This document has been prepared by I&L Consulting to discharge Condition 4 of the approved Planning Application 134103/FO/2022. The text included in the box below in italics are the comments received from LLFA followed by I&L Consulting response provided below each point.

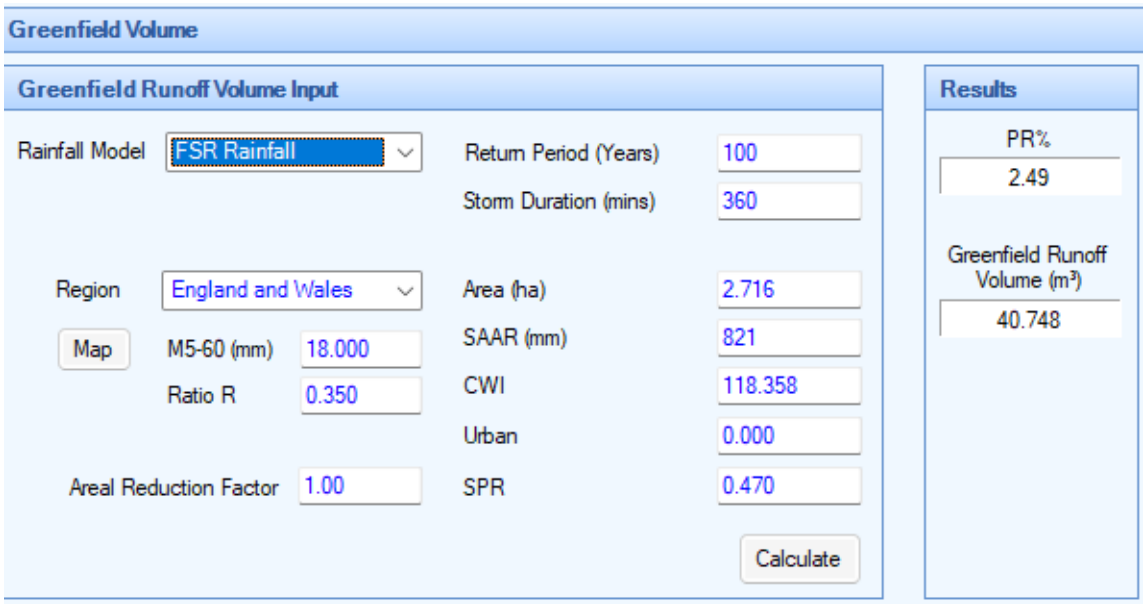
Decision Notice Clause	Further information required:
An existing and proposed impermeable areas drawing to accompany all discharge rate calculations.	*"The AECOM Flood Risk Assessment and Drainage Strategy ref. 60663052-ACM-ArA-XX-RP-C-00002 dated April 2022 has the proposed and existing catchment plans that show how the overall discharge rate to the non-containment system of 111l/s has been calculated."* *The following is required:* *- Please submit existing and proposed impermeable area drawings as part of this application.*

I&L Consulting Response:

Please see Impermeable area plan D05.

Decision Notice Clause	Further information required:
Runoff volume in the 1 in 100 year, 6 hours rainfall shall be constrained to a value as close as is reasonable practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment;	*A peak runoff rate (54.7l/s) has been provided; however, no information has been provided regarding the proposed runoff volumes.* *The following is required:* *- Please provide the greenfield runoff volume and proposed runoff volume for the 1 in 100 year, 6 hours rainfall event.*

I&L Consulting Response:



Decision Notice Clause	Further information required:
Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 45% climate change in any part of a building	*A climate change allowance of 40% has been used for the hydraulic calculations.* *The following is required:* - *A 45% climate change allowance is required, as per the condition clause.* - *Please refer to the requirements listed in the below clause for hydraulic calculations.*

I&L Consulting Response:

The proposed runoff volume for the 1 in 100 year + 45% climate change event is 1,787m³, as calculated in the submitted drainage network calculations.

The drainage network has been updated to incorporate a 45% climate change allowance in accordance with the condition requirements. Please refer to the updated drainage network calculations.

Decision Notice Clause	Further information required:
Where surface water is connected to an offsite private drainage network, agreement in principle from the asset owner (MAG) is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.	*A statement has been provided: " The AECOM Flood Risk Assessment and Drainage Strategy ref. 60663052-ACM-ArA-XX-RP-C-00002 dated April 2022 sets out the existing drainage strategy which follows the same principles. MAG are aware of the scheme and have raised no such objections to these flow rates or proposals."* *This is not proof of acceptance of proposed flows and/or new connection.*

I&L Consulting Response:

Response from Manchester Airport Authority to follow.

Decision Notice Clause	Further information required:
For sites where proposed development would cause unusual pollution risk to surface water evidence of pollution control measures (preferably through SuDS) is required	*A statement has been provided that "The storage system and retention separator are both contractor led design. As such, it is not possible to provide specific manufacturers proposals. However, please see attached proposed details which are subject to change." Generic cross-section details of a 'helibore pipe' system have been provided for surface water storage, but these do not confirm site-specific dimensions and levels.* *The following is required:* - *Please provide details of the proposed separator, and confirm the inclusion of a separator on a finalised drainage layout.*

I&L Consulting Response:

Please refer to the product brochure of the proposed petrol interceptor. The interceptor is included within the drainage design and is shown on the Drainage Planning Strategy drawing D00.

Decision Notice Clause	Further information required:
Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.	*An inflow of 61.7/s has been included in the hydraulic calculations at 'Phase 2 stub' and for pipes 5.000, 5.001 and 1.007. It is unclear how this value has been derived or what it represents. No details of drainage phasing have been provided, and no drainage layout has been provided to correspond with these pipe/manhole references. Phase 3 has not been included, this will need to be modelled if Phase 3 discharges to the same network as Phase 1 and 2.* *The following is required:* - *Please provide a drainage phasing plan, or a surface water drainage layout illustrating all phases.* - *Ensure that phases are all accounted for in the hydraulic calculations.*

I&L Consulting Response:

The drainage network calculations and Drainage Planning Strategy drawing D00 represent the full development, including all phases.

Decision Notice Clause	Further information required:
Hydraulic calculation of the proposed drainage system	*A drainage layout has not been provided to accompany the hydraulic calculations. A climate change allowance of 40% has been used for the hydraulic calculations. No model parameters have been provided for the attenuation tank.* *The following is required:* *A 45% climate change allowance is required, as per the condition clause.* - *Please include all modelled parameters (including the modelled attenuation tank).* - *Please provide a finalised surface water drainage layout (showing all components, outfalls, levels and connectivity) to correspond with the hydraulic calculations.* - *Standard comment: The applicant must present a consistent package to discharge this condition* *(Including all layouts and calculations). The layout and calculations must be jointly updated to account for any edits required. When preparing a resubmission, the applicant must ensure that the drainage layout and hydraulic calculations correspond, and that they can be cross-referenced for checks. This includes layout annotations and schedule printouts.*

I&L Consulting Response:

The drainage layout and hydraulic calculations have been updated to ensure consistency. A 45% climate change allowance has been applied, and all model parameters, including the attenuation tank, are included within the submitted drainage network calculations.

Please refer to Drainage Planning Strategy drawing D00 and associated calculations, which correspond and can be cross-referenced.

Decision Notice Clause	**Further information required:**
Construction details of flow control and SuDS elements	*A generic technical specification has been provided for the flow control (hydrobrake).* *The following is required:* - *Please provide site-specific construction details for the proposed attenuation tank and the proposed flow control manhole.*

I&L Consulting Response:

Please refer to the Drainage details drawing D11.

LEGEND

- EXISTING PRIVATE FOUL WATER PIPE
- INDICATIVE THIRD PARTY RISING MAIN AREA THAT NEEDS FURTHER INVESTIGATION
- DIVERTED FOUL WATER PIPE
- ABANDONED FOUL WATER PIPE
- NEW FOUL WATER PIPE
- IC 0.45 — NEW FOUL WATER INSPECTION CHAMBER
- F000 1.20 — NEW FOUL WATER MANHOLE
- EXISTING PRIVATE STORM WATER PIPE
- DIVERTED STORM WATER PIPE
- ABANDONED STORM WATER PIPE
- NEW STORM WATER PIPE
- S000 0.45 — NEW STORM WATER INSPECTION CHAMBER
- S000 1.20 — NEW STORM WATER MANHOLE
- S000 1.20 (CP) — NEW STORM WATER CATCHPIT MANHOLE
- S000 1.20 (VC) — NEW STORM WATER MANHOLE WITH VENTED COVER
- A0/OB — LINEAR DRAINAGE CHANNEL (ACCESS BOX/ OUTLET BOX)
- PHASE 1 BOUNDARY
- SITE BOUNDARY

DRAINAGE

1. REFER TO CIVIL AND STRUCTURAL SPECIFICATION REPORT - PART R
2. CONTRACTOR SHOULD ENSURE THE LOCAL PLANNING AUTHORITY HAVE APPROVED THE DRAINAGE PROPOSALS PRIOR TO ORDERING MATERIAL OR INSTALLATION.

HYDRAULIC DESIGN:

3. THE SURFACE WATER NETWORK, FLOW CONTROL AND ATTENUATION HAS BEEN DESIGNED USING CAUSEWAY FLOW SOFTWARE WITH FSR RAINFALL DATA.

STRATEGY:

4. DISCHARGE RATE RESTRICTED AT 5.4 l/s FOR 1 IN 1 YR STORM AND 103.8 l/s FOR 1 IN 100 YR+45% CLIMATE CHANGE STORM SUBJECT TO LLFA APPROVAL. THESE RATES ARE BASED ON THE APPROVED DRAINAGE STRATEGY PREPARED BY AECOM (REF 60663052-ACM-ARA-XX-RP-C-00001, DATED 21ST APRIL 2022), WHICH ADOPTS 2 l/s/ha FOR THE 1 IN 1 YEAR STORM EVENT AND A 50% BETTERMENT OF THE EXISTING BROWNFIELD RUNOFF RATE FOR THE 1 IN 100 YEAR + 45% CLIMATE CHANGE EVENT.
5. TOTAL ATTENUATION FOR 100YR+45% CLIMATE CHANGE BELOW GROUND = 978m³

FINAL DRAINAGE CONNECTIONS:

6. WHERE THIRD PARTY APPROVAL IS REQUIRED THESE ARE NOTED AGAINST EACH DISCHARGE POINT ON THE DRAWING.
7. NO CONNECTION OR DISCHARGE SHOULD BE MADE UNTIL APPROVAL HAS BEEN RECEIVED. CHECK STATUS OF APPLICATION WITH ENGINEER.
8. CONTRACTOR SHOULD INVESTIGATE AND INSTALL FINAL DRAINAGE CONNECTIONS PRIOR TO INSTALLING ANY UPSTREAM DRAINAGE TO AVOID POTENTIAL LEVEL ISSUES.
9. EVERY EFFORT HAS BEEN MADE TO PROVIDE ACCURATE INFORMATION. HOWEVER, THE CONTRACTOR IS ADVISED TO CHECK ACTUAL CONDITIONS. I.E. THE LOCATION, ACCESSIBILITY, UNDERGROUND ROUTE, LEVELS, SIZES, CONDITION OF EXISTING SEWERS TO BE RE-USED AND/OR CONNECTED INTO.

GENERALLY:

10. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
11. REPORT CONFLICTS TO ENGINEER IMMEDIATELY.
12. EVERY EFFORT HAS BEEN MADE TO ASCERTAIN TYPE, LOCATION AND DEPTH OF BURIED SERVICES AND/OR OBSTRUCTIONS. HOWEVER, THE CONTRACTOR IS ADVISED TO CARRY OUT OWN INVESTIGATIONS TO ENSURE THERE ARE NO CLASHES WITH THE PROPOSED WORKS.
13. CONTRACTOR IS RESPONSIBLE FOR PROTECTING RETAINED SERVICES AND MAKING CONTACT WITH OWNERS OF APPARATUS TO OBTAIN NECESSARY CONSENT FOR EXCAVATION, PROTECTION AND/OR DIVERTING.
14. BURIED OBSTRUCTIONS ENCOUNTERED DURING EXCAVATION THAT CONFLICT WITH PROPOSED WORKS SHOULD BE BROKEN OUT AND REMOVED. RESIDUAL VOIDS TO BE BACKFILLED AND COMPACTED AS PER SPECIFICATION.

