

Appendix D – Marston & Grundy Drawings

ASHTON NEW ROAD

FOUL WATER DRAINAGE STRATEGY

FOUL WATER GENERATED BY THE NEW DEVELOPMENT WILL CONNECT TO THE COMBINED PUBLIC SEWER VIA AN EXISTING PRIVATE CONNECTION.

SURFACE WATER DRAINAGE

CONSIDERATION HAS BEEN GIVEN TO THE HIERARCHY OF DRAINAGE OPTIONS FOR THE SITE AS FOLLOWS:

- DISCHARGE INTO GROUND - ADOPTED FOR SOFT LANDSCAPING AND SMALL AREAS OF HARD LANDSCAPING, BUT UNDERLYING CLAY SUBSTRATA WOULD MAKE INFILTRATION BASED OPTIONS FOR LARGER AREAS UNSUITABLE.
- DISCHARGE TO SURFACE WATER BODY - CRT HAVE ADVISED THAT THERE IS NO CAPACITY IN THE ADJACENT ASHTON CANAL. NO OTHER WATERCOURSE IN CLOSE PROXIMITY.
- DISCHARGE TO SURFACE WATER SEWER, HIGHWAY DRAIN OR OTHER DRAINAGE SYSTEM - NO SURFACE WATER SEWER IN CLOSE PROXIMITY.
- DISCHARGE TO COMBINED WATER SEWER - CONNECT TO EXISTING COMBINED WATER SEWER VIA THE EXISTING PRIVATE CONNECTION AT RESTRICTED RATES.

THE PROPOSAL IS TO DISCHARGE SURFACE WATER FROM THE NEW DEVELOPMENT AT A RESTRICTED OUTFLOW OF 5L/s TO THE ADJACENT COMBINED SEWER VIA AN EXISTING PRIVATE DRAIN. ONLINE GEOCELLULAR TANKS TO RETAIN THE PEAK FLOWS.

SUDS TO ENCOMPASS:

- PERMEABLE SURFACING
- ATTENUATION TANK.
- FLOW CONTROL

NOTE THE HYDRAULIC MODEL AND PIPE INFORMATION SHOWN ON THIS DRAWING IS BASED ON ANTICIPATED GROUND LEVELS AND SUBJECT TO CHANGE AT DETAILED DESIGN STAGE.

NOTES

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KEY

- APPLICATION BOUNDARY
- EXISTING PRIVATE COMBINED WATER DRAINAGE
- EXISTING PRIVATE SURFACE WATER DRAINAGE
- EXISTING PRIVATE DRAINAGE TO BE ABANDONED
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED COMBINED WATER DRAINAGE
- PROPOSED PERMEABLE SURFACING
- PROPOSED GAS DIVERSION ROUTE AND EASEMENT - T.B.C BY OTHERS.
- PROPOSED OVERLAND FLOW ROUTES

PROPOSED GAS PIPE DIVERSION ROUTE AND EASEMENT SHOWN INDICATIVE ONLY. FINAL SETTING OUT BY OTHERS AND PENDING CONFIRMATION FROM GAS SUPPLIER THAT PROPOSED DRAINAGE CAN BE LOCATED WITHIN EASEMENT ZONE

LOCATIONS, DEPTH AND SIZE OF ALL EXISTING DRAINAGE TBC PRIOR TO WORKS COMMENCING

ALL PIPEWORK TO BE 100Ø UNLESS NOTED OTHERWISE

FW PIPES TO BE LAID AT MAX GRADIENT OF 1:80.
SW PIPES TO BE LAID AT MAX GRADIENT OF 1:100.

PROVIDE PROPRIETARY ROOT BARRIER PROTECTION FOR ALL DRAINAGE BELOW SOFT LANDSCAPING AREAS.

C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
P4	STAGE 4 ISSUE	AMT	08.04.24	PK
P3	CLIMATE INCREASED TO 45%	PG	21.03.24	PK
P2	LANDSCAPE PLAN UPDATED	PG	12.12.23	PK
P1	PRELIMINARY ISSUE	PG	13.11.23	PK
Rev	Description	By	Date	CHKD

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Client

MCFC

Project

MCWFC FACILITY,
ETIHAD CAMPUS

Drawing

BELOW GROUND DRAINAGE
STRATEGY PLAN

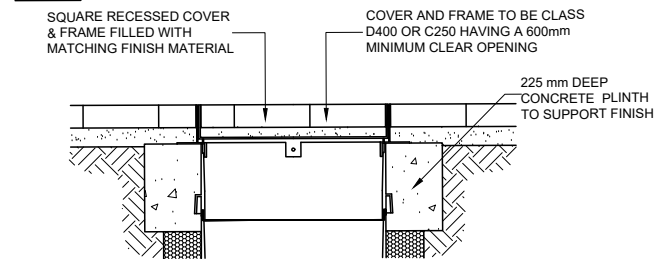
Purpose of Issue

CONSTRUCTION

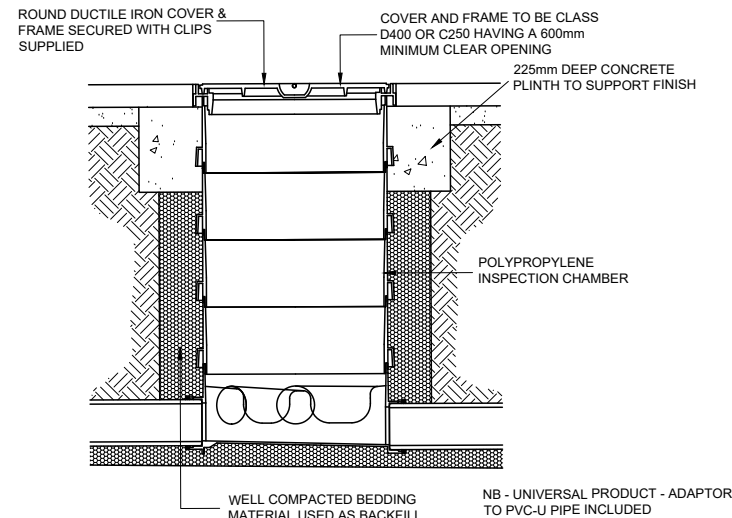
Project No.	Scale @ A1	Date	Drawn	Checked
13636	1:200	Nov '23	PG	PJK

Drawing Identifier	BS1192 Compliant
project	origin
zone	level
type	role
number	revision
MCW-MaG-ZZ-XX-DR-C-200	C1

SITED IN DRIVEWAYS / HARD LANDSCAPED AREAS WITH RECESSED COVER

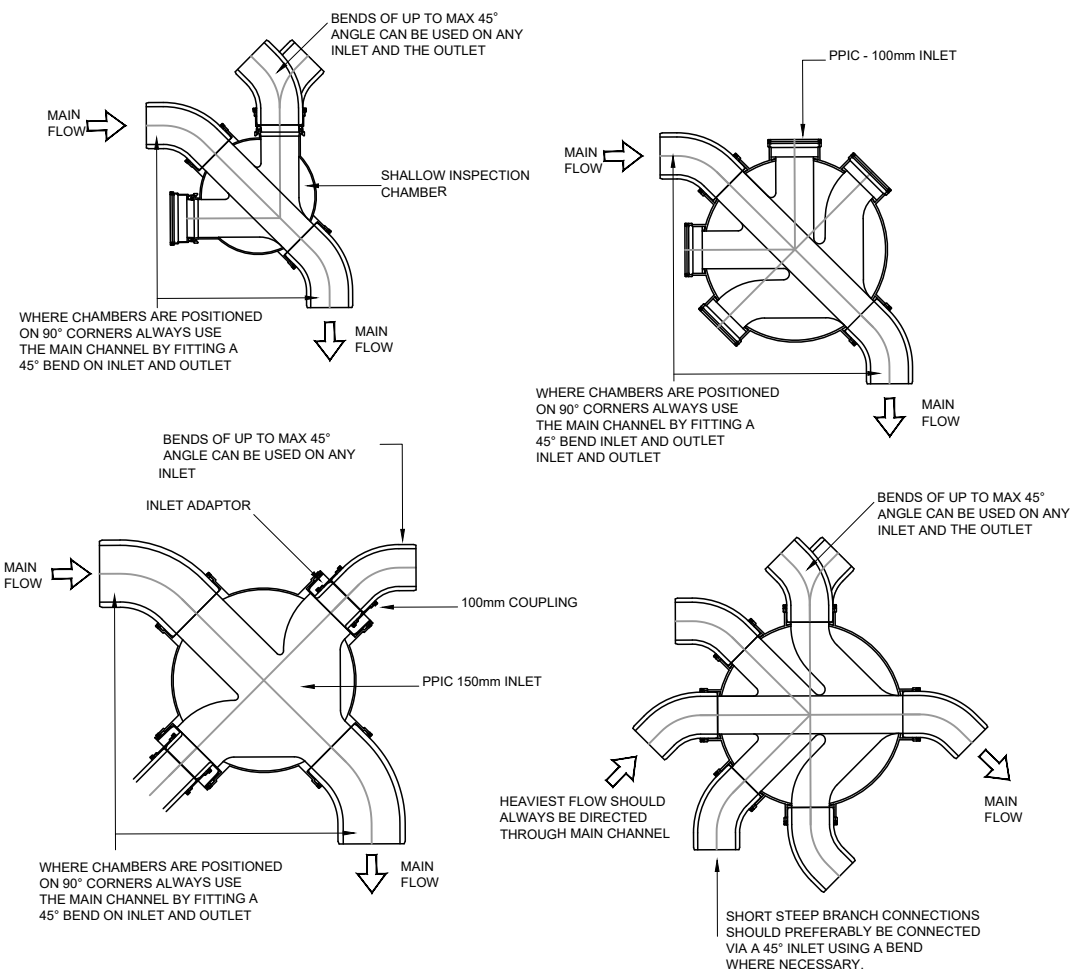


SITED IN DRIVEWAYS / HARD LANDSCAPED AREAS WITH STANDARD ROUND COVER



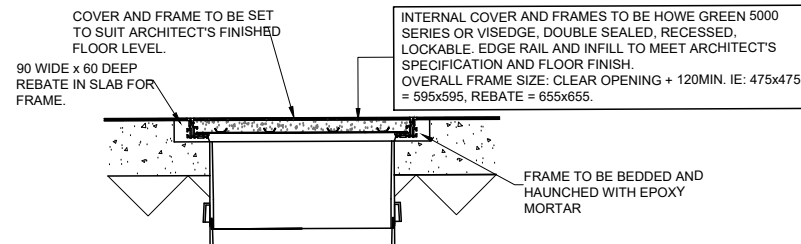
POLYPROPYLENE INSPECTION CHAMBER INSTALLATION DETAIL

(475dia. UP TO 1.2m DEPTH)

