PROPOSED PHASE 2 RESIDENTIAL DEVELOPMENT AT FORMER BAGULEYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL.

DRAINAGE STRATEGY REPORT

HAMILTON TECHNICAL SERVICES
1 CHILTERN AVE, EUXTON, CHORLEY, LANCS, PR7 6NU

ISSUE 2
2/8/2024
C-0995

Document Control Sheet

Proposed Phase 2 Residential Development on land at former Baguley's Garden centre, Midgeland road, Blackpool. FY4 5HE.

Drainage Strategy Report

Job	Date	Issue	Copy
C0995	06TH Jan 2022	1	
C0995	08th Feb 2024	2	

Originator……..G Hamilton… ……..

Checker……G Hamilton…… ..……..

Approver……G Hamilton…… …..……..

Contents

1. Introduction

1.1. Hamilton Technical Services have been commissioned by Mr Dennis Mackay of Denmac Holdings Ltd., to prepare a drainage report and design for Phase 2 of a residential development on land off Midgeland Road, Blackpool. The site is on land formerly known as Baguley's Garden centre.

1.2. The site comprises an area of land on the east side of Midgeland Road and to the west side of Stockydale Road. The site is presently set to rough ground, brambles and grass with some old concrete footings and with hedges to the southern and eastern boundaries.

1.3. The national grid reference for the site is 333434E, 432811N. A location plan is attached as **Figure 1** of this report.

2. Description of the existing site.

2.1. The site is bounded to the east by Stockydale Road beyond which lies residential land. To the north the site is bounded by further residential land part of which is a section of Phase 1 of the development. To the west the site is bounded by the remainder of Phase 1 of the development and older residential properties leading to Midgeland road. The southern boundary is to more residential properties and a southerly section of Stockydale Road.

2.2. Consultation of the extensive site investigations carried out as part of the Phase 1 planning application indicate the site to be underlain by clay soils and to be naturally wet with impeded drainage. Further site investigation was been undertaken by means of a set of three boreholes and site walkover. That appraisal confirms the findings that exclude infiltration as a means of surface water disposal for the development of Phase 1. A copy of the borehole logs is contained in **Appendix 3** of this report.

2.3. A watercourse exists close to the northwest corner of the development boundary; however this watercourse is shallow, overgrown and intermittent in places and is not suitable for the discharge of surface water run-off. As part of the planning application process for Phase 1 of the development, agreement was reached with United Utilities for the surface water run-off from the site to be discharged into the public surface water sewer in Midgeland Road.

2.4. As part of the site investigations for Phase 2 of the development two trial pits have been excavated to determine whether infiltration was an option for surface water disposal on this phase. The location of these pits is shown on **Figure 2** of this report. The percolation tests were a failure as the water placed into the pits did not dissipate into the ground. A set of phots showing the pits before being filled with water and on the following morning are attached as **Figures 3 – 6** of this report.

2.5. A copy of the percolation test results is also contained in **Appendix 3** of this report.

2.6. Infiltration is not a viable option, there is no suitable watercourse within or adjacent to the site to which surface water can be discharged. The only viable option is to discharge run-off to the public surface water sewer in Midgeland Road, through the existing drainage serving Phase 1 of the development.

2.7. As part of the construction of Phase 1 of the development separate systems for foul and surface water drainage were installed. The surface water system included a large attenuation tank to which the run-off from Phase 2 was to be discharged when development commenced on Phase 2. A plan showing the drainage installed at Phase 1 is attached as **Figure 2** of this report.

2.8. The foul drainage system installed for Phase 1 was designed to accept only the run-off from Phase 1. The foul water run-off from Phase 2 is to be discharged into the public combined sewer in Stockydale Road on the eastern site boundary.

2.9. Surface water from Phase 2 will be discharged to the attenuation system already installed and incorporating a reduced discharge through an orifice fitted in the manhole immediately downstream of the attenuation tank.

3. Proposals for Development

3.1. The development of the site will consist of the regrading of the site in many areas. The extension of the Phase 1 road system network. The construction of the new drainage works and the construction of five detached bungalows with garages drives and parking. The communal areas of the site will be landscaped. A plan showing the proposed site layout is attached as **Figure 7** of this report.

3.2. The surface water run-off from the developed site will drain into the existing attenuation tank from where it will outfall into the existing Phase 1 drainage system at a controlled rate. Foul water run-off will be discharged into the existing public sewer located just outside the site boundary in Stockydale Road at the existing UU MH 4801.

3.3. The outlet chamber from the attenuation system contains a flow restriction orifice of 50mm diameter to minimise the discharge rates from the new phase of development to the minimum practical flow rates. A plan showing the proposed drainage layout for Phase 2 is attached as **Figure 8** of this report.

3.4. A series of flow simulation calculations has been completed using Micro Drainage software and these calculations show the maximum flow rates from Phase 2 will be limited as follows. The maximum flow rate during a 1 in 1 Yr storm will be 1.40 l/s; during a 1 in 2 Yr storm it will be 1.60 l/s; during a 1 in 30 Yr storm it will be 2.90 l/s and during a 1 in 100 Yr storm it will be 3.70 l/s.

3.5. These calculations include an allowance for climate change of 40% rainfall increase and an allowance of 10% for urban creep. A plan showing the catchment areas used in the calculations is attached as **Figure 9** of this report and a selection of the calculations is contained in **Appendix 1** of this report.

3.6. These calculations show that the attenuation and control system will not result in any surface flooding or exceedance flows and therefore will not increase any risk of flooding on or beyond the Phase 2 site boundaries.

3.7. The developer has also been giving consideration to the possibility of adding one further dwelling to the development at some time in the future. We have therefore taken this into consideration in the verification of the design of the surface water system serving Phase 2 of the development.

3.8. To this end, a further series of storm simulation calculations has been completed with the additional plot taken into account. A “provisional” drainage layout plan has been attached as **Figure 10** of this report and also a SW catchment plan is attached as **Figure 11.**

3.9. This series of flow simulation calculations has been completed showing the maximum flow rates from Phase 2 will be limited as follows. The maximum flow rate during a 1 in 1 Yr storm will be 1.50 l/s; during a 1 in 2 Yr storm it will be 1.70 l/s; during a 1 in 30 Yr storm it will be 3.10 l/s and during a 1 in 100 Yr storm it will be 3.90 l/s.

3.10. Again, these calculations show that there will be no surface flooding or exceedance flows generated by the surface water system for Phase 2.

4. Maintenance

4.1. The maintenance and any necessary repairs to the roads, landscaping and drainage systems will be carried out by the site management company that looks after the Phase 1 development. The new dwellings will be signed up to this management company

4.2. The drainage systems will be inspected at six month intervals and any necessary cleaning or repair works will be carried out immediately.

4.3. The funding for the management company will be through an annual maintenance fee paid by each dwelling belonging to the scheme.

5. Conclusions

5.1. The development of the site can be completed in a safe and sustainable manner that will reduce the risk of flooding within and outside the site.

5.2. The surface water drainage serving the developed site has been designed to accommodate the predicted changes in rainfall due to climate change and urban creep for the 100 yr lifetime of the development.

