

This survey is related to OSGB36(15) coordinate system by GPS 'rapid static' methods. No scale factor has been applied to the survey information. All horizontal distances taken from this drawing are ground distances.

FOUL DRAINAGE

CONTAMINATED SURFACE

SURFACE DRAINAGE

COMBINED DRAINAGE

PUMPING MAN

FOUL ASSUMED RUN

SURFACE ASSUMED RUN

FOUL TAKEN FROM RECORDS

SURFACE TAKEN FROM RECORDS

ABANDONED RUN

TRADE EFFLUENT

SURVEY BOUNDARY

AR	ASSUMED ROUTE	MH	MANHOLE
BO	BACKDROP	MB	MONITORING WELL
BP	BORFHOLE	RE	ROODING EYE
CH	CHAMBER LEVEL	RP	RAIN WATER PIPE
CO	CATCHPIT	S/A	SOAKAWAY
G	DEPTH	SV	SURFACE VELOCITY
DP	DOWN PIPE	SWP	SOIL VENT PIPE
END	END OF TRANCE	TR	TRAPPED EXIT
ER	EARTHING ROD	TRR	TAKEN FROM COTY
GL	GULLY	UTCVT	UNABLE TO CATCH
HC	HEAD OF RUN	UTL	UNABLE TO FIND
IC	INSPECTION CHAMBER	UTL	UNABLE TO LIFT
IS	INVERT LEVEL	UTS	UNABLE TO SURVEY
KWS	SURFACE WATER SEWER	VP	VENT PIPE
KWS	CONTAMINATED SURFACE WATER SEW	VR	VAPOUR RECOVERY
FW	FULL WATER SEWER	WL	WATER LEVEL
SW	SEWER UNDER SEWER		

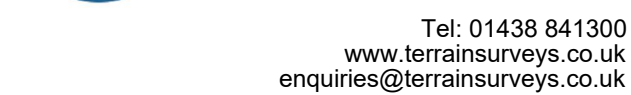
BWB CONSULTING (BIRMINGHAM)

**STAKEHILL INDUSTRIAL ESTATE
MIDDLETON**

DRAINAGE INVESTIGATION

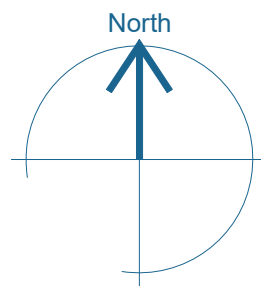
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Drawn by JS	Checked by MH	Date of Survey JULY 2024
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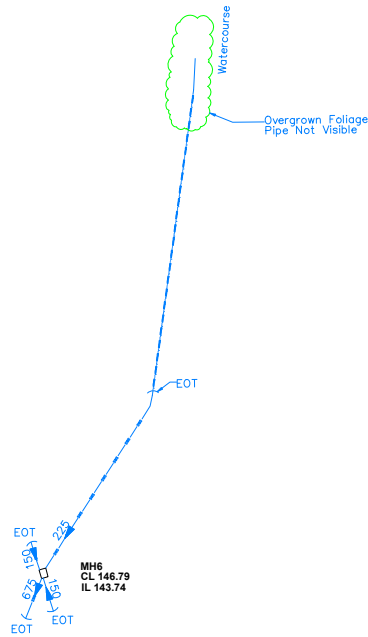




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UTILITY KEY

- FOUL DRAINAGE
 - CONTAMINATED SURFACE
 - SURFACE DRAINAGE
 - COMBINED DRAINAGE
 - POURING MAN
 - FOUL ASSUMED RUN
 - SURFACE ASSUMED RUN
 - FOUL TAKEN FROM RECORDS
 - SURFACE TAKEN FROM RECORDS
 - ABANDONED RUN
 - TRADE EFFLUENT
 - SURVEY BOUNDARY
- CABLE / PIPE ROSE
● BACKDROP / TRAPPED EXIT
⊞ DRAINAGE VALVE
- ⊞ END OF TRACE
X END OF RECORDS
⊞ HEAD OF RUN / CAPED
⊞ PIPE INLET / OUTFALL