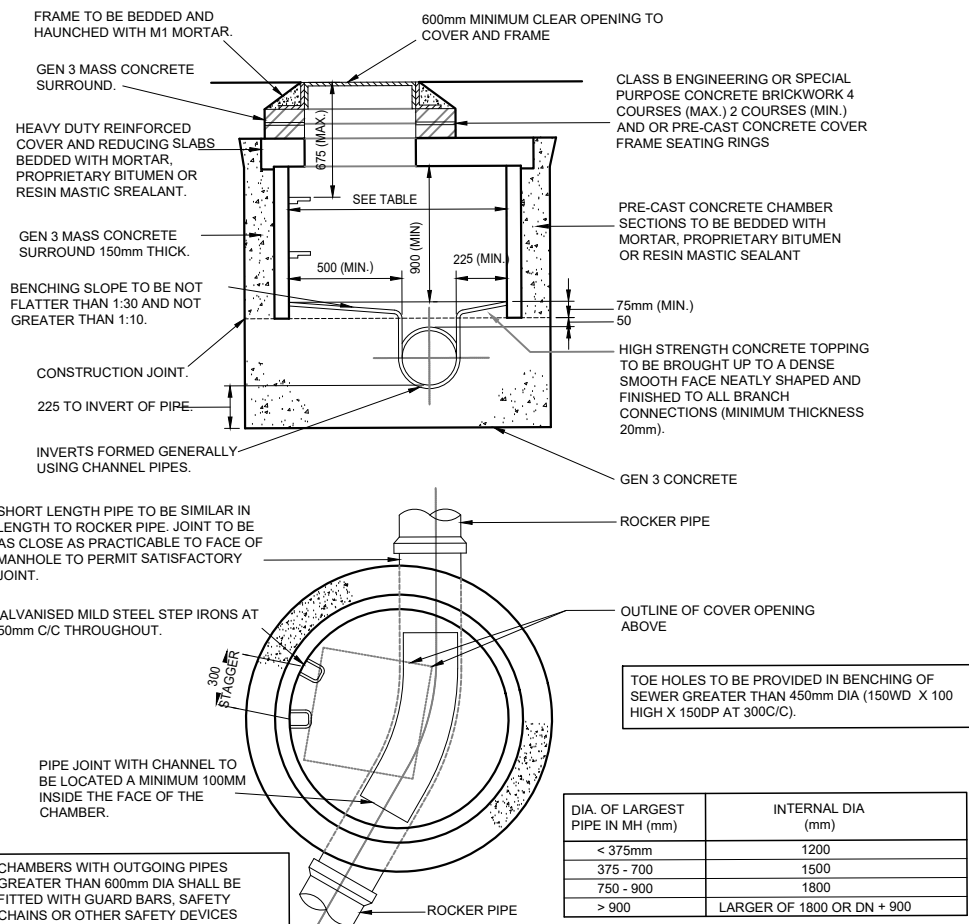
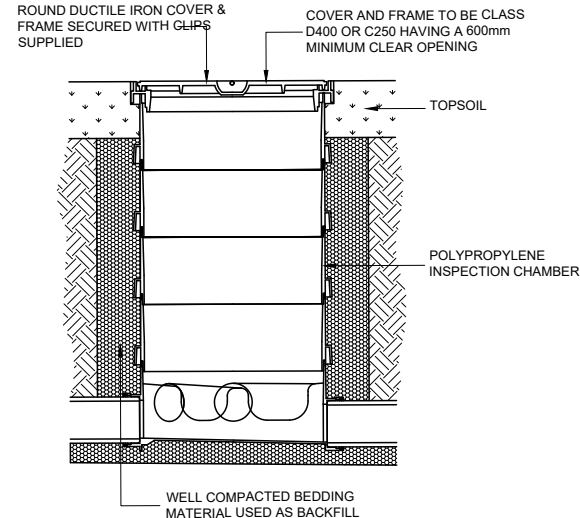


TYPICAL MINI ACCESS CHAMBER / PPIC INSTALLATION DETAIL

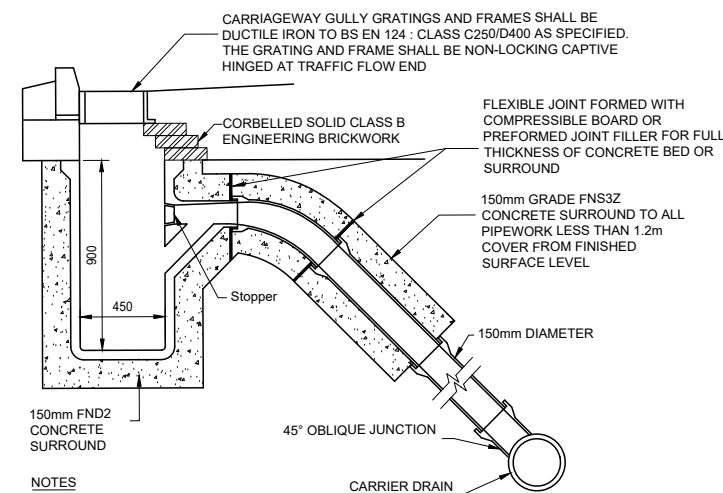
INTERNALLY SITED IN CONCRETE FLOOR SLAB



SITED IN SOFT LANDSCAPED AREAS WITH STANDARD ROUND COVER



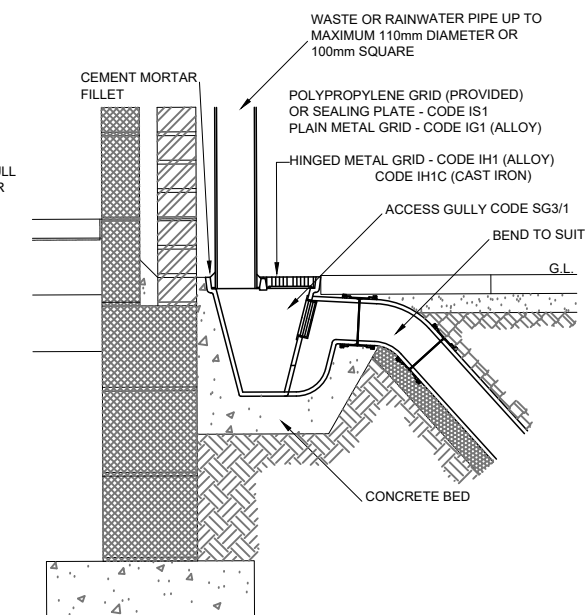
MANHOLE TYPE B



NOTES

1. GULLY POT TO BE 95 LITRES MIN CAPACITY
2. MAXIMUM TRENCH WIDTH FOR 150mm GULLY LEAD IS 600mm
3. CONCRETE SURROUND TO PIPES SHALL ALWAYS FINISH AT A JOINT

GULLY DETAIL WITH CONNECTION TO CARRIER DRAIN



ACCESS GULLY CONNECTION DETAIL

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C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
P1	STAGE 4 ISSUE	AMT	08.04.24	PK
Rev	Description	By	Date	Chk'd

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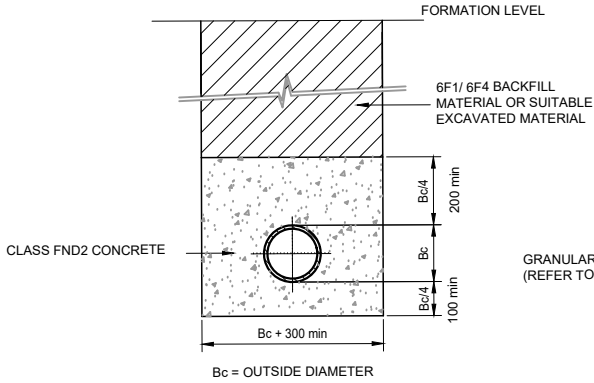
Client
MCFC

Project
**MCWFC FACILITY
PHASE 1**

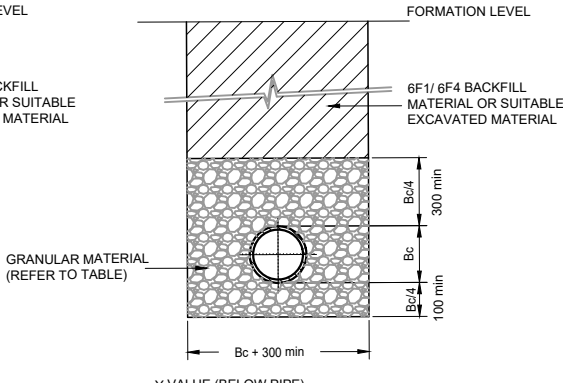
Drawing
**DRAINAGE DETAILS
SHEET 1**

Purpose of Issue
CONSTRUCTION

Project No.	Scale @ A1	Date	Drawn	Checked			
13636	NTS	Apr 24	AMT	PK			
Drawing Identifier							
project	origin	zone	level	type	role	number	Revision
MCW-MaG-ZZ-XX-DR-C-201							C1

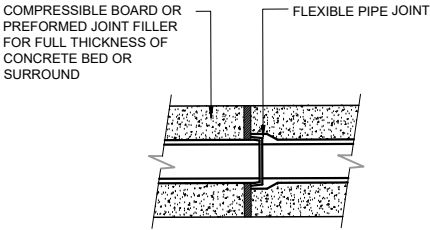


CLASS Z BEDDING DETAIL



CLASS S BEDDING DETAIL

NB- WHERE DRAINAGE IS IN CLOSE PROXIMITY TO EXISTING OR PROPOSED LANDSCAPE PLANTING, THE GRANULAR BED AND SURROUND SHALL BE WRAPPED WITH A DOUBLE THICKNESS OF LOTRAK 1800 OR SIMILAR APPROVED.



JOINTS FOR CONCRETE SURROUND TO PIPES
(TO OCCUR AT EACH PIPE JOINT)

Pipe Ø	Joint thickness
< 450	18mm
450-1200	36mm
1200 >	54mm

COMPRESSIBLE FILLER TABLE

(BITUMEN IMPREGNATED INSULATING BOARD TO BS 1142: PART 3)

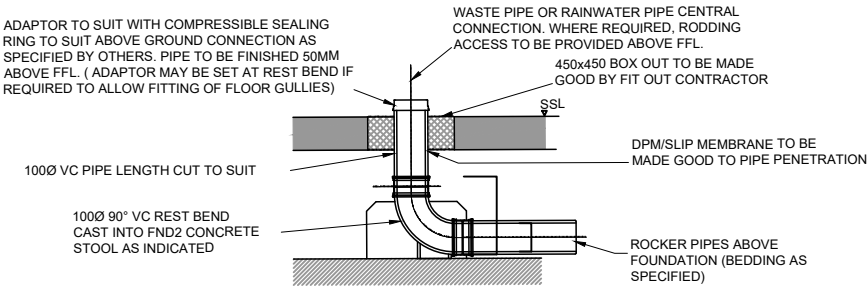
TRENCH WIDTHS	
PIPE I.D	OVERALL TRENCH WIDTH
100	550
150	600
225	700
300	850
375	1050
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
1050	2100
1200	2300
1350	2500
1500	2700
1800	3100

BS EN 1610:1997 ANNEX B TABLE B.15 COARSE AGGREGATE - PIPE BEDDING							
SIEVE SIZE (mm)	PERCENTAGE BY MASS PASSING BS SIEVES FOR NOMINAL SIZES						
	GRADED AGGREGATE (mm)			SINGLE-SIZED AGGREGATE (mm)			
	40 to 5	20 to 5	14 to 5	40	20	14	10
50.0	100	-----	-----	100	-----	-----	-----
37.5	90 - 100	100	-----	85 - 100	100	-----	-----
20.0	35 - 70	90 - 100	100	0 - 25	85 - 100	100	-----
14.0	-----	-----	90 - 100	-----	-----	85 - 100	100
10.0	10 - 40	30 - 60	50 - 85	0 - 5	0 - 25	0 - 50	85 - 100
5.0	0 - 5	0 - 10	0 - 10	-----	0 - 5	0 - 10	0 - 25
2.36	-----	-----	-----	-----	-----	-----	0 - 5