Figures;

Figure 1 – Site Location Plan
Figure 2 - Existing Site Drainage Plan
Figure 3 – Photo of T Pit 1 excavated
Figure 4 – Photo of T Pit 2 excavated
Figure 5 – Photo of T Pit 1 failure
Figure 6 – Photo of T Pit 2 failure
Figure 7 – Proposed Site Layout Plan
Figure 8 – Proposed Site Drainage Plan
Figure 9 – Surface Water Catchment Areas Plan
Figure 10 – Provisional Drainage Plan 6 Plots
Figure 11 – Provisional SW Catchment Areas Plan 6 Plots

Appendix 1 – Surface Water Storm Simulation Calcs. Ph 2.
Appendix 2 - SW Storm Calculations Ph 2 6 Plots
Appendix 3 – Borehole Logs and Percolation Test Results

Rev.	Amendment	Date	By / Chk
B	- Red and blue line amended.	20/09/21	JB / AC
A	- Red and blue line amended.	20/09/21	JB / AC
\	- Initial issue.	26/02/19	JB / AC

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Project
New Residential Scheme,
Land off Midgeland Road,
Blackpool

Client
Mr. D. McKay

Drawing Title
Site Location Plan

Status
PLANNING

Scale
1:1250 @ A3

Drawn By
JB

Date
20/02/2019

Drawing Number
JBA363-PL-001

Revision
B

Rev	Details	By	Date
A	WATERCOURSE ADDED	RGH	07.20.2024

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Client: DENNIS MACKAY DENMAC HOLDINGS LTD.

Project: PHASE 2, FORMER BAGULEYS GARDEN CENTRE MIDGELAND ROAD, BLACKPOOL

Title: EXISTING PHASE 1 DRAINAGE LAYOUT PLAN

Proj. No. C - 0995 - 01 | Rev. A | Date 05.01.2022 | Drawn RGH | Scale 1:500@A1 | Check RGH

MATERIALS KEY

A = Hanson Rannock Red Multi facing brick

B = K-Rend Champagne to all elevations

C = Marley Modern Anthracite roof tiles

Plot 12 =	A; C
Plot 13 =	B; C
Plot 14 =	A; C
Plot 15 =	B; C
Plot 16 =	A; C
Plot 17 =	A; C
~~Plot 18 =~~	~~B; C~~

Rev.	Amendment	Date	By / Chk
J	- Garage position amended. - Indicative drainage added.	04/12/23	JB
H	- Unit 17 added. - POS updated.	14/11/23	JB / LS
G	- Kerbline amended. - POS updated.	28/02/22	JB / AC
F	- POS updated.	18/01/22	JB / AC
E	- Revision cloud removed.	10/01/22	JB / AC
D	- Unit removed. - POS amended. - Landscaping amended.	11/11/21	JB / AC
C	- Hedgerow position adjacent Stockydale Road amended.	08/11/21	JB / AC
B	- Unit removed. - POS enlarged. - Rear gardens to units 13-17 enlarged. - Outline of Unit 8 added.	04/11/21	JB / AC
A	- Garage positions amended.	26/10/21	JB / AC
\	- Initial issue.	14/09/21	JB / AC

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Project
New Residential Scheme,
Land off Midgeland Road,
Blackpool

Client
Mr. D. McKay

Drawing Title
Proposed External Materials

Status
PLANNING

Scale
1:500 @ A1

Drawn By
JB

Date
14/09/2021

Drawing Number
JBA363-PL-020

Revision
J

Rev	Details	By	Date
A	PERCOLATION TEST LOCATIONS ADDED	RGH	07.20.2024

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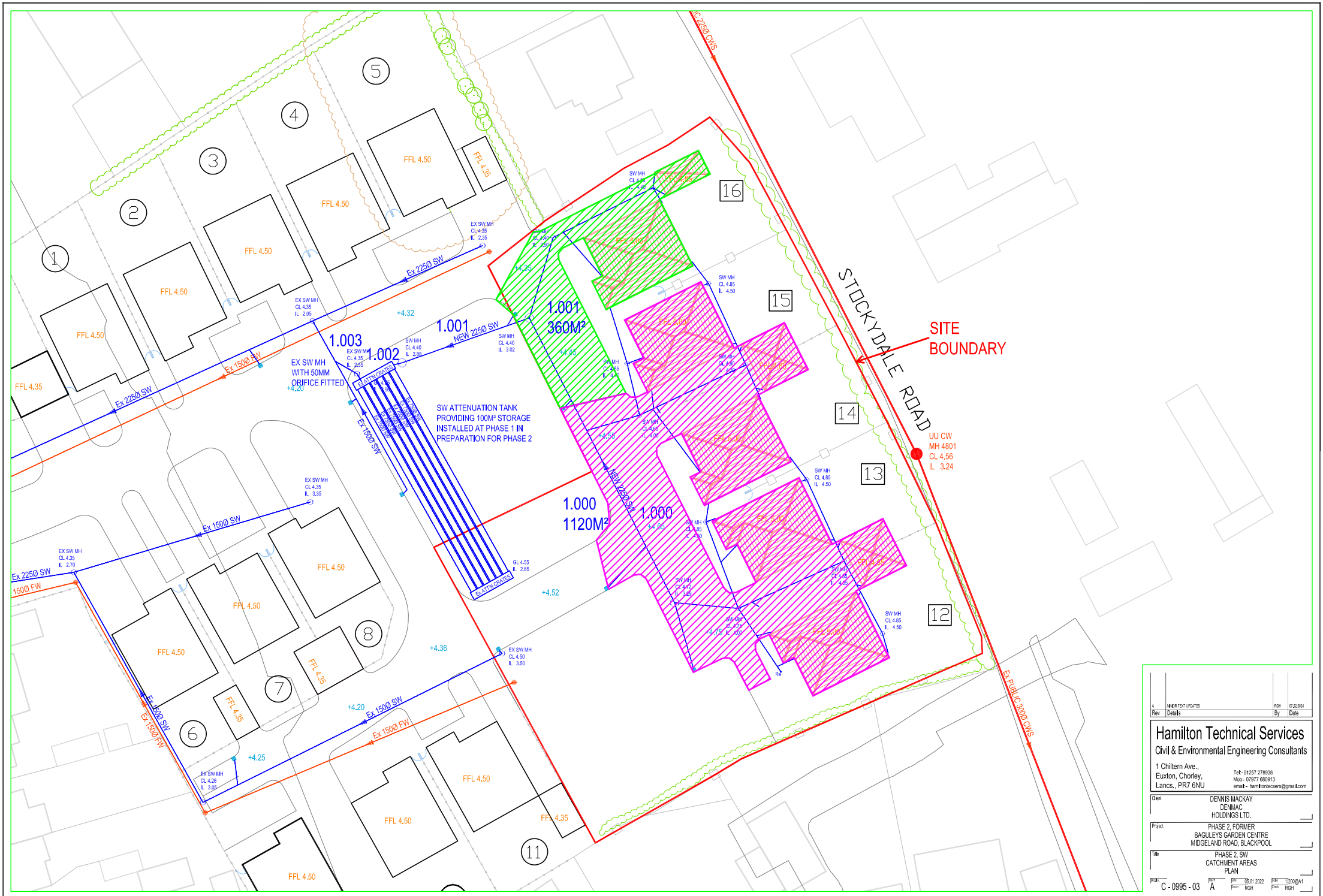
Project: PHASE 2, FORMER BAGULEYS GARDEN CENTRE MIDGELAND ROAD, BLACKPOOL

Title: PROPOSED PHASE 2 DRAINAGE LAYOUT PLAN

Proj. No. C - 0995 - 02 | Rev. A | Date 05.01.2022 | Drawn RGH | Scale 1:200@A1 | Check RGH



Rev	Details	By	Date
A	MINOR TEXT UPDATES	RGH	07.20.2024

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Client: DENNIS MACKAY DENMAC HOLDINGS LTD.