ABBREVIATIONS

AR	ASSUMED ROUTE	MM	MANHOLE
BD	BACKDROP	MR	MONITORING WELL
BN	BORING	RE	ROCKING EYE
CL	COVER LEVEL	RWP	RAIN WATER PIPE
CP	CATCHPIPE	S/A	SOAKAWAY
D	DEPTH	SV	SUCK VALVE
DP	DOWN PIPE	SVP	SOIL VENT PIPE
EOT	END OF TRACE	TE	TRAPPED EXT
ET	EXTENDING ROD	TR	TAKEN FROM RECORD
GV	GULLY	UTECTV	UNABLE TO CITY
HR	HEAD OF RUN	UTL	UNABLE TO LIFT
IC	INSPECTION CHAMBER	UTS	UNABLE TO SURVEY
I	INVERT LEVEL	UTL	UNABLE TO LIFT
OWS	CONTAMINATED SURFACE WATER SEWER	VP	VENT PIPE
FS	FULL WATER SEWER	VR	VENT PIPE
CWS	COMBINED WATER SEWER	WL	WATER LEVEL

Client
BWB CONSULTING (BIRMINGHAM)

Project
**STAKEHILL INDUSTRIAL ESTATE
MIDDLETON**

Title
DRAINAGE INVESTIGATION

Drawing Number
TS24-386-1-Rev A

Revision	Description	Rev. By	Date
A	Additional Manhole references & invert levels added.	JJS	29/07/24

Scale 1:500@A0

Sheet 3 of 3

Drawn by	Checked by	Date of Survey
JS	MH	JULY 2024



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Appendix 6: Greenfield Runoff Rate



Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	2.2
Summer CV	0.750	Drain Down Time (mins)	240	30 year (l/s)	4.0
Winter CV	0.840	Additional Storage (m³/ha)	20.0	100 year (l/s)	4.9
Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.70
Greenfield Method	FEH	Growth Factor 100 year	2.08
Positively Drained Area (ha)	1.000	Betterment (%)	0
SAAR (mm)	1087	QMed	2.2
Host	1	QBar	2.4
BFIHost	0.809	Q 2 year (l/s)	2.2
Region	10	Q 30 year (l/s)	4.0
QBar/QMed conversion factor	1.075	Q 100 year (l/s)	4.9
Growth Factor 2 year	0.93		

Appendix 7: Extract of Phase I Geo-Environmental Desk Study Report

- 5.3.3 *The Geo-Insight report has indicated that the site is located within an area where the hazard rating for landslides is very low and that slope instability problems are unlikely to be present. No special action is required to avoid problems due to landslides. No special investigation required and increased construction costs will increase financial risks are unlikely due to potential problems with landslides.*
- 5.3.4 *The Geo-Insight report has also indicated that hazard rating for “running sands” is very low. Very low potential for “running sand” problems at water table rises or if in sandy strata exposed to water. No special action is required to avoid problems due to “running sand”. No special ground investigation required in increased construction costs or increased financial risks are unlikely due to potential problems with “running sands”.*
- 5.3.5 *The site has got a highly variable topography but generally the site slopes towards Stakehill Lane at varying gradients between 1:30 to 1:15 therefore the shallow gradients are not considered to increase the risk of slope movement or instability within the site. We do however note that the undulating topography of the site may mean that there may be a requirement for potential retaining structures within areas of the development site.*
- 5.3.6 *During the site visit no visual evidence of slope movement has been identified e.g., in the form of soil “creep” terracettes etc.*
- 5.3.7 *Based upon the above information we consider that the site is considered to be at very low risk of slope stability issues and it is not considered any specific investigation is into slope stability is required.*

5.4 Drainage

- 5.4.1 *The geological information relating to this site suggests that the majority of the superficial strata is likely to consist of impermeable glacial till deposits, glacial fluvial deposits may be present within the site but comprise of permeable sands and gravels however these are considered to be localised and discontinuous and therefore it is unlikely that the adoption of a sustainable urban drainage system will be feasible on this site.*

