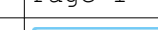


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Morgan House, Mount View Standard Way Northallerton, DL6 2YD	Parkmount Road Manchester South - lin100+45CC	
Date 04/04/2024 File P07 - SW Calcs - South	Designed by ZS Checked by ZS	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Pipe Sizes STANDARD Manhole Sizes STANDARD

Designed with Level Soffits

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	12.034	0.034	353.9	0.062	5.00	0.0	0.600	o	900	Pipe/Conduit	
S2.001	33.264	0.084	395.0	0.032	0.00	0.0	0.600	o	900	Pipe/Conduit	
S3.000	11.458	0.033	347.2	0.059	5.00	0.0	0.600	o	900	Pipe/Conduit	
S2.002	39.837	0.100	398.4	0.029	0.00	0.0	0.600	o	1050	Pipe/Conduit	
S2.003	13.212	0.946	14.0	0.044	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.004	17.986	1.026	17.5	0.001	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

Align Property Partners

Morgan House, Mount View
Standard Way
Northallerton, DL6 2YD

Date 04/04/2024
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Parkmount Road
Manchester
South - lin100+45CC

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Manhole Schedules for SW lin100+45CC (P07)

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes Invert Level (m)
S4	80.068	2.468	Open Manhole	2100	S2.000	77.600	900		
S5	80.528	2.962	Open Manhole	2100	S2.001	77.566	900	S2.000	77.566
S6	81.002	3.487	Open Manhole	2100	S3.000	77.515	900		
S7	81.430	4.098	Open Manhole	2400	S2.002	77.332	1050	S2.001	77.430
								S3.000	77.430
S8-HB	81.970	4.738	Open Manhole	2400	S2.003	77.232	150	S2.002	77.232
S9	81.631	5.495	Open Manhole	1800	S2.004	76.136	300	S2.003	76.232
S - Exg. CWS01	80.200	5.090	Open Manhole	1500		OUTFALL		S2.004	75.136

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S4	386035.463	402054.736	386035.463	402054.736	Required	
S5	386036.880	402066.686	386036.880	402066.686	Required	
S6	386023.520	402098.162	386023.520	402098.162	Required	
S7	386034.847	402099.888	386034.847	402099.888	Required	
S8-HB	386029.829	402139.408	386029.829	402139.408	Required	
S9	386017.312	402143.636	386017.312	402143.636	Required	
S - Exg. CWS01	385999.646	402140.260			No Entry	

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PIPELINE SCHEDULES for SW lin100+45CC (P07)

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S2.000	o	900	S4	80.068	77.600	1.568	Open Manhole	2100
S2.001	o	900	S5	80.528	77.566	2.062	Open Manhole	2100
S3.000	o	900	S6	81.002	77.515	2.587	Open Manhole	2100
S2.002	o	1050	S7	81.430	77.332	3.048	Open Manhole	2400
S2.003	o	150	S8-HB	81.970	77.232	4.588	Open Manhole	2400
S2.004	o	300	S9	81.631	76.136	5.195	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S2.000	12.034	353.9		S5	80.528	77.566	2.062 Open Manhole	2100
S2.001	33.264	395.0		S7	81.430	77.482	3.048 Open Manhole	2400
S3.000	11.458	347.2		S7	81.430	77.482	3.048 Open Manhole	2400
S2.002	39.837	398.4		S8-HB	81.970	77.232	3.688 Open Manhole	2400
S2.003	13.212	14.0		S9	81.631	76.286	5.195 Open Manhole	1800
S2.004	17.986	17.5	S - Exg. CWS01		80.200	75.110	4.790 Open Manhole	1500

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Online Controls for SW lin100+45CC (P07)

Hydro-Brake® Optimum Manhole: S8-HB, DS/PN: S2.003, Volume (m³): 53.9

Unit Reference MD-SHE-0100-5900-2000-5900	
Design Head (m)	2.000
Design Flow (l/s)	5.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	77.232
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.9	Kick-Flo®	0.890	4.0
Flush-Flo™	0.435	5.1	Mean Flow over Head Range	-	4.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	1.200	4.6	3.000	7.1	7.000	10.6
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.0
0.300	5.0	1.600	5.3	4.000	8.2	8.000	11.3
0.400	5.1	1.800	5.6	4.500	8.6	8.500	11.7
0.500	5.1	2.000	5.9	5.000	9.1	9.000	12.0
0.600	5.0	2.200	6.2	5.500	9.5	9.500	12.3
0.800	4.5	2.400	6.4	6.000	9.9		
1.000	4.3	2.600	6.7	6.500	10.3		

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Align Property Partners		Page 7																		
Morgan House, Mount View Standard Way Northallerton, DL6 2YD	Parkmount Road Manchester South - lin100+45CC																			
Date 04/04/2024	Designed by ZS																			
File P07 - SW Calcs - South	Checked by ZS																			
Innovyze	Network 2020.1.3																			
<u>Storage Structures for SW lin100+45CC (P07)</u> <u>Cellular Storage Manhole: S4, DS/PN: S2.000</u> Invert Level (m) 78.200 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>50.0</td><td>0.0</td><td>1.001</td><td>0.0</td><td>0.0</td></tr><tr><td>1.000</td><td>50.0</td><td>0.0</td><td></td><td></td><td></td></tr></table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	50.0	0.0	1.001	0.0	0.0	1.000	50.0	0.0			
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)															
0.000	50.0	0.0	1.001	0.0	0.0															
1.000	50.0	0.0																		
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Align Property Partners