Project: PHASE 2, FORMER BAGULEYS GARDEN CENTRE MIDGELAND ROAD, BLACKPOOL

Title: PHASE 2, SW CATCHMENT AREAS PLAN

Proj. No.: C - 0995 - 03
Rev: A
Date: 05.01.2022
Drawn: RGH
Scale: 1:200@A1
Check: RGH

Rev	Details	By	Date
-	-	-	-

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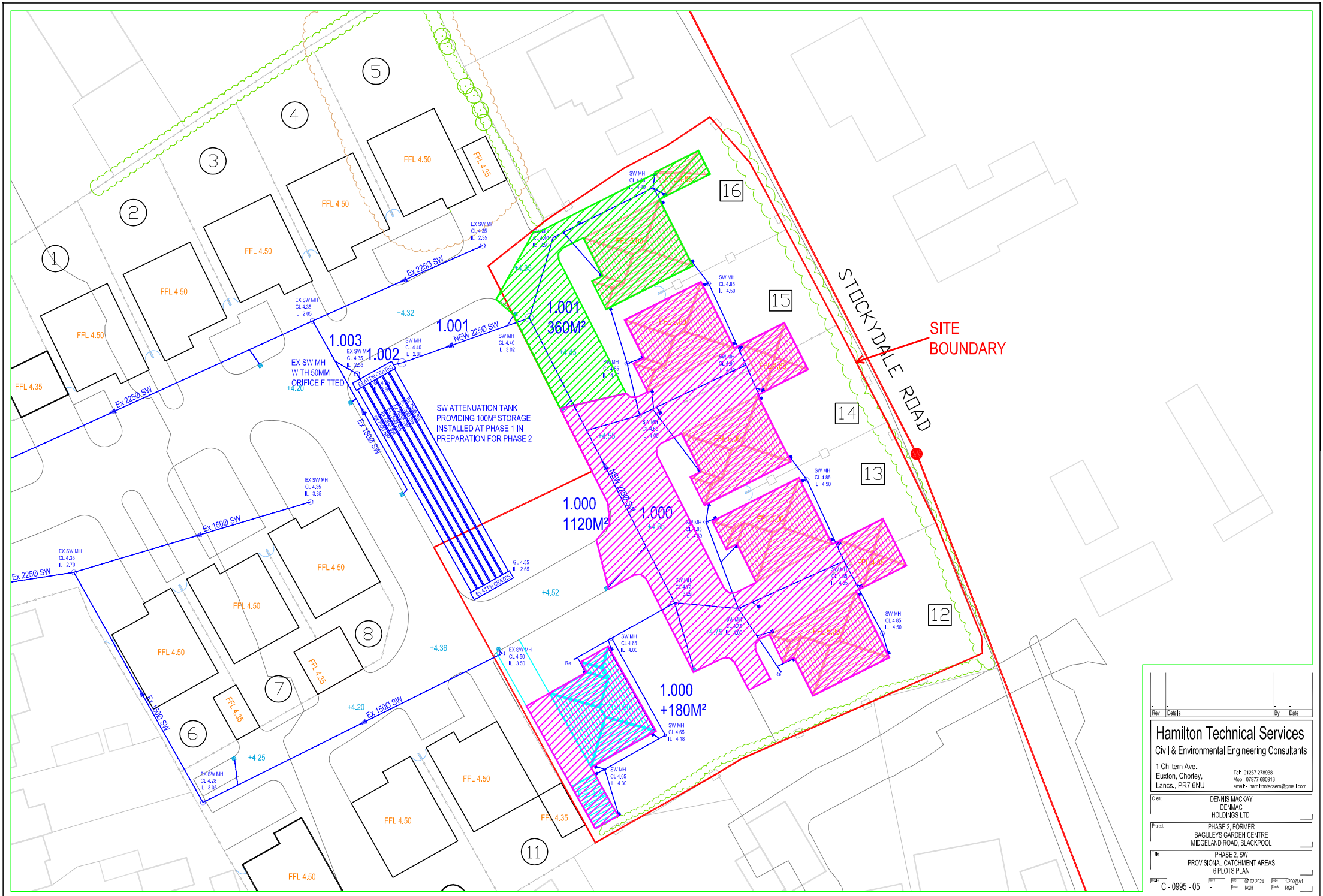
Client: DENNIS MACKAY DENMAC HOLDINGS LTD.

Project: PHASE 2, FORMER BAGULEYS GARDEN CENTRE MIDGELAND ROAD, BLACKPOOL

Title: PROPOSED PHASE 2 PROVISIONAL DRAINAGE LAYOUT 6 PLOTS PLAN

Proj. No. C - 0995 - 04 | Rev - | Date 07.02.2024 | Scale 1:200@A1 | Drawn RGH | Check RGH



Rev	Details	By	Date
-	-	-	-

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Client: DENNIS MACKAY DENMAC HOLDINGS LTD.

Project: PHASE 2, FORMER BAGULEYS GARDEN CENTRE MIDGELAND ROAD, BLACKPOOL

Title: PHASE 2, SW PROVISIONAL CATCHMENT AREAS 6 PLOTS PLAN

Proj. No.: C - 0995 - 05 | Rev: - | Date: 07.02.2024 | Drawn: RGH | Scale: 1:200@A1 | Check: RGH

Land at former Baguleys Garden centre, Midgeland Road, Blackpool.

Appendix 1

SW Run-off Simulation Calculations – 5 Plots

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

STORM SEWER DESIGN by the Modified Rational Method

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)
1.000	39.560	0.270	146.5	0.112	4.00	0.0	0.600	o	225
1.001	16.690	0.140	119.2	0.036	0.00	0.0	0.600	o	225
1.002	6.000	0.330	18.2	0.000	0.00	0.0	0.600	o	225
1.003	3.200	0.300	10.7	0.000	0.00	0.0	0.600	o	150

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)
1.000	0.00	4.61	3.290	0.112	0.0	0.0	0.0	1.08	42.9	0.0
1.001	0.00	4.84	3.020	0.148	0.0	0.0	0.0	1.20	47.6	0.0
1.002	0.00	4.88	2.880	0.148	0.0	0.0	0.0	3.08	122.6	0.0
1.003	0.00	4.89	2.550	0.148	0.0	0.0	0.0	3.10	54.8	0.0

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.382	-0.133	0.000	0.34	0.0	14.0	OK
1.001	S2	3.122	-0.123	0.000	0.41	0.0	17.6	OK
1.002	S3	2.951	-0.154	0.000	0.22	0.0	17.6	OK
1.003	S4	2.612	-0.088	0.000	0.03	0.0	0.9	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

STORM SEWER DESIGN by the Modified Rational Method

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)
1.000	39.560	0.270	146.5	0.112	4.00	0.0	0.600	o	225
1.001	16.690	0.140	119.2	0.036	0.00	0.0	0.600	o	225
1.002	6.000	0.330	18.2	0.000	0.00	0.0	0.600	o	225
1.003	3.200	0.300	10.7	0.000	0.00	0.0	0.600	o	150