6.0 PROPOSED GROUND INVESTIGATIONS

6.1 Ground Investigation

- 6.1.1 *By undertaking an intrusive ground investigation an assessment of the ground and groundwater profiles may be carried out and the geo-technical and geo-environmental risks associated with this site identified. The investigation will allow a quantitative assessment as to whether any of the potential risks identified in this study are present and are of material concern to the proposed development. The works should be undertaken in accordance with the recommendations laid down in BS 10175 : 2011 “Investigation of Potentially Contaminated Sites”.*

Appendix 8: Storage Calculations

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	0.750	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)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Catchment 1	2.300	5.00	130.100	-17.412	76.471	1.400
Catchment 8a	0.200	5.00	144.000	86.781	25.875	2.000
Catchment 2a	0.700	5.00	142.500	35.851	84.154	1.400
Catchment 2b	0.400	5.00	138.000	19.207	78.367	1.400
Catchment 3b	1.800	5.00	137.000	41.465	53.689	1.400
Catchment 3a	1.700	5.00	139.000	37.658	57.842	1.400
Catchment 4a	1.200	5.00	139.500	53.986	55.553	1.400
Catchment 4b	0.500	5.00	138.500	52.415	46.233	1.400
Catchment 5a	0.900	5.00	142.500	76.900	52.686	2.200
Catchment 5b	0.900	5.00	139.000	65.002	40.403	1.400
Catchment 6	0.500	5.00	138.000	53.007	41.027	1.400
Catchment 7a	0.300	5.00	143.000	85.584	39.636	2.200
Catchment 7b	0.200	5.00	142.000	79.923	32.966	2.200
Catchment 9	0.500		140.500	87.771	8.471	1.400
Catchment 8b	0.300	5.00	144.500	91.751	16.685	2.000

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	2.2
Summer CV	0.750	Drain Down Time (mins)	240	30 year (l/s)	4.0
Winter CV	0.840	Additional Storage (m³/ha)	20.0	100 year (l/s)	4.9
Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	x

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 %)
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.70
Greenfield Method	FEH	Growth Factor 100 year	2.08
Positively Drained Area (ha)	1.000	Betterment (%)	0
SAAR (mm)	1087	QMed	2.2
Host	1	QBar	2.4
BFIHost	0.809	Q 2 year (l/s)	2.2
Region	10	Q 30 year (l/s)	4.0
QBar/QMed conversion factor	1.075	Q 100 year (l/s)	4.9
Growth Factor 2 year	0.93		

Node Catchment 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	128.700	Product Number	CTL-SHE-0127-7400-1000-7400
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.4	Min Node Diameter (mm)	1200

Node Catchment 4b Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 6	Sump Available	✓
Invert Level (m)	137.100	Product Number	CTL-SHE-0108-5300-1000-5300
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.3	Min Node Diameter (mm)	1200

Node Catchment 2a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 2b	Sump Available	✓
Invert Level (m)	141.100	Product Number	CTL-SHE-0075-2500-1000-2500
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node Catchment 2b Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	136.600	Product Number	CTL-SHE-0090-3600-1000-3600
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.6	Min Node Diameter (mm)	1200

Node Catchment 3a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 3b	Sump Available	✓
Invert Level (m)	137.600	Product Number	CTL-SHE-0132-8000-1000-8000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.0	Min Node Diameter (mm)	1200

Node Catchment 3b Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	135.600	Product Number	CTL-SHE-0154-1130-1000-1130
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	11.3	Min Node Diameter (mm)	1200

Node Catchment 4a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 4b	Sump Available	✓
Invert Level (m)	138.100	Product Number	CTL-SHE-0089-3500-1000-3500
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Node Catchment 8a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 9	Sump Available	✓
Invert Level (m)	142.000	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 5a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 5b	Sump Available	✓
Invert Level (m)	140.300	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 5b Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 6	Sump Available	✓
Invert Level (m)	137.600	Product Number	CTL-SHE-0098-4300-1000-4300
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.3	Min Node Diameter (mm)	1200

Node Catchment 6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	136.600	Product Number	CTL-SHE-0151-1080-1000-1080
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.8	Min Node Diameter (mm)	1200