RIGID PIPES BEDDING GRADING

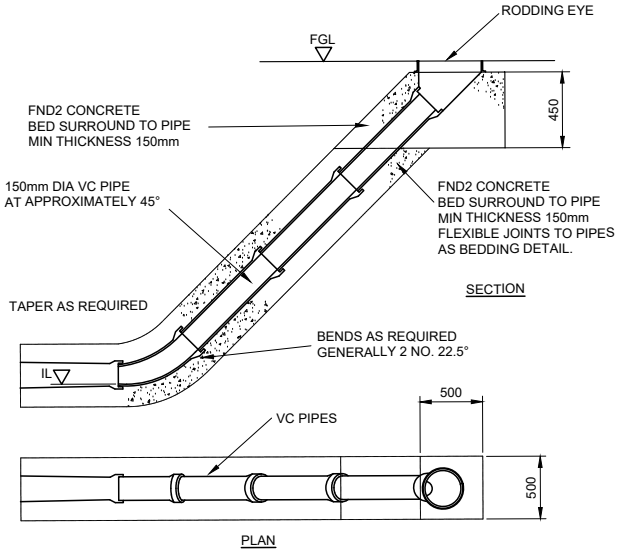
BASED ON BS EN 1610 : 1997 TABLE B.15
FOR RIGID PIPES THE BEDDING SHOULD BE SINGLE SIZE MATERIAL OR GRADED MATERIAL FROM 5mm UP TO A MAX SIZE OF 10mm FOR 100mm PIPES; 14mm FOR 150mm PIPES; 20mm FOR 225mm TO 600mm PIPES; 40mm FOR OVER 675mm PIPES

CHALK/LIMESTONE SHALL NOT BE USED AS BEDDING MATERIAL IN GROUND WHERE THE Ph <7

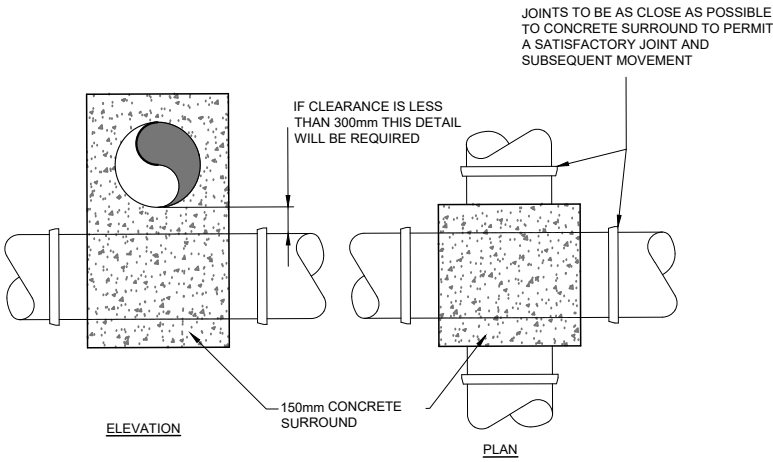


1000mm BELOW GROUND PIPE CONNECTION

NOTE: 1000mm 90° VC REST BEND INVERT LEVELS AS SPECIFIED.
BRANCH CONNECTIONS OFF FOUNDATIONS MAY BE SET DEEPER TO ALLOW FOR CONNECTION TO MAIN DRAIN RUN. ALTERNATIVELY, THE 1000mm 90° VC REST BEND MAY BE REPLACED BY 45°/30°/15° BENDS TO ALLOW FOR STEEP BRANCH CONNECTIONS.

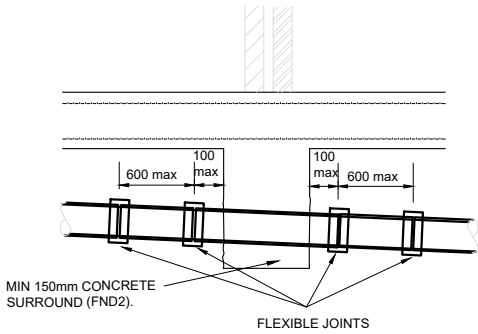


RODDING EYE



SPECIAL PIPE CROSSOVER DETAIL

REQUIRED IF CLEARANCE BETWEEN PIPES CROSSING EACH OTHER IS LESS THAN 300mm



PIPES PASSING THRO' SLAB THICKENINGS

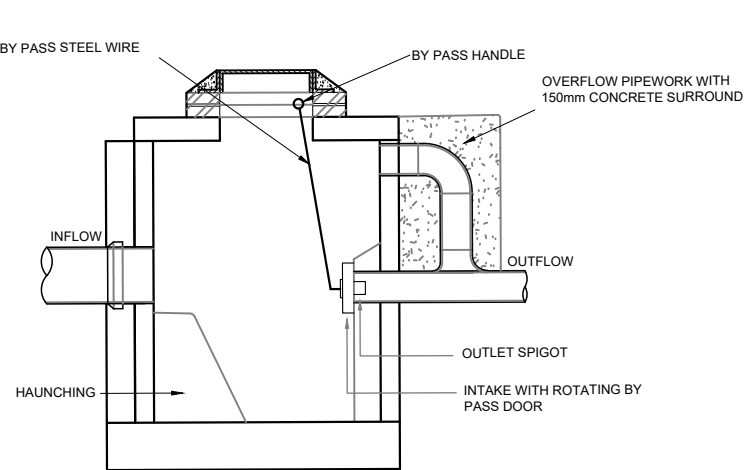
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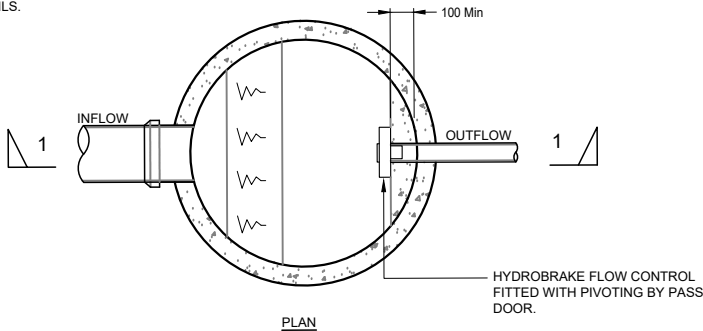
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C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
P1	STAGE 4 ISSUE	AMT	08.04.24	PK
Rev	Description	By	Date	Chk'd
Marston & Grundy LLP Consulting Engineers Priory House, Ellesmere Ave Marple, Stockport, Cheshire, SK6 7AN Telephone: 0161 427 7231 Email: mail@marstonandgrundy.com				
Client MCFC				
Project MCWFC FACILITY PHASE 1				
Drawing DRAINAGE DETAILS SHEET 2				
Purpose of Issue CONSTRUCTION				
Project No. 13636	Scale @ A1 NTS	Date Apr 24	Drawn AMT	Checked PK
Drawing Identifier project	origin	zone	level	type
role	number	Revision		
MCW-MaG-ZZ-XX-DR-C-202				C1

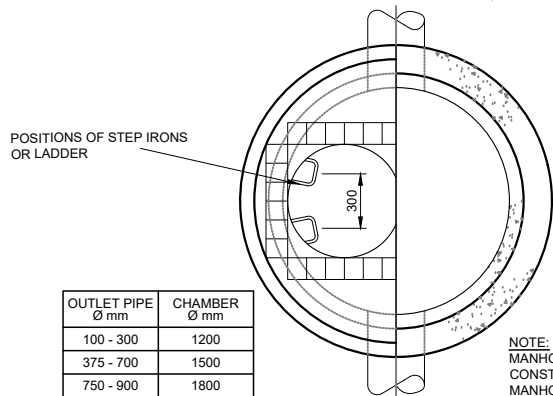
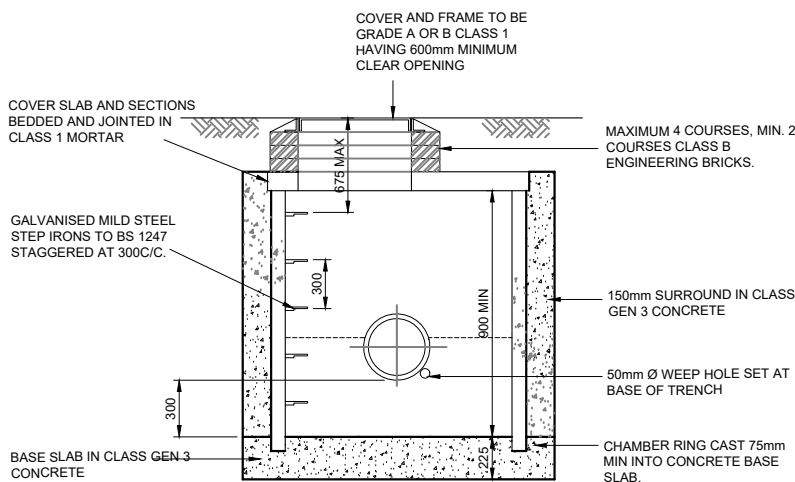


SECTION 1-1

NOTE:
THIS DRAWING IS INDICATIVE ONLY.
SEE MANUFACTURERS DRAWINGS AND
SPECIFICATION FOR CONSTRUCTION
DETAILS.



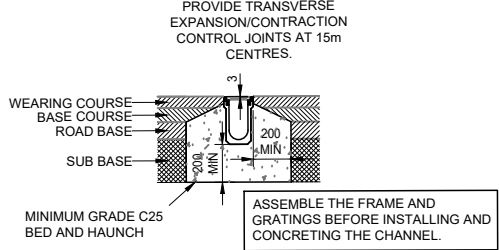
TYPICAL VORTEX CONTROL CHAMBER



OUTLET PIPE Ø mm	CHAMBER Ø mm
100 - 300	1200
375 - 700	1500
750 - 900	1800

(DEPTH TO TOP OF BASE
SLAB 1.2-3.0m)

TYPICAL CATCHPIT CHAMBER



TYPICAL DRAINAGE CHANNEL IN
FLEXIBLE PAVEMENT

NOTES

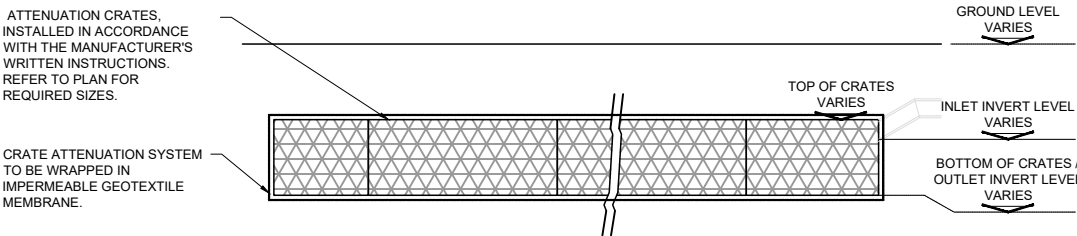
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OPERATION AND MAINTENANCE REQUIREMENTS FOR ATTENUATION STORAGE TANKS