Morgan House, Mount View

Standard Way

Northallerton, DL6 2YD

Date 04/04/2024

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Parkmount Road

Manchester

South - lin100+45CC

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

for SW lin100+45CC (P07)

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 0.000

Inlet Coeffiecient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Online Controls 1

Number of Offline Controls 0

Number of Storage Structures 1

Number of Time/Area Diagrams 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 386019 402134 SD 86019 02134

Data Type Point

Cv (Summer) 1.000

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep Fine

DTS Status ON

DVD Status ON

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 2, 30, 100

Climate Change (%) 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S2.000	S4	120 Summer	2	+0%	100/30 Summer				77.702
S2.001	S5	120 Summer	2	+0%	100/30 Summer				77.701
S3.000	S6	120 Summer	2	+0%	100/30 Summer				77.701
S2.002	S7	120 Summer	2	+0%	100/30 Summer				77.701
S2.003	S8-HB	120 Summer	2	+0%	2/15 Summer				77.701
S2.004	S9	30 Summer	2	+0%					76.167

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S4	-0.798	0.000	0.01		36	5.2	OK	
S2.001	S5	-0.765	0.000	0.01			7.5	OK	
S3.000	S6	-0.714	0.000	0.01			4.5	OK	
S2.002	S7	-0.681	0.000	0.01			11.2	OK	
S2.003	S8-HB	0.319	0.000	0.12			5.1	SURCHARGED	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW lin100+45CC (P07)

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)						
S2.004	S9	-0.269	0.000	0.02			5.1	OK	

Align Property Partners

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Morgan House, Mount View
Standard Way
Northallerton, DL6 2YD

Parkmount Road
Manchester
South - lin100+45CC

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Micro Drainage

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW lin100+45CC (P07)

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 386019 402134 SD 86019 02134

Data Type Point

Cv (Summer) 1.000

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

DVD Status ON

Analysis Timestep Fine

Inertia Status OFF

DTS Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 2, 30, 100

Climate Change (%) 0, 0, 45

Water

Level

PN

US/MH Name

Storm

Return Period

Climate Change

First (X) Surchage

First (Y) Flood

First (Z) Overflow

Overflow Act.

Level (m)

S2.000

S4

120 Winter

30

+0%

100/30 Summer

78.101

S2.001

S5

120 Winter

30

+0%

100/30 Summer

78.101

S3.000

S6

120 Winter

30

+0%

100/30 Summer

78.101

S2.002

S7

120 Winter

30

+0%

100/30 Summer

78.101

S2.003

S8-HB

120 Winter

30

+0%

2/15 Summer

78.101

S2.004

S9

15 Summer

30

+0%

76.167

Surcharged

Flooded

Half Drain

Pipe

US/MH

Depth

Volume

Flow / Overflow

Time

Flow

Level

PN

Name

(m)

(m³)

Cap.

(l/s)

(mins)

(l/s)

Status

Exceeded

S2.000

S4

-0.399

0.000

0.01

96

7.3

OK

S2.001

S5

-0.365

0.000

0.01

8.9

OK

S3.000

S6

-0.314

0.000

0.01

6.9

OK

S2.002

S7

-0.280

0.000

0.01

10.6

OK

S2.003

S8-HB

0.719

0.000

0.12

5.1

SURCHARGED

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Align Property Partners

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Morgan House, Mount View
Standard Way
Northallerton, DL6 2YD

Parkmount Road
Manchester
South - lin100+45CC

Date 04/04/2024
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Micro Drainage

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW lin100+45CC (P07)

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	S9	-0.269	0.000	0.02			5.5	OK	

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Align Property Partners

Morgan House, Mount View
Standard Way
Northallerton, DL6 2YD

Date 04/04/2024
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Parkmount Road
Manchester
South - lin100+45CC

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW lin100+45CC (P07)

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 386019 402134 SD 86019 02134

Data Type Point

Cv (Summer) 1.000

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

DVD Status ON

Analysis Timestep Fine

Inertia Status OFF

DTS Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 2, 30, 100

Climate Change (%) 0, 0, 45

Water

Level

PN

US/MH Name

Storm

Return Period

Climate Change

First (X) Surchage

First (Y) Flood

First (Z) Overflow

Overflow Act.

Level (m)

S2.000

S4

240 Winter

100

+45%

100/30 Summer

79.161

S2.001

S5

240 Winter

100

+45%

100/30 Summer

79.164

S3.000

S6

240 Winter

100

+45%

100/30 Summer

79.171

S2.002

S7

240 Winter

100

+45%

100/30 Summer

79.170

S2.003

S8-HB

240 Winter

100

+45%

2/15 Summer

79.176

S2.004

S9

15 Summer

100

+45%

76.168

Surcharged

Flooded

Half Drain

Pipe

US/MH

Depth

Volume

Flow / Overflow

Time

Flow

Status

Level

PN

Name

(m)

(m³)

Cap.

(l/s)

(mins)

(l/s)

Exceeded

S2.000

S4

0.661

0.000

0.02

124

13.7

SURCHARGED

S2.001

S5

0.698

0.000

0.02

13.1

SURCHARGED

S3.000

S6

0.756

0.000

0.02

8.6

SURCHARGED

S2.002

S7

0.788

0.000

0.01

9.6

SURCHARGED

S2.003

S8-HB

1.794

0.000

0.13

5.7

SURCHARGED

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Innovyze				Network 2020.1.3					
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW lin100+45CC (P07)</u>									
PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.004	S9	-0.268	0.000	0.03			5.9	OK	
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