NEW DRAINAGE:

15. INTERNAL FOUL POINTS ARE LOCATED AND SET OUT BY THE ARCHITECT.
16. TRADITIONAL RAINWATER DOWNPIPES ARE PROVIDED BY THE CLADDING CONTRACTOR AND COORDINATED WITH THE ARCHITECT.
17. PREFERRED LOCATIONS OF SIPHONIC DOWNPIPES ARE SHOWN AND ARE TO BE DESIGNED BY A SPECIALIST. THE WAREHOUSE SHOULD NOT DRAIN THROUGH OFFICE AREAS.
18. DESIGN ASSUMES THAT ALL WORKS ARE NOT TO BE ADOPTED.
19. GRADIENTS OF PIPES ARE AVERAGED. PIPE CONNECTIONS SHOULD BE INSTALLED TO THE STATED INVERT LEVELS.
20. COVER LEVELS OF THE MANHOLES ARE AVERAGED. COVER AND FRAME SHOULD BE SET TO SUIT FINISHED GROUND LEVELS.
21. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O), INCLUDING BACKDROP PIPEWORK, WHERE THE RODDING ACCESS LEVEL IS SPECIFIED.
22. FLAT LATERAL CONNECTION TO BE 135° 'Y' JUNCTIONS (IE 45° OBLIQUE JUNCTIONS) RELATIVE TO MAIN RUN. TO BE USED ON FOUL OR SURFACE WATER RUNS. 90° OR 87.5° SQUARE JUNCTIONS SUITABLE FOR SURFACE WATER CONNECTIONS ONLY.
23. SADDLE CONNECTIONS TO LARGER PIPES SHOULD BE MADE SO THAT THE INVERT LEVEL OF THE SMALLER PIPE DOES NOT ADJOIN BELOW MID HEIGHT OF THE LARGER PIPE.
24. PIPES CROSSING WITHIN 200MM OF EACH OTHER ARE TO BE ISOLATED BY CONCRETE FOR A MINIMUM DISTANCE OF 1M BEYOND CROSSING POINT IN ALL DIRECTIONS.
25. A CCTV DRAINAGE SURVEY TO BE CARRIED OUT ON COMPLETION TO PROVE THE INTEGRITY OF THE AS-BUILT DRAINAGE SYSTEMS.

ANCILLARY ITEMS:

26. WHERE PROPOSED CONTRACTOR MUST PROVIDE PROPOSALS FOR SUPPLY OF LINEAR DRAINAGE CHANNELS, KERB DRAINS, INTERCEPTORS, ATTENUATION, PUMPS, HYDROBRAKE, FILTER UNITS.
27. WHERE PROPOSED ALLOWANCE SHOULD BE MADE FOR POWER SUPPLY TO INTERCEPTORS AND PUMPS AND FOR INSTALLING CONTROL PANELS.

PETROL INTERCEPTOR (PI)

SPEL STORMCEPTOR BYPASS SEPERATORS 325 C1/SC OR SIMILAR APPROVED

AREA DRAINED	11,260m²
COVER LEVEL	66.370m
IL IN	Ø600 @ 64.037m
IL OUT	Ø600 @ 63.937m

ALLOW FOR CONCRETE SURROUND, POWER SUPPLY, CONTROL PANEL, VENTING AND HIGH LEVEL ALARM.

COMPLEX CONTROL (HB)

OUTLET TO TANK TO HAVE A COMPLEX CONTROL (2NO.HYDROBRAKE) TOLIMIT FLOW TO 5.4 l/s (1 IN 1 YEAR) AND 103.8 l/s (1 IN 100YR+45% CC)

HYDROBRAKE:
1. AT IL 63.875 WITH DESIGN HEAD OF 1.625m LIMITING TO 5.4 l/s.
2. AT IL 64.485 WITH DESIGN HEAD OF 1.015m LIMITING TO 98.4 l/s.

FINAL DIAMETER OF MANHOLE CHAMBER AND ANY ADDITIONAL SUMP REQUIREMENT BY FLOW REGULATOR SPECIALIST.

ATTENUATION TANK

CONTRACTOR TO OBTAIN DESIGN/QUOTE FROM SUPPLIER BASED ON FOLLOWING PARAMETERS

AREA DRAINED	24,430m²
SIZE	117 x 5.5 x 1.60m (1,030m³)
WATER VOLUME	978m³
GROUND LEVEL	66.550m-66.800m
TANK TOP	65.500m
TANK BASE	63.900m

ALLOW FOR VENTING, BEDDING & SURROUND, MEMBRANE WITH WELDED JOINTS ALL CONNECTIONS INTO TANKS TO BE VIA MANIFOLD/REDUCERS TO SUIT MIN. 150 PIPE CONNECTION.

FOUL STORAGE + INTEGRAL PUMP (PS)

CONTRACTOR TO OBTAIN DESIGN/QUOTE FROM PREFERRED SUPPLIER BASED ON FOLLOWING PARAMETERS

CHAMBER CL	66.350m
LOWEST INLET LEVEL	63.000m
STORAGE VOLUME*	8.50m³ 24 HOUR** STORAGE PROVIDED BELOW LOWEST INLET
DISCHARGE RATE*	3.6l/s
PUMP TYPE	DUTY/STANDBY

RISING MAIN L150m FROM 65.150m TO 65.200m. DIAMETER AND REQUIREMENTS FOR WASH OUT CHAMBER TO BE CONFIRMED BY SUPPLIER.

* RATE AND VOLUME CALCULATED BASED USING EMPLOYMENT DENSITIES GUIDE AND CoP FLOW AND LOADS.
** 6 HOUR STORAGE SUBJECT TO BUILDING CONTROL INSPECTOR APPROVAL BASED ON PROPERTY USE. ALARM WITH GSM CONNECTIVITY AND MAINTENANCE CONTRACT WITH ENGINEER CALL OUT.

CONTRACTOR TO ALLOW FOR BACKUP PUMP, CONCRETE SURROUND, POWER SUPPLY, CONTROL PANEL, VENTING, HIGH LEVEL ALARM AND GSM CONNECTIVITY.

YORK DRIVE

AVRO WAY

VISCOUNT DRIVE

UNIT 2A SSL/FFL = 66.500 | UNIT 2B SSL/FFL = 66.500 | UNIT 2C SSL/FFL = 66.500 | UNIT 3A SSL/FFL = 67.650 | UNIT 3B SSL/FFL = 67.650 | UNIT 3C SSL/FFL = 67.650 | UNIT 3D SSL/FFL = 67.650

UNIT 1A SSL/FFL = 66.650 | UNIT 1B SSL/FFL = 66.650 | UNIT 1C SSL/FFL = 66.650 | UNIT 1D SSL/FFL = 66.650 | UNIT 1E SSL/FFL = 66.650 | UNIT 1F SSL/FFL = 66.650

S3 Ø1.35 CL:66.345 IL:64.424 — L84.82m Ø300 @ 1:150 — F1 Ø1.20 CL:66.386 IL:TBC — L27.23m Ø150 @ TBC — S1 Ø1.20 CL:67.586 IL:66.386 — L90.00m Ø300 @ 1:72

NEW MANHOLE IN LINE OF EXISTING FOUL PIPE

NEW CHANNEL AND SW PIPES TO CONNECT TO EXISTING OUTFALL

RELOCATE FW PUMPING STATION NO. 9. AND RISING MAIN.

EXISTING FW PUMPING STATION NO. 6. LOCATION TO BE CONFIRMED.

S2 Ø1.20 CL:66.339 IL:65.139

CONNECT NEW RISING MAIN TO PUMPING STATION NO.9

EXISTING FW PUMPING STATION NO. 9 TO BE RELOCATED.

EXISTING THIRD PARTY SERVICES CROSSING THE SITE. TO BE DIVERTED SUBJECT FURTHER INVESTIGATION.

EXISTING THIRD PARTY WATER MAIN CROSSING THE SITE. TO BE DIVERTED SUBJECT FURTHER INVESTIGATION.

MH162 Ø1.20 CL:66.459 IL:63.878 — L67.87m Ø100 @ 1:80 — MH161 Ø1.20 CL:66.459 IL:64.726 — L66.09m Ø300 @ 1:150 (8.000) — L75.08m Ø100 @ 1:80 — L73.47m Ø300 @ 1:150 (7.000) — MH160 Ø1.20 CL:67.588 IL:65.664 — L45.00m Ø100 @ 1:40 — MH159 Ø0.45 CL:67.589 IL:66.789

S122 Ø1.20 CL:66.432 IL:65.232 — S123 Ø1.35 CL:66.438 IL:64.716 — S119 Ø1.20 CL:67.557 IL:66.357 — S120 Ø1.35 CL:67.557 IL:65.792

LDC_O — L37.66m Ø375 @ 1:150 (9.000) — L30.28m Ø375 @ 1:150 (7.001)

L35.38m Ø100 @1:80

S115 Ø1.20 CL:65.811 IL:64.611 — LINEAR DRAINAGE CHANNEL_M — S116 Ø1.20 CL:66.151 IL:64.086 — L74.91m Ø300 @ 1:200 (5.000) — S114 Ø1.35 CL:66.975 IL:65.383 — L47.55m Ø375 @ 1:39 (4.001) — L47.55m Ø300 @ 1:150 (4.000) — S113 Ø1.20 CL:66.975 IL:65.775 — S121 Ø1.35 CL:66.816 IL:65.550

LDC_N

SPUR CONNECTION TO BE CAPPED FOR FUTURE PHASE 2 FOUL WATER CONNECTION.

SPUR CONNECTION TO BE CAPPED FOR PHASE 2

SPUR CONNECTION TO BE CAPPED FOR PHASE 2

SPUR CONNECTION TO BE CAPPED FOR PHASE 2

LINEAR DRAINAGE CHANNEL_L

EXCEEDANCE ROUTE IN THE EVENT OF A FAILURE OF THE DRAINAGE SYSTEM OR STORM EVENT IN EXCESS OF THE 1 IN 100 + 40% CC

LINEAR DRAINAGE CHANNEL_G — LINEAR DRAINAGE CHANNEL_H — LDC_I — L10.44m Ø450 @ 1:250 (4.002) — LDC_J — S117 Ø1.50 CL:66.369 IL:64.044 — S118 Ø1.50 CL:66.378 IL:63.929 — S124 Ø1.35 CL:66.777 IL:64.000 — L2.00m Ø375 @ 1:20 (8.002) — IL 63.900 — L2.00m Ø375 @ 1:50 (7.002) — IL 65.550 — L5.93m Ø600 @ 1:237 (1.005) — IL 63.900 — L13.25m Ø450 @ 1:201 (1.006) — S125 Ø1.35 CL:67.103 IL:63.809

S129 Ø1.20 CL:66.368 IL:65.168 — L32.14m Ø225 @ 1:42 (6.000) — L2.57m Ø600 @ 1:350 (3.003) — L6.74m Ø300 @ 1:54 (3.002) — L89.75m Ø300 @ 1:144 (2.003) — L8.29m Ø600 @ 1:286 (3.005) — L2.81m Ø600 @ 1:350 (3.004) — S112 Ø1.20 CL:66.504 IL:64.459 — IL 64.150 — L5.15m Ø375 @ 1:129 (1.004) — S111 Ø1.20 CL:66.556 IL:64.874 — S104 Ø1.20 CL:66.573 IL:64.619 — S110 Ø1.20 CL:66.556 IL:65.356

L62.25m Ø300 @ 1:150 (3.001) — L61.10m Ø225 @ 1:150 (3.000) — L53.03m Ø300 @ 1:150 (1.003) — L53.03m Ø300 @ 1:150 (1.002)

GULLY — Refuse — Plant — GULLY — Refuse — Plant — GULLY — Refuse — Plant — GULLY

LDC_A

S108 Ø1.20 CL:66.588 IL:64.890 — L2.60m Ø100 @ 1:80 — LINEAR DRAINAGE CHANNEL_F — LINEAR DRAINAGE CHANNEL_E — LINEAR DRAINAGE CHANNEL_D — LINEAR DRAINAGE CHANNEL_C — LINEAR DRAINAGE CHANNEL_B — S103 Ø1.20 CL:66.587 IL:64.973

MH116 Ø1.20 CL:66.560 IL:63.207 — L69.09m Ø100 @ 1:80 — L79.76m Ø100 @ 1:80 — L45.00m Ø100 @ 1:60

MH115 Ø1.20 CL:66.635 IL:64.071 — S109 Ø1.50 CL:66.573 IL:64.190 — MH114 Ø1.20 CL:66.618 IL:65.068 — MH113 Ø0.45 CL:66.618 IL:65.818

L45.19m Ø300 @ 1:200 (1.007) — L26.07m Ø300 @ 1:150 (2.000) — L26.07m Ø300 @ 1:111 (1.001)

EXISTING RISING MAIN IDENTIFIED ON THE SITE-WIDE MANCHESTER AIRPORT DRAINAGE PLAN. EXACT LOCATION TO BE CONFIRMED ON SITE DURING PHASE 1 WORKS. RELOCATION OF THE RISING MAIN MAY BE REQUIRED.

EXISTING THIRD PARTY SERVICES CROSSING THE SITE. TO BE DIVERTED SUBJECT FURTHER INVESTIGATION.