Node Catchment 7a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 7b	Sump Available	✓
Invert Level (m)	140.800	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 7b Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	139.800	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	139.100	Product Number	CTL-SHE-0074-2400-1000-2400
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.4	Min Node Diameter (mm)	1200

Node Catchment 8b Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 9	Sump Available	✓
Invert Level (m)	142.500	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	128.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2046.0	0.0	1.400	3262.0	0.0

Node Catchment 8a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	142.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	198.0	0.0	1.000	198.0	0.0	1.001	0.0	0.0	2.000	0.0	0.0

Node Catchment 2a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	141.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	512.0	0.0	1.400	1098.0	0.0

Node Catchment 2b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	136.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	239.0	0.0	1.400	839.0	0.0

Node Catchment 3b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	135.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1958.0	0.0	1.400	3204.0	0.0

Node Catchment 3a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	137.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	1209.0	0.0	1.400	2203.0	0.0

Node Catchment 4a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	138.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	987.0	0.0	1.400	1980.0	0.0

Node Catchment 4b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	137.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	319.0	0.0	1.400	883.0	0.0

Node Catchment 5a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	140.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	981.0	0.0	1.200	981.0	0.0	1.201	0.0	0.0	2.200	0.0	0.0

Node Catchment 5b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	137.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	638.0	0.0	1.400	1797.0	0.0

Node Catchment 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	136.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	324.0	0.0	1.400	1103.0	0.0

Node Catchment 7a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	140.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	265.0	0.0	1.200	265.0	0.0	1.201	0.0	0.0	2.200	0.0	0.0

Node Catchment 7b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	139.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	326.0	0.0	1.200	326.0	0.0	1.201	0.0	0.0	2.200	0.0	0.0

Node Catchment 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	139.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	734.0	0.0	1.400	1678.0	0.0

Node Catchment 8b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	142.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	256.0	0.0	1.000	256.0	0.0	1.001	0.0	0.0	2.000	0.0	0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	Catchment 1	2760	129.699	0.999	50.8	2511.1490	0.0000	OK
960 minute winter	Catchment 8a	885	142.702	0.702	9.5	140.4880	0.0000	OK
2160 minute winter	Catchment 2a	2100	142.089	0.989	18.9	721.0896	0.0000	OK
2880 minute winter	Catchment 2b	2760	137.587	0.986	11.0	449.9182	0.0000	OK
4320 minute winter	Catchment 3b	4140	136.582	0.982	37.1	2376.4210	0.0000	OK
2160 minute winter	Catchment 3a	1980	138.598	0.998	45.9	1584.1080	0.0000	OK
2880 minute winter	Catchment 4a	2760	139.090	0.990	26.5	1342.0250	0.0000	OK
2160 minute winter	Catchment 4b	2100	138.081	0.981	16.7	513.6234	0.0000	OK
4320 minute winter	Catchment 5a	4140	141.429	1.129	14.8	1116.3910	0.0000	OK
2880 minute winter	Catchment 5b	2820	138.582	0.982	21.5	1037.6000	0.0000	OK
4320 minute winter	Catchment 6	4080	137.585	0.985	17.1	596.1398	0.0000	OK
1440 minute winter	Catchment 7a	1320	141.723	0.923	10.8	247.0880	0.0000	OK
8640 minute winter	Catchment 7b	7140	140.805	1.005	3.9	329.4687	0.0000	OK
7200 minute winter	Catchment 9	7020	140.096	0.996	9.2	1072.7910	0.0000	OK
1440 minute winter	Catchment 8b	1320	143.450	0.950	10.8	245.9816	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Discharge Vol (m³)
2880 minute winter	Catchment 1	Hydro-Brake®		7.4	1110.4
960 minute winter	Catchment 8a	Hydro-Brake®	Catchment 9	1.9	100.9
2160 minute winter	Catchment 2a	Hydro-Brake®	Catchment 2b	2.5	298.4
2880 minute winter	Catchment 2b	Hydro-Brake®		3.6	564.8
4320 minute winter	Catchment 3b	Hydro-Brake®		11.3	2430.6
2160 minute winter	Catchment 3a	Hydro-Brake®	Catchment 3b	8.0	929.1
2880 minute winter	Catchment 4a	Hydro-Brake®	Catchment 4b	3.5	539.3
2160 minute winter	Catchment 4b	Hydro-Brake®	Catchment 6	5.3	623.8
4320 minute winter	Catchment 5a	Hydro-Brake®	Catchment 5b	2.0	440.0
2880 minute winter	Catchment 5b	Hydro-Brake®	Catchment 6	4.3	666.4
4320 minute winter	Catchment 6	Hydro-Brake®		10.8	2447.9
1440 minute winter	Catchment 7a	Hydro-Brake®	Catchment 7b	1.9	153.3
8640 minute winter	Catchment 7b	Hydro-Brake®		1.9	763.9
7200 minute winter	Catchment 9	Hydro-Brake®		2.4	869.5
1440 minute winter	Catchment 8b	Hydro-Brake®	Catchment 9	1.9	155.0