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)
1.000	0.00	4.61	3.290	0.112	0.0	0.0	0.0	1.08	42.9	0.0
1.001	0.00	4.84	3.020	0.148	0.0	0.0	0.0	1.20	47.6	0.0
1.002	0.00	4.88	2.880	0.148	0.0	0.0	0.0	3.08	122.6	0.0
1.003	0.00	4.89	2.550	0.148	0.0	0.0	0.0	3.10	54.8	0.0

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.369	-0.146	0.000	0.26	0.0	10.8	OK
1.001	S2	3.108	-0.137	0.000	0.33	0.0	13.9	OK
1.002	S3	2.942	-0.163	0.000	0.17	0.0	13.8	OK
1.003	S4	2.629	-0.071	0.000	0.04	0.0	1.2	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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1.003	3.200	0.300	10.7	0.000	0.00	0.0	0.600	o	150

Network Results Table

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1.001	0.00	4.84	3.020	0.148	0.0	0.0	0.0	1.20	47.6	0.0
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Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

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Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.354	-0.161	0.000	0.18	0.0	7.3	OK
1.001	S2	3.092	-0.153	0.000	0.23	0.0	9.6	OK
1.002	S3	2.931	-0.174	0.000	0.12	0.0	9.6	OK
1.003	S4	2.643	-0.057	0.000	0.04	0.0	1.4	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.396	-0.119	0.000	0.45	0.0	18.1	OK
1.001	S2	3.138	-0.107	0.000	0.54	0.0	22.7	OK
1.002	S3	2.961	-0.144	0.000	0.28	0.0	22.8	OK
1.003	S4	2.630	-0.070	0.000	0.04	0.0	1.2	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.381	-0.134	0.000	0.34	0.0	13.9	OK
1.001	S2	3.122	-0.123	0.000	0.42	0.0	17.9	OK
1.002	S3	2.952	-0.153	0.000	0.22	0.0	17.9	OK
1.003	S4	2.652	-0.048	0.000	0.04	0.0	1.4	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.363	-0.152	0.000	0.23	0.0	9.4	OK
1.001	S2	3.102	-0.143	0.000	0.29	0.0	12.2	OK
1.002	S3	2.938	-0.167	0.000	0.15	0.0	12.2	OK
1.003	S4	2.670	-0.030	0.000	0.05	0.0	1.6	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.693	0.178	0.000	1.10	0.0	44.7	SURCHARGED
1.001	S2	3.355	0.110	0.000	1.35	0.0	57.0	SURCHARGED
1.002	S3	3.021	-0.084	0.000	0.71	0.0	57.1	OK
1.003	S4	2.765	0.065	0.000	0.07	0.0	2.3	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.485	-0.030	0.000	0.89	0.0	36.3	OK
1.001	S2	3.270	0.025	0.000	1.12	0.0	47.3	SURCHARGED
1.002	S3	3.004	-0.101	0.000	0.58	0.0	47.3	OK
1.003	S4	2.828	0.128	0.000	0.08	0.0	2.6	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.418	-0.097	0.000	0.61	0.0	24.9	OK
1.001	S2	3.170	-0.075	0.000	0.78	0.0	32.9	OK
1.002	S3	2.980	-0.125	0.000	0.41	0.0	32.9	OK
1.003	S4	2.886	0.186	0.000	0.08	0.0	2.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	4.034	0.519	0.000	1.37	0.0	55.7	SURCHARGED
1.001	S2	3.510	0.265	0.000	1.71	0.0	72.2	SURCHARGED
1.002	S3	3.047	-0.058	0.000	0.89	0.0	72.0	OK
1.003	S4	2.828	0.128	0.000	0.08	0.0	2.6	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.731	0.216	0.000	1.13	0.0	45.9	SURCHARGED
1.001	S2	3.377	0.132	0.000	1.42	0.0	60.0	SURCHARGED
1.002	S3	3.025	-0.080	0.000	0.74	0.0	59.9	OK
1.003	S4	2.915	0.215	0.000	0.09	0.0	3.0	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.444	-0.071	0.000	0.81	0.0	32.7	OK
1.001	S2	3.220	-0.025	0.000	1.00	0.0	42.3	OK
1.002	S3	2.998	-0.107	0.000	0.52	0.0	42.3	OK
1.003	S4	2.995	0.295	0.000	0.10	0.0	3.4	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	120
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.404	-0.111	0.000	0.51	0.0	20.7	OK
1.001	S2	3.152	-0.093	0.000	0.65	0.0	27.4	OK
1.002	S3	3.055	-0.050	0.000	0.34	0.0	27.4	OK
1.003	S4	3.051	0.351	0.000	0.10	0.0	3.6	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	240
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.376	-0.139	0.000	0.31	0.0	12.6	OK
1.001	S2	3.118	-0.127	0.000	0.39	0.0	16.7	OK
1.002	S3	3.070	-0.035	0.000	0.21	0.0	16.7	OK
1.003	S4	3.067	0.367	0.000	0.11	0.0	3.7	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	300
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 300 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.368	-0.147	0.000	0.26	0.0	10.7	OK
1.001	S2	3.109	-0.136	0.000	0.33	0.0	14.1	OK
1.002	S3	3.065	-0.040	0.000	0.17	0.0	14.1	OK
1.003	S4	3.062	0.362	0.000	0.11	0.0	3.6	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	480
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 480 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.355	-0.160	0.000	0.18	0.0	7.5	OK
1.001	S2	3.093	-0.152	0.000	0.23	0.0	9.9	OK
1.002	S3	3.039	-0.066	0.000	0.12	0.0	9.9	OK
1.003	S4	3.036	0.336	0.000	0.10	0.0	3.5	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.120	4-8	0.028

Total Area Contributing (ha) = 0.148

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	600
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 600 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.349	-0.166	0.000	0.15	0.0	6.3	OK
1.001	S2	3.087	-0.158	0.000	0.20	0.0	8.3	OK
1.002	S3	3.017	-0.088	0.000	0.10	0.0	8.3	OK
1.003	S4	3.014	0.314	0.000	0.10	0.0	3.5	SURCHARGED

Land at former Baguleys Garden centre, Midgeland Road, Blackpool.