S107 Ø1.20 CL:66.402 IL:65.104 — S106 Ø1.20 CL:66.612 IL:65.422 — L47.70m Ø300 @ 1:150 (2.001) — L47.70m Ø225 @ 1:150 (2.000) — S105 Ø1.20 CL:66.615 IL:65.815 — S101 Ø1.20 CL:66.615 IL:65.815 — L82.96m Ø300 @ 1:150 (1.000) — LDC_K — S102 Ø1.20 CL:66.578 IL:65.262 — S126 Ø1.35 CL:67.148 IL:63.335

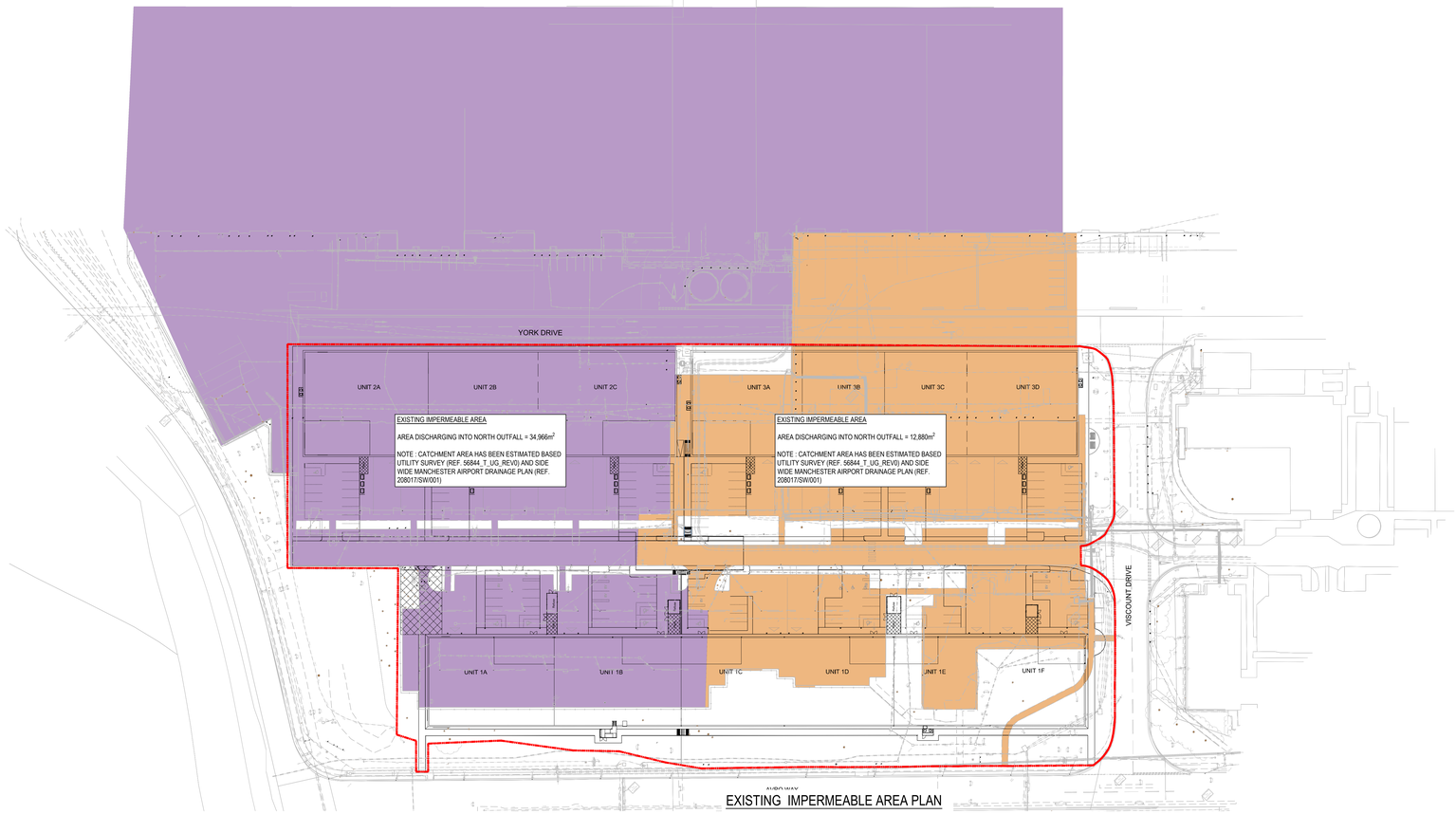
FORM NEW MANHOLE ON EXISTING MANCHESTER AIRPORT DRAINAGE NETWORK. PROPOSED FLOW AND CONNECTION TO BE AGREED WITH MAG. EXISTING NETWORK LAYOUT TAKEN FROM SITE WIDE DRAINAGE PLAN. FURTHER INVESTIGATION REQUIRED TO CONFIRM.

Rev.	Date	Description	Technician	Reviewer
P1	18.03.26	ISSUED FOR PLANNING	MS	GV

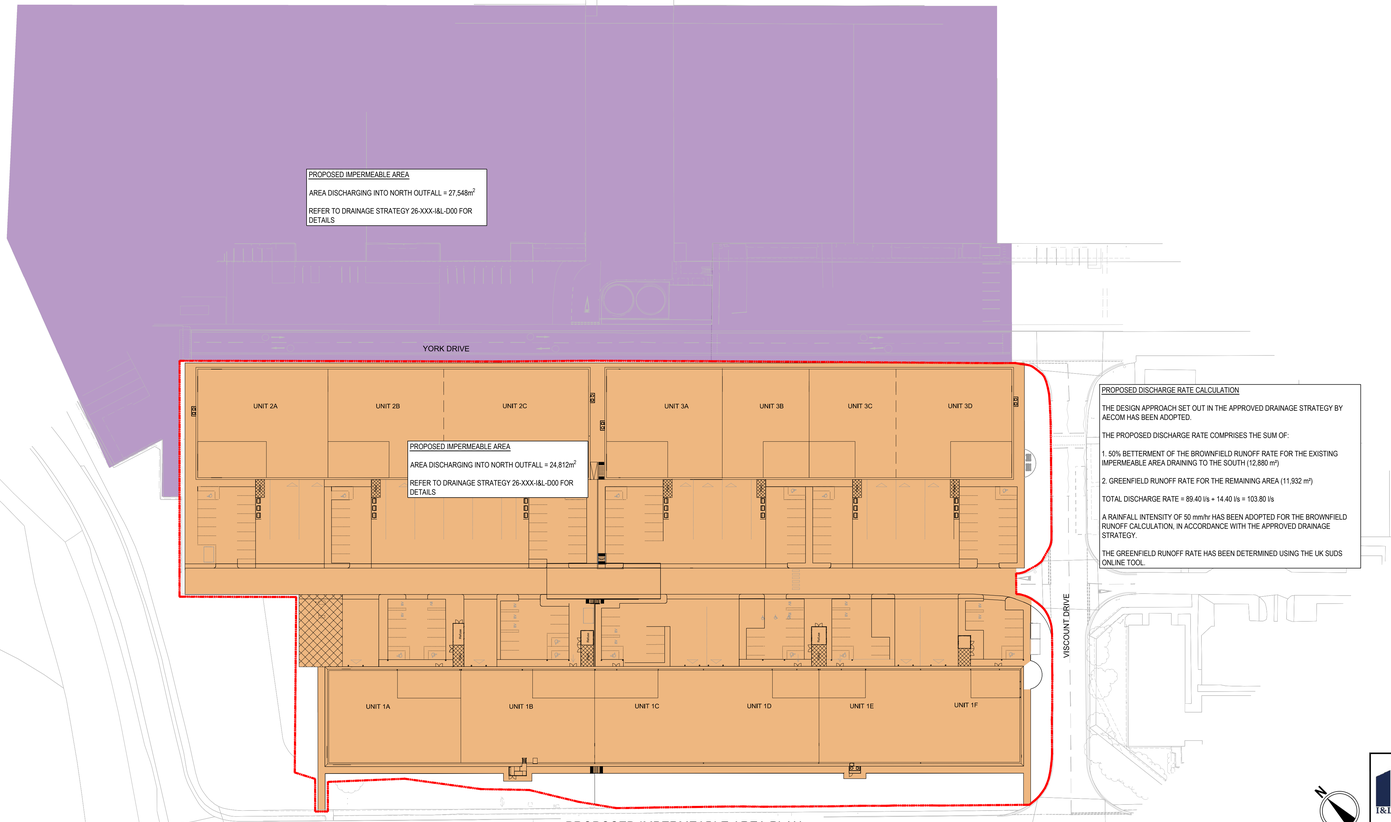
I&L CONSULTING Ltd
projects@il-consultants.com

Project: ARGOSY DRIVE, MANCHESTER AIRPORT
Drawing: DRAINAGE PLANNING STRATEGY

Drawing Set	Drawing Status	Scale	Project Number	Drawing Number	Revision
DRAINAGE	PLANNING	1:250 @ A0 1:1000 @ A3	26-XXX-I&L	D00	P1



EXISTING IMPERMEABLE AREA PLAN



PROPOSED IMPERMEABLE AREA PLAN

PROPOSED DISCHARGE RATE CALCULATION

THE DESIGN APPROACH SET OUT IN THE APPROVED DRAINAGE STRATEGY BY AECOM HAS BEEN ADOPTED.

THE PROPOSED DISCHARGE RATE COMPRISES THE SUM OF:

1. 50% BETTERMENT OF THE BROWNFIELD RUNOFF RATE FOR THE EXISTING IMPERMEABLE AREA DRAINING TO THE SOUTH (12,880 m²)

2. GREENFIELD RUNOFF RATE FOR THE REMAINING AREA (11,932 m²)

TOTAL DISCHARGE RATE = 89.40 l/s + 14.40 l/s = 103.80 l/s

A RAINFALL INTENSITY OF 50 mm/hr HAS BEEN ADOPTED FOR THE BROWNFIELD RUNOFF CALCULATION, IN ACCORDANCE WITH THE APPROVED DRAINAGE STRATEGY.

THE GREENFIELD RUNOFF RATE HAS BEEN DETERMINED USING THE UK SUDS ONLINE TOOL

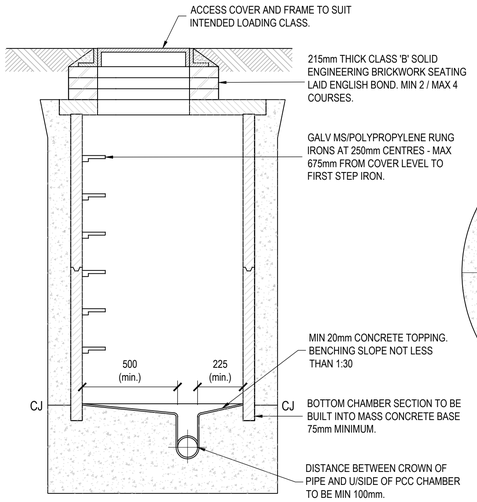
Rev.	Date	Description	Technician	Reviewer
P1	18.03.26	ISSUE D FOR PLANNING	WD	DY

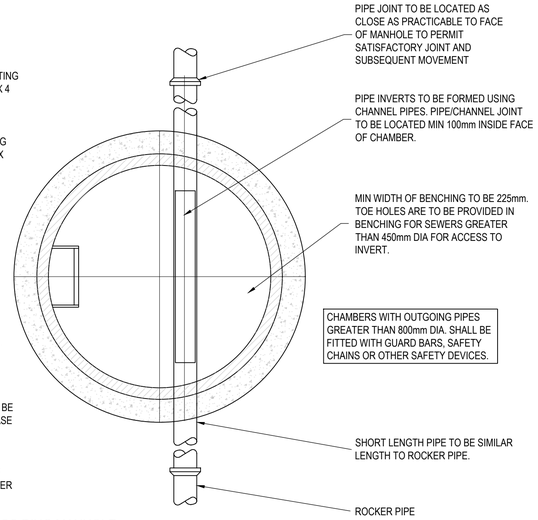
I&L CONSULTING Ltd
projects@il-consultants.com

Project: ARGOSY DRIVE, MANCHESTER AIRPORT

Drawing: IMPERMEABLE AREA PLAN

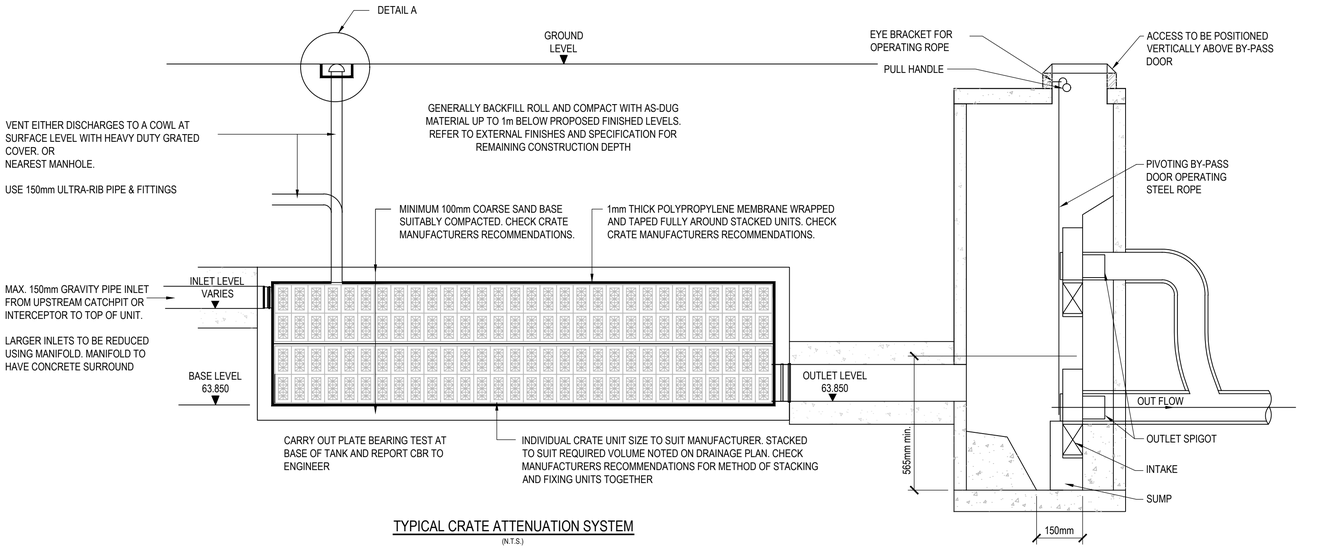
Drawing Set	Drawing Status	Scale	Project Number	Drawing Number	Revision
GROUNDWORKS	PLANNING	N.T.S @ A0	26-0XX-I&L	D05	P1





PCC RING MANHOLE DEPTH TO SOFFIT 3M MAX.