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Catchment 1	2.300	5.00	130.100	-17.412	76.471	1.400
Catchment 8a	0.200	5.00	144.000	86.781	25.875	2.000
Catchment 2a	0.700	5.00	142.500	35.851	84.154	1.400
Catchment 2b	0.400	5.00	138.000	19.207	78.367	1.400
Catchment 3b	1.800	5.00	137.000	41.465	53.689	1.400
Catchment 3a	1.700	5.00	139.000	37.658	57.842	1.400
Catchment 4a	1.200	5.00	139.500	53.986	55.553	1.400
Catchment 4b	0.500	5.00	138.500	52.415	46.233	1.400
Catchment 5a	0.900	5.00	142.500	76.900	52.686	2.200
Catchment 5b	0.900	5.00	139.000	65.002	40.403	1.400
Catchment 6	0.500	5.00	138.000	53.007	41.027	1.400
Catchment 7a	0.300	5.00	143.000	85.584	39.636	2.200
Catchment 7b	0.200	5.00	142.000	79.923	32.966	2.200
Catchment 9	0.500		140.500	87.771	8.471	1.400
Catchment 8b	0.300	5.00	144.500	91.751	16.685	2.000

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.300	2 year (l/s)	2.2
Summer CV	0.750	30 year (l/s)	4.0
Winter CV	0.840	100 year (l/s)	4.9
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

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 %)
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.70
Greenfield Method	FEH	Growth Factor 100 year	2.08
Positively Drained Area (ha)	1.000	Betterment (%)	0
SAAR (mm)	1087	QMed	2.2
Host	1	QBar	2.4
BFIHost	0.809	Q 2 year (l/s)	2.2
Region	10	Q 30 year (l/s)	4.0
QBar/QMed conversion factor	1.075	Q 100 year (l/s)	4.9
Growth Factor 2 year	0.93		

Node Catchment 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	128.700	Product Number	CTL-SHE-0127-7400-1000-7400
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.4	Min Node Diameter (mm)	1200

Node Catchment 4b Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 6	Sump Available	✓
Invert Level (m)	137.100	Product Number	CTL-SHE-0108-5300-1000-5300
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.3	Min Node Diameter (mm)	1200

Node Catchment 2a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 2b	Sump Available	✓
Invert Level (m)	141.100	Product Number	CTL-SHE-0075-2500-1000-2500
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node Catchment 2b Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	136.600	Product Number	CTL-SHE-0090-3600-1000-3600
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.6	Min Node Diameter (mm)	1200

Node Catchment 3a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 3b	Sump Available	✓
Invert Level (m)	137.600	Product Number	CTL-SHE-0132-8000-1000-8000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.0	Min Node Diameter (mm)	1200

Node Catchment 3b Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	135.600	Product Number	CTL-SHE-0154-1130-1000-1130
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	11.3	Min Node Diameter (mm)	1200

Node Catchment 4a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 4b	Sump Available	✓
Invert Level (m)	138.100	Product Number	CTL-SHE-0089-3500-1000-3500
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Node Catchment 8a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 9	Sump Available	✓
Invert Level (m)	142.000	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 5a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 5b	Sump Available	✓
Invert Level (m)	140.300	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 5b Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 6	Sump Available	✓
Invert Level (m)	137.600	Product Number	CTL-SHE-0098-4300-1000-4300
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.3	Min Node Diameter (mm)	1200

