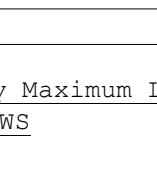


Lees Roxburgh		Page 0																												
The Genesis Centre Science Park South Birchwood WA3 7BH																														
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX	Designed by Adam Norris Checked by																													
Innovyze		Network 2020.1																												
<u>STORM SEWER DESIGN by the Modified Rational Method</u> <u>Design Criteria for SWS REDESIGNED 04.03.24.SWS</u> Pipe Sizes SWS REDESIGNED 11.01 Manhole Sizes SWS REDESIGNED 11.01 FSR Rainfall Model - England and Wales <table> <tr> <td>Return Period (years)</td> <td>2</td> <td>PIMP (%)</td> <td>100</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Add Flow / Climate Change (%)</td> <td>0</td> </tr> <tr> <td>Ratio R</td> <td>0.362</td> <td>Minimum Backdrop Height (m)</td> <td>0.200</td> </tr> <tr> <td>Maximum Rainfall (mm/hr)</td> <td>5</td> <td>Maximum Backdrop Height (m)</td> <td>0.000</td> </tr> <tr> <td>Maximum Time of Concentration (mins)</td> <td>30</td> <td>Min Design Depth for Optimisation (m)</td> <td>1.200</td> </tr> <tr> <td>Foul Sewage (l/s/ha)</td> <td>0.000</td> <td>Min Vel for Auto Design only (m/s)</td> <td>0.75</td> </tr> <tr> <td>Volumetric Runoff Coeff.</td> <td>0.750</td> <td>Min Slope for Optimisation (1:X)</td> <td>500</td> </tr> </table> Designed with Level Soffits			Return Period (years)	2	PIMP (%)	100	M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0	Ratio R	0.362	Minimum Backdrop Height (m)	0.200	Maximum Rainfall (mm/hr)	5	Maximum Backdrop Height (m)	0.000	Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200	Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75	Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500
Return Period (years)	2	PIMP (%)	100																											
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0																											
Ratio R	0.362	Minimum Backdrop Height (m)	0.200																											
Maximum Rainfall (mm/hr)	5	Maximum Backdrop Height (m)	0.000																											
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200																											
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75																											
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500																											
©1982-2020 Innovyze																														

Lees Roxburgh		Page 1
The Genesis Centre Science Park South Birchwood WA3 7BH		
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX		
Designed by Adam Norris Checked by		
Innovyze		Network 2020.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SWS REDESIGNED 04.03.24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet 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	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.362
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

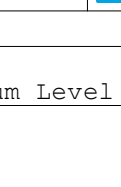
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	100/180 Winter				65.420
1.001	2	15 Winter	1	+0%	100/120 Winter				65.168
1.002	3	15 Winter	1	+0%	100/120 Winter				65.067
1.003	4	120 Winter	1	+0%	100/120 Winter				65.025
2.000	5	120 Winter	1	+0%	100/120 Winter				65.025
1.004	6	120 Winter	1	+0%	100/60 Winter				65.025
1.005	7	120 Winter	1	+0%	100/60 Winter				65.024
1.006	8	120 Winter	1	+0%	1/15 Summer				65.023
1.007	9	15 Winter	1	+0%					63.600
1.008	10	60 Winter	1	+0%	100/60 Winter				59.450
1.009	11	60 Winter	1	+0%	100/60 Winter				59.449
1.010	12	60 Winter	1	+0%	100/60 Summer				59.448
1.011	13	60 Winter	1	+0%	1/15 Summer				59.446
1.012	14	60 Winter	1	+0%					59.106

©1982-2020 Innovyze

Lees Roxburgh		Page 2
The Genesis Centre Science Park South Birchwood WA3 7BH		
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX	Designed by Adam Norris Checked by	
Innovyze		Network 2020.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SWS REDESIGNED 04.03.24.SWS

PN	US/MH Name	Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)				
1.000	1	-1.138	0.000	0.01			18.7	OK	
1.001	2	-1.210	0.000	0.02			38.9	OK	
1.002	3	-1.187	0.000	0.03			56.7	OK	
1.003	4	-1.178	0.000	0.01			24.0	OK	
2.000	5	-1.342	0.000	0.00			12.0	OK	
1.004	6	-0.962	0.000	0.01			19.6	OK	
1.005	7	-0.834	0.000	0.00			8.6	OK	
1.006	8	0.487	0.000	0.14			8.4	SURCHARGED	
1.007	9	-0.152	0.000	0.23			28.6	OK	
1.008	10	-0.949	0.000	0.01			21.7	OK	
1.009	11	-0.862	0.000	0.02			17.2	OK	
1.010	12	-0.835	0.000	0.02			16.4	OK	
1.011	13	0.105	0.000	0.26			13.4	SURCHARGED	
1.012	14	-0.205	0.000	0.22			13.4	OK	

Lees Roxburgh		Page 3
The Genesis Centre Science Park South Birchwood WA3 7BH		
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX		
Designed by Adam Norris Checked by		
Innovyze		Network 2020.1

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SWS REDESIGNED 04.03.24.SWS

Simulation Criteria

Areal Reduction Factor 1.000	Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0	MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0	Inlet 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 0
Number of Online Controls 2	Number of Time/Area Diagrams 0
Number of Offline Controls 0	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R 0.362
Region England and Wales Cv (Summer)	0.750	
M5-60 (mm)	18.000 Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

