



APPENDIX D – SURFACE WATER DRAINAGE CALCULATION



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	0.2
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	0.6
Summer CV	0.950	Additional Storage (m ³ /ha)	0.0	100 year (l/s)	0.8
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.047	Betterment (%)	0
SAAR (mm)	590	QBar	0.2
Soil Index	5	Q 1 year (l/s)	0.2
SPR	0.53	Q 30 year (l/s)	0.6
Region	6	Q 100 year (l/s)	0.8
Growth Factor 1 year	0.85		

Node SA1 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	85.650	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000

Node SA1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.25200	Invert Level (m)	85.650	Depth (m)	0.750
Side Inf Coefficient (m/hr)	0.25200	Time to half empty (mins)	128	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	15.000		



Results for 1 year Critical Storm Duration. Lowest mass balance: 95.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	SA1	74	85.714	0.064	2.4	1.8231	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	SA1	Depth/Flow	0.0	0.0
120 minute summer	SA1	Infiltration	1.1	



Results for 2 year Critical Storm Duration. Lowest mass balance: 95.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	SA1	80	85.766	0.116	3.7	3.2949	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	SA1	Depth/Flow	0.0	0.0
120 minute summer	SA1	Infiltration	1.2	



Results for 30 year Critical Storm Duration. Lowest mass balance: 95.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	SA1	90	86.027	0.377	9.0	10.7521	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	SA1	Depth/Flow	0.0	0.0
120 minute summer	SA1	Infiltration	1.5	



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 95.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute winter	SA1	98	86.195	0.545	8.3	15.5233	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute winter	SA1	Depth/Flow	0.0	0.0
120 minute winter	SA1	Infiltration	1.7	



Results for 100 year Critical Storm Duration. Lowest mass balance: 95.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute winter	SA1	96	86.148	0.498	7.7	14.1803	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute winter	SA1	Depth/Flow	0.0	0.0
120 minute winter	SA1	Infiltration	1.6	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute winter	SA1	100	86.462	0.812	10.8	21.3893	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute winter	SA1	Depth/Flow	0.0	0.0
120 minute winter	SA1	Infiltration	1.9	



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	2.1
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	5.9
Summer CV	0.950	Additional Storage (m ³ /ha)	0.0	100 year (l/s)	7.8
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.478	Betterment (%)	0
SAAR (mm)	590	QBar	2.5
Soil Index	5	Q 1 year (l/s)	2.1
SPR	0.53	Q 30 year (l/s)	5.9
Region	6	Q 100 year (l/s)	7.8
Growth Factor 1 year	0.85		

Node SA2 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	85.650	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000

Node SA2 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.25200	Invert Level (m)	85.650	Depth (m)	1.500
Side Inf Coefficient (m/hr)	0.25200	Time to half empty (mins)	188	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.500	Number Required	1
Porosity	0.95	Pit Length (m)	24.000		



Results for 1 year Critical Storm Duration. Lowest mass balance: 97.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute summer	SA2	116	85.779	0.129	6.3	7.3626	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute summer	SA2	Depth/Flow	0.0	0.0
180 minute summer	SA2	Infiltration	2.3	



Results for 2 year Critical Storm Duration. Lowest mass balance: 97.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute summer	SA2	120	85.873	0.223	9.2	12.6928	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute summer	SA2	Depth/Flow	0.0	0.0
180 minute summer	SA2	Infiltration	2.5	



Results for 30 year Critical Storm Duration. Lowest mass balance: 97.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute winter	SA2	104	86.325	0.675	19.4	38.4840	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute winter	SA2	Depth/Flow	0.0	0.0
120 minute winter	SA2	Infiltration	3.4	



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 97.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA2	148	86.630	0.980	19.7	55.8548	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA2	Depth/Flow	0.0	0.0
180 minute winter	SA2	Infiltration	3.9	



Results for 100 year Critical Storm Duration. Lowest mass balance: 97.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute winter	SA2	116	86.542	0.892	24.3	50.8431	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute winter	SA2	Depth/Flow	0.0	0.0
120 minute winter	SA2	Infiltration	3.8	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA2	152	86.981	1.331	25.3	75.8424	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA2	Depth/Flow	0.0	0.0
180 minute winter	SA2	Infiltration	4.6	



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	1.3
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	3.8
Summer CV	0.950	Additional Storage (m ³ /ha)	0.0	100 year (l/s)	5.0
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.305	Betterment (%)	0
SAAR (mm)	590	QBar	1.6
Soil Index	5	Q 1 year (l/s)	1.3
SPR	0.53	Q 30 year (l/s)	3.8
Region	6	Q 100 year (l/s)	5.0
Growth Factor 1 year	0.85		

Node SA3 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	87.800	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000

Node SA3 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	87.800	Depth (m)	1.500
Side Inf Coefficient (m/hr)	0.06480	Time to half empty (mins)	896	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	11.000	Number Required	1
Porosity	0.95	Pit Length (m)	16.500		