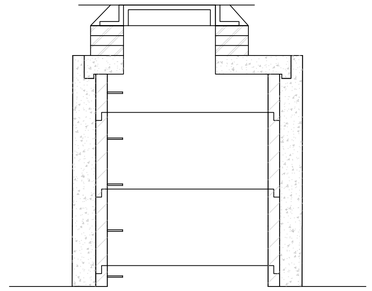
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TYPICAL CRATE ATTENUATION SYSTEM

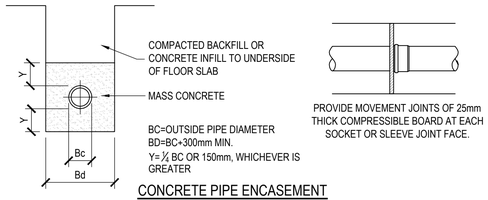
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SECTION A-A



CATCHPIT MANHOLE

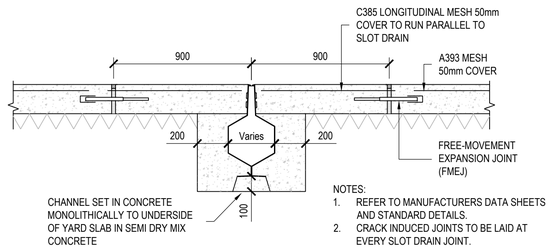
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CONCRETE PIPE ENCASEMENT

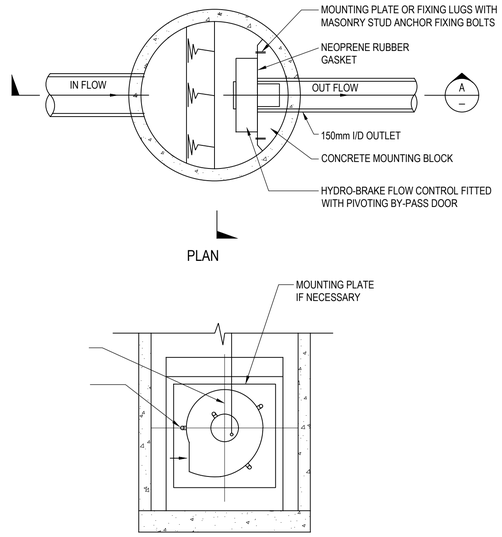
BELOW SLABS / ADJACENT FOUNDATIONS

(N.T.S.)

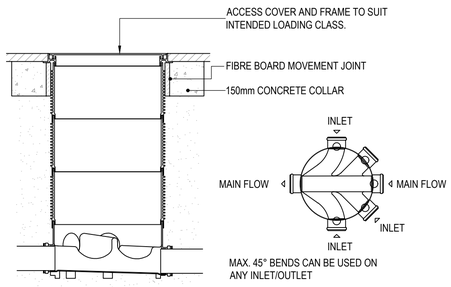


TYPICAL SLOT CHANNEL DETAILS

(N.T.S.)

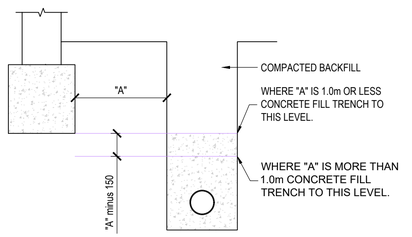


PLAN



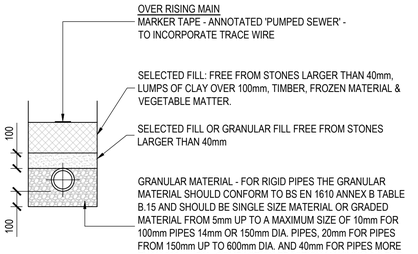
PLASTIC INSPECTION CHAMBER MAX. 1.2m DEPTH

(N.T.S.)



PIPE RUNS NEAR BUILDINGS

(N.T.S.)

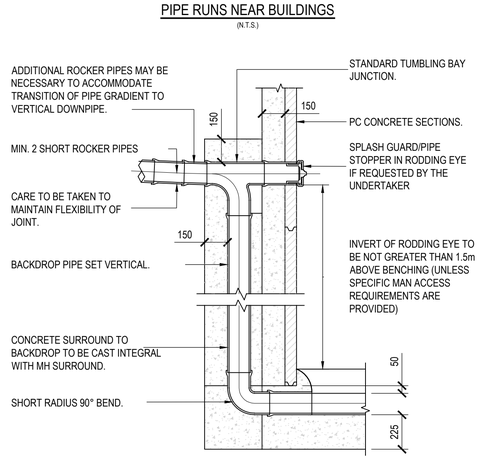


FLEXIBLE PIPE BEDDING DETAIL

(N.T.S.)

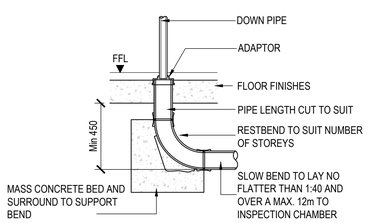
SECTION B-B

HYDRO-BRAKE FLOW CONTROL



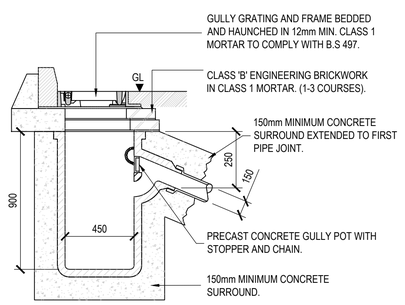
TYPICAL EXTERNAL BACKDROP DETAIL

(N.T.S.)



SUPPORT TO BENDS AT BASE OF VERTICAL DOWNPIPES

(N.T.S.)



TYPICAL ROAD GULLY DETAIL

(N.T.S.)

Rev.	Date	Description	Technician	Reviewer
P1	17.03.26	PLANNING ISSUE	NM	IL

I&L CONSULTING Ltd
projects@il-consultants.com

Project: **ARGOSY DRIVE, MANCHESTER AIRPORT**

Drawing: **DRAINAGE DETAILS**

Drawing Set	Drawing Status	Scale	Project Number	Drawing Number	Revision
DRAINAGE	PLANNING	N.T.S	26-XXX-I&L	D11	P1

Nodes

Name	Area (ha)	Cover Level (m)	Node Type	Diameter (mm)	Depth (m)	Invert Level (m)
S101	0.123	66.615	Manhole	1200	0.800	65.815
S102	0.016	66.578	Manhole	1200	1.316	65.262
S103	0.079	66.587	Manhole	1200	1.614	64.973
S104	0.066	66.573	Manhole	1200	1.954	64.619
S105	0.093	66.615	Manhole	1200	0.800	65.815
S106	0.052	66.612	Manhole	1200	1.190	65.422
S107		66.402	Manhole	1200	1.298	65.104
S108	0.123	66.588	Manhole	1200	1.698	64.890
S109		66.573	Manhole	1500	2.383	64.190
S110	0.116	66.556	Manhole	1200	1.200	65.356
S111	0.120	66.556	Manhole	1200	1.682	64.874
S112		66.504	Manhole	1200	2.045	64.459
S113	0.249	66.975	Manhole	1200	1.200	65.775
S114	0.285	66.975	Manhole	1350	1.592	65.383
S115	0.189	65.811	Manhole	1200	1.200	64.611
S116		66.151	Manhole	1200	2.065	64.086
S129	0.111	66.368	Manhole	1200	1.200	65.168
S117	0.056	66.369	Manhole	1500	2.325	64.044
PI		66.368	Junction		2.431	63.937
S118		66.378	Manhole	1500	2.448	63.930
S122	0.184	66.432	Manhole	1200	1.200	65.232
S123	0.199	66.438	Manhole	1350	1.722	64.716
S124		66.777	Manhole	1350	2.777	64.000
S119	0.191	67.557	Manhole	1200	1.200	66.357
S120	0.191	67.557	Manhole	1350	1.765	65.792
S121		66.816	Manhole	1350	1.226	65.590
Tank		66.500	Junction		2.600	63.900
HB		66.708	Manhole	2700	2.833	63.875
S125		67.103	Manhole	1350	3.294	63.809
S126		67.148	Manhole	1500	3.565	63.583

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)
1.000	S101	S102	82.962	0.600	Colebrook-White	65.815	65.262	0.553	150.0	300	Circular	6.08
1.001	S102	S103	32.073	0.600	Colebrook-White	65.262	64.973	0.289	111.0	300	Circular	6.44
1.002	S103	S104	53.027	0.600	Colebrook-White	64.973	64.619	0.354	149.8	300	Circular	7.13
1.003	S104	S109	53.027	0.600	Colebrook-White	64.619	64.265	0.354	149.8	300	Circular	7.82
2.000	S105	S106	47.699	0.600	Colebrook-White	65.815	65.497	0.318	150.0	225	Circular	5.75
2.001	S106	S107	47.699	0.600	Colebrook-White	65.422	65.104	0.318	150.0	300	Circular	6.37
2.002	S107	S108	32.073	0.600	Colebrook-White	65.104	64.890	0.214	149.9	300	Circular	6.78
2.003	S108	S109	89.748	0.600	Colebrook-White	64.890	64.265	0.625	143.6	300	Circular	7.93
1.004	S109	Tank	5.150	0.600	Colebrook-White	64.190	64.150	0.040	128.8	375	Circular	7.98
3.000	S110	S111	61.101	0.600	Colebrook-White	65.356	64.874	0.482	126.8	300	Circular	5.73
3.001	S111	S112	62.252	0.600	Colebrook-White	64.874	64.459	0.415	150.0	300	Circular	6.54
3.002	S112	S117	6.735	0.600	Colebrook-White	64.459	64.334	0.125	53.9	300	Circular	6.59
4.000	S113	S114	47.550	0.600	Colebrook-White	65.775	65.458	0.317	150.0	300	Circular	5.62
4.001	S114	S116	47.550	0.600	Colebrook-White	65.383	64.161	1.222	38.9	375	Circular	5.89

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.281	90.6	16.7	0.500	1.016	0.123	0.0
1.001	1.492	105.4	18.8	1.016	1.314	0.139	0.0
1.002	1.282	90.6	29.5	1.314	1.654	0.218	0.0
1.003	1.282	90.6	38.5	1.654	2.008	0.284	0.0
2.000	1.065	42.3	12.6	0.575	0.890	0.093	0.0
2.001	1.281	90.6	19.7	0.890	0.998	0.145	0.0
2.002	1.282	90.6	19.7	0.998	1.398	0.145	0.0
2.003	1.310	92.6	36.3	1.398	2.008	0.268	0.0
1.004	1.595	176.2	74.8	2.008	1.975	0.552	0.0
3.000	1.395	98.6	15.7	0.900	1.382	0.116	0.0
3.001	1.281	90.6	32.0	1.382	1.745	0.236	0.0
3.002	2.146	151.7	32.0	1.745	1.735	0.236	0.0
4.000	1.281	90.6	33.7	0.900	1.217	0.249	0.0
4.001	2.912	321.6	72.4	1.217	1.615	0.534	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)
5.000	S115	S116	74.913	0.600	Colebrook-White	64.611	64.236	0.375	199.8	300	Circular	6.13
4.002	S116	S117	10.439	0.600	Colebrook-White	64.086	64.044	0.042	248.5	450	Circular	6.26
6.000	S129	S117	32.138	0.600	Colebrook-White	65.168	64.410	0.758	42.4	225	Circular	5.27
3.003	S117	PI	2.570	0.600	Colebrook-White	64.044	64.037	0.007	367.1	600	Circular	6.63
3.004	PI	S118	2.559	0.600	Colebrook-White	63.937	63.930	0.007	365.6	600	Circular	6.66
3.005	S118	Tank	8.290	0.600	Colebrook-White	63.930	63.900	0.030	276.3	600	Circular	6.75
8.000	S122	S123	66.088	0.600	Colebrook-White	65.232	64.791	0.441	149.9	300	Circular	5.86
8.001	S123	S124	37.089	0.600	Colebrook-White	64.716	64.000	0.716	51.8	375	Circular	6.10
8.002	S124	Tank	2.000	0.600	Colebrook-White	64.000	63.900	0.100	20.0	375	Circular	6.11
7.000	S119	S120	73.469	0.600	Colebrook-White	66.357	65.867	0.490	149.9	300	Circular	5.96
7.001	S120	S121	30.280	0.600	Colebrook-White	65.792	65.590	0.202	149.9	375	Circular	6.30
7.002	S121	Tank	2.000	0.600	Colebrook-White	65.590	65.550	0.040	50.0	375	Circular	6.31
1.005	Tank	HB	5.069	0.600	Colebrook-White	63.900	63.875	0.025	202.8	600	Circular	8.03
1.006	HB	S125	13.250	0.600	Colebrook-White	63.875	63.809	0.066	200.8	450	Circular	8.18