Node Catchment 6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	136.600	Product Number	CTL-SHE-0151-1080-1000-1080
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.8	Min Node Diameter (mm)	1200

Node Catchment 7a Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 7b	Sump Available	✓
Invert Level (m)	140.800	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 7b Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	139.800	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	139.100	Product Number	CTL-SHE-0074-2400-1000-2400
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.4	Min Node Diameter (mm)	1200

Node Catchment 8b Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node	Catchment 9	Sump Available	✓
Invert Level (m)	142.500	Product Number	CTL-SHE-0066-2000-1100-2000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Catchment 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	128.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	2046.0	0.0	1.400	3262.0	0.0

Node Catchment 8a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	142.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	198.0	0.0	1.000	198.0	0.0	1.001	0.0	0.0	2.000	0.0	0.0

Node Catchment 2a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	141.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	512.0	0.0	1.400	1098.0	0.0

Node Catchment 2b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	136.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	239.0	0.0	1.400	839.0	0.0

Node Catchment 3b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	135.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	1958.0	0.0	1.400	3204.0	0.0

Node Catchment 3a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	137.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	1209.0	0.0	1.400	2203.0	0.0

Node Catchment 4a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	138.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	987.0	0.0	1.400	1980.0	0.0

Node Catchment 4b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	137.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	319.0	0.0	1.400	883.0	0.0

Node Catchment 5a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	140.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	981.0	0.0	1.200	981.0	0.0	1.201	0.0	0.0	2.200	0.0	0.0

Node Catchment 5b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	137.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	638.0	0.0	1.400	1797.0	0.0

Node Catchment 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	136.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	324.0	0.0	1.400	1103.0	0.0

Node Catchment 7a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	140.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	265.0	0.0	1.200	265.0	0.0	1.201	0.0	0.0	2.200	0.0	0.0

Node Catchment 7b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	139.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	326.0	0.0	1.200	326.0	0.0	1.201	0.0	0.0	2.200	0.0	0.0

Node Catchment 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	139.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	734.0	0.0	1.400	1678.0	0.0

Node Catchment 8b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	142.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