MAINTENANCE SCHEDULE	REQUIRED ACTION	TYPICAL FREQUENCY
REGULAR MAINTENANCE	INSPECT AND IDENTIFY ANY AREAS THAT ARE NOT OPERATING CORRECTLY. IF REQUIRED, TAKE REMEDIAL ACTION.	MONTHLY FOR 3 MONTHS, THEN ANNUALLY
	REMOVE DEBRIS FROM THE CATCHMENT SURFACE (WHERE IT MAY CAUSE RISKS TO PERFORMANCE.)	MONTHLY
	FOR SYSTEMS WHERE RAINFALL INFILTRATES INTO THE TANK FROM ABOVE, CHECK SURFACE OF FILTER FOR BLOCKAGE BY SEDIMENT, ALGAE OR OTHER MATTER: REMOVE AND REPLACE SURFACE INFILTRATION MEDIUM AS NECESSARY.	ANNUALLY
	REMOVE SEDIMENT FROM PRE-TREATMENT STRUCTURES AND/ OR INTERNAL FOREBAYS.	ANNUALLY OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR/REHABILITATE INLETS, OUTLET, OVERFLOWS AND VENTS.	AS REQUIRED
MONITORING	INSPECT/CHECK ALL INLETS, OUTLETS, VENTS AND OVERFLOWS TO ENSURE THAT THEY ARE IN GOOD CONDITION AND OPERATING AS DESIGNED.	ANNUALLY
	SURVEY INSIDE OF TANK FOR SEDIMENT BUILD-UP AND REMOVE IF NECESSARY.	EVERY 5 YEARS OR AS REQUIRED



TYPICAL ATTENUATION DETAIL

C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
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Client
MCFC

Project
**MCWFC FACILITY
PHASE 1**

Drawing
**DRAINAGE DETAILS
SHEET 3**

Purpose of Issue
CONSTRUCTION

Project No.	Scale @ A1	Date	Drawn	Checked			
13636	NTS	Apr 24	AMT	PK			
Drawing Identifier							
project	origin	zone	level	type	role	number	Revision
MCW-MaG-ZZ-XX-DR-C-203							C1

DRAINAGE NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, SPECIFICATIONS AND DOCUMENTATION.
2. THE POSITION, SIZE AND LEVELS OF ALL DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
3. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
4. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
5. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
6. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF THE RELEVANT BRITISH/EUROPEAN STANDARD AND THE BUILDING REGULATIONS PART H.
7. CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:

a) ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600mmCOVER.

b) ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2m COVER.
8. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O). ALL CHAMBER INVERT LEVELS ARE FOR THE OUTGOING PIPE LEVELS. BACKDROP PIPEWORK SHALL BE CONNECTED AT SOFFIT TO SOFFIT WITH THE RODDING ACCESS LEVEL SPECIFIED.
9. ANY GRADIENTS OF DRAINS INDICATED ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL THE DRAINS TO THE SPECIFIED LEVELS SHOWN FOR EACH MANHOLE (U.N.O). CATCHPIT INVERT LEVELS ARE FOR THE OUTGOING PIPE WITH THE SUMP LEVEL SPECIFIED SEPARATELY.
10. CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.
11. COVER LEVELS OF THE MANHOLES ARE PROVISIONAL AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED GROUND LEVELS. ALL EXTERNAL WORKS CONSTRUCTION AREAS TO BE AS LOCATED BY THE ARCHITECT.
12. MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH THE RELEVANT BRITISH/EUROPEAN STANDARD AND THE FOLLOWING:

a) VEHICULAR AREAS: CLASS E600 & D400, DOUBLE TRIANGULAR, 150mm DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.

b) PEDESTRIAN AREAS: CLASS B125/C250, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
13. DOUBLE SEAL MANHOLE COVERS AND FRAMES ARE TO BE USED ON INTERNAL FOUL WATER DRAINAGE CHAMBERS. FINISH TO BE CONFIRMED BY THE ARCHITECT.
14. HEAVY DUTY COVER SLABS ARE TO BE USED WITHIN VEHICULAR TRAFFICKED AREAS.
15. GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH THE RELEVANT BRITISH/EUROPEAN STANDARD AS FOLLOWS:

a) AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.

b) AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.

c) GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
16. POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT AND M&E ENGINEER.

17. ALL OIL/PETROL SEPARATORS TO HAVE OIL ALARM SYSTEM IN ACCORDANCE WITH CLIENT'S REQUIREMENTS AND VENTS IN ACCORDANCE WITH MANUFACTURER'S DETAILS/RECOMMENDATIONS. SEPARATOR TO HAVE FULL CONCRETE SURROUND TO MANUFACTURER'S RECOMMENDATIONS.
18. DIAMETER OF PCC MANHOLES VARIES WITH PIPE SIZE, AND IS TO BE IN ACCORDANCE WITH THE TABLES SHOWN ON THE ACCOMPANYING MARSTON & GRUNDY STANDARD DETAILS DRAWINGS.
19. DRAINAGE CHANNELS ARE TO BE ACO QMAX IN SERVICE YARDS AND ACO MULTIDRAIN IN CAR PARKS, OR SIMILAR APPROVED. CHANNELS ARE TO BE SIZED BY THE SUPPLIER AND APPROVED BY THE ENGINEER IN WRITING PRIOR TO ORDERING. DRAINAGE CHANNELS TO BE INSTALLED TO MANUFACTURERS' REQUIREMENTS. DESIGN OF CHANNELS SHALL BE BASED ON A 1 IN 30 YEAR STORM RETURN PERIOD, 15 MINUTE DURATION.
20. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO THE RELEVANT BRITISH/EUROPEAN STANDARD.
21. ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO THE RELEVANT BRITISH/EUROPEAN STANDARD AND SHOULD BE KITE-MARKED/CE-MARKED ACCORDINGLY.
22. INSITU CONCRETE GRADES TO BE AS STATED ON THE DRAWINGS. DESIGN CHEMICAL CLASS FOR ALL PRECAST CONCRETE PRODUCTS SHALL BE DC4 UNLESS AGREED OTHERWISE.
23. ALL SEPARATORS SHALL BE IN ACCORDANCE WITH THE ENVIRONMENT AGENCY DOCUMENT PPG3 OR APPROPRIATE.
24. ALL BELOW GROUND PLASTIC/GRP TANKS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. THEY SHALL BE PROVIDED WITH SUFFICIENT CONCRETE SURROUND TO COUNTER FLOATATION AND SHALL HAVE A WALL THICKNESS ADEQUATE TO RESIST THE HIGHEST GROUND WATER LEVEL WHICH COULD BE ENCOUNTERED AT THEIR LOCATION.
25. ALL EXISTING DRAINAGE/STRUCTURES TO BE ABANDONED SHALL BE BROKEN OUT AND REMOVED FROM SITE, THE EXCAVATION SHALL BE BACKFILLED WITH A SUITABLE GRANULAR MATERIAL TO THE REQUIRED LEVEL. ALTERNATIVELY, DEEP DRAINS MAY BE CLEANED AND GROUTED WITH A 1:10 CEMENTITIOUS GROUT, WITH STRUCTURES BROKEN DOWN 1m BELOW FINISHED GROUND LEVEL AND BACKFILLED WITH A SUITABLE GRANULAR MATERIAL.
26. WHERE UTILITY/LAND DRAINAGE TRENCHES ETC CROSS OVER DRAINAGE TRENCHES, THE CONTRACTOR SHALL CONSTRUCT AN IMPERMEABLE BARRIER TO PREVENT GROUNDWATER INFILTRATING INTO THE DRAINAGE TRENCH.
27. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE EXISTING DRAINAGE SYSTEM.
28. ALL WORKS ARE ASSUMED TO BE WITHIN PUBLIC HIGHWAY OR WITHIN LAND OWNERS LANDS & NO WORKS ARE REQUIRED ON THIRD PARTY LAND OWNERS PROPERTY.
29. ALL RWP, GULLY AND CHANNEL CONNECTIONS SHALL BE 150mm DIA U.N.O. WASTE/SOIL STACK CONNECTIONS SHALL BE 100mm DIA. UNO AND SHALL HAVE INTERNAL ABOVE GROUND RODDING EYES OR LARGE ACCESS FITTINGS IN ACCORDANCE WITH BUILDING REGULATIONS.
30. DESIGN ASSUMES THAT NO WATER AUTHORITY SEWERS OR OTHER DRAINAGE SYSTEMS REQUIRE MODIFICATION, DIVERSION OR ABANDONING.
31. BACKFILL TO ALL DRAINAGE TRENCHES TO BE CLASS 6F1 MATERIAL.
32. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO BE REINSTATED TO HIGHWAY AUTHORITY REQUIREMENTS.
33. NO DEEP ROOTING TREES/VEGETATION SHOULD BE PLANTED WITHIN 5.0m OF ANY DRAINAGE WORKS.
34. ALL WPC'S, SRWP'S AND RWP'S ARE SHOWN INDICATIVELY. LOCATIONS SHALL BE CONFIRMED BY OTHERS.
35. ALL MANHOLES LESS THAN 1.5m DEEP ARE CONSIDERED AS NONE MAN ENTRY AND SHALL BE MAINTAINED FROM GROUND LEVEL.

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C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
P1	STAGE 4 ISSUE	AMT	08.04.24	PK
Rev	Description	By	Date	Chk'd
Marston & Grundy LLP Consulting Engineers Priory House, Ellesmere Ave Marple, Stockport, Cheshire, SK6 7AN Telephone: 0161 427 7231 Email: mail@marstonandgrundy.com				
Client MCFC				
Project MCWFC FACILITY PHASE 1				
Drawing DRAINAGE NOTES				
Purpose of Issue CONSTRUCTION				
Project No.	Scale @ A1	Date	Drawn	Checked
13636	NTS	Apr 24	AMT	PK
Drawing Identifier	project	origin	zone	level
MCW-MaG-ZZ-XX-DR-C-204				
	type	role	number	Revision
				C1

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	OWNERSHIP BOUNDARY
	PLANNING BOUNDARY
	EXISTING ROOF IMPERMEABLE AREA
	EXISTING HARD LANDSCAPING POSITIVELY DRAINED
	EXISTING COMBINED PUBLIC SEWER
	EXISTING SW PRIVATE DRAINAGE
	EXISTING FW PRIVATE DRAINAGE
	EXISTING COMBINED PRIVATE DRAINAGE

C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
Rev	Description	Ry	Date	Chk'd

Rev	Description	By	Date	Chk'd
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Marston & Grundy LLP
Consulting Engineers
Priory House, Ellesmere Ave
Marple, Stockport, Cheshire, SK6 7AN
Telephone: 0161 427 7231
Email: mail@marstonandgrundy.com

Client	
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Client
MCFC

Project	
---------	--

MCWFC FACILITY,
ETIHAD CAMPUS

Drawing

EXISTING IMPERMEABLE AREAS

Purpose of Issue	
------------------	--

Purpose of Issue

CONSTRUCTION

Project No.	Scale @ A1	Date	Drawn	Checked
13636	1:500	May '24	AMT	PJK

Drawing Identifier		BS1192 Compliant	
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project	origin	zone	level	type	role	number	revision
MCW-MaG-ZZ-XX-DR-C-210							C1