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
5.000	1.109	78.4	25.6	0.900	1.615	0.189	0.0
4.002	1.285	204.3	98.0	1.615	1.875	0.723	0.0
6.000	2.014	80.1	15.0	0.975	1.734	0.111	0.0
3.003	1.265	357.6	152.6	1.725	1.731	1.126	0.0
3.004	1.267	358.4	152.6	1.831	1.848	1.126	0.0
3.005	1.460	412.7	152.6	1.848	2.000	1.126	0.0
8.000	1.282	90.6	24.9	0.900	1.347	0.184	0.0
8.001	2.522	278.5	51.9	1.347	2.402	0.383	0.0
8.002	4.067	449.2	51.9	2.402	2.225	0.383	0.0
7.000	1.281	90.6	25.9	0.900	1.390	0.191	0.0
7.001	1.477	163.2	51.8	1.390	0.851	0.382	0.0
7.002	2.567	283.5	51.8	0.851	0.575	0.382	0.0
1.005	1.706	482.4	331.1	2.000	2.233	2.443	0.0
1.006	1.431	227.6	331.1	2.383	2.844	2.443	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)
1.007	S125	S126	45.190	0.600	Colebrook-White	63.809	63.583	0.226	200.0	300	Circular	8.86

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.007	1.108	78.3	331.1	2.994	3.265	2.443	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	82.962	150.0	300	Circular	66.615	65.815	0.500	66.578	65.262	1.016
1.001	32.073	111.0	300	Circular	66.578	65.262	1.016	66.587	64.973	1.314
1.002	53.027	149.8	300	Circular	66.587	64.973	1.314	66.573	64.619	1.654
1.003	53.027	149.8	300	Circular	66.573	64.619	1.654	66.573	64.265	2.008
2.000	47.699	150.0	225	Circular	66.615	65.815	0.575	66.612	65.497	0.890
2.001	47.699	150.0	300	Circular	66.612	65.422	0.890	66.402	65.104	0.998
2.002	32.073	149.9	300	Circular	66.402	65.104	0.998	66.588	64.890	1.398
2.003	89.748	143.6	300	Circular	66.588	64.890	1.398	66.573	64.265	2.008
1.004	5.150	128.8	375	Circular	66.573	64.190	2.008	66.500	64.150	1.975

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S101	1200	Manhole	Adoptable	S102	1200	Manhole	Adoptable
1.001	S102	1200	Manhole	Adoptable	S103	1200	Manhole	Adoptable
1.002	S103	1200	Manhole	Adoptable	S104	1200	Manhole	Adoptable
1.003	S104	1200	Manhole	Adoptable	S109	1500	Manhole	Adoptable
2.000	S105	1200	Manhole	Adoptable	S106	1200	Manhole	Adoptable
2.001	S106	1200	Manhole	Adoptable	S107	1200	Manhole	Adoptable
2.002	S107	1200	Manhole	Adoptable	S108	1200	Manhole	Adoptable
2.003	S108	1200	Manhole	Adoptable	S109	1500	Manhole	Adoptable
1.004	S109	1500	Manhole	Adoptable	Tank		Junction	

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	61.101	126.8	300	Circular	66.556	65.356	0.900	66.556	64.874	1.382
3.001	62.252	150.0	300	Circular	66.556	64.874	1.382	66.504	64.459	1.745
3.002	6.735	53.9	300	Circular	66.504	64.459	1.745	66.369	64.334	1.735
4.000	47.550	150.0	300	Circular	66.975	65.775	0.900	66.975	65.458	1.217
4.001	47.550	38.9	375	Circular	66.975	65.383	1.217	66.151	64.161	1.615
5.000	74.913	199.8	300	Circular	65.811	64.611	0.900	66.151	64.236	1.615
4.002	10.439	248.5	450	Circular	66.151	64.086	1.615	66.369	64.044	1.875
6.000	32.138	42.4	225	Circular	66.368	65.168	0.975	66.369	64.410	1.734
3.003	2.570	367.1	600	Circular	66.369	64.044	1.725	66.368	64.037	1.731
3.004	2.559	365.6	600	Circular	66.368	63.937	1.831	66.378	63.930	1.848
3.005	8.290	276.3	600	Circular	66.378	63.930	1.848	66.500	63.900	2.000
8.000	66.088	149.9	300	Circular	66.432	65.232	0.900	66.438	64.791	1.347
8.001	37.089	51.8	375	Circular	66.438	64.716	1.347	66.777	64.000	2.402
8.002	2.000	20.0	375	Circular	66.777	64.000	2.402	66.500	63.900	2.225
7.000	73.469	149.9	300	Circular	67.557	66.357	0.900	67.557	65.867	1.390

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	S110	1200	Manhole	Adoptable	S111	1200	Manhole	Adoptable
3.001	S111	1200	Manhole	Adoptable	S112	1200	Manhole	Adoptable
3.002	S112	1200	Manhole	Adoptable	S117	1500	Manhole	Adoptable
4.000	S113	1200	Manhole	Adoptable	S114	1350	Manhole	Adoptable
4.001	S114	1350	Manhole	Adoptable	S116	1200	Manhole	Adoptable
5.000	S115	1200	Manhole	Adoptable	S116	1200	Manhole	Adoptable
4.002	S116	1200	Manhole	Adoptable	S117	1500	Manhole	Adoptable
6.000	S129	1200	Manhole	Adoptable	S117	1500	Manhole	Adoptable
3.003	S117	1500	Manhole	Adoptable	PI		Junction	
3.004	PI		Junction		S118	1500	Manhole	Adoptable
3.005	S118	1500	Manhole	Adoptable	Tank		Junction	
8.000	S122	1200	Manhole	Adoptable	S123	1350	Manhole	Adoptable
8.001	S123	1350	Manhole	Adoptable	S124	1350	Manhole	Adoptable
8.002	S124	1350	Manhole	Adoptable	Tank		Junction	
7.000	S119	1200	Manhole	Adoptable	S120	1350	Manhole	Adoptable

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.001	30.280	149.9	375	Circular	67.557	65.792	1.390	66.816	65.590	0.851
7.002	2.000	50.0	375	Circular	66.816	65.590	0.851	66.500	65.550	0.575
1.005	5.069	202.8	600	Circular	66.500	63.900	2.000	66.708	63.875	2.233
1.006	13.250	200.8	450	Circular	66.708	63.875	2.383	67.103	63.809	2.844
1.007	45.190	200.0	300	Circular	67.103	63.809	2.994	67.148	63.583	3.265

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
7.001	S120	1350	Manhole	Adoptable	S121	1350	Manhole	Adoptable
7.002	S121	1350	Manhole	Adoptable	Tank		Junction	
1.005	Tank		Junction		HB	2700	Manhole	Adoptable
1.006	HB	2700	Manhole	Adoptable	S125	1350	Manhole	Adoptable
1.007	S125	1350	Manhole	Adoptable	S126	1500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
S101	380791.923	385105.042	66.615	0.800	1200	Manhole	Adoptable	0	1.000	65.815	300	Circular
S102	380850.589	385046.381	66.578	1.316	1200	Manhole	Adoptable	1	1.000	65.262	300	Circular
								0	1.001	65.262	300	Circular
S103	380873.267	385069.061	66.587	1.614	1200	Manhole	Adoptable	1	1.001	64.973	300	Circular
								0	1.002	64.973	300	Circular

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
S104	380835.770	385106.555	66.573	1.954	1200	Manhole	Adoptable	1	1.002	64.619	300	Circular
												
								0	1.003	64.619	300	Circular
S105	380779.590	385117.375	66.615	0.800	1200	Manhole	Adoptable					
												
								0	2.000	65.815	225	Circular
S106	380745.860	385151.102	66.612	1.190	1200	Manhole	Adoptable	1	2.000	65.497	225	Circular
												
								0	2.001	65.422	300	Circular
S107	380712.131	385184.828	66.402	1.298	1200	Manhole	Adoptable	1	2.001	65.104	300	Circular
												
								0	2.002	65.104	300	Circular
S108	380734.809	385207.508	66.588	1.698	1200	Manhole	Adoptable	1	2.002	64.890	300	Circular
												
								0	2.003	64.890	300	Circular
S109	380798.273	385144.050	66.573	2.383	1500	Manhole	Adoptable	1	2.003	64.265	300	Circular
												
								2	1.003	64.265	300	Circular
								0	1.004	64.190	375	Circular
S110	380861.550	385086.826	66.556	1.200	1200	Manhole	Adoptable					
												
								0	3.000	65.356	300	Circular
S111	380818.348	385130.034	66.556	1.682	1200	Manhole	Adoptable	1	3.000	64.874	300	Circular
												
								0	3.001	64.874	300	Circular

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
S112	380774.332	385174.056	66.504	2.045	1200	Manhole	Adoptable	 1	3.001	64.459	300	Circular
								0	3.002	64.459	300	Circular
S113	380853.672	385118.930	66.975	1.200	1200	Manhole	Adoptable	 0	4.000	65.775	300	Circular
S114	380820.068	385152.571	66.975	1.592	1350	Manhole	Adoptable	 1	4.000	65.458	300	Circular
								0	4.001	65.383	375	Circular
S115	380733.522	385239.214	65.811	1.200	1200	Manhole	Adoptable	 0	5.000	64.611	300	Circular
S116	380786.463	385186.213	66.151	2.065	1200	Manhole	Adoptable	 1	5.000	64.236	300	Circular
								2	4.001	64.161	375	Circular
								0	4.002	64.086	450	Circular
S129	380756.352	385201.559	66.368	1.200	1200	Manhole	Adoptable	 0	6.000	65.168	225	Circular
S117	380779.077	385178.835	66.369	2.325	1500	Manhole	Adoptable	 1	6.000	64.410	225	Circular
								2	4.002	64.044	450	Circular
								3	3.002	64.334	300	Circular
								0	3.003	64.044	600	Circular
PI	380783.401	385174.508	66.368	2.431		Junction		 1	3.003	64.037	600	Circular
								0	3.004	63.937	600	Circular

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
S118	380785.386	385172.526	66.378	2.448	1500	Manhole	Adoptable	1	3.004	63.930	600	Circular
								0	3.005	63.930	600	Circular
S122	380756.389	385249.625	66.432	1.200	1200	Manhole	Adoptable	0	8.000	65.232	300	Circular
S123	380803.094	385202.868	66.438	1.722	1350	Manhole	Adoptable	1	8.000	64.791	300	Circular
								0	8.001	64.716	375	Circular
S124	380796.733	385166.328	66.777	2.777	1350	Manhole	Adoptable	1	8.001	64.000	375	Circular
								0	8.002	64.000	375	Circular
S119	380836.469	385169.454	67.557	1.200	1200	Manhole	Adoptable	0	7.000	66.357	300	Circular
S120	380888.390	385117.474	67.557	1.765	1350	Manhole	Adoptable	1	7.000	65.867	300	Circular
								0	7.001	65.792	375	Circular
S121	380866.968	385096.074	66.816	1.226	1350	Manhole	Adoptable	1	7.001	65.590	375	Circular
								0	7.002	65.590	375	Circular
Tank	380873.528	385083.136	66.500	2.600		Junction		1	8.002	63.900	375	Circular
								2	7.002	65.550	375	Circular
								3	3.005	63.900	600	Circular
								4	1.004	64.150	375	Circular
								0	1.005	63.900	600	Circular

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
HB	380877.537	385079.110	66.708	2.833	2700	Manhole	Adoptable	1	1.005	63.875	600	Circular
								0	1.006	63.875	450	Circular
S125	380886.826	385069.665	67.103	3.294	1350	Manhole	Adoptable	1	1.006	63.809	450	Circular
								0	1.007	63.809	300	Circular
S126	380854.868	385037.715	67.148	3.565	1500	Manhole	Adoptable	1	1.007	63.583	300	Circular

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m³/ha)	0.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)	
FSR Region	England and Wales	Analysis Speed	Detailed	Check Discharge Rate(s)	x
M5-60 (mm)	18.000	Skip Steady State	✓	Check Discharge Volume	x
Ratio-R	0.350	Drain Down Time (mins)	2880		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160	2880

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	45	0	0
30	0	0	0				

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Node HB Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	63.875	Product Number	CTL-SHE-0100-5400-1625-5400
Design Depth (m)	1.625	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.4	Min Node Diameter (mm)	1200

Node HB Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	64.485	Product Number	CTL-SHE-0392-9840-1015-9840
Design Depth (m)	1.015	Min Outlet Diameter (m)	0.450
Design Flow (l/s)	98.4	Min Node Diameter (mm)	2700

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	63.900
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	120

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	643.5	0.0	1.600	643.5	0.0	1.601	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	93.928	26.578	1 year 120 minute winter	18.178	7.231
1 year 15 minute winter	65.914	26.578	1 year 180 minute summer	21.468	5.524
1 year 30 minute summer	62.257	17.617	1 year 180 minute winter	13.955	5.524
1 year 30 minute winter	43.689	17.617	1 year 240 minute summer	17.257	4.561
1 year 60 minute summer	43.047	11.376	1 year 240 minute winter	11.465	4.561
1 year 60 minute winter	28.599	11.376	1 year 360 minute summer	13.498	3.474
1 year 120 minute summer	27.360	7.231	1 year 360 minute winter	8.774	3.474