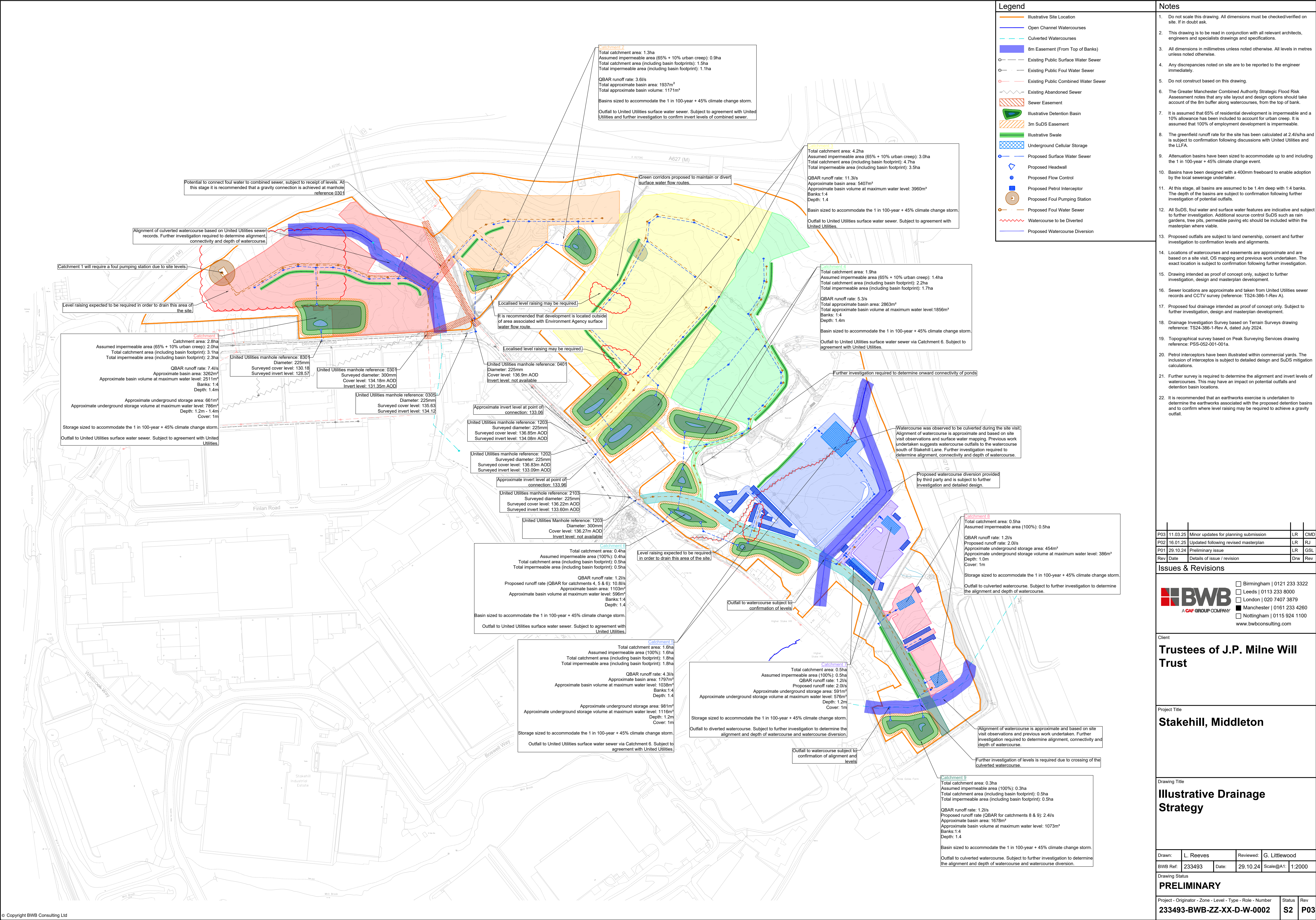
Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	256.0	0.0	1.000	256.0	0.0	1.001	0.0	0.0	2.000	0.0	0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute winter	Catchment 1	2100	129.647	0.947	59.5	2359.3550	0.0000	OK
720 minute winter	Catchment 8a	690	142.731	0.731	11.9	146.2201	0.0000	OK
2160 minute winter	Catchment 2a	2100	142.048	0.947	18.1	682.4557	0.0000	OK
2160 minute winter	Catchment 2b	2100	137.541	0.941	12.6	419.9157	0.0000	OK
4320 minute winter	Catchment 3b	4140	136.518	0.918	35.4	2197.0300	0.0000	OK
1440 minute winter	Catchment 3a	1380	138.574	0.974	60.1	1537.5840	0.0000	OK
2160 minute winter	Catchment 4a	2100	139.038	0.938	31.0	1254.5560	0.0000	OK
1440 minute winter	Catchment 4b	1410	138.034	0.934	21.0	480.4440	0.0000	OK
4320 minute winter	Catchment 5a	4140	141.347	1.046	13.9	1035.1260	0.0000	OK
2880 minute winter	Catchment 5b	2820	138.533	0.933	20.5	967.1469	0.0000	OK
2880 minute winter	Catchment 6	2820	137.545	0.945	19.5	561.3770	0.0000	OK
960 minute winter	Catchment 7a	930	141.722	0.921	14.4	246.7102	0.0000	OK
7200 minute winter	Catchment 7b	6420	140.754	0.954	4.0	312.8340	0.0000	OK
7200 minute winter	Catchment 9	6600	140.036	0.936	8.8	989.4878	0.0000	OK
960 minute winter	Catchment 8b	930	143.449	0.949	14.4	245.8696	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Discharge Vol (m³)
2160 minute winter	Catchment 1	Hydro-Brake®		7.4	833.9
720 minute winter	Catchment 8a	Hydro-Brake®	Catchment 9	1.9	82.1
2160 minute winter	Catchment 2a	Hydro-Brake®	Catchment 2b	2.5	293.9
2160 minute winter	Catchment 2b	Hydro-Brake®		3.6	427.3
4320 minute winter	Catchment 3b	Hydro-Brake®		11.3	2368.5
1440 minute winter	Catchment 3a	Hydro-Brake®	Catchment 3b	8.0	650.6
2160 minute winter	Catchment 4a	Hydro-Brake®	Catchment 4b	3.5	406.1
1440 minute winter	Catchment 4b	Hydro-Brake®	Catchment 6	5.3	438.0
4320 minute winter	Catchment 5a	Hydro-Brake®	Catchment 5b	2.0	428.7
2880 minute winter	Catchment 5b	Hydro-Brake®	Catchment 6	4.3	653.5
2880 minute winter	Catchment 6	Hydro-Brake®		10.8	1645.3
960 minute winter	Catchment 7a	Hydro-Brake®	Catchment 7b	1.9	110.9
7200 minute winter	Catchment 7b	Hydro-Brake®		1.9	639.8
7200 minute winter	Catchment 9	Hydro-Brake®		2.4	850.4
960 minute winter	Catchment 8b	Hydro-Brake®	Catchment 9	1.9	112.1