NOTES

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LEGEND

- OWNERSHIP SITE BOUNDARY
- DEVELOPMENT SITE BOUNDARY
- EXISTING ROOF IMPERMEABLE AREA
- PROPOSED ROOF IMPERMEABLE AREA
- PROPOSED HARD LANDSCAPING POSITIVELY DRAINED
- PROPOSED PERMEABLE HARD LANDSCAPING
- EXISTING COMBINED PUBLIC SEWER
- EXISTING SW PRIVATE DRAINAGE
- EXISTING FW PRIVATE DRAINAGE
- EXISTING COMBINED PRIVATE DRAINAGE
- PROPOSED SW DRAINAGE
- PROPOSED FW DRAINAGE
- PROPOSED COMBINED DRAINAGE

C1	CONSTRUCTION ISSUE	AMT	10.05.24	PK
Rev	Description	By	Date	Chk'd

Marston & Grundy LLP
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Email: mail@marstonandgrundy.com

Client
MCFC

Project
MCWFC FACILITY,
ETIHAD CAMPUS

Drawing
PROPOSED
IMPERMEABLE AREAS

Purpose of Issue
CONSTRUCTION

Project No.	Scale @ A1	Date	Drawn	Checked
13636	1:500	May '24	AMT	PJK

Drawing Identifier						BS1192 Compliant	
project	origin	zone	level	type	role	number	revision
MCW-MaG-ZZ-XX-DR-C-211							C1

Technical Specification

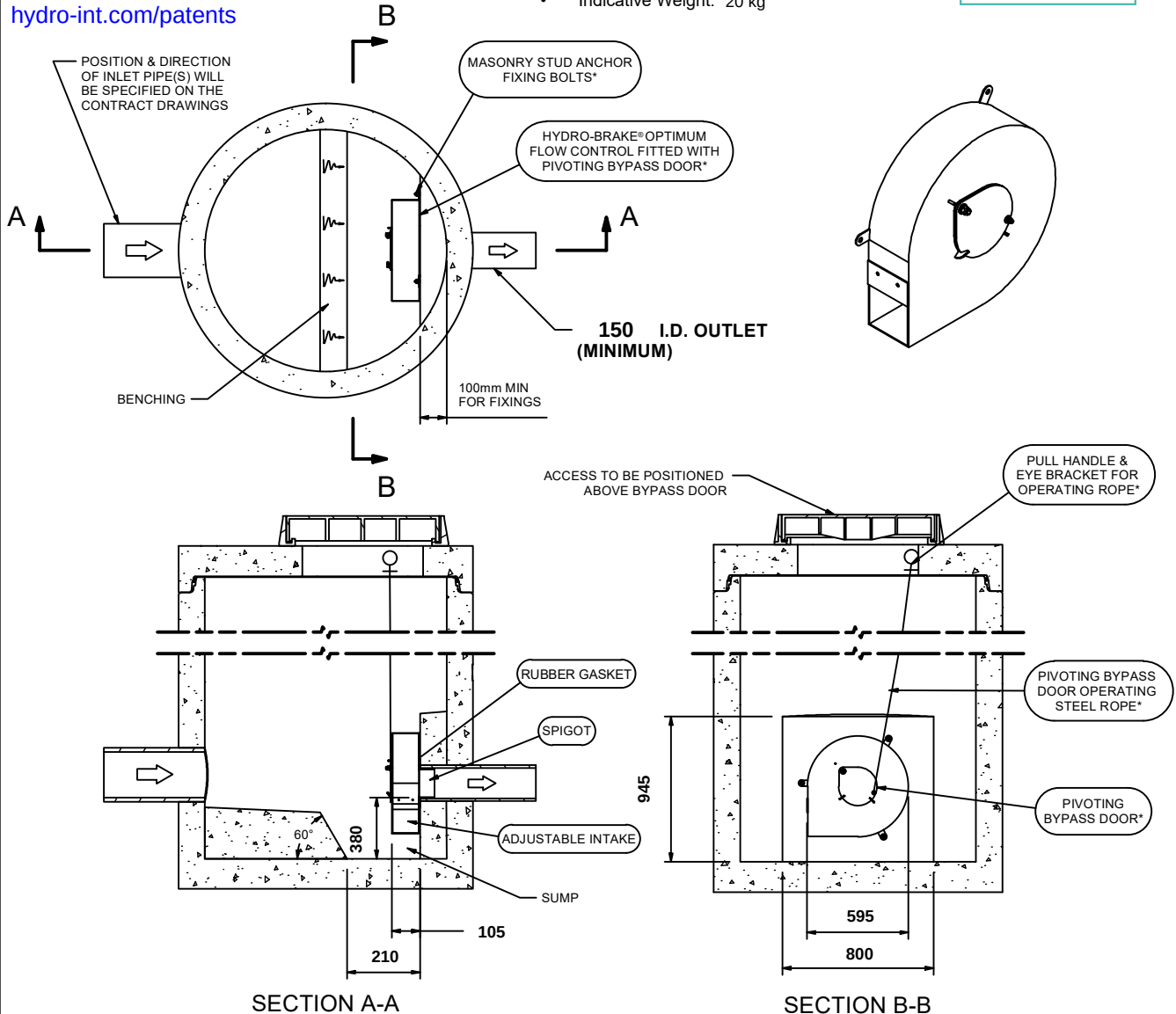
Control Point	Head (m)	Flow (l/s)
Primary Design	1.500	5.000
Flush-Flo™	0.431	4.879
Kick-Flo®	0.878	3.900
Mean Flow		4.321

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Variable flow rate post installation via adjustable inlet
- Indicative Weight: 20 kg



hydro-int.com/patents



IMPORTANT:

○ LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS

* WHERE SUPPLIED

HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

**DESIGN
ADVICE**



The head/flow characteristics of this SHE-0098-5000-1500-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

**Hydro
International**
A CRH COMPANY

DATE 10/05/2024 12:59

SITE Womens Facility

DESIGNER Andy Thomas

REF 13636

SHE-0098-5000-1500-5000

Hydro-Brake® Optimum

Appendix E – Hydraulic Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	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)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
SW01	0.020	4.00	67.000	450	0.950
SW02	0.038	4.00	67.000	450	1.200
SW03	0.014	4.00	66.900	450	1.525
SW04	0.125	4.00	67.000	1200	1.200
SW05	0.028	4.00	67.000	1200	1.475
SW06	0.020	4.00	66.700	1200	1.525
SW07			66.100	1200	1.525
SW08	0.060	4.00	66.200	1200	1.350
TANK			66.200	100	1.725
SW09			66.600	1500	2.175
CW01			66.600	1200	2.325
EX MH			66.570	1200	2.506

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	SW01	SW02	15.000	0.600	66.050	65.800	0.250	60.0	150	4.19	50.0
1.001	SW02	SW03	26.000	0.600	65.800	65.450	0.350	74.3	150	4.56	50.0
1.002	SW03	SW06	14.000	0.600	65.375	65.175	0.200	70.0	225	4.71	50.0
2.000	SW04	SW05	17.000	0.600	65.800	65.525	0.275	61.8	225	4.17	50.0
2.001	SW05	SW06	27.000	0.600	65.525	65.175	0.350	77.1	225	4.47	50.0
1.003	SW06	SW07	25.000	0.600	65.175	64.575	0.600	41.7	225	4.92	50.0
1.004	SW07	TANK	4.000	0.600	64.575	64.475	0.100	40.0	225	4.95	50.0
3.000	SW08	TANK	5.000	0.600	64.850	64.770	0.080	62.5	150	4.07	50.0
1.005	TANK	SW09	3.000	0.600	64.475	64.425	0.050	60.0	225	4.98	50.0
1.006	SW09	CW01	7.000	0.600	64.425	64.275	0.150	46.7	225	5.04	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.301	23.0	2.7	0.800	1.050	0.020	0.0	35	0.877
1.001	1.168	20.6	7.9	1.050	1.300	0.058	0.0	64	1.089
1.002	1.565	62.2	9.8	1.300	1.300	0.072	0.0	60	1.149
2.000	1.666	66.2	16.9	0.975	1.250	0.125	0.0	78	1.403
2.001	1.490	59.2	20.7	1.250	1.300	0.153	0.0	92	1.362
1.003	2.032	80.8	33.2	1.300	1.300	0.245	0.0	101	1.937
1.004	2.074	82.5	33.2	1.300	1.500	0.245	0.0	99	1.962
3.000	1.274	22.5	8.1	1.200	1.280	0.060	0.0	62	1.173
1.005	1.691	67.2	41.3	1.500	1.950	0.305	0.0	128	1.776
1.006	1.919	76.3	41.3	1.950	2.100	0.305	0.0	118	1.958

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.007	CW01	EX MH	6.319	0.600	64.275	64.064	0.211	30.0	225	5.08	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.007	2.397	95.3	41.3	2.100	2.281	0.305	0.0	103	2.312

Pipeline Schedule

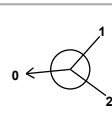
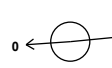
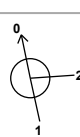
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	15.000	60.0	150	Circular	67.000	66.050	0.800	67.000	65.800	1.050
1.001	26.000	74.3	150	Circular	67.000	65.800	1.050	66.900	65.450	1.300
1.002	14.000	70.0	225	Circular	66.900	65.375	1.300	66.700	65.175	1.300
2.000	17.000	61.8	225	Circular	67.000	65.800	0.975	67.000	65.525	1.250
2.001	27.000	77.1	225	Circular	67.000	65.525	1.250	66.700	65.175	1.300
1.003	25.000	41.7	225	Circular	66.700	65.175	1.300	66.100	64.575	1.300
1.004	4.000	40.0	225	Circular	66.100	64.575	1.300	66.200	64.475	1.500
3.000	5.000	62.5	150	Circular	66.200	64.850	1.200	66.200	64.770	1.280
1.005	3.000	60.0	225	Circular	66.200	64.475	1.500	66.600	64.425	1.950
1.006	7.000	46.7	225	Circular	66.600	64.425	1.950	66.600	64.275	2.100
1.007	6.319	30.0	225	Circular	66.600	64.275	2.100	66.570	64.064	2.281

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW01	450	Manhole	Adoptable	SW02	450	Manhole	Adoptable
1.001	SW02	450	Manhole	Adoptable	SW03	450	Manhole	Adoptable
1.002	SW03	450	Manhole	Adoptable	SW06	1200	Manhole	Adoptable
2.000	SW04	1200	Manhole	Adoptable	SW05	1200	Manhole	Adoptable
2.001	SW05	1200	Manhole	Adoptable	SW06	1200	Manhole	Adoptable
1.003	SW06	1200	Manhole	Adoptable	SW07	1200	Manhole	Adoptable
1.004	SW07	1200	Manhole	Adoptable	TANK	100	Manhole	Adoptable
3.000	SW08	1200	Manhole	Adoptable	TANK	100	Manhole	Adoptable
1.005	TANK	100	Manhole	Adoptable	SW09	1500	Manhole	Adoptable
1.006	SW09	1500	Manhole	Adoptable	CW01	1200	Manhole	Adoptable
1.007	CW01	1200	Manhole	Adoptable	EX MH	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW01	110.350	71.864	67.000	0.950	450		0	1.000	66.050	150
SW02	105.435	39.608	67.000	1.200	450		1	1.000	65.800	150
SW03	73.740	37.797	66.900	1.525	450		0	1.001	65.800	150
							1	1.001	65.450	150
							0	1.002	65.375	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW04	55.782	81.346	67.000	1.200	1200		0	2.000	65.800	225
SW05	70.013	70.385	67.000	1.475	1200		1	2.000	65.525	225
SW06	53.910	52.373	66.700	1.525	1200		1	2.001	65.175	225
							2	1.002	65.175	225
							0	1.003	65.175	225
SW07	15.605	48.644	66.100	1.525	1200		1	1.003	64.575	225
							0	1.004	64.575	225
SW08	9.224	32.290	66.200	1.350	1200		0	3.000	64.850	150
TANK	5.774	47.966	66.200	1.725	100		1	3.000	64.770	150
							2	1.004	64.475	225
							0	1.005	64.475	225
SW09	-0.836	80.000	66.600	2.175	1500		1	1.005	64.425	225
							0	1.006	64.425	225
CW01	-5.582	89.661	66.600	2.325	1200		1	1.006	64.275	225
							0	1.007	64.275	225
EX MH	-6.690	95.882	66.570	2.506	1200		1	1.007	64.064	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