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 480 minute summer	10.770	2.846	30 year 720 minute summer	17.173	4.602
1 year 480 minute winter	7.155	2.846	30 year 720 minute winter	11.541	4.602
1 year 600 minute summer	8.916	2.439	30 year 960 minute summer	14.085	3.709
1 year 600 minute winter	6.092	2.439	30 year 960 minute winter	9.330	3.709
1 year 720 minute summer	8.021	2.150	30 year 1440 minute summer	10.196	2.733
1 year 720 minute winter	5.390	2.150	30 year 1440 minute winter	6.852	2.733
1 year 960 minute summer	6.691	1.762	30 year 2160 minute summer	7.274	2.010
1 year 960 minute winter	4.432	1.762	30 year 2160 minute winter	5.012	2.010
1 year 1440 minute summer	4.970	1.332	30 year 2880 minute summer	6.028	1.616
1 year 1440 minute winter	3.340	1.332	30 year 2880 minute winter	4.051	1.616
1 year 2160 minute summer	3.647	1.008	100 year +45% CC 15 minute summer	429.887	121.643
1 year 2160 minute winter	2.513	1.008	100 year +45% CC 15 minute winter	301.675	121.643
1 year 2880 minute summer	3.082	0.826	100 year +45% CC 30 minute summer	289.193	81.832
1 year 2880 minute winter	2.071	0.826	100 year +45% CC 30 minute winter	202.942	81.832
30 year 15 minute summer	229.717	65.002	100 year +45% CC 60 minute summer	199.139	52.627
30 year 15 minute winter	161.205	65.002	100 year +45% CC 60 minute winter	132.303	52.627
30 year 30 minute summer	152.996	43.293	100 year +45% CC 120 minute summer	123.927	32.750
30 year 30 minute winter	107.365	43.293	100 year +45% CC 120 minute winter	82.334	32.750
30 year 60 minute summer	104.640	27.653	100 year +45% CC 180 minute summer	95.134	24.481
30 year 60 minute winter	69.521	27.653	100 year +45% CC 180 minute winter	61.839	24.481
30 year 120 minute summer	64.978	17.172	100 year +45% CC 240 minute summer	74.874	19.787
30 year 120 minute winter	43.170	17.172	100 year +45% CC 240 minute winter	49.745	19.787
30 year 180 minute summer	49.971	12.859	100 year +45% CC 360 minute summer	56.497	14.539
30 year 180 minute winter	32.482	12.859	100 year +45% CC 360 minute winter	36.725	14.539
30 year 240 minute summer	39.453	10.426	100 year +45% CC 480 minute summer	44.233	11.690
30 year 240 minute winter	26.211	10.426	100 year +45% CC 480 minute winter	29.388	11.690
30 year 360 minute summer	29.978	7.714	100 year +45% CC 600 minute summer	36.054	9.862
30 year 360 minute winter	19.486	7.714	100 year +45% CC 600 minute winter	24.634	9.862
30 year 480 minute summer	23.574	6.230	100 year +45% CC 720 minute summer	32.006	8.578
30 year 480 minute winter	15.662	6.230	100 year +45% CC 720 minute winter	21.510	8.578
30 year 600 minute summer	19.285	5.275	100 year +45% CC 960 minute summer	26.118	6.877
30 year 600 minute winter	13.177	5.275	100 year +45% CC 960 minute winter	17.301	6.877

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC 1440 minute summer	18.759	5.028	100 year +45% CC 2160 minute winter	9.144	3.668
100 year +45% CC 1440 minute winter	12.607	5.028	100 year +45% CC 2880 minute summer	10.927	2.929
100 year +45% CC 2160 minute summer	13.271	3.668	100 year +45% CC 2880 minute winter	7.344	2.929

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S101	10	65.897	0.082	14.9	0.0930	0.0000	OK
15 minute winter	S102	11	65.340	0.078	16.3	0.0886	0.0000	OK
15 minute winter	S103	11	65.081	0.108	25.0	0.1217	0.0000	OK
15 minute winter	S104	12	64.743	0.124	32.3	0.1398	0.0000	OK
15 minute winter	S105	11	65.893	0.078	11.2	0.0886	0.0000	OK
15 minute winter	S106	11	65.511	0.089	16.8	0.1005	0.0000	OK
15 minute winter	S107	11	65.191	0.087	16.9	0.0983	0.0000	OK
15 minute winter	S108	12	65.006	0.116	30.8	0.1311	0.0000	OK
960 minute winter	S109	780	64.477	0.287	5.8	0.5067	0.0000	OK
15 minute winter	S110	10	65.431	0.075	14.0	0.0843	0.0000	OK
15 minute winter	S111	11	64.991	0.117	28.1	0.1325	0.0000	OK
15 minute winter	S112	11	64.556	0.097	27.6	0.1098	0.0000	OK
15 minute winter	S113	10	65.895	0.120	30.1	0.1353	0.0000	OK
15 minute winter	S114	10	65.494	0.111	63.4	0.1587	0.0000	OK
15 minute winter	S115	11	64.720	0.109	22.9	0.1231	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S101	1.000	S102	14.5	0.977	0.160	1.2483	
15 minute winter	S102	1.001	S103	16.0	0.864	0.152	0.5988	
15 minute winter	S103	1.002	S104	24.8	1.005	0.274	1.3100	
15 minute winter	S104	1.003	S109	31.2	1.164	0.345	1.4232	
15 minute winter	S105	2.000	S106	10.8	0.893	0.256	0.5791	
15 minute winter	S106	2.001	S107	16.9	0.986	0.187	0.8195	
15 minute winter	S107	2.002	S108	16.8	0.811	0.185	0.6675	
15 minute winter	S108	2.003	S109	29.0	1.168	0.313	2.2282	
15 minute winter	S109	1.004	Tank	60.3	1.396	0.342	0.2223	
15 minute winter	S110	3.000	S111	13.6	0.711	0.138	1.1918	
15 minute winter	S111	3.001	S112	27.6	1.224	0.305	1.4065	
15 minute winter	S112	3.002	S117	27.2	1.506	0.179	0.1219	
15 minute winter	S113	4.000	S114	29.2	1.143	0.322	1.2142	
15 minute winter	S114	4.001	S116	62.7	1.855	0.195	1.8314	
15 minute winter	S115	5.000	S116	21.7	0.956	0.277	1.7045	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	S116	780	64.477	0.391	7.5	0.4421	0.0000	OK
15 minute winter	S129	10	65.231	0.063	13.4	0.0711	0.0000	OK
960 minute winter	S117	780	64.477	0.433	11.3	0.7648	0.0000	OK
960 minute winter	PI	780	64.477	0.540	11.1	0.0000	0.0000	OK
960 minute winter	S118	780	64.477	0.547	11.1	0.9662	0.0000	OK
15 minute winter	S122	11	65.332	0.100	22.3	0.1131	0.0000	OK
15 minute winter	S123	10	64.821	0.105	44.6	0.1509	0.0000	OK
960 minute winter	S124	750	64.477	0.477	14.8	0.6824	0.0000	SURCHARGED
15 minute winter	S119	11	66.459	0.102	23.1	0.1149	0.0000	OK
15 minute winter	S120	10	65.931	0.139	44.1	0.1984	0.0000	OK
15 minute winter	S121	11	65.705	0.115	44.1	0.1640	0.0000	OK
960 minute winter	Tank	780	64.477	0.577	41.4	352.5898	0.0000	OK
960 minute winter	HB	795	64.480	0.605	11.8	3.4653	0.0000	SURCHARGED
180 minute winter	S125	168	63.861	0.052	5.1	0.0747	0.0000	OK
180 minute winter	S126	168	63.635	0.052	5.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S116	4.002	S117	84.1	0.929	0.411	0.9449	
15 minute winter	S129	6.000	S117	13.1	1.476	0.164	0.2861	
15 minute winter	S117	3.003	PI	130.7	1.232	0.366	0.2728	
15 minute winter	PI	3.004	S118	130.7	1.262	0.365	0.2651	
15 minute winter	S118	3.005	Tank	130.8	2.493	0.317	0.6480	
15 minute winter	S122	8.000	S123	21.4	1.056	0.236	1.3409	
15 minute winter	S123	8.001	S124	44.5	1.925	0.160	0.8679	
60 minute winter	S124	8.002	Tank	59.2	2.291	0.132	0.1837	
15 minute winter	S119	7.000	S120	22.1	1.066	0.244	1.5244	
15 minute winter	S120	7.001	S121	44.1	1.350	0.270	0.9909	
15 minute winter	S121	7.002	Tank	44.3	1.716	0.156	0.0517	
60 minute summer	Tank	1.005	HB	19.7	0.369	0.041	0.7832	
180 minute winter	HB	1.006	S125	5.1	0.540	0.023	0.1263	
180 minute winter	S125	1.007	S126	5.1	0.632	0.065	0.3667	338.2

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S101	10	65.948	0.133	36.4	0.1503	0.0000	OK
15 minute winter	S102	11	65.392	0.130	40.1	0.1466	0.0000	OK
15 minute winter	S103	11	65.159	0.186	62.1	0.2108	0.0000	OK
15 minute winter	S104	11	64.842	0.223	80.9	0.2523	0.0000	OK
15 minute winter	S105	10	65.947	0.132	27.5	0.1496	0.0000	OK
15 minute winter	S106	11	65.568	0.146	41.6	0.1654	0.0000	OK
15 minute winter	S107	11	65.247	0.143	41.7	0.1613	0.0000	OK
15 minute winter	S108	11	65.100	0.210	76.3	0.2379	0.0000	OK
240 minute winter	S109	164	64.762	0.572	33.5	1.0103	0.0000	SURCHARGED
15 minute winter	S110	10	65.475	0.119	34.3	0.1350	0.0000	OK
15 minute winter	S111	11	65.074	0.200	69.0	0.2267	0.0000	OK
240 minute winter	S112	164	64.762	0.303	14.9	0.3432	0.0000	SURCHARGED
15 minute winter	S113	10	65.986	0.211	73.6	0.2382	0.0000	OK
15 minute winter	S114	10	65.563	0.180	155.4	0.2581	0.0000	OK
15 minute winter	S115	10	64.792	0.181	55.9	0.2047	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S101	1.000	S102	35.5	1.219	0.391	2.4297	
15 minute winter	S102	1.001	S103	40.1	1.066	0.380	1.2049	
15 minute winter	S103	1.002	S104	62.5	1.220	0.690	2.7095	
15 minute winter	S104	1.003	S109	78.4	1.414	0.865	2.9407	
15 minute winter	S105	2.000	S106	26.7	1.121	0.630	1.1343	
15 minute winter	S106	2.001	S107	41.7	1.243	0.460	1.6003	
15 minute winter	S107	2.002	S108	42.1	0.976	0.464	1.3758	
15 minute winter	S108	2.003	S109	75.1	1.429	0.811	4.7173	
15 minute winter	S109	1.004	Tank	153.5	1.749	0.872	0.4517	
15 minute winter	S110	3.000	S111	33.6	0.887	0.340	2.3136	
15 minute winter	S111	3.001	S112	67.9	1.496	0.750	2.8220	
15 minute winter	S112	3.002	S117	67.7	1.865	0.446	0.2444	
15 minute winter	S113	4.000	S114	71.4	1.409	0.789	2.4233	
15 minute winter	S114	4.001	S116	154.3	1.861	0.480	3.8640	
15 minute winter	S115	5.000	S116	54.3	0.988	0.693	4.2964	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	S116	164	64.763	0.677	44.1	0.7655	0.0000	SURCHARGED
15 minute winter	S129	10	65.271	0.103	32.8	0.1166	0.0000	OK
240 minute winter	S117	164	64.762	0.718	73.8	1.2686	0.0000	SURCHARGED
240 minute winter	PI	164	64.762	0.825	72.5	0.0000	0.0000	SURCHARGED
240 minute winter	S118	164	64.761	0.831	72.3	1.4692	0.0000	SURCHARGED
15 minute winter	S122	11	65.399	0.167	54.4	0.1893	0.0000	OK
15 minute winter	S123	10	64.887	0.171	110.4	0.2453	0.0000	OK
240 minute winter	S124	164	64.761	0.761	51.8	1.0894	0.0000	SURCHARGED
15 minute winter	S119	11	66.528	0.171	56.5	0.1934	0.0000	OK
15 minute winter	S120	10	66.029	0.237	109.4	0.3391	0.0000	OK
15 minute winter	S121	11	65.781	0.191	108.7	0.2728	0.0000	OK
240 minute winter	Tank	164	64.761	0.861	147.0	526.4073	0.0000	SURCHARGED
240 minute winter	HB	164	64.760	0.885	70.2	5.0662	0.0000	SURCHARGED
240 minute winter	S125	168	64.042	0.233	70.1	0.3331	0.0000	OK
240 minute winter	S126	168	63.790	0.207	70.2	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S116	4.002	S117	207.3	1.325	1.015	1.6182	
15 minute winter	S129	6.000	S117	32.3	1.872	0.403	0.5543	
15 minute winter	S117	3.003	PI	322.5	1.660	0.902	0.4992	
15 minute winter	PI	3.004	S118	323.1	1.620	0.902	0.6055	
15 minute winter	S118	3.005	Tank	316.1	2.742	0.766	2.0335	
15 minute winter	S122	8.000	S123	52.8	1.332	0.583	2.6200	
15 minute winter	S123	8.001	S124	109.7	2.288	0.394	2.3708	
15 minute winter	S124	8.002	Tank	105.7	3.656	0.235	0.2206	
15 minute winter	S119	7.000	S120	54.7	1.344	0.604	2.9916	
15 minute winter	S120	7.001	S121	108.7	1.683	0.666	1.9536	
15 minute winter	S121	7.002	Tank	109.2	2.168	0.385	0.1008	
240 minute winter	Tank	1.005	HB	70.2	0.354	0.146	1.4278	
240 minute winter	HB	1.006	S125	70.1	0.917	0.308	1.0208	
240 minute winter	S125	1.007	S126	70.2	1.270	0.896	2.4952	853.3