Appendix 2

SW Run-off Simulation Calculations – 6 Plots

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m^3) = 2.532

STORM SEWER DESIGN by the Modified Rational Method

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)
1.000	39.560	0.270	146.5	0.130	4.00	0.0	0.600	o	225
1.001	16.690	0.140	119.2	0.036	0.00	0.0	0.600	o	225
1.002	6.000	0.330	18.2	0.000	0.00	0.0	0.600	o	225
1.003	3.200	0.300	10.7	0.000	0.00	0.0	0.600	o	150

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)
1.000	0.00	4.61	3.290	0.130	0.0	0.0	0.0	1.08	42.9	0.0
1.001	0.00	4.84	3.020	0.166	0.0	0.0	0.0	1.20	47.6	0.0
1.002	0.00	4.88	2.880	0.166	0.0	0.0	0.0	3.08	122.6	0.0
1.003	0.00	4.89	2.550	0.166	0.0	0.0	0.0	3.10	54.8	0.0

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.390	-0.125	0.000	0.40	0.0	16.2	OK
1.001	S2	3.129	-0.116	0.000	0.47	0.0	19.8	OK
1.002	S3	2.955	-0.150	0.000	0.25	0.0	19.9	OK
1.003	S4	2.619	-0.081	0.000	0.03	0.0	1.1	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.376	-0.139	0.000	0.31	0.0	12.5	OK
1.001	S2	3.114	-0.131	0.000	0.37	0.0	15.6	OK
1.002	S3	2.947	-0.158	0.000	0.19	0.0	15.6	OK
1.003	S4	2.638	-0.062	0.000	0.04	0.0	1.3	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.360	-0.155	0.000	0.21	0.0	8.5	OK
1.001	S2	3.097	-0.148	0.000	0.25	0.0	10.8	OK
1.002	S3	2.934	-0.171	0.000	0.13	0.0	10.8	OK
1.003	S4	2.655	-0.045	0.000	0.04	0.0	1.5	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.406	-0.109	0.000	0.52	0.0	21.0	OK
1.001	S2	3.147	-0.098	0.000	0.61	0.0	25.6	OK
1.002	S3	2.967	-0.138	0.000	0.32	0.0	25.7	OK
1.003	S4	2.640	-0.060	0.000	0.04	0.0	1.3	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.389	-0.126	0.000	0.40	0.0	16.1	OK
1.001	S2	3.129	-0.116	0.000	0.48	0.0	20.1	OK
1.002	S3	2.956	-0.149	0.000	0.25	0.0	20.1	OK
1.003	S4	2.664	-0.036	0.000	0.05	0.0	1.6	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
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	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.369	-0.146	0.000	0.27	0.0	10.9	OK
1.001	S2	3.108	-0.137	0.000	0.32	0.0	13.7	OK
1.002	S3	2.942	-0.163	0.000	0.17	0.0	13.8	OK
1.003	S4	2.685	-0.015	0.000	0.05	0.0	1.7	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.840	0.325	0.000	1.25	0.0	50.8	SURCHARGED
1.001	S2	3.409	0.164	0.000	1.47	0.0	62.4	SURCHARGED
1.002	S3	3.030	-0.075	0.000	0.78	0.0	62.9	OK
1.003	S4	2.791	0.091	0.000	0.07	0.0	2.4	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.589	0.074	0.000	1.01	0.0	41.2	SURCHARGED
1.001	S2	3.305	0.060	0.000	1.23	0.0	52.0	SURCHARGED
1.002	S3	3.011	-0.094	0.000	0.64	0.0	51.8	OK
1.003	S4	2.863	0.163	0.000	0.08	0.0	2.8	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.431	-0.084	0.000	0.71	0.0	29.0	OK
1.001	S2	3.183	-0.062	0.000	0.87	0.0	36.9	OK
1.002	S3	2.986	-0.119	0.000	0.46	0.0	36.9	OK
1.003	S4	2.928	0.228	0.000	0.09	0.0	3.1	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	4.261	0.746	0.000	1.54	0.0	62.8	SURCHARGED
1.001	S2	3.599	0.354	0.000	1.87	0.0	79.3	SURCHARGED
1.002	S3	3.059	-0.046	0.000	0.98	0.0	79.1	OK
1.003	S4	2.863	0.163	0.000	0.08	0.0	2.8	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.903	0.388	0.000	1.29	0.0	52.6	SURCHARGED
1.001	S2	3.442	0.197	0.000	1.57	0.0	66.5	SURCHARGED
1.002	S3	3.036	-0.069	0.000	0.82	0.0	66.2	OK
1.003	S4	2.960	0.260	0.000	0.09	0.0	3.2	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.501	-0.014	0.000	0.92	0.0	37.4	OK
1.001	S2	3.271	0.026	0.000	1.12	0.0	47.5	SURCHARGED
1.002	S3	3.054	-0.051	0.000	0.59	0.0	47.5	OK
1.003	S4	3.050	0.350	0.000	0.10	0.0	3.6	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	120
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.415	-0.100	0.000	0.59	0.0	24.1	OK
1.001	S2	3.163	-0.082	0.000	0.73	0.0	30.7	OK
1.002	S3	3.119	0.014	0.000	0.38	0.0	30.7	SURCHARGED
1.003	S4	3.116	0.416	0.000	0.11	0.0	3.8	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	180
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.395	-0.120	0.000	0.44	0.0	18.1	OK
1.001	S2	3.142	-0.103	0.000	0.55	0.0	23.1	OK
1.002	S3	3.135	0.030	0.000	0.29	0.0	23.1	SURCHARGED
1.003	S4	3.131	0.431	0.000	0.11	0.0	3.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	240
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.383	-0.132	0.000	0.36	0.0	14.6	OK
1.001	S2	3.146	-0.099	0.000	0.44	0.0	18.7	OK
1.002	S3	3.138	0.033	0.000	0.23	0.0	18.7	SURCHARGED
1.003	S4	3.134	0.434	0.000	0.11	0.0	3.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	360
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.368	-0.147	0.000	0.26	0.0	10.8	OK
1.001	S2	3.135	-0.110	0.000	0.32	0.0	13.8	OK
1.002	S3	3.127	0.022	0.000	0.17	0.0	13.7	SURCHARGED
1.003	S4	3.123	0.423	0.000	0.11	0.0	3.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	480
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 480 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.360	-0.155	0.000	0.21	0.0	8.7	OK
1.001	S2	3.115	-0.130	0.000	0.26	0.0	11.1	OK
1.002	S3	3.108	0.003	0.000	0.14	0.0	11.1	SURCHARGED
1.003	S4	3.104	0.404	0.000	0.11	0.0	3.8	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.134	4-8	0.032

Total Area Contributing (ha) = 0.166

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	600
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 600 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.354	-0.161	0.000	0.18	0.0	7.3	OK
1.001	S2	3.092	-0.153	0.000	0.22	0.0	9.3	OK
1.002	S3	3.084	-0.021	0.000	0.12	0.0	9.3	OK
1.003	S4	3.081	0.381	0.000	0.11	0.0	3.7	SURCHARGED

Land at former Baguleys Garden centre, Midgeland Road, Blackpool.

Appendix 3

Percolation Testing Results
Borehole Logs

SUB SURFACE
SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Standard Penetration Test Results

Site : BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE

Client : DENNIS MACKAY HOUSE BUILDER

Engineer:

Job Number 5949

Sheet 1 / 1

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
M1	1.00	1.15	1.45	SPT	0	0	0	0	2	3	N=5	
M1	2.00	2.15	2.45	SPT	3	4	4	6	6	6	N=22	
M1	3.00	3.15	3.45	SPT	2	3	5	4	5	7	N=21	
M1	4.00	4.15	4.45	SPT	2	3	4	6	6	7	N=23	
M1	5.00	5.15	5.45	SPT	2	3	4	5	5	4	N=18	
M2	1.00	1.15	1.45	SPT	2	2	2	3	3	4	N=12	
M2	2.00	2.15	2.45	SPT	3	3	4	5	6	8	N=23	
M2	3.00	3.15	3.45	SPT	4	3	5	5	5	7	N=22	
M2	4.00	4.15	4.45	SPT	2	4	4	5	6	8	N=23	
M2	5.00	5.15	5.45	SPT	2	4	4	4	5	5	N=18	
M3	1.00	1.15	1.45	SPT	2	2	2	3	3	5	N=13	
M3	2.00	2.15	2.45	SPT	4	4	4	5	5	5	N=19	
M3	3.00	3.15	3.45	SPT	3	2	3	4	5	7	N=19	
M3	4.00	4.15	4.45	SPT	2	3	3	4	5	6	N=18	

SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site	Borehole Number
BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE	M1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE	72mm to 2.00m 52mm to 5.00m		DENNIS MACKAY HOUSE BUILDER	5949
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	10/11/2014		1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	B			Seepage(1) at 0.40m.		(1.00)	Dark brown silty CLAY with roots and rootlets (TOPSOIL).		▽1
1.00-1.45 1.00-1.45 1.00-2.00	SPT N=5 D C			0,0/0,0,2,3 1.00m to 2.00m - 100% recovery		1.00	Soft low strength becoming stiff high strength brown and grey mottled slightly gravelly silty CLAY with plant and rootlet remains. Gravel is subangular to subrounded fine to coarse sandstone, mudstone and siltstone.		
				HV@1.60m, c=65kPa			.... at 1.60m : firm medium strength		
				HV@1.80m, c=80kPa					
2.00-2.45 2.00-2.45 2.00-3.00	SPT N=22 D B			3,4/4,6,6,6			.... below 2.00m : stiff high strength and occasional sand lenses		
				HP@2.00m, c=100kPa		(3.00)			
3.00-3.45 3.00-3.45 3.00-4.00	SPT N=21 D C			2,3/5,4,5,7 3.00m to 4.00m - 50% recovery					
4.00-4.45 4.00-4.45 4.00-5.00	SPT N=23 D C			2,3/4,6,6,7 4.00m to 5.00m - 50% recovery		4.00	Firm medium to high strength dark brown fine to coarse slightly gravelly silty CLAY. Gravel is subangular to subrounded mudstone, quartz and sandstone.		
5.00-5.45	SPT N=18			2,3/4,5,5,4		(1.45)			

Remarks
Hand dug inspection pit from GL to 1.00m to check for services - 1hr
C = Plastic lined core sample
HV = Hand Shear Vane test
HP = Hand Penetrometer test
Standing water at 0.20m
Perched water at 0.40m

Scale (approx)	Logged By
1:25	MDS.SJ

Figure No. 5949.M1

SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site	Borehole Number
BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE	M1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE	72mm to 2.00m 52mm to 5.00m		DENNIS MACKAY HOUSE BUILDER	5949
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	10/11/2014		2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
5.00-5.45	D			10/11/2014:0.20m		5.45	Firm medium to high strength dark brown fine to coarse slightly gravelly silty CLAY. Gravel is subangular to subrounded mudstone, quartz and sandstone.		
							Complete at 5.45m		

Remarks

Scale (approx)	Logged By
1:25	MDS.SJ

Figure No. 5949.M1

SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site	Borehole Number
BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE	M2

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE	83mm to 2.00m 62mm to 4.00m 52mm to 5.00m		DENNIS MACKAY HOUSE BUILDER	5949
	Location AS PLAN	**Dates** 10/11/2014	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.30	B					(0.30)	MADE GROUND: dark brown slightly gravelly slightly sandy silty clay with occasional silt lenses and occasional rootlets. Gravel sized fragments are subangular fine to coarse clinker, glass and stone.		
0.30-1.00	B			Seepage(1) at 0.30m.		0.30 (0.70)	Soft light brown slightly gravelly silty CLAY. Gravel is subangular fine mudstone.		▽1
1.00-1.45 1.00-1.45 1.00-2.00	SPT N=12 D C			2,2/2,3,3,4 1.00m to 2.00m - 100% recovery		1.00	Firm medium becoming high strength brown and occasional grey mottled slightly gravelly silty CLAY with occasional plant remains. Gravel is subangular to subrounded fine to medium mudstone and sandstone.		
				HV@1.60m, c=80kPa			.... below 1.60m : high strength		
				HV@1.80m, c=95kPa					
2.00-2.45 2.00-2.45 2.00-3.00	SPT N=23 D C			3,3/4,5,6,8 2.00m to 3.00m - 60% recovery		(2.00)			
				HV@2.50m, c=80kPa					
3.00-3.45 3.00-3.45 3.00-4.00	SPT N=22 D C			4,3/5,5,5,7 3.00m to 4.00m - 30% recovery		3.00	Firm high strength locally medium strength dark brown slightly gravelly silty CLAY with occasional bands of fine to coarse sand. Gravel is subangular to rounded fine to coarse sandstone, quartz and mudstone.		
4.00-4.45 4.00-4.45 4.00-5.00	SPT N=23 D C			2,4/4,5,6,8 4.00m to 5.00m - 50% recovery		(2.45)			
5.00-5.45	SPT N=18			2,4/4,4,5,5					

Remarks
Hand dug inspection pit from GL to 1.00m to check for services - 1hr
C = Plastic lined core sample
HV = Hand Shear Vane test
Perched water at 0.30m
Standing water at 0.30m

Scale (approx)	Logged By
1:25	MDS/SJ

Figure No. 5949.M2

SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site	Borehole Number
BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE	M2

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE	83mm to 2.00m 62mm to 4.00m 52mm to 5.00m		DENNIS MACKAY HOUSE BUILDER	5949
	Location AS PLAN	**Dates** 10/11/2014	**Engineer**	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
5.00-5.45	D			10/11/2014:0.30m		5.45	.... below 5.00m : medium strength Complete at 5.45m		

Remarks

Scale (approx)	Logged By
1:25	MDS/SJ

Figure No. 5949.M2

SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site	Borehole Number
BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE	M3

