical dimension
4	4.18	DER	Settled deposits, coarse, 20% cross-sectional area loss
5	5.87	DER	Settled deposits, coarse, 20% cross-sectional area loss, start
6	11.08	DER	Settled deposits, coarse, 20% cross-sectional area loss, finish
7	11.08	SA	Survey abandoned, Unable to pass debris

PLR:	CP-01X	**Upstream Node:**	CP-01
Inspection Direction:	Downstream	**Downstream Node:**	L-06
Inspected Length:	10.48 m	**Dia/Height:**	100 mm
Total Length:	10.48 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP-01
2	0.00	WL	Water level, 0% of the vertical dimension
3	9.02	DES	Settled deposits, fine, 5% cross-sectional area loss, start
4	10.48	DES	Settled deposits, fine, 5% cross-sectional area loss, finish
5	10.48	LHF	Finish node, lamphole, reference: L-06

PLR:	CP-01X	**Upstream Node:**	CP-01
Inspection Direction:	Downstream	**Downstream Node:**	L-07
Inspected Length:	10.21 m	**Dia/Height:**	100 mm
Total Length:	10.21 m	**Pipe Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP-01
2	0.00	WL	Water level, 0% of the vertical dimension

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Summary

Project Name	Project Date
VolkerFitzpatrick Limited - Butterfly Lane - PJ00415657	02/08/2021

No.	m+	Code	Observation
3	10.21	LHF	Finish node, lamphole, reference: L-07

PLR:	CP02X	**Upstream Node:**	CP02
Inspection Direction:	Downstream	**Downstream Node:**	Downstream
Inspected Length:	9.23 m	**Dia/Height:**	300 mm
Total Length:	9.23 m	**Pipe Material:**	Concrete

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP02
2	0.00	WL	Water level, 20% of the vertical dimension
3	9.23	OFF	Finish node, outfall, reference: Downstream, Reached ditch

PLR:	DitchX	**Upstream Node:**	Ditch
Inspection Direction:	0	**Downstream Node:**	Ditch
Inspected Length:	0.00 m	**Dia/Height:**	
Total Length:		**Pipe Material:**	

No.	m+	Code	Observation
1	0.00	REM	General remark, Look see of ditch area

PLR:	OutfallX	**Upstream Node:**	Outfall
Inspection Direction:	0	**Downstream Node:**	Outfall
Inspected Length:	0.00 m	**Dia/Height:**	
Total Length:		**Pipe Material:**	

No.	m+	Code	Observation
1	0.00	REM	General remark, Look see of outfall area

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 30/07/2021 - CP01X

Item No.	Inspection Direction	PLR	Insp. No.	Contractor`s Job Ref
1	Downstream	CP01X	1	PJ00415495

1, 00:00:01, 0.00 m
Start node, catchpit, reference: CP01

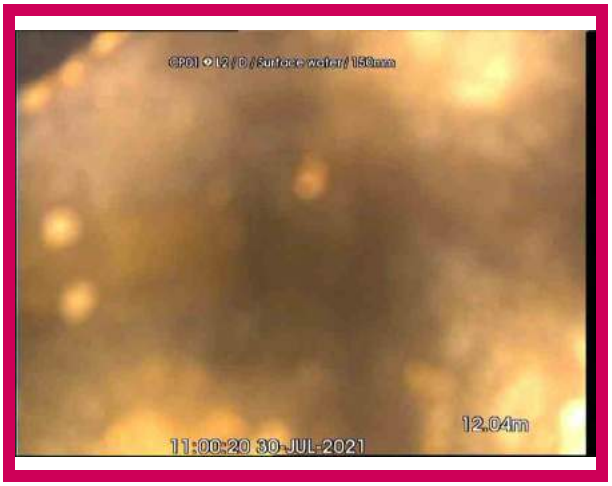
2, 00:00:37, 10.44 m
Finish node, catchpit, reference: L1, Reached CP02

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 30/07/2021 - CP01X

Item No.	Inspection Direction	PLR	Insp. No.	Contractor`s Job Ref
2	Downstream	CP01X	2	PJ00415495

1, 00:00:01, 0.00 m
Start node, catchpit, reference: CP01



2, 00:01:24, 12.04 m
Finish node, catchpit, reference: L2, Reached CP02

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 30/07/2021 - CP01X

Item No.	Inspection Direction	PLR	Insp. No.	Contractor`s Job Ref
3	Downstream	CP01X	3	PJ00415495

1, 0.00 m
Start node, catchpit, reference: CP01

2, 00:01:13, 12.08 m
Finish node, catchpit, reference: L3, Reached CP02

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 30/07/2021 - CP01X

Item No.	Inspection Direction	PLR	Insp. No.	Contractor`s Job Ref
4	Downstream	CP01X	4	PJ00415495

1, 00:00:01, 0.00 m
Start node, catchpit, reference: CP01

2, 00:00:58, 11.26 m
Settled deposits, hard or compacted at joint, 25% cross-sectional area loss

3, 00:02:23, 11.57 m
Finish node, catchpit, reference: L4, Reached CP02

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 02/08/2021 - CP-01X

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
5	Downstream	CP-01X	5	PJ00415657

1, 00:00:34, 4.18 m
Settled deposits, coarse, 20% cross-sectional area loss

2, 00:01:15, 5.87 m
Settled deposits, coarse, 20% cross-sectional area loss, start