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute summer	SA3	248	87.969	0.169	9.2	29.1712	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
360 minute summer	SA3	Depth/Flow	0.0	0.0
360 minute summer	SA3	Infiltration	1.7	



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute summer	SA3	272	88.059	0.259	12.9	44.6544	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
360 minute summer	SA3	Depth/Flow	0.0	0.0
360 minute summer	SA3	Infiltration	1.8	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute winter	SA3	352	88.483	0.683	17.8	117.7580	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
360 minute winter	SA3	Depth/Flow	0.0	0.0
360 minute winter	SA3	Infiltration	2.0	



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute winter	SA3	352	88.777	0.977	24.1	168.4978	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
360 minute winter	SA3	Depth/Flow	0.0	0.0
360 minute winter	SA3	Infiltration	2.1	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute winter	SA3	352	88.679	0.879	22.0	151.6296	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
360 minute winter	SA3	Depth/Flow	0.0	0.0
360 minute winter	SA3	Infiltration	2.1	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
480 minute winter	SA3	472	89.099	1.299	24.1	223.9179	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
480 minute winter	SA3	Depth/Flow	0.0	0.0
480 minute winter	SA3	Infiltration	2.3	



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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	0.5
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	1.4
Summer CV	0.950	Additional Storage (m ³ /ha)	0.0	100 year (l/s)	1.9
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	35	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.116	Betterment (%)	0
SAAR (mm)	590	QBar	0.6
Soil Index	5	Q 1 year (l/s)	0.5
SPR	0.53	Q 30 year (l/s)	1.4
Region	6	Q 100 year (l/s)	1.9
Growth Factor 1 year	0.85		

Node SA4 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	88.000	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000

Node SA4 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.10440	Invert Level (m)	88.000	Depth (m)	0.750
Side Inf Coefficient (m/hr)	0.10440	Time to half empty (mins)	228	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	4.000	Number Required	1
Porosity	0.95	Pit Length (m)	35.000		



Results for 1 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute summer	SA4	112	88.052	0.052	5.0	6.8786	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute summer	SA4	Depth/Flow	0.0	0.0
180 minute summer	SA4	Infiltration	2.1	



Results for 2 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute summer	SA4	120	88.083	0.083	7.2	10.9955	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute summer	SA4	Depth/Flow	0.0	0.0
180 minute summer	SA4	Infiltration	2.1	



Results for 30 year Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute summer	SA4	140	88.241	0.241	16.6	32.0679	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute summer	SA4	Depth/Flow	0.0	0.0
180 minute summer	SA4	Infiltration	2.3	



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA4	172	88.353	0.353	15.4	46.9457	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA4	Depth/Flow	0.0	0.0
180 minute winter	SA4	Infiltration	2.4	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.20%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA4	176	88.486	0.486	19.9	64.6004	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA4	Depth/Flow	0.0	0.0
180 minute winter	SA4	Infiltration	2.6	



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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	0.2
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	0.6
Summer CV	0.950	Additional Storage (m ³ /ha)	0.0	100 year (l/s)	0.9
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.052	Betterment (%)	0
SAAR (mm)	590	QBar	0.3
Soil Index	5	Q 1 year (l/s)	0.2
SPR	0.53	Q 30 year (l/s)	0.6
Region	6	Q 100 year (l/s)	0.9
Growth Factor 1 year	0.85		

Node SA5 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	86.400	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000

Node SA5 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.10440	Invert Level (m)	86.400	Depth (m)	0.750
Side Inf Coefficient (m/hr)	0.10440	Time to half empty (mins)	280	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	3.000	Number Required	1
Porosity	0.95	Pit Length (m)	15.000		



Results for 1 year Critical Storm Duration. Lowest mass balance: 95.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
240 minute summer	SA5	152	86.479	0.079	2.0	3.3843	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
240 minute summer	SA5	Depth/Flow	0.0	0.0
240 minute summer	SA5	Infiltration	0.7	



Results for 2 year Critical Storm Duration. Lowest mass balance: 95.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
240 minute summer	SA5	160	86.527	0.127	2.8	5.4180	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
240 minute summer	SA5	Depth/Flow	0.0	0.0
240 minute summer	SA5	Infiltration	0.7	



Results for 30 year Critical Storm Duration. Lowest mass balance: 95.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA5	172	86.763	0.363	5.1	15.5034	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA5	Depth/Flow	0.0	0.0
180 minute winter	SA5	Infiltration	0.8	



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 95.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA5	176	86.926	0.526	6.9	22.4934	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA5	Depth/Flow	0.0	0.0
180 minute winter	SA5	Infiltration	0.9	



Results for 100 year Critical Storm Duration. Lowest mass balance: 95.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute winter	SA5	176	86.875	0.475	6.4	20.2986	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute winter	SA5	Depth/Flow	0.0	0.0
180 minute winter	SA5	Infiltration	0.9	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
240 minute winter	SA5	232	87.109	0.709	7.2	30.3093	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
240 minute winter	SA5	Depth/Flow	0.0	0.0
240 minute winter	SA5	Infiltration	1.0	