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

Node SW09 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.006	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0098-5000-1500-5000
Invert Level (m)	64.425	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.500	Min Node Diameter (mm)	1200
Design Flow (l/s)	5.0		

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	64.475
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	95.0	0.0	0.800	95.0	0.0	1.200	95.0	0.0	1.201	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	92.521	26.180	30 year 60 minute summer	98.615	26.061
1 year 15 minute winter	64.927	26.180	30 year 60 minute winter	65.517	26.061
1 year 30 minute summer	60.022	16.984	30 year 120 minute summer	59.946	15.842
1 year 30 minute winter	42.121	16.984	30 year 120 minute winter	39.827	15.842
1 year 60 minute summer	40.398	10.676	30 year 180 minute summer	45.598	11.734
1 year 60 minute winter	26.839	10.676	30 year 180 minute winter	29.640	11.734
1 year 120 minute summer	24.980	6.602	30 year 240 minute summer	35.759	9.450
1 year 120 minute winter	16.596	6.602	30 year 240 minute winter	23.758	9.450
1 year 180 minute summer	19.271	4.959	30 year 360 minute summer	26.939	6.932
1 year 180 minute winter	12.527	4.959	30 year 360 minute winter	17.511	6.932
1 year 240 minute summer	15.301	4.043	30 year 480 minute summer	20.981	5.545
1 year 240 minute winter	10.165	4.043	30 year 480 minute winter	13.940	5.545
1 year 360 minute summer	11.775	3.030	30 year 600 minute summer	17.039	4.661
1 year 360 minute winter	7.654	3.030	30 year 600 minute winter	11.642	4.661
1 year 480 minute summer	9.342	2.469	30 year 720 minute summer	15.093	4.045
1 year 480 minute winter	6.207	2.469	30 year 720 minute winter	10.143	4.045
1 year 600 minute summer	7.682	2.101	30 year 960 minute summer	12.278	3.233
1 year 600 minute winter	5.249	2.101	30 year 960 minute winter	8.133	3.233
1 year 720 minute summer	6.859	1.838	30 year 1440 minute summer	8.788	2.355
1 year 720 minute winter	4.609	1.838	30 year 1440 minute winter	5.906	2.355
1 year 960 minute summer	5.653	1.489	100 year +45% CC 15 minute summer	423.061	119.712
1 year 960 minute winter	3.745	1.489	100 year +45% CC 15 minute winter	296.885	119.712
1 year 1440 minute summer	4.127	1.106	100 year +45% CC 30 minute summer	278.374	78.770
1 year 1440 minute winter	2.773	1.106	100 year +45% CC 30 minute winter	195.350	78.770
30 year 15 minute summer	226.195	64.005	100 year +45% CC 60 minute summer	187.417	49.529
30 year 15 minute winter	158.733	64.005	100 year +45% CC 60 minute winter	124.515	49.529
30 year 30 minute summer	147.452	41.724	100 year +45% CC 120 minute summer	114.312	30.209
30 year 30 minute winter	103.475	41.724	100 year +45% CC 120 minute winter	75.946	30.209

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC 180 minute summer	86.951	22.375	100 year +45% CC 600 minute summer	32.099	8.780
100 year +45% CC 180 minute winter	56.520	22.375	100 year +45% CC 600 minute winter	21.932	8.780
100 year +45% CC 240 minute summer	68.114	18.001	100 year +45% CC 720 minute summer	28.365	7.602
100 year +45% CC 240 minute winter	45.253	18.001	100 year +45% CC 720 minute winter	19.063	7.602
100 year +45% CC 360 minute summer	51.133	13.158	100 year +45% CC 960 minute summer	22.984	6.052
100 year +45% CC 360 minute winter	33.238	13.158	100 year +45% CC 960 minute winter	15.225	6.052
100 year +45% CC 480 minute summer	39.658	10.480	100 year +45% CC 1440 minute summer	16.353	4.383
100 year +45% CC 480 minute winter	26.348	10.480	100 year +45% CC 1440 minute winter	10.990	4.383

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01	10	66.083	0.033	2.5	0.0194	0.0000	OK
15 minute winter	SW02	10	65.863	0.063	7.3	0.0498	0.0000	OK
15 minute winter	SW03	10	65.433	0.058	9.0	0.0198	0.0000	OK
15 minute winter	SW04	10	65.876	0.076	15.7	0.2447	0.0000	OK
15 minute summer	SW05	10	65.615	0.090	19.2	0.1361	0.0000	OK
15 minute winter	SW06	10	65.272	0.097	30.8	0.1349	0.0000	OK
15 minute summer	SW07	10	64.694	0.119	30.4	0.1347	0.0000	OK
15 minute winter	SW08	10	64.917	0.067	7.6	0.1344	0.0000	OK
60 minute winter	TANK	48	64.650	0.175	22.2	16.5812	0.0000	OK
60 minute winter	SW09	49	64.649	0.224	12.1	0.3966	0.0000	OK
60 minute winter	CW01	49	64.310	0.035	4.6	0.0397	0.0000	OK
60 minute winter	EX MH	49	64.097	0.033	4.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	1.000	SW02	2.5	0.520	0.109	0.0744	
15 minute winter	SW02	1.001	SW03	7.2	1.053	0.351	0.1789	
15 minute winter	SW03	1.002	SW06	9.0	0.749	0.145	0.1703	
15 minute winter	SW04	2.000	SW05	15.7	1.181	0.237	0.2262	
15 minute summer	SW05	2.001	SW06	19.3	1.241	0.325	0.4193	
15 minute winter	SW06	1.003	SW07	30.5	1.645	0.378	0.4646	
15 minute summer	SW07	1.004	TANK	30.6	2.150	0.371	0.0663	
15 minute winter	SW08	3.000	TANK	7.6	1.078	0.338	0.0353	
60 minute winter	TANK	1.005	SW09	12.1	0.554	0.181	0.1092	
60 minute winter	SW09	Hydro-Brake®	CW01	4.6				
60 minute winter	CW01	1.007	EX MH	4.6	1.200	0.048	0.0240	27.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW01	10	66.103	0.053	6.2	0.0308	0.0000	OK
15 minute winter	SW02	10	65.913	0.113	17.9	0.0896	0.0000	OK
15 minute winter	SW03	10	65.467	0.092	22.1	0.0315	0.0000	OK
15 minute summer	SW04	10	65.932	0.132	38.5	0.4254	0.0000	OK
15 minute summer	SW05	10	65.686	0.161	47.1	0.2434	0.0000	OK
15 minute winter	SW06	10	65.362	0.187	75.4	0.2602	0.0000	OK
120 minute winter	SW07	112	65.014	0.439	22.7	0.4970	0.0000	SURCHARGED
120 minute winter	SW08	110	65.014	0.164	5.6	0.3316	0.0000	SURCHARGED
120 minute winter	TANK	112	65.014	0.539	27.6	51.2085	0.0000	SURCHARGED
120 minute winter	SW09	112	65.013	0.588	9.8	1.0396	0.0000	SURCHARGED
30 minute summer	CW01	24	64.311	0.036	4.9	0.0412	0.0000	OK
60 minute winter	EX MH	37	64.099	0.035	4.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW01	1.000	SW02	6.2	0.638	0.270	0.1487	
15 minute winter	SW02	1.001	SW03	17.8	1.283	0.862	0.3601	
15 minute winter	SW03	1.002	SW06	22.0	0.871	0.354	0.3533	
15 minute summer	SW04	2.000	SW05	38.5	1.406	0.581	0.4650	
15 minute summer	SW05	2.001	SW06	47.1	1.446	0.796	0.8861	
15 minute winter	SW06	1.003	SW07	74.7	1.941	0.925	0.9377	
120 minute winter	SW07	1.004	TANK	22.0	1.438	0.267	0.1591	
120 minute winter	SW08	3.000	TANK	5.6	0.999	0.248	0.0880	
120 minute winter	TANK	1.005	SW09	9.8	0.544	0.146	0.1193	
120 minute winter	SW09	Hydro-Brake®	CW01	4.9				
30 minute summer	CW01	1.007	EX MH	4.9	1.223	0.051	0.0253	47.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01	12	66.907	0.857	11.5	0.4969	0.0000	FLOOD RISK
15 minute winter	SW02	12	66.865	1.065	28.1	0.8438	0.0000	FLOOD RISK
15 minute winter	SW03	12	66.360	0.985	30.8	0.3377	0.0000	SURCHARGED
15 minute winter	SW04	11	66.984	1.184	72.0	3.8043	0.0000	FLOOD RISK
15 minute winter	SW05	12	66.769	1.244	69.8	1.8802	0.0000	FLOOD RISK
15 minute winter	SW06	12	66.304	1.129	101.9	1.5724	0.0000	SURCHARGED
180 minute winter	SW07	176	65.932	1.357	31.4	1.5351	0.0000	FLOOD RISK
180 minute winter	SW08	176	65.932	1.082	7.9	2.1856	0.0000	FLOOD RISK
180 minute winter	TANK	176	65.932	1.457	37.8	114.0592	0.0000	FLOOD RISK
180 minute winter	SW09	176	65.931	1.506	8.1	2.6613	0.0000	SURCHARGED
180 minute winter	CW01	176	64.312	0.037	5.0	0.0418	0.0000	OK
180 minute winter	EX MH	176	64.099	0.035	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	1.000	SW02	9.4	0.666	0.411	0.2641	
15 minute winter	SW02	1.001	SW03	23.3	1.326	1.132	0.4577	
15 minute winter	SW03	1.002	SW06	28.3	0.894	0.454	0.5568	
15 minute winter	SW04	2.000	SW05	54.2	1.434	0.818	0.6761	
15 minute winter	SW05	2.001	SW06	64.3	1.616	1.085	1.0738	
15 minute winter	SW06	1.003	SW07	98.6	2.478	1.220	0.9943	
180 minute winter	SW07	1.004	TANK	30.6	1.510	0.371	0.1591	
180 minute winter	SW08	3.000	TANK	7.2	1.019	0.320	0.0880	
180 minute winter	TANK	1.005	SW09	8.1	0.538	0.121	0.1193	
180 minute winter	SW09	Hydro-Brake®	CW01	5.0				
180 minute winter	CW01	1.007	EX MH	5.0	1.231	0.053	0.0257	105.2

Appendix F – United Utilities Pre-Development Enquiry Response

Paul Graveney

From: seweradoptions@uuplc.co.uk
Sent: 08 November 2023 13:04
To: Paul Graveney
Subject: RE: PDE CA28, MCWFC, Manchester - 04885350

Good afternoon Paul,

Hope you're well.