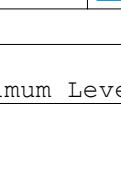
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 240	Winter	30	+0%	100/180	Winter			65.555
1.001	2 240	Winter	30	+0%	100/120	Winter			65.555
1.002	3 240	Winter	30	+0%	100/120	Winter			65.555
1.003	4 240	Winter	30	+0%	100/120	Winter			65.555
2.000	5 240	Winter	30	+0%	100/120	Winter			65.555
1.004	6 240	Winter	30	+0%	100/60	Winter			65.555
1.005	7 240	Winter	30	+0%	100/60	Winter			65.553
1.006	8 240	Winter	30	+0%	1/15	Summer			65.552
1.007	9 15	Summer	30	+0%					63.649
1.008	10 120	Winter	30	+0%	100/60	Winter			59.805
1.009	11 120	Winter	30	+0%	100/60	Winter			59.801
1.010	12 120	Winter	30	+0%	100/60	Summer			59.800
1.011	13 120	Winter	30	+0%	1/15	Summer			59.796
1.012	14 120	Winter	30	+0%					59.110

©1982-2020 Innovyze

Lees Roxburgh		Page 4
The Genesis Centre Science Park South Birchwood WA3 7BH		
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX	Designed by Adam Norris Checked by	
Innovyze Network 2020.1		

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SWS REDESIGNED 04.03.24.SWS									
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
1.000	1	-1.003	0.000	0.01			9.3	OK	
1.001	2	-0.823	0.000	0.01			21.0	OK	
1.002	3	-0.699	0.000	0.02			25.8	OK	
1.003	4	-0.648	0.000	0.01			25.5	OK	
2.000	5	-0.812	0.000	0.01			16.5	OK	
1.004	6	-0.432	0.000	0.01			17.0	OK	
1.005	7	-0.305	0.000	0.00			7.6	OK	
1.006	8	1.016	0.000	0.14			8.7	SURCHARGED	
1.007	9	-0.103	0.000	0.57			71.0	OK	
1.008	10	-0.594	0.000	0.02			30.7	OK	
1.009	11	-0.509	0.000	0.02			21.6	OK	
1.010	12	-0.483	0.000	0.02			20.0	OK	
1.011	13	0.455	0.000	0.28			14.6	SURCHARGED	
1.012	14	-0.201	0.000	0.24			14.6	OK	

©1982-2020 Innovyze

Lees Roxburgh		Page 5
The Genesis Centre Science Park South Birchwood WA3 7BH		
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX		
Designed by Adam Norris Checked by		
Innovyze		Network 2020.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SWS REDESIGNED 04.03.24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet 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	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.362
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	360 Winter	100	+45%	100/180 Winter				67.586
1.001	2	360 Winter	100	+45%	100/120 Winter				67.587
1.002	3	360 Winter	100	+45%	100/120 Winter				67.587
1.003	4	360 Winter	100	+45%	100/120 Winter				67.587
2.000	5	360 Winter	100	+45%	100/120 Winter				67.587
1.004	6	360 Winter	100	+45%	100/60 Winter				67.587
1.005	7	360 Winter	100	+45%	100/60 Winter				67.587
1.006	8	360 Winter	100	+45%	1/15 Summer				67.587
1.007	9	15 Summer	100	+45%					63.728
1.008	10	180 Winter	100	+45%	100/60 Winter				61.424
1.009	11	180 Winter	100	+45%	100/60 Winter				61.424
1.010	12	180 Winter	100	+45%	100/60 Summer				61.423
1.011	13	180 Winter	100	+45%	1/15 Summer				61.423
1.012	14	180 Winter	100	+45%					59.111

©1982-2020 Innovyze

Lees Roxburgh		Page 6
The Genesis Centre Science Park South Birchwood WA3 7BH		
Date 01/01/0001 File SWS REDESIGN 12.09.24.MDX	Designed by Adam Norris Checked by	
Innovyze		Network 2020.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for SWS REDESIGNED 04.03.24.SWS

PN	US/MH Name	Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)				
1.000	1	1.028	0.000	0.01			11.9	SURCHARGED	
1.001	2	1.209	0.000	0.01			19.8	SURCHARGED	
1.002	3	1.333	0.000	0.01			23.0	SURCHARGED	
1.003	4	1.383	0.000	0.01			22.2	SURCHARGED	
2.000	5	1.220	0.000	0.01			23.3	SURCHARGED	
1.004	6	1.601	0.000	0.01			14.5	SURCHARGED	
1.005	7	1.729	0.000	0.01			10.1	FLOOD RISK	
1.006	8	3.051	0.000	0.19			11.8	FLOOD RISK	
1.007	9	-0.024	0.000	1.00			124.5	OK	
1.008	10	1.025	0.000	0.03			38.9	SURCHARGED	
1.009	11	1.114	0.000	0.03			29.4	SURCHARGED	
1.010	12	1.140	0.000	0.02			25.8	SURCHARGED	
1.011	13	2.082	0.000	0.29			14.8	FLOOD RISK	
1.012	14	-0.201	0.000	0.24			14.8	OK	