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	6.5
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	18.5
Summer CV	0.950	Additional Storage (m ³ /ha)	20.0	100 year (l/s)	24.6
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Detailed	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	1.500	Betterment (%)	0
SAAR (mm)	590	QBar	7.7
Soil Index	5	Q 1 year (l/s)	6.5
SPR	0.53	Q 30 year (l/s)	18.5
Region	6	Q 100 year (l/s)	24.6
Growth Factor 1 year	0.85		

Node SA6 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	85.750	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000

Node SA6 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.10440	Invert Level (m)	85.750	Depth (m)	1.500
Side Inf Coefficient (m/hr)	0.10440	Time to half empty (mins)	776	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	10.000	Number Required	1
Porosity	0.95	Pit Length (m)	19.000		



Node SA6 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.10440	Invert Level (m)	89.000	Depth (m)	0.500
Side Inf Coefficient (m/hr)	0.10440	Time to half empty (mins)	40	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	0.250	Number Required	1
Porosity	0.33	Pit Length (m)	390.000		

Node SA6 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.10440	Invert Level (m)	89.000	Depth (m)	0.450
Side Inf Coefficient (m/hr)	0.10440	Time to half empty (mins)	40	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	0.150	Number Required	1
Porosity	0.33	Pit Length (m)	5337.000		



Results for 1 year Critical Storm Duration. Lowest mass balance: 98.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	SA6	288	86.242	0.492	25.9	90.9824	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute summer	SA6	Depth/Flow	0.0	0.0
360 minute summer	SA6	Infiltration	3.2	
360 minute summer	SA6	Infiltration	0.0	
360 minute summer	SA6	Infiltration	0.0	



Results for 2 year Critical Storm Duration. Lowest mass balance: 98.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
360 minute winter	SA6	344	86.516	0.766	23.5	141.6213	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
360 minute winter	SA6	Depth/Flow	0.0	0.0
360 minute winter	SA6	Infiltration	3.4	
360 minute winter	SA6	Infiltration	0.0	
360 minute winter	SA6	Infiltration	0.0	



Results for 30 year Critical Storm Duration. Lowest mass balance: 98.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
240 minute winter	SA6	176	89.042	3.292	68.5	297.9203	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
240 minute winter	SA6	Depth/Flow	0.0	0.0
240 minute winter	SA6	Infiltration	4.0	
240 minute winter	SA6	Infiltration	1.7	
240 minute winter	SA6	Infiltration	16.3	



Results for 100 year Critical Storm Duration. Lowest mass balance: 98.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
240 minute summer	SA6	156	89.139	3.389	127.5	327.1748	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
240 minute summer	SA6	Depth/Flow	0.0	0.0
240 minute summer	SA6	Infiltration	4.0	
240 minute summer	SA6	Infiltration	3.0	
240 minute summer	SA6	Infiltration	33.2	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
180 minute summer	SA6	116	89.389	3.639	212.7	402.1838	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
180 minute summer	SA6	Depth/Flow	0.0	0.0
180 minute summer	SA6	Infiltration	4.0	
180 minute summer	SA6	Infiltration	5.8	
180 minute summer	SA6	Infiltration	71.8	



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
PP	0.835	84.000	554102.536	237747.849	0.350

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	1 year (l/s)	1.5
Rainfall Events	Singular	Drain Down Time (mins)	10080	30 year (l/s)	4.3
Summer CV	0.950	Additional Storage (m³/ha)	0.0	100 year (l/s)	5.8
Winter CV	0.950	Starting Level (m)		Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.353	Betterment (%)	0
SAAR (mm)	590	QBar	1.8
Soil Index	5	Q 1 year (l/s)	1.5
SPR	0.53	Q 30 year (l/s)	4.3
Region	6	Q 100 year (l/s)	5.8
Growth Factor 1 year	0.85		

Node PP Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	83.650	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	2.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.000	2.500	0.000



Node PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Invert Level (m)	83.650	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.03600	Time to half empty (mins)	92	Depth (m)	0.350
Safety Factor	2.0	Width (m)	83.500	Inf Depth (m)	
Porosity	0.33	Length (m)	100.000		



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	76	83.711	0.061	65.0	51.7540	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Depth/Flow	0.0	0.0
120 minute summer	PP	Infiltration	25.6	



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	82	83.759	0.109	159.2	163.0216	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Depth/Flow	0.0	0.0
120 minute summer	PP	Infiltration	41.9	



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	86	83.789	0.139	214.9	244.3928	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Depth/Flow	0.0	0.0
120 minute summer	PP	Infiltration	41.9	



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	84	83.780	0.130	199.2	220.7063	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Depth/Flow	0.0	0.0
120 minute summer	PP	Infiltration	41.9	



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
120 minute summer	PP	92	83.825	0.175	278.9	345.5663	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
120 minute summer	PP	Depth/Flow	0.0	0.0
120 minute summer	PP	Infiltration	42.0	