Appendix 9: Illustrative Drainage Strategy



- Notes
- Do not scale this drawing. All dimensions must be checked/verified on site. If in doubt ask.
 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - Do not construct based on this drawing.
 - The Greater Manchester Combined Authority Strategic Flood Risk Assessment notes that any site layout and design options should take account of the 8m buffer along watercourses, from the top of bank.
 - It is assumed that 65% of residential development is impermeable and a 10% allowance has been included to account for urban creep. It is assumed that 100% of employment development is impermeable.
 - The greenfield runoff rate for the site has been calculated at 2.4l/s/ha and is subject to confirmation following discussions with United Utilities and the LLFA.
 - Attenuation basins have been sized to accommodate up to and including the 1 in 100-year + 45% climate change event.
 - Basins have been designed with a 400mm freeboard to enable adoption by the local sewerage undertaker.
 - At this stage, all basins are assumed to be 1.4m deep with 1:4 banks. The depth of the basins are subject to confirmation following further investigation of potential outfalls.
 - All SuDS, foul water and surface water features are indicative and subject to further investigation. Additional source control SuDS such as rain gardens, tree pits, permeable paving etc should be included within the masterplan where viable.
 - Proposed outfalls are subject to land ownership, consent and further investigation to confirmation levels and alignments.
 - Locations of watercourses and easements are approximate and are based on a site visit, OS mapping and previous work undertaken. The exact location is subject to confirmation following further investigation.
 - Drawing intended as proof of concept only, subject to further investigation, design and masterplan development.
 - Sewer locations are approximate and taken from United Utilities sewer records and CCTV survey (reference: TS24-386-1-Rev A).
 - Proposed foul drainage intended as proof of concept only. Subject to further investigation, design and masterplan development.
 - Drainage Investigation Survey based on Terrain Surveys drawing reference: TS24-386-1-Rev A, dated July 2024.
 - Topographical survey based on Peak Surveying Services drawing reference: PSS-052-001-001a.
 - Petrol interceptors have been illustrated within commercial yards. The inclusion of interceptors is subject to detailed design and SuDS mitigation calculations.
 - Further survey is required to determine the alignment and invert levels of watercourses. This may have an impact on potential outfalls and detention basin locations.
 - It is recommended that an earthworks exercise is undertaken to determine the earthworks associated with the proposed detention basins and to confirm where level raising may be required to achieve a gravity outfall.

P03	11.03.25	Minor updates for planning submission	LR	CMD
P02	16.01.25	Updated following revised masterplan	LR	RJ
P01	29.10.24	Preliminary issue	LR	GSL
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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Client

Trustees of J.P. Milne Will Trust

Project Title

Stakehill, Middleton

Drawing Title

Illustrative Drainage Strategy

Drawn:	L. Reeves	Reviewed:	G. Littlewood
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BWB Ref:	233493	Date:	29.10.24	Scale@A1:	1:2000
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Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
233493-BWB-ZZ-XX-D-W-0002	S2	P03