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S101	12	66.050	0.235	68.1	0.2654	0.0000	OK
15 minute winter	S102	12	65.917	0.655	78.3	0.7413	0.0000	SURCHARGED
15 minute winter	S103	12	65.809	0.836	102.6	0.9454	0.0000	SURCHARGED
180 minute winter	S104	136	65.408	0.789	40.4	0.8926	0.0000	SURCHARGED
15 minute winter	S105	12	66.553	0.738	51.5	0.8345	0.0000	FLOOD RISK
15 minute winter	S106	12	66.198	0.776	75.3	0.8773	0.0000	SURCHARGED
15 minute winter	S107	12	65.998	0.894	66.2	1.0117	0.0000	SURCHARGED
15 minute winter	S108	12	65.849	0.959	124.9	1.0847	0.0000	SURCHARGED
180 minute winter	S109	136	65.401	1.211	75.2	2.1401	0.0000	SURCHARGED
15 minute winter	S110	12	65.652	0.296	64.2	0.3343	0.0000	OK
15 minute winter	S111	11	65.496	0.622	124.1	0.7036	0.0000	SURCHARGED
180 minute winter	S112	136	65.403	0.944	33.3	1.0672	0.0000	SURCHARGED
15 minute winter	S113	11	66.885	1.110	137.7	1.2549	0.0000	FLOOD RISK
15 minute winter	S114	11	66.088	0.705	282.0	1.0088	0.0000	SURCHARGED
15 minute winter	S115	10	65.638	1.027	104.5	1.1612	0.0000	FLOOD RISK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S101	1.000	S102	69.4	1.386	0.767	5.3735	
15 minute summer	S102	1.001	S103	66.2	1.116	0.628	2.2586	
15 minute winter	S103	1.002	S104	92.1	1.308	1.016	3.7341	
15 minute winter	S104	1.003	S109	121.7	1.728	1.343	3.7341	
15 minute winter	S105	2.000	S106	46.5	1.204	1.099	1.8970	
15 minute summer	S106	2.001	S107	74.9	1.369	0.827	3.3589	
15 minute summer	S107	2.002	S108	67.2	1.012	0.742	2.2586	
15 minute winter	S108	2.003	S109	122.0	1.732	1.318	6.3200	
15 minute winter	S109	1.004	Tank	243.9	2.212	1.385	0.5680	
15 minute summer	S110	3.000	S111	60.3	0.982	0.612	3.5945	
15 minute summer	S111	3.001	S112	112.3	1.595	1.240	4.3837	
15 minute summer	S112	3.002	S117	112.1	1.780	0.739	0.4743	
15 minute winter	S113	4.000	S114	133.0	1.888	1.468	3.3484	
15 minute winter	S114	4.001	S116	283.6	2.572	0.882	5.2446	
15 minute winter	S115	5.000	S116	101.2	1.437	1.292	5.2753	

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.04%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	S116	136	65.403	1.317	102.5	1.4899	0.0000	SURCHARGED
180 minute winter	S129	136	65.404	0.236	15.8	0.2672	0.0000	SURCHARGED
180 minute winter	S117	136	65.402	1.358	154.5	2.3987	0.0000	SURCHARGED
180 minute winter	PI	136	65.401	1.464	153.1	0.0000	0.0000	SURCHARGED
180 minute winter	S118	136	65.401	1.471	152.7	2.5985	0.0000	SURCHARGED
15 minute winter	S122	11	65.534	0.302	101.8	0.3411	0.0000	SURCHARGED
180 minute winter	S123	136	65.403	0.687	54.5	0.9830	0.0000	SURCHARGED
180 minute winter	S124	136	65.400	1.400	51.9	2.0038	0.0000	SURCHARGED
15 minute winter	S119	10	67.023	0.666	105.6	0.7531	0.0000	SURCHARGED
15 minute winter	S120	10	66.305	0.513	207.7	0.7345	0.0000	SURCHARGED
15 minute winter	S121	11	65.874	0.284	204.0	0.4067	0.0000	OK
180 minute winter	Tank	136	65.400	1.500	328.3	916.9144	0.0000	SURCHARGED
180 minute winter	HB	136	65.397	1.522	105.0	8.7168	0.0000	SURCHARGED
720 minute summer	S125	405	64.252	0.443	103.1	0.6334	0.0000	SURCHARGED
720 minute summer	S126	405	63.832	0.249	103.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S116	4.002	S117	383.8	2.422	1.878	1.6540	
15 minute winter	S129	6.000	S117	60.9	2.006	0.761	1.0832	
15 minute winter	S117	3.003	PI	579.0	2.094	1.619	0.7239	
15 minute winter	PI	3.004	S118	577.6	2.061	1.612	0.7208	
15 minute winter	S118	3.005	Tank	632.3	3.043	1.532	2.3351	
15 minute winter	S122	8.000	S123	95.0	1.474	1.048	4.3190	
15 minute winter	S123	8.001	S124	202.4	2.472	0.727	3.4860	
15 minute winter	S124	8.002	Tank	195.2	4.015	0.435	0.2206	
15 minute winter	S119	7.000	S120	102.1	1.449	1.127	5.1736	
15 minute winter	S120	7.001	S121	204.0	1.910	1.250	3.0267	
15 minute winter	S121	7.002	Tank	205.0	2.535	0.723	0.1612	
60 minute winter	Tank	1.005	HB	106.9	0.584	0.222	1.4278	
720 minute summer	HB	1.006	S125	103.1	0.916	0.453	2.0250	
720 minute summer	S125	1.007	S126	103.1	1.481	1.317	3.0016	1877.0

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SPEL Stormceptor®

Class 1 Bypass Separators

Overview

SPEL Stormceptors® are the most widely used separators where it is acceptable to treat the first flush and flows up to 6.5mm/hr rainfall. This covers approximately 94% of all rainfall events in the UK. Any excess rainfall is by-passed internally without treatment.

Class 1 By Pass Separators are designed to achieve a discharge concentration of less than 5mg/l of oil under standard test conditions, and should be used when the separator is required to remove small amounts of oil, such as those arising from car park run-off.

These are used when it is considered an acceptable risk not to provide full treatment for storm flows, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small. They are especially suitable for low risk sites with large catchment areas.

Product Range

100 Series
(1.3m internal diameter):
NSB 3
Catchment area: 1,667m²

200 Series
(1.2m internal diameter):
NSB 4 - NSB 15
Catchment area: 2,222m² - 8,333m²

300 Series
(1.8m internal diameter):
NSB 20 - NSB 50
Catchment area: 11,111m² - 27,778m²

400 Series
(2.6m internal diameter):
NSB 60 - NSB 160
Catchment area: 33,333m² - 88,889m²

500 Series
(3.5m internal diameter):
NSB 180 - NSB 250
Catchment area: 100,000m² - 139,000m²

600 Series
(4m internal diameter):
NSB 300 - NSB 800
Catchment area: 167,000m² - 444,000m²

25 YEAR TANK SHELL WARRANTY

50 YEAR TANK SHELL LIFE EXPECTANCY

SPELGuard SERVICING & COMMISSIONING

BS EN 858 CERTIFIED

Applications

Car parks larger than 800m² or with 50+ car parking spaces

Smaller car parks discharging to sensitive environments

Roads

Light industrial

Airport taxiways

Shell Design

Designed with reference to BS EN 13121. All tank shells carry the SPEL 25 Year Warranty and life expectancy in excess of 50 years.

Shell Specifications

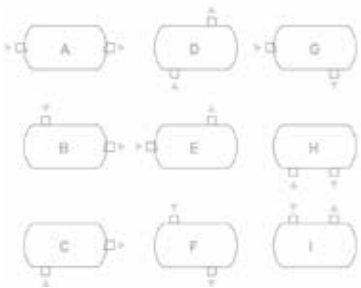
Different tank shell specifications are available dependent upon tank invert levels, ground conditions and ground water levels

Inlet/Outlet Connections

160/225/300mm diameter PVCU socket/ spigot.

450, 600, 750, 900 and 1200mm diameter GRP spigot available. For connecting to site pipework via Flex-Seal/Band-Seal or similar flexible couplings.

The nine inlet/outlet options below are available to assist with design and installation.



This graphic shows indicative locations only. For accurate location, please contact our technical team.

SPEL Stormceptor® Class 1 By Pass Separators

Introduction

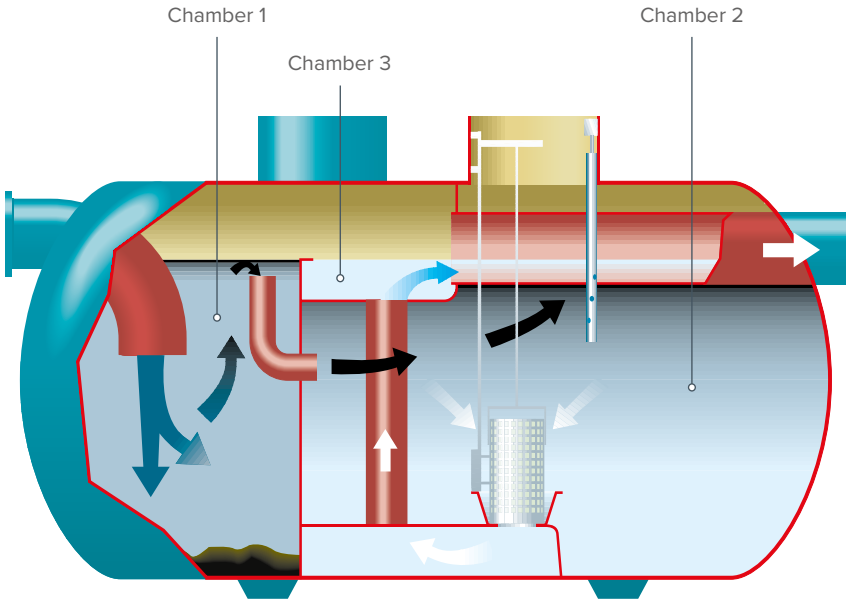
SPEL Stormceptor® is a well proven, high quality system, specially designed and fabricated to provide a very effective means of separating oil/light liquids and silt in stormwater drainage systems, it was also **the first Environment Agency listed class 1 by-pass separator.** The SPEL Stormceptor® 'SC' models are also designed to capture **high volumes of silt.**

The SPEL Stormceptor® is fully certified to BS EN 858 and has been used effectively throughout the UK, Europe and other parts of the world. All SPEL systems are off-site built and have the SPEL 25 Year Warranty.

NSB/Treated Flow Path

The polluted surface water first enters the primary chamber (chamber 1) where silt settles out and is retained. The fuel, oil and other pollutants lighter than water, rise to the surface and are efficiently skimmed off and transferred to the separation chamber (chamber 2).

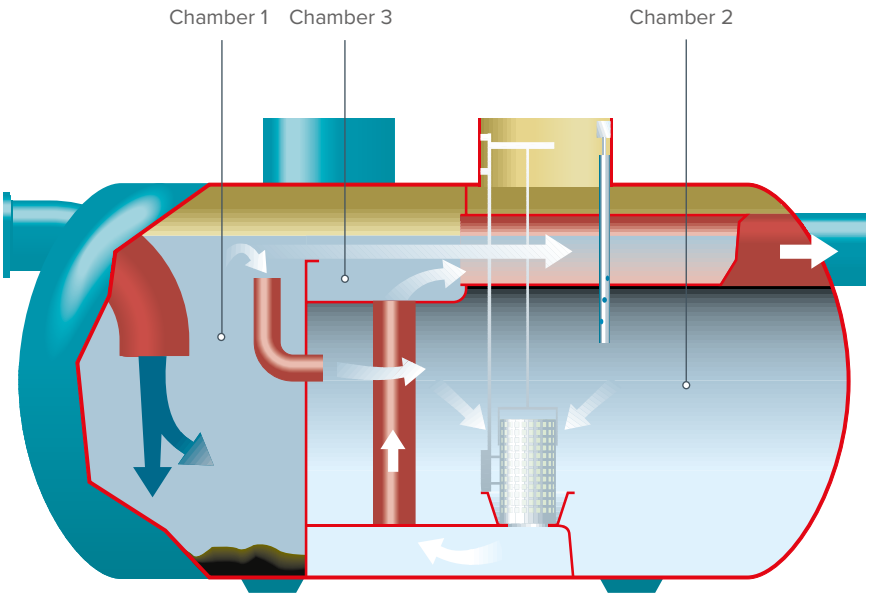
In normal conditions all the flow passes through the separation chamber, where the quiescent conditions allow the pollutants to separate out efficiently. Water from the cleanest zone in the separation chamber flows through a coalescer unit, to remove smaller globules of oil, up to the outlet chamber (chamber 3) and thence to the outlet pipe.