United Utilities have no objection to the proposed use of existing connection. Please be advised we would require betterment to be applied to your discharge rates as per your local council which I believe would be 50% in this instance.

Kind Regards



Lewis Barr
Assistant Developer Engineer
Developer Services & Metering
Customer Services
07827286541
unitedutilities.com

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----- Original Message -----

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 07/11/2023 16:52
To: paul@marstonandgrundy.com
Subject: RE: PDE CA28, MCWFC, Manchester - 04885350

Good Afternoon,

PRE DEVELOPMENT APPLICATION AT: MCWFC, Manchester – UU Ref 04885350

Please accept this email as receipt of your application received on 07/11/2023 for the above development. This has now been logged on our system and the job reference is 04885350 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to the engineer, Eireann, for technical assessment. You will receive their response within 8 working days.

Kind regards,



Katie Houghton
Customer Advisor Advanced
Developer Services & Metering
Customer Services

Tel: 0345 072 6067 (option 4)
unitedutilities.com

----- Original Message -----

From: Paul Graveney [paul@marstonandgrundy.com]
Sent: 07/11/2023 09:42
To: seweradoptions@uuplc.co.uk
Subject: RE: PDE CA28, MCWFC, Manchester - 04885350

Hi Katie,

So sorry, not sure why the application form was not in the email. See attached.

Paul

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: Tuesday, November 7, 2023 9:33 AM
To: Paul Graveney <paul@marstonandgrundy.com>
Subject: PDE CA28, MCWFC, Manchester - 04885350

Good Morning,

PRE DEVELOPMENT APPLICATION AT MCWFC, Manchester - UU Ref – 04885350

Please accept this email as receipt of your application received on 06/11/2023 for the above development. This has now been logged on our system and the job reference is **04885350**, we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is **not** suitable to start technical assessment. The application checklist details the required information for technical assessment; however, for an Engineer to start assessing your application, please provide the following:

1. Application form

In the meantime, if I can be of any further help, please let me know.

Kind regards,



Katie Houghton

Customer Advisor Advanced
Developer Services & Metering
Customer Services

Tel: 0345 072 6067 (option 4)
unitedutilities.com

----- Original Message -----

From: Paul Graveney [paul@marstonandgrundy.com]

Sent: 06/11/2023 09:37

To: wastewaterdeveloperservices@uuplc.co.uk

Subject: Pre Development Enquiry - MCWFC Manchester

Good Morning,

Please find attached our pre development enquiry for a new training facility at MCWFC, Manchester.

The proposal is to reuse the existing connection to the combined public sewer.

Regards,

Paul

Paul Graveney

Marston & Grundy LLP Consulting Engineers

Priory House

Ellesmere Avenue

Marple

Stockport

Cheshire

Appendix G – CRT Correspondance

Paul Graveney

From: Gareth Taylor <Gareth.Taylor@canalrivertrust.org.uk>
Sent: 07 November 2023 14:04
To: Paul Graveney
Cc: Paul Kendrick
Subject: RE: MCWFC Facility adjacent the Ashton Canal
Attachments: FW: SWD Explanatory process email

Paul

We do have a process, for which I have attached our SWD Application pack for your information. However, we don't give approval in principle for any SWD proposals to the canal, as we are not a drainage authority and have to assess each individual application on a case by case basis, so we can determine the flood risk and environmental impact. I do know that the Ashton Canal is approaching capacity, so have forwarded your proposal on to our Utility and Hydrology Team to comment.

Additional and something you may wish to consider is that the Trust have a Pre-Planning Service (free of charge) where by you can submit the site proposal and have the Trust consider this before the planning application is submitted to the LHA. If you submit the proposed drainage, you may gain the approval in principle (or not) for the proposed discharge to the canal as part of our internal consultation.

Pre-Planning Service: <https://canalrivertrust.org.uk/specialist-teams/planning-and-design/our-statutory-consultee-role/what-were-interested-in/pre-application-advice>

Hope this helps.
Regards

Gareth Taylor (BSc)

Infrastructure Services, Works Engineer (Northwest)
Northwest Region: Lancaster canal, Leeds to Liverpool canal (Yorkshire Boarder – Greenberfield Locks).
Manchester, Bury & Bolton Canal, Rochdale Canal & Ashton Canal.

canalrivertrust.org.uk

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For further information and a copy of the 3rd Party Code of Practice please follow the link below.

<https://canalrivertrust.org.uk/business-and-trade/undertaking-works-on-our-property-and-our-code-of-practice>

From: Paul Graveney <paul@marstonandgrundy.com>
Sent: Monday, November 6, 2023 1:49 PM
To: Gareth Taylor <Gareth.Taylor@canalrivertrust.org.uk>
Cc: Paul Kendrick <paul.kendrick@marstonandgrundy.com>
Subject: MCWFC Facility adjacent the Ashton Canal

You don't often get email from paul@marstonandgrundy.com. [Learn why this is important](#)

Good Afternoon Gareth,

I am working on a new MCWFC Facility at the MCFC Campus in east Manchester. The proposal is to refurbish the derelict bank and include an extension to it. As shown on the attached location plan, the development is located adjacent the Ashton Canal.

From the drainage investigations carried out to date, we don't believe there are any historic connections to it. All runoff connects to the combined sewer.

In line with the SuDS hierarchy, we need to consider the option of discharging the new surface water runoff at a controlled rate to the Canal.

However, we are also mindful that the CRT may have their own restrictions that need to be applied, especially with it being so close to the Grade 2 listed locks.

With this in mind we should be grateful if you can review and advise your initial thoughts as to the viability (or not) of connecting to the canal with the new surface water runoff and where the preferred location would be.

I look forward to hearing from you.

Regards

Paul

Paul Graveney

Marston & Grundy LLP Consulting Engineers
Priory House
Ellesmere Avenue
Marple
Stockport
Cheshire
SK6 7AN

Tel 07710 758971
Email: paul@marstonandgrundy.com
Web: www.marstonandgrundy.com

Keep in touch

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Paul Graveney

Paul@marstonandgrundy.com

Your Ref

Our Ref CRTR-PLAN-2023-40329

Thursday 30 November 2023

Dear Mr Graveney,

Proposal: Existing derelict bank being modified internally and extended to form a new Womens Training Facility with external landscaping

Location: Proposed Womens Training Facility Manchester City Football Club Etihad Campus, Ashton New Road, Manchester

Waterway: Ashton Canal

Thank you for your pre-application consultation.

We are the charity who look after and bring to life 2000 miles of canals & rivers. Our waterways contribute to the health and wellbeing of local communities and economies, creating attractive and connected places to live, work, volunteer and spend leisure time. These historic, natural and cultural assets form part of the strategic and local green-blue infrastructure network, linking urban and rural communities as well as habitats. By caring for our waterways and promoting their use we believe we can improve the wellbeing of our nation. The Trust is a statutory consultee in the Development Management process.

The Trust have reviewed the pre-application submission, which mainly relates to query about whether it is possible to create a surface water outfall to the canal from the site, especially given the proximity to a lock. We have the following **general advice**:

The site is next to the towpath side of the Ashton canal. The grade II listed Lock 8 is also sited next to the site. There is a relatively short pound of water here (distance between locks).

In terms of being able to accept surface water from a development site to the canal then this would need to be assessed by the Trust's mandatory surface water process, further details can be found here <https://canalrivertrust.org.uk/business-and-trade/utilities>.

Through the mandatory process we are able to assess whether we can accept surface water from development sites. We are unable to provide an 'in principle' response as to whether this would be acceptable or not outside of this process. You are advised to contact the Canal & River Trust Utilities Team at the utilitiesenquiry@canalrivertrust.org.uk to discuss the acceptability of discharging surface water from the site to the adjacent canal in order to ensure that any necessary consents are obtained. Please be advised that the Trust is not a land drainage authority, and such discharges are not granted as of right- where they are granted, they will usually be subject to completion of a commercial agreement.

We can however advise that due to the number of surface water outfalls in this area and issues of overtopping heading into Manchester, a hydraulic model has been invested in by the Trust, to assess future discharge

Canal & River Trust Planning Team

Canal & River Trust, National Waterways Museum, Ellesmere Port South Pier Road Ellesmere Port Cheshire CH65 4FW
T: 0151 355 5017 E: nationalwaterwaysmuseum@canalrivertrust.org.uk W: canalrivertrust.org.uk

proposals. Any application related to this site will be required to go through a detailed impact assessment and thus will be assessed within this hydraulic model. It is possible that mitigation measure will be required in order to accept this proposal.

In terms of the proximity to the lock we would need to ensure that the outfall here would not have any adverse impact on navigational safety. To meet the principles of the mandatory process then volumes should be at greenfield run off rates and velocity 0.3m/s. The location of any outfall would be assessed as part of the mandatory process.

The outfall would also need to cross the canal towpath to form an outfall to the canal. This would also require separate approval for the outfall / pipe within the towpath as it would cross land registered as Infrastructure Trust Property and would as such require consent from DEFRA. This would form part of the application process. Any works on our land would be required to be carried out in accordance with the Canal & River Trust Third Party Works Code of Practice.

We note that the site is likely to be contaminated, with asbestos having been found present in samples taken. We would want to ensure that no contaminants enter the canal from the site.

The only other plan that has been submitted is a landscape masterplan and this does not provide much detail. We note that a number of trees would be removed, however these appear to be smaller trees and set away from the canal edge.

The above comments are provided based on the details provided and do not prejudice any further comments or concerns that may be raised by the Trust as the scheme progresses.

Please do not hesitate to contact the Utilities team at the Trust, as set out above, if you have any queries.

Yours sincerely,

Tim Bettany-Simmons MRTPI
Area Planner

Tim.Bettany-Simmons@canalrivertrust.org.uk
07342 057926

<https://canalrivertrust.org.uk/specialist-teams/planning-and-design>

Canal & River Trust Planning Team

Canal & River Trust, National Waterways Museum, Ellesmere Port South Pier Road Ellesmere Port Cheshire CH65 4FW
T: 0151 355 5017 E: nationalwaterwaysmuseum@canalrivertrust.org.uk W: canalrivertrust.org.uk

DETAILED INFORMATION

Water discharge

This section is applicable to canals and navigable rivers where The Trust is riparian owner and those navigations identified in Statutory Instrument No 1195 *'The Inland Waterways of the Trust Board Order 1965'* as amended. The requirements relating to navigation are applicable to other river navigations.

Water Discharge

Introduction

The Trust is not a land drainage authority. Water levels in canals are maintained in dry spells using reservoirs, river abstractions, pumping from ground water sources and re-circulatory pumping at locks ('back pumping'). Water levels are controlled in wet periods using overflow weirs and manually controlled sluices. Without these, the canal would overtop and may breach its banks, causing damage to property and possible loss of life. When the canals were constructed, they were usually a closed system, isolated from the effects of storms. Therefore storm water discharges do not assist in dry periods and can cause severe difficulties in wet conditions. Where a new (or modified) discharge is proposed, it will be reviewed to determine if the benefits to the Trust outweigh the risks of acceptance and approval by Water Management and Environment Teams, the Waterway and the Utilities Team will be required.