3, 00:02:25, 11.08 m
Settled deposits, coarse, 20% cross-sectional area loss, finish

4, 00:02:25, 11.08 m
Survey abandoned, Unable to pass debris

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 02/08/2021 - CP-01X

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
6	Downstream	CP-01X	6	PJ00415657

1, 00:00:00, 0.00 m
Start node, catchpit, reference: CP-01

2, 00:00:33, 10.48 m
Finish node, lamphole, reference: L-06

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 02/08/2021 - CP-01X

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
7	Downstream	CP-01X	7	PJ00415657

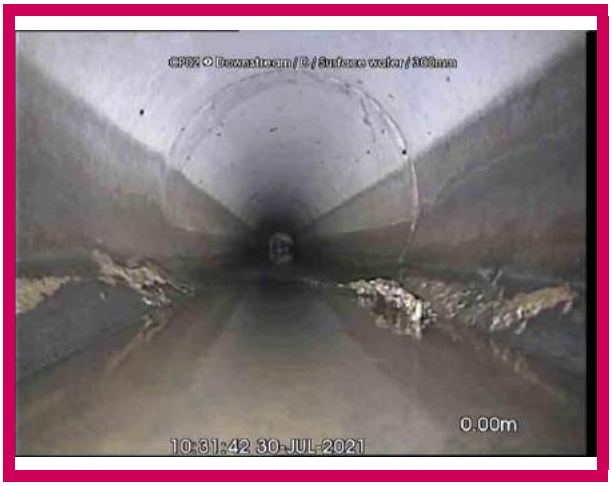
1, 00:00:00, 0.00 m
Start node, catchpit, reference: CP-01

2, 00:00:41, 10.21 m
Finish node, lamphole, reference: L-07

Lanes Group plc
11 Chester Road,, Eaton Socon, St Neots
Tel. 01480 262000
cctvsupport@lanesfordrains.co.uk

Section Pictures - 30/07/2021 - CP02X

Item No.	Inspection Direction	PLR	Insp. No.	Contractor`s Job Ref
8	Downstream	CP02X	8	PJ00415495



1, 00:00:01, 0.00 m
Start node, catchpit, reference: CP02

2, 00:01:25, 9.23 m
Finish node, outfall, reference: Downstream, Reached ditch

Lanes Group plc

West London
686 Stirling Road
Slough Trading Estate
Slough. SL1 4ST
Tel: 0333 344 9099
Email: sloughops@lanesgroup.co.uk

VOLKER FITZPATRICK LIMITED
RIVERPOINT HOUSE
LONDON ROAD
RIVERHEAD
SEVENOAKS
Kent
TN13 2DN

Quote Reference SL7672
Date 4/8/2021

Dear Ms Wasielewska,

RE: VOLKERFITZPATRICK LIMITED, Butterfly Lane, , Elstree, WD6 3AF

Thank you for your recent enquiry regarding works for the above mentioned site. I now have the pleasure in detailing my quotation and pricing schedule for your consideration.

Scope of works

Following our first visit on 2nd August to undertake a CCTV survey please see our recommendations for remedial works to take place.

To supply a 2800 gallon Jet / Vacuumation unit complete with two fully trained engineers. This unit has the ability to high-pressure water jet at a rate of 96 gallons per minute and has a vacuum capability of 850 CFM.

This is to remove all settled deposits in the lines.

We reserve the right to amend our quotation accordingly.

• Should high levels of toxic gas be located (as per gas monitors) during the course of the works then the programme may need to be extended.

• Parking and access are to be made available for the duration of the works

Cancellation Fee - If reserved units are cancelled within 48hrs before the agreed commencement date, then a cancellation fee of 50% of the value of the day's work may well apply.

Any waste arising from the cleansing works that requires removal from the site will be vacuumed and disposed of at a registered transfer station. We are unable to confirm waste costs at this time as volume and type of waste are currently unknown.

Lanes Group plc

West London
686 Stirling Road
Slough Trading Estate
Slough. SL1 4ST
Tel: 0333 344 9099
Email: sloughops@lanesgroup.co.uk

Indicative waste costs are detailed below

Sewage of waste - £75 per 1000 gallons or part there of

Solid/Silt Waste - £125 per tonne or part there of

hazardous Waste - Cost + 20%

Consignment note for hazardous waste - £65

Wash out for hazardous waste - £150

All prices are based on normal working hours (08.00hrs to 16.30hrs) Monday to Friday, weekend and out of hours work will be charged at an additional 30%.

The working areas will be guarded using signs, cones and barriers, as required.

Quote does not include for any traffic management costs if required

Conditions

• Subject to Lanes Group PLC standard terms and conditions which are attached. The terms and conditions can also be found on our website www.lanesfordrains.co.uk

Lanes Group plc

West London

686 Stirling Road
Slough Trading Estate
Slough. SL1 4ST
Tel: 0333 344 9099
Email: sloughops@lanesgroup.co.uk

We trust this meets with your approval and await your official instruction before proceeding with the works. In the meantime should you require any further assistance or additional information please do not hesitate to contact me.

Yours faithfully,

Oliver Sandrove
Area Development Manager - West London
Tel 0333 344 9099 Option 2
Oliver.Sandrove@lanesgroup.co.uk