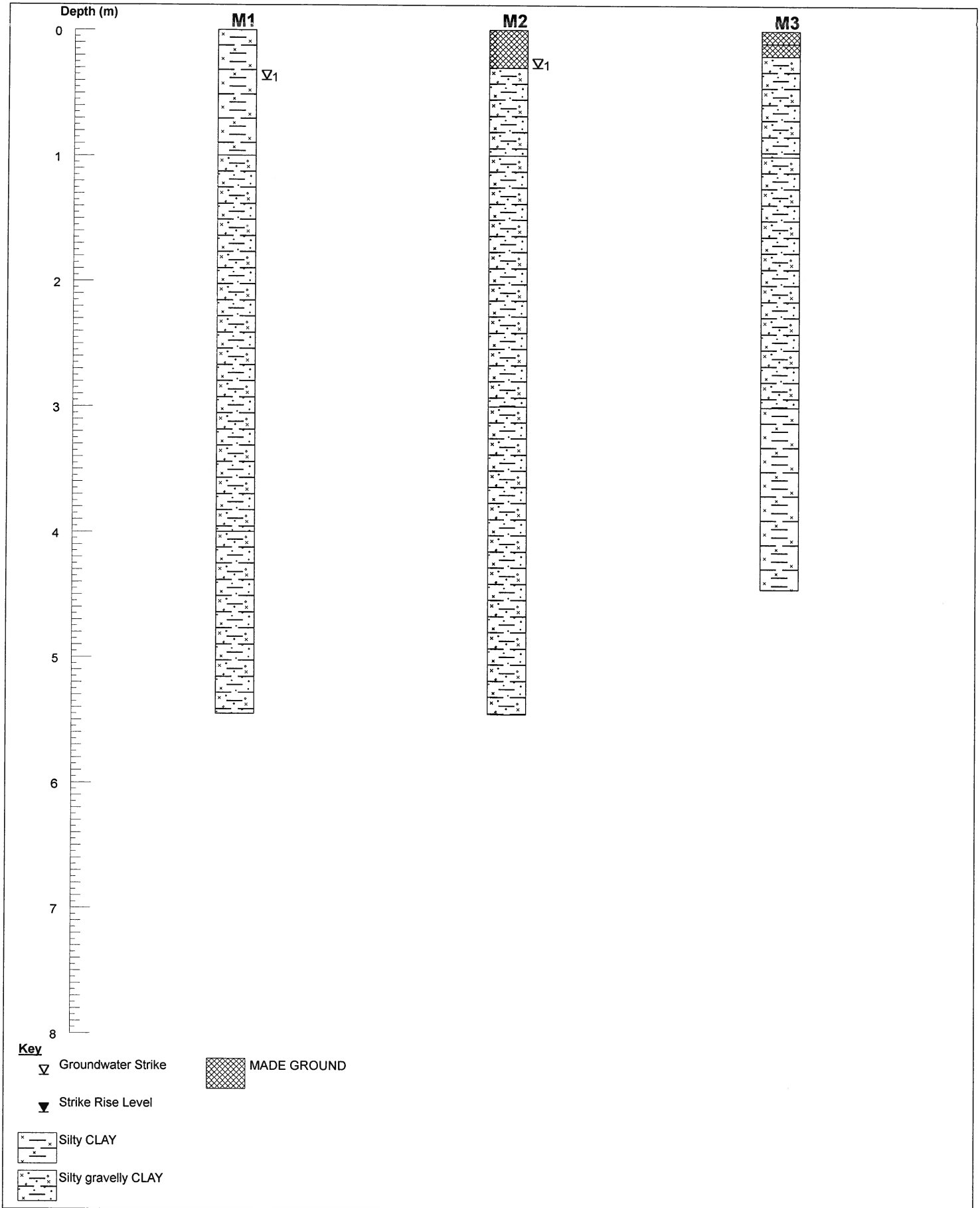
Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE	83mm to 3.00m 52mm to 4.00m		DENNIS MACKAY HOUSE BUILDER	5949
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	10/11/2014		1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.10) 0.10	MADE GROUND: concrete surfacing (drillers description).		
0.20-1.00	B					(0.10) 0.20	MADE GROUND: gravel sized fragments of limestone (drillers description).		
						(0.80)	Firm brown occasional grey mottled slightly gravelly silty CLAY with occasional sand lenses. Gravel is subangular to subrounded fine to medium mudstone.		
1.00-1.45 1.00-1.45 1.00-2.00	SPT N=13 D C			2,2/2,3,3,5 1.00m to 2.00m - 100% recovery		1.00	Firm medium strength becoming stiff high strength brown and occasional grey mottled slightly gravelly silty CLAY with occasional rootlet remains and occasional sand lenses. Gravel is subangular to rounded fine to medium mudstone, sandstone and quartz.		
				HV@1.60m, c=130+kPa			.... below 1.60m : stiff high strength		
				HV@1.80m, c=130+kPa					
2.00-2.45 2.00-2.45 2.00-3.00	SPT N=19 D C			4,4/4,5,5,5 2.00m to 3.00m - 100% recovery		(2.00)			
				HV@2.70m, c=125kPa					
3.00-3.45 3.00-3.45 3.00-4.00	SPT N=19 D C			3,2/3,4,5,7 3.00m to 4.00m - 100% recovery		3.00	Firm high to medium strength brown silty CLAY with bands and pockets of fine to medium sand.		
						(1.45)			
4.00-4.45 4.00-4.45	SPT N=18 D			2,3/3,4,5,6			.... below 4.00m : medium strength slightly gravelly. Gravel is subrounded fine to medium quartz and mudstone.		
				10/11/2014:3.50m		4.45	Complete at 4.45m		

Remarks
Hand dug inspection pit from GL to 1.00m to check for services - 1hr
C = Plastic lined core sample
HV = Hand Shear Vane test
Standing water at 3.50m