The Trust will use its *Mandatory Process on Reviewing & Approving Discharges* when considering proposals. This document will be made available to Promoters on request. The process entails the submission of an Outline and, if necessary, a Detailed Impact Assessment, by the Promoter.

It should not be assumed that an existing discharge can be retained when a site is redeveloped for a new use, if permission is given to retain and re-use an existing discharge a new commercial agreement will normally be required.

Promoters must submit the completed Appendix 4 (Outline Pollution Risk & Hydrological Assessment) to allow the Trust to consider a proposal for a new or modified discharge to its network. To assist the completion of Appendix 4, reference should be made to the Trust's *Surface Water Discharge Guidance – Producing an Outline and Detailed Impact Assessment*. The subsequent sections of this Chapter describe the three main aspects of consideration that The Trust undertakes, namely: flood risk, pollution/water quality risk and navigational impact.

Flood Risk considerations

The only discharge which will normally be considered is uncontaminated surface water in small quantities at suitable locations.

The Trust supports the principles of Sustainable Drainage Systems (SuDS) which should be followed. Guidance is given in the CIRIA publication C523 'Sustainable Urban Drainage Systems – Best Practice Manual' – This refers to the CIRIA Sustainable Urban Drainage Design Manuals C521 for Scotland and C522 for England and Wales. The Flood and Water



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Management Act 2010 introduces changes to the legislation relating to SuDS, and subsequent editions of this document will reflect those changes, once enacted/commenced.

The details of on-site flow attenuation measures (such as SuDS) giving details of design, information about storage or drainage of water in excess of attenuation should be provided as well as any details of maintenance and adoption agreements for SuDS. If the SuDS are not maintained in the long term, then they will fail to provide the design attenuation and The Trust will be exposed to the full un-attenuated additional flood risk. Any SuDS such as underground storage, ponds, soakaways, flow restrictors etc. must have a suitable maintenance regime in place to ensure their effective operation over the life expectancy of the development.

In addition to the above information, the details of the proposed connection with the canal should be provided together with an estimate of the peak velocity of the discharge orthogonal to boat movement.

Discharges are not usually permissible directly above and below locks, adjacent to moving bridges and at mooring sites. Navigational difficulties would ensue as a result of the transverse flows. In order to minimise navigational difficulties associated with transverse flows of water the discharge energy must be minimised in the discharge structure design or by storage. Discharge velocity generally must not exceed 0.3 m/s measured at 90° to the direction of the navigable channel.

Discharges into the Waterway may require consent from the Environment Agency (EA) or the Scottish Environment Protection Agency (SEPA). The Promoter will be responsible for obtaining any necessary consent and providing proof to the Works Engineer that this has been done. It must not be presumed that EA or SEPA consent confers The Trust consent.

New developments must be designed in accordance with "Planning Policy Statement 25 (PPS25)" in England or "Technical Advice Note (TAN) 15" for Wales. These documents set out how flood risk is to be managed during the design and planning process.

If mitigation measures are required, it must be agreed at an early stage whether the new or modified structures are to be procured by The Trust or the Promoter and which party will own and maintain them in the long term. It is usual that the structures are designed and built by the Promoter to an acceptable design and that The Trust assumes long term responsibility for the water control structures only, on its own land, on acceptance of an agreed commuted sum.

Discharges are not usually permissible in short canal pounds between locks. Difficulties could result from the capacity of by-wash weirs, surcharging the pounds and dewatering for the maintenance of locks.

Discharges are not usually permissible directly above and below locks, adjacent to moving bridges and at mooring sites. Navigational difficulties would ensue as a result of the transverse flows. In order to minimise navigational difficulties associated with transverse flows of water the discharge energy must be minimised in the discharge structure design or by storage. The discharge velocity generally must not exceed 0.3 m/s measured at 90° to the direction of the navigable channel.



Pollution/Water Quality considerations

The Trust will not generally accept sewage or trade effluent. Only in exceptional circumstances where there is adequate treatment, evidence of a treatment plant maintenance schedule and adequate dilution will applications be considered.

Discharges into the Waterway may require consent from the Environment Agency or the Scottish Environmental Protection Agency. The Promoter will be responsible for obtaining any necessary permit and providing proof to the Works Engineer that this has been done. It must not be presumed that Environment Agency consent confers Trust consent.

Pollution control measures such as traps, gullies, oil separators, silt traps, swales or detention ponds will be required where appropriate. All pollution control measures should conform to the relevant Environment Agency publications and Pollution Prevention Guidance (PPG) notes. It is unlikely that these will be permitted to be built on land owned by the Trust. Normal practice would be to construct them on the Promoters land with adequate access provided to allow them to be regularly maintained.

The Promoter must supply their long term maintenance plan, with emergency contact numbers for all oil separators, silt traps, swales and other pollution control devices for approval by the Trust. Suitable isolating systems such as valves or stanks must be included at the design stage, in to allow maintenance and provide protection to the receiving waterway from pollution incidents.

Where it is possible to do so at design stage, a representative sample of the proposed discharge water should be taken and analysed for appropriate parameters. The results should be supplied to the Works Engineer for consideration. In some cases an analysed sample of the water in the receiving canal will be required for the purpose of comparison.

During operation, it may be necessary to require that water samples are taken at intervals and analysed. It may be necessary for The Trust or its agents to inspect from time to time the area drained to the Waterway to ensure that the pollution risks remain acceptable. Alternatively, it may be acceptable for the inspection to be carried out by the discharger using a standard self-assessment procedure.

Calculations and plans will be required for the drainage network. The plans should define the pipe runs and illustrate the uses to which the drained areas are to be put and any other factors that may affect the quality of the surface run-off.

Where water is discharged at a higher temperature to that of the normal canal water, consideration will have to be given to the environmental impact. This will involve modelling outputs, with consideration to: the size of the receiving waterway, flow, design of the discharge outlet, and hot water plume dispersal from the outfall. In some cases additional water may have to be passed along the waterway at the Promoters expense to give the required dilution of the discharge. Any additional water required for dilution will be treated as an abstraction, see Section 4.2 below and also included in the discharge quantity for design of mitigation measures.

Navigational Impact considerations

The point of discharge is installed perpendicularly to the canal centre line in both axes. The point of discharge should not protrude past the surface of the canal wall such that it affects the mooring of a craft at the same location.



The pipe diameter for above water surface discharges is limited by the available distance between the normal water level and the underside of the coping stone. Several smaller pipes should be used where feasible.

The point of discharge must be installed such that water cannot flow from the canal or be abstracted using the point of discharge. For gravity discharges a stilling chamber / sand trap / oil interceptor is typically provided on the neighbouring land. For pumped discharges the discharge pipe is typically installed above normal canal water level to avoid siphoning.

At locations where craft will be manoeuvring at low speed the limit to the velocity of discharge will be reduced in proportion to the reduction in craft speed. The discharge velocity generally must not exceed 0.3 m/s measured at 90° to the direction of the navigable channel. The Works Engineer will specify the craft speed. A stilling basin is usually needed to comply with this requirement. In most cases physical or mathematical modelling will be necessary.

Scour protection may be needed.

Discharge structures should be designed to minimise the visual impact on the canal, to allow the quality of the discharge to be monitored and to prevent loss of water from the canal into the drainage system. The structure should be accessible in safety for maintenance and sampling. Where this is not possible, for instance on river navigations, a remote sampling point and a flap valve are needed. Outfall structures should normally be designed for the discharge to take place below the normal water surface, preferably via a stilling chamber arrangement, wherever practicable. Above surface outfalls are only accepted in exceptional circumstances, due to the visual impact and risk of navigational difficulties, although offside outfalls above surface are less likely to cause problems than towpath side.

Fendering and signing of structures may be necessary. In particular pumped discharges will need to be signed to advise waterway users of their intermittent operation.

Discharge structures should be capable of carrying the loads imposed by the use of the towing path maintenance vehicles.

Towpath levels should not be raised to accommodate pipework.

APPENDIX 4: OUTLINE POLLUTION RISK & HYDROLOGICAL ASSESSMENT

The following information is required from the Promoter at an early stage in order to assess the viability or feasibility of the proposal. **Note that this checklist only applies to surface water discharges.** Other types of discharge such as sewage effluent and trade effluent should be treated on a case by case basis, but are not usually accepted.

Scheme Title

Promoter

Pollution hazards

Information on the pollution hazards within the areas to be drained:

Planning use class



Use of area to be drained to canal

Nature and quantities of chemicals, fuel/oil, wastes, liquid food products, and other potentially polluting substances that may be used on area drained

Details of any activities which will occur in the drainage area and which could contaminate surface water.

Whether the site requires or has authorisation from the Environment Agency under section 6 of the Environmental Protection Act 1990 (IPC authorisation), or hazardous substances consent from the local authority under the Planning (Hazardous Substances) Act 1990

Any previous contaminate uses of the site, and if so, any soil contamination found from any site investigations.

If highway drainage is included, average annual traffic density, and whether industrial premises access directly to the road

Management controls

Any documentation relating to the environmental commitment and environmental track record of the Promoter (and of the person ultimately responsible for the drainage if different). It should be relevant both to design and construction and to the use operation and maintenance of the areas drained and of the drainage system with respect to prevention of water pollution, e.g.:

- Company Environmental Policy
- Environmental Management System
- Other relevant procedures or standards
- Where the discharge is an existing one, details of any prosecutions, enforcement notices or cautions from any environmental regulator within the last 5 years relating to the discharge.

Hydrological

The applicant is referred to *Surface Water Discharge Guidance – Producing an Outline and Detailed Impact Assessment*. The aim of this document is to provide an applicant wishing to discharge surface water into the Trust's network with the necessary technical guidance to produce an impact assessment acceptable to the Trust.

The Trust believe that the assessment should reflect the additional risk and a two stage process is adopted of an outline impact assessment (Section 2.1 of the Surface Water Discharge Guidance) followed by a more detailed impact assessment (Section 2.2 of the Surface Water Discharge Guidance), if necessary.

If the applicant can demonstrate, to the Trust's satisfaction, that the peak rate of discharge from the site to the waterway, the 1 in 100 year return period event, after development (including an allowance for climate change (20%) and urban creep (10%)) will be less than (or equal to) the pre-development situation (including an allowance for climate change (20%)) then a statement of this, accompanied by supporting calculations (see Section 2.1), will be regarded as an acceptable Outline Impact assessment.



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From the Outline Impact Assessment the following information should be provided:

Information to be provided Included

Written description of the development site (accompanied by photographs if appropriate) detailing:

Pre-development use and proposed development extent and characteristics of the site.

Existing site drainage arrangements and proposed drainage scheme

Relationship of site to the Trust's waterway

Plan of site showing:

development site catchment area, outline or detailed drainage design and relationship to any part of The Trust's system (e.g. waterway pound(s), river navigation, reservoir, feeder channel etc.) as hard copy or digitally (AutoCAD® DWG, DXF™, and DWF files)

Details of catchment parameters: area, soil, percentage impermeable, percentage permeable etc. used to estimate pre and post development site runoff.

Description of method of runoff estimation employed for pre and post proposed development.

Estimates of pre and post development site runoff (l/s in a 1:100yr event - see Guidance document).

Digital copies of drainage design calculations and, if available drainage model data and result files, for both pre and post proposed development.