Storm/Peak Flow Path

During a storm the level in the primary chamber rises and the stormwater passes over the weir into the outlet chamber and to the outlet pipe.

The design keeps the turbulence within the separation chamber to a minimum which avoids disturbing the contaminants retained.



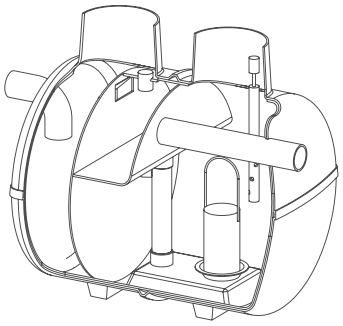
SPEL Stormceptor® By Pass Separators

100 Series (1.3m ø) and 200 Series (1.2m ø), Class 1

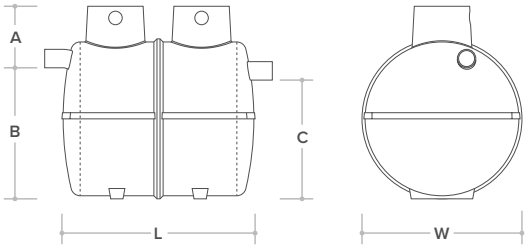
Compliant to the European Standard BS EN 858-1

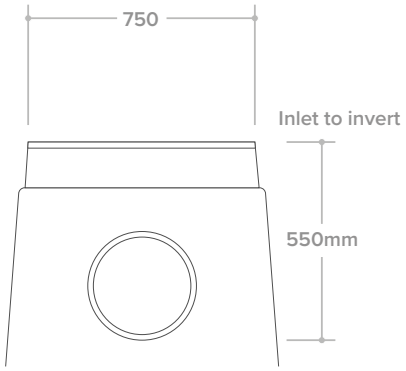
Model	Treated Flow (l/s)	Max. Flow (l/s)	Catchment Area (m^2)	Length (mm)	Internal Diameter (mm)	Oil storage (litres)	Silt storage (litres)	Inlet Invert (mm)	Base to inlet (mm)	Base to outlet	Optimum in/out pipe diameter (mm) for orientation*	Number of access shafts Diameter (mm)	
	NSB			L	W	NSB x 15	NSB x 100	A	B	C		450	750*
103 C1/SC	3	30	**1,667**	1,550	1,300	45	300	500	1,015	965	160	2	-
204 C1/SC	4	40	**2,222**	1,870	1,200	60	400	550	1,350	1,300	300	-	1
206 C1/SC	6	60	**3,333**	2,120	1,200	90	600	550	1,350	1,300	300	-	1
208 C1/SC	8	80	**4,444**	2,270	1,200	120	800	550	1,350	1,300	300	-	1
210 C1/SC	10	100	**5,556**	2,930	1,200	150	1,000	550	1,350	1,300	300	-	1
212 C1/SC	12	120	**6,667**	3,570	1,200	180	1,200	560	1,350	1,300	300	-	1
215 C1/SC	15	150	**8,333**	4,240	1,200	225	1,500	560	1,350	1,300	300	-	1

***SPEL Separators are designed for a maximum flow (NS/NSB) but can be fitted with larger than the recommended maximum connection size IN/OUT or with the addition of adapters providing the maximum flow (NS/NSB) cannot be exceeded or any increase in the operating level in the SPEL Separator to cause the captured pollutants to escape into the vent connections or through access shaft connections. Any overriding of the above criteria could jeopardise performance to the European Standard BS EN 858-1.*

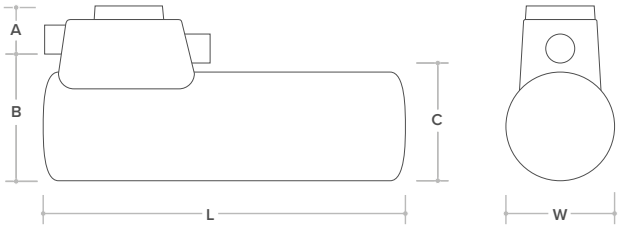


100 Series





200 Series



SPEL Stormceptor® By Pass Separators

300 Series (1.8m ø) and 400 Series (2.6m ø) Class 1

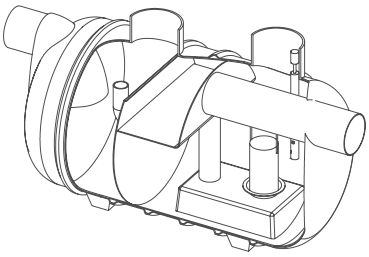
Compliant to the European Standard BS EN 858-1

Model	Nominal Size (NSB)	Peak Flow (l/s)	Catchment Area (m²)	Oil storage (litres)	Silt storage (litres)	Length (mm)	Internal Diameter (mm)	Inlet Invert (mm)	Base to inlet (mm)	Base to outlet	Optimum in/out pipe diameter (mm) for orientation*	Number of access shafts A-C** Diameter (mm)			
	Flow (l/s)			NSB x 15	NSB x 100	L	W	A	B	C		450	600	750	900
320 C1/SC	20	200	**11,111**	300	2,000	3,200	1,800	700	1,450	1,350	450	-	2	-	-
325 C1/SC	25	250	**13,889**	375	2,500	3,540	1,800	700	1,450	1,350	450	-	2	-	-
330 C1/SC	30	300	**16,667**	450	3,000	4,420	1,800	700	1,450	1,350	450	-	-	1	1
340 C1/SC	40	400	**22,222**	600	4,000	5,760	1,800	740	1,410	1,310	450	-	1	1	-
345 C1/SC	45	450	**25,000**	675	4,500	6,570	1,800	740	1,410	1,310	450	-	1	1	-
350 C1/SC	50	500	**27,778**	750	5,000	7,060	1,800	740	1,410	1,310	450	-	1	1	-

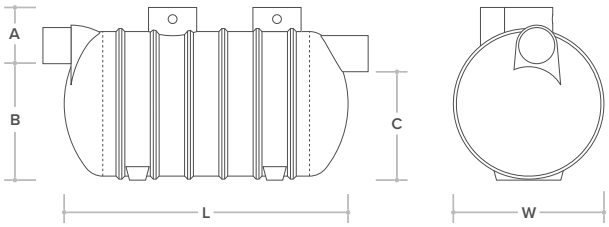
300 Series - models without silt capacity are available if required - details on application

**SPEL Separators are designed for a maximum flow (NS/NSB) but can be fitted with larger than the recommended maximum connection size IN/OUT or with the addition of adapters providing the maximum flow (NS/NSB) cannot be exceeded or any increase in the operating level in the SPEL Separator to cause the captured pollutants to escape into the vent connections or through access shaft connections. Any overriding of the above criteria could jeopardise performance to the European Standard BS EN 858-1.*

***D-I configurations available upon request.*



300 Series

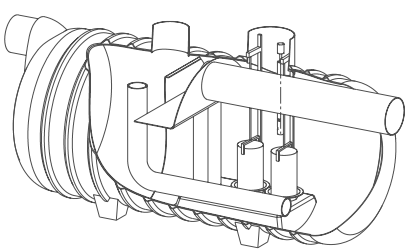


Model	Nominal Size (NSB)	Peak Flow (l/s)	Catchment Area (m²)	Oil storage (litres)	Silt storage (litres)	Length (mm)	Diameter (mm)	Inlet Invert (mm)	Base to inlet (mm)	Base to outlet	Optimum in/out pipe diameter (mm) for orientation*	Number of access shafts A-C** Diameter (mm)			
	Flow (l/s)			NSB x 15	NSB x 100	L	W	A	B	C		450	600	750	900
460 C1/SC	60	600	**33,333**	900	6,000	4,400	2,600	950	2,100	2,000	600	-	-	1	1
470 C1/SC	70	700	**38,889**	1,050	7,000	5,250	2,600	950	2,100	2,000	600	-	-	1	1
480 C1/SC	80	800	**44,444**	1,200	8,000	6,170	2,600	950	2,100	2,000	600	-	-	1	1
4100 C1/SC	100	1,000	**55,556**	1,500	10,000	7,400	2,600	1,100	1,950	1,850	750	-	-	1	1
4125 C1/SC	125	1,250	**69,444**	1,875	12,500	9,050	2,600	1,100	1,950	1,850	750	-	-	1	1
4150 C1/SC	150	1,500	**83,333**	2,250	15,000	9,950	2,600	1,100	1,950	1,850	750	-	-	-	2
4160 C1/SC	160	1,600	**88,889**	2,400	16,000	11,830	2,600	1,250	1,800	1,700	750	-	-	1	2

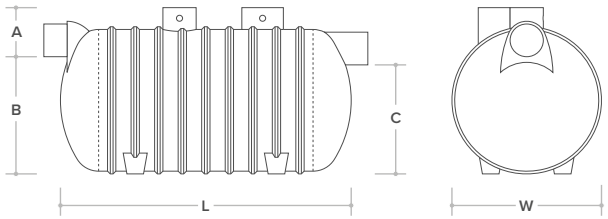
400 Series - models without silt capacity are available if required - details on application.

**SPEL Separators are designed for a maximum flow (NS/NSB) but can be fitted with larger than the recommended maximum connection size IN/OUT or with the addition of adapters providing the maximum flow (NS/NSB) cannot be exceeded or any increase in the operating level in the SPEL Separator to cause the captured pollutants to escape into the vent connections or through access shaft connections. Any overriding of the above criteria could jeopardise performance to the European Standard BS EN 858-1.*

***D-I configurations available upon request.*



400 Series



SPEL Stormceptor® By Pass Separators

500 Series (3.5m ø) and 600 Series (4.0m ø) Class 1

Compliant to the European Standard BS EN 858-1

These Stormceptors® are individually designed to meet specific site requirements according to catchment area, class, silt capacity, inlet/outlet connection size and orientation. Please contact our technical department for your specific requirements.

Model	Nominal Size (NSB)	Peak Flow (l/s)	Catchment Area (Hectares)	Oil storage (litres)	Silt storage (litres)	Length (mm)	Internal Diameter (mm)	Inlet Invert (mm)	Base to inlet (mm)	Base to outlet	Optimum in/out pipe diameter (mm) for orientation*	Number of access shafts A-C** Diameter (mm)			
	Flow (l/s)			NSB x 15	NSB x 100	L	W	A	B	C		450	600	750	900
5180 C1/SC	180	1,800	**10**	2,700	18000	7,470	3,500	1,185	2,690	2,550	900	-	-	1	2
5200 C1/SC	200	2,000	**11.1**	3,000	20000	8,530	3,500	1,185	2,425	2,325	1,200	-	1	1	2
5250 C1/SC	250	2,500	**13.9**	3,750	25000	10,040	3,500	1,185	2,425	2,325	1,200	-	2	1	2
6300 C1/SC	300	3,000	**16.7**	4,500	30000	10,310	4,000	1,325	2,850	2,675	1,200	-	-	2	2
6350 C1/SC	350	3,500	**19.4**	5,250	35000	11,470	4,000	1,325	2,850	2,675	1,200	-	-	2	3
6400 C1/SC	400	4,000	**22.2**	6,000	40000	12,690	4,000	1,325	2,850	2,675	1,200	-	-	2	3
6500 C1/SC	500	5,000	**27.8**	7,500	50000	15,870	4,000	1,325	2,850	2,675	1,200	-	-	2	4
6600 C1/SC	600	6,000	**33.3**	9,000	60000	18,260	4,000	1,325	2,850	2,675	1,200	-	2	1	4
6700 C1/SC	700	7,000	**38.9**	10,500	70000	22,250	4,000	1,325	2,850	2,675	1,200	-	-	2	5
6500 C1	500	5,000	**27.8**	7,500	Nil	11,910	4,150	1,325	2,850	2,675	1,200	-	1	1	4
6600 C1	600	6,000	**33.3**	9,000	Nil	13,510	4,150	1,325	2,850	2,675	1,200	-	1	1	4
6700 C1	700	7,000	**38.9**	10,500	Nil	16,650	4,150	1,325	2,850	2,675	1,200	-	1	1	5
6800 C1	800	8,000	**44.4**	12,000	Nil	19,890	4,150	1,325	2,850	2,675	1,200	-	-	1	6

Please note that C1 models do not have the full silt storage capacity as recommended in BS EN 858. Alternative silt capacity needs to be designed into the network upstream of the separator. This could include a silt capture tank.

**SPEL Separators are designed for a maximum flow (NS/NSB) but can be fitted with larger than the recommended maximum connection size IN/OUT or with the addition of adapters providing the maximum flow (NS/NSB) cannot be exceeded or any increase in the operating level in the SPEL Separator to cause the captured pollutants to escape into the vent connections or through access shaft connections. Any overriding of the above criteria could jeopardise performance to the European Standard BS EN 858-1.*

***D-I configurations available upon request.*