Scale (approx)	Logged By
1:25	MDS/SJ

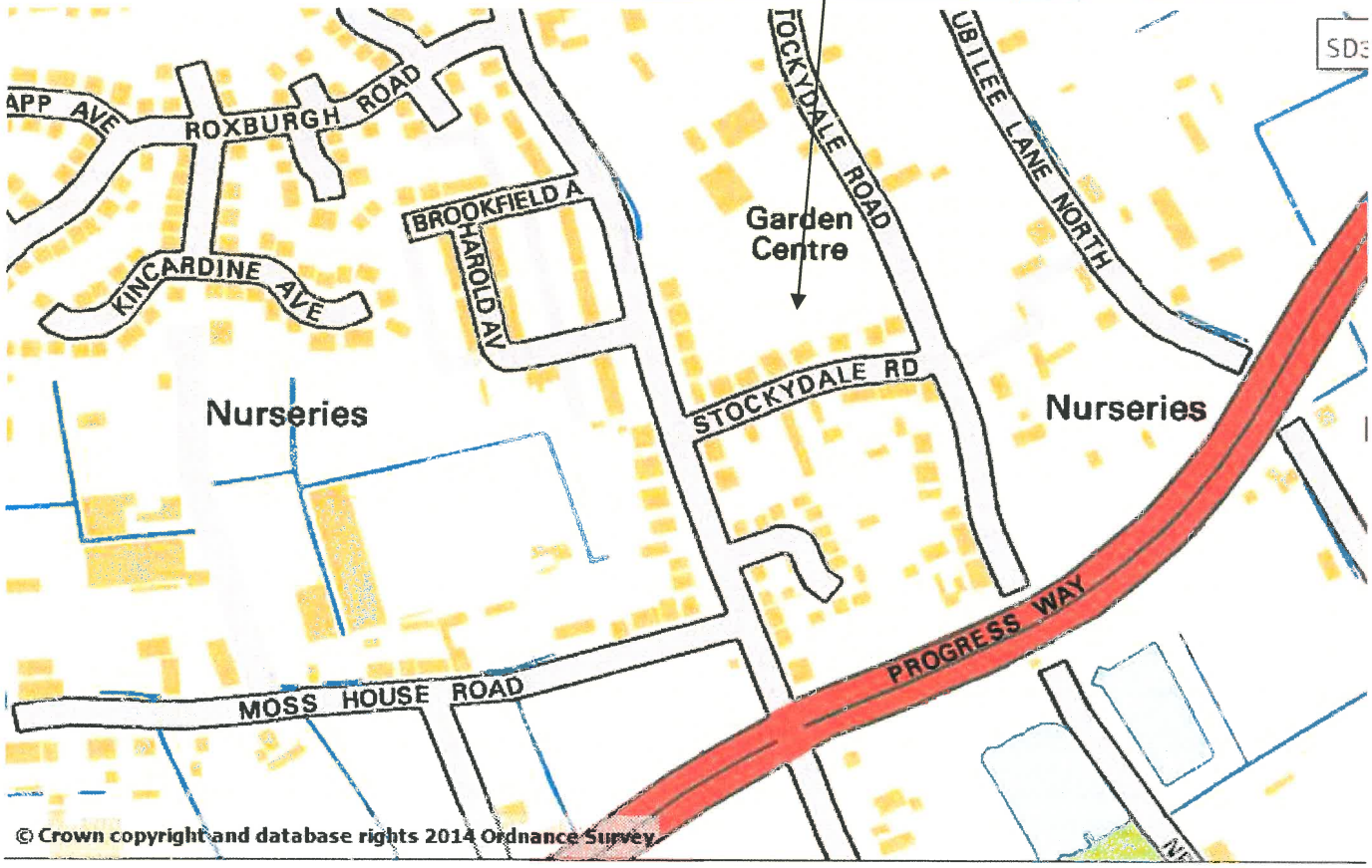
Figure No. 5949.M3



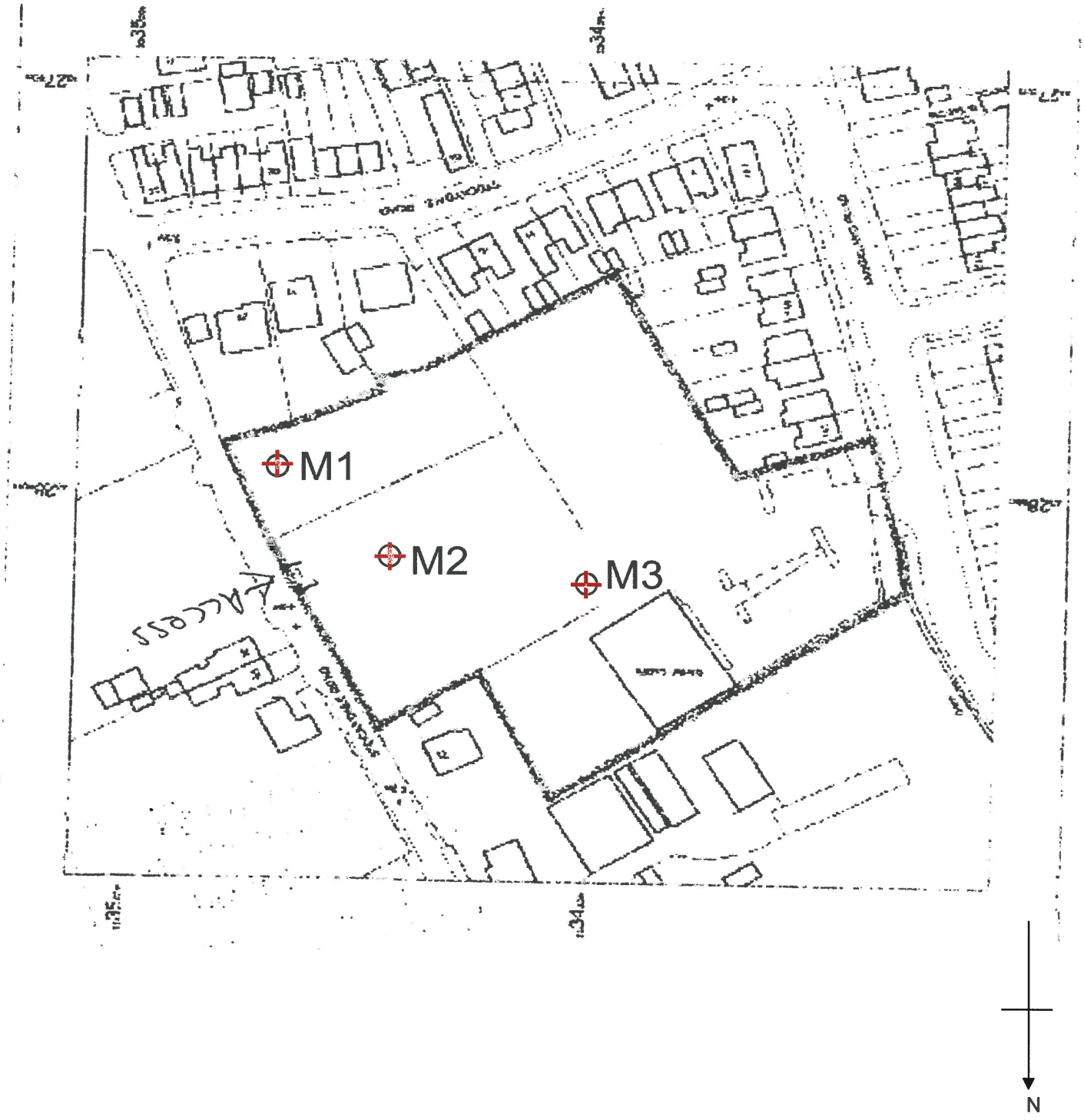
SUB SURFACE
SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Nominal Section

Site	Date Drawn	Date Checked	Sheet	Job Number
BAGUELYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL, LANCASHIRE	03/12/2014		1/1	5949
Client	**Drawn By**	**Checked By**	**Scale**	**Figure No.**
DENNIS MACKAY HOUSE BUILDER			1:40[V]	5949.1



SUB SURFACE SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907				
Site BAGUELYS GARDEN CENTRE, MIDGELAND ROAD BLACKPOOL, LANCS	Location Map			
	Date Drawn 02-Dec-14	Date Checked 02-Dec-14	Sheet 1 / 1	Job No. 5949
Client DENNIS MACKAY HOUSE BUILDER	Drawn By MDS	Checked By CAM	Scale NTS	Figure No. 1



SUB SURFACE SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907	Bore Hole Locations			
Site BAGUELYS GARDEN CENTRE, MIDGELAND ROAD BLACKPOOL, LANCS	Date Drawn 02-Dec-14	Date Checked 02-Dec-14	Sheet 1 / 1	Job No. 5949
Client DENNIS MACKAY HOUSE BUILDER	Drawn By MDS	Checked By CAM	Scale NTS	Figure No. 2

HAMILTON TECHNICAL SERVICES

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SURFACE WATER - PERCOLATION TEST RECORD SHEET
Baguleys Garden centre, Midgeland Road, Blackpool.

Excavated trial holes, to following approximate dims; 1.0m long, 500mm wide, 1.2m deep. Measured and noted dimensions of holes, see below.
The pits were filled to approximately 900mm deep.
Left overnight and inspected the following morning.

TEST RECORDS
Pre-test, trial pits filled to 1.00m deep and left overnight.

(Filled test hole to 1.0m deep.
Time of completion of filling. (Start time)
Time when the hole is approximately 25% emptied.
Time when the hole is approximately 75% emptied.
Time when the water has drained away. (Empty)
Repeat test)

Pre-test, trial pits filled to 1.00m deep and left overnight.

Test pit filled to 1.0m deep on 13th March, evening.

Test Day.

DATE :- 1st October 2023 Weather :- Showers.

TEST 1, Trial Pit 1 2nd Oct 2023
Start 09.30 Water is still 1.0m deep in pit.
25% NO DROP in the water level. Test failure recorded.
75%
Empty

TEST 1, Trial Pit 2 2nd Oct 2023
Start 9.30 AM. Water is still 0.98m deep in pit.
25% NO DROP in the water level. Test failure recorded.
75%
Empty

DIMENSIONS T Pit 1	DIMENSIONS T Pit 2
L= 1.10m	L= 1.20m
W = 0.50m	W= 0.50m
D = 1.20m	D= 1.00m