APPENDICES

Appendix 1: Parameters Plan& Illustrative Layout

Sheet 1 | Sheet 1 | Sheet 3 | Sheet 3

Sheet 1 | Sheet 3

Sheet 1 | Sheet 3

Key

- Order Limits
- Open land / landscaping, including bunding, attenuation ponds, public footpaths and bridleways, estate road infrastructure, A47 Link Road and any land to be restored to agricultural use.
- Historic woodland protection zone
- Area of existing highways and land reserved adjacent to existing and proposed highways for highways and engineering works including construction and laydown of materials compounds.
- Watercourse
- Existing rail corridor
- Rail freight interchange including A47 Link Road and bridge infrastructure
- Rail corridor within development zones
- New bridge over rail line
- Development zone for site hub
- Line of A47 Link Road and estate roads
- Deviation Potential of A47 Link road and estate roads. The boundaries of zones through which a limit of deviation runs will change depending on the final alignment of the infrastructure within the limit of deviation
- Development Signage Locations
- Rerouting of existing linkage from Bridge Farm to new highway infrastructure
- (x) Development Zones

NOTE 1: Development Zones include the existing buildings to be demolished, the A47 Link Road, estate road infrastructure, rail freight interchange link to estate road and elements pertaining to individual development plots including buildings, hardstandings, parking, energy services, landscaping, bunding and storm water attenuation.
NOTE 2: Noise attenuation measures, ranging from 1.8m to 6m in height are to be provided within the landscaped areas, railport and development zones and are illustratively shown on ESR Figure reference no. 10.10

Schedule of Parameters for Development Zones						
Zone	Number of Warehousing Units / Buildings *1	Maximum development floor space per Zone (m^2)	Other Defined Element Within Zone	Maximum building / element height measured to roof ridge / highest point in metres above Ordnance Datum		Equivalent building height relative to FFL
A	1 to 6 warehousing units	105,000 sq.m.			119.15m	Up to 22m
B	1 to 5 warehousing units	115,000 sq.m.		B1	115.65m	Up to 22m
				B2	121.65m	Up to 28m
				B3	115.65m	Up to 22m
C	1 to 6 warehousing units	140,000 sq.m.		C1	119.15m	Up to 22m
				C2	122.15m	Up to 25m
D	1 to 4 warehousing units	184,000 sq.m.		D1	119.15m	Up to 22m
				D2	125.15m	Up to 28m
E	1 to 3 warehousing units	137,000 sq.m.		E1	118.65m	Up to 25m
				E2	115.65m	Up to 22m
F	1 to 2 buildings	500 sq.m.			111.50m	Up to 10m
G	1 to 2 buildings	500 sq.m.			107.15m	Up to 10m
			Energy Services		112.15m	
H	1 to 2 buildings	750 sq.m.			107.15m	Up to 10m
			Yard (including container stacks)		112.95m	Up to 14.5m
J	1 to 2 buildings	500 sq.m.			106.50m	Up to 10m
			Yard (including container stacks)		112.50m	Up to 14.5m
			Gantry Cranes		123.50m	
Total maximum floor space across the development*2		650,000 sq.m.				

*1 These are the potential number of main use buildings in each zone and excludes any ancillary buildings or structures.
*2 This total floor space is the maximum floor space (excluding mezzanine space) that will be developed across the site notwithstanding that the maximum floor space stated for each Zone combined would exceed this figure i.e. it is the overall floor space cap for each zone excluding mezzanine floor space.

N

no.	date	revision	by

aja architects

aja architects llp
1170 Elliott Court
Herald Avenue
Coventry Business Park
COVENTRY CV5 6UB

T: 024 7625 3200
F: 024 7625 3210
E: aja@aja-architects.com
W: www.aja-architects.com

client

TRITAX SYMMETRY
A TRITAX BIG BOX COMPANY

project

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

drawing

Parameters Plan - Sheet 2

scale	1:2500 @ A0	drawn	mjl
checked	mjl	date	November 2022

Regulation no.5(2)(o)

Plan No: 2.12 B
Status - Final

0m 10 20 40 50 100m 150 200m
Scale Bar

Sheet 4 | Sheet 4 | Sheet 5 | Sheet 5 | Sheet 5

Schedule of Accommodation						
All areas are gross internal						
Unit	Distribution	Offices	Total	Car Parking	Lorry Parking	Height
01	61,435 sq.m.	2,787 sq.m.	64,222 sq.m.	534 no. spaces	114 no. spaces	Up to 22m
02	25,316 sq.m.	1,208 sq.m.	26,524 sq.m.	221 no. spaces	45 no. spaces	Up to 22m
03	25,548 sq.m.	1,115 sq.m.	26,663 sq.m.	222 no. spaces	53 no. spaces	Up to 22m
04	44,825 sq.m.	2,090 sq.m.	46,915 sq.m.	391 no. spaces	63 no. spaces	Up to 22m
05	32,702 sq.m.	1,672 sq.m.	34,374 sq.m.	286 no. spaces	51 no. spaces	Up to 28m
06	130,992 sq.m.	4,645 sq.m.	135,637 sq.m.	1130 no. spaces	191 no. spaces	Up to 22m
07	95,225 sq.m.	2,369 sq.m.	97,594 sq.m.	813 no. spaces	76 no. spaces	Up to 22m
08	76,551 sq.m.	2,369 sq.m.	78,920 sq.m.	658 no spaces	63 no. spaces	Up to 28m
09	128,948 sq.m.	3,252 sq.m.	132,200 sq.m.	1102 no. spaces	180 no. spaces	Up to 25m
		Total	643,049 sq.m.	5,357 no. spaces	836 no. spaces	
		Railport	465 sq.m.	99 no. spaces		
		Lorry Park & Drivers Welfare	465 sq.m.	11 no. spaces	104 no. spaces	
		Amenity & security Offices	465 sq.m.	18 no. spaces		
		Total Development	644,444 sq.m.	5,485 no. spaces	940 no. spaces	

Key

- New M69 Slip Lanes
- A47 Link Road
- A47 Link Bridge Crossing
- Estate Roads
- Railport - Sidings
- Railport - Container Storage
- Lorry Park, Energy Services & Drivers Welfare
- Site Hub
- Building Footprints
- External Yards
- Parking Areas
- Water Features and Ponds
- New Bridleway within main HNRFI site
- New landscaping within main HNRFI site
- Well Being Zone
- Existing surrounding landscaping and farmland
- Existing woodland
- Existing alignment of public footpaths and bridleways (orange)
- Proposed alignment of public footpaths and bridleways (blue)
- Proposed alignment of pedestrian footpath / cycleway link (purple)

notes

no. date revision by

aja architects

aja architects llp
1170 Elliott Court
Herald Avenue
Coventry Business Park
COVENTRY CV5 6UB
T: 024 7625 3200
F: 024 7625 3210
E: aja@aja-architects.com
W: www.aja-architects.com
AJA Architects is the trading style of AJA Architects Consulting limited (a limited company no. 10692795) and AJA Architects LLP (a limited liability partnership registered in England No. OC326721).

client

TRITAX SYMMETRY
A TRITAX BIG BOX COMPANY

project

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

drawing

Illustrative Masterplan

scale 1:2500 @ A0 drawn mjl

checked mjl date July 2022

Regulation no.5(2)(o)

5905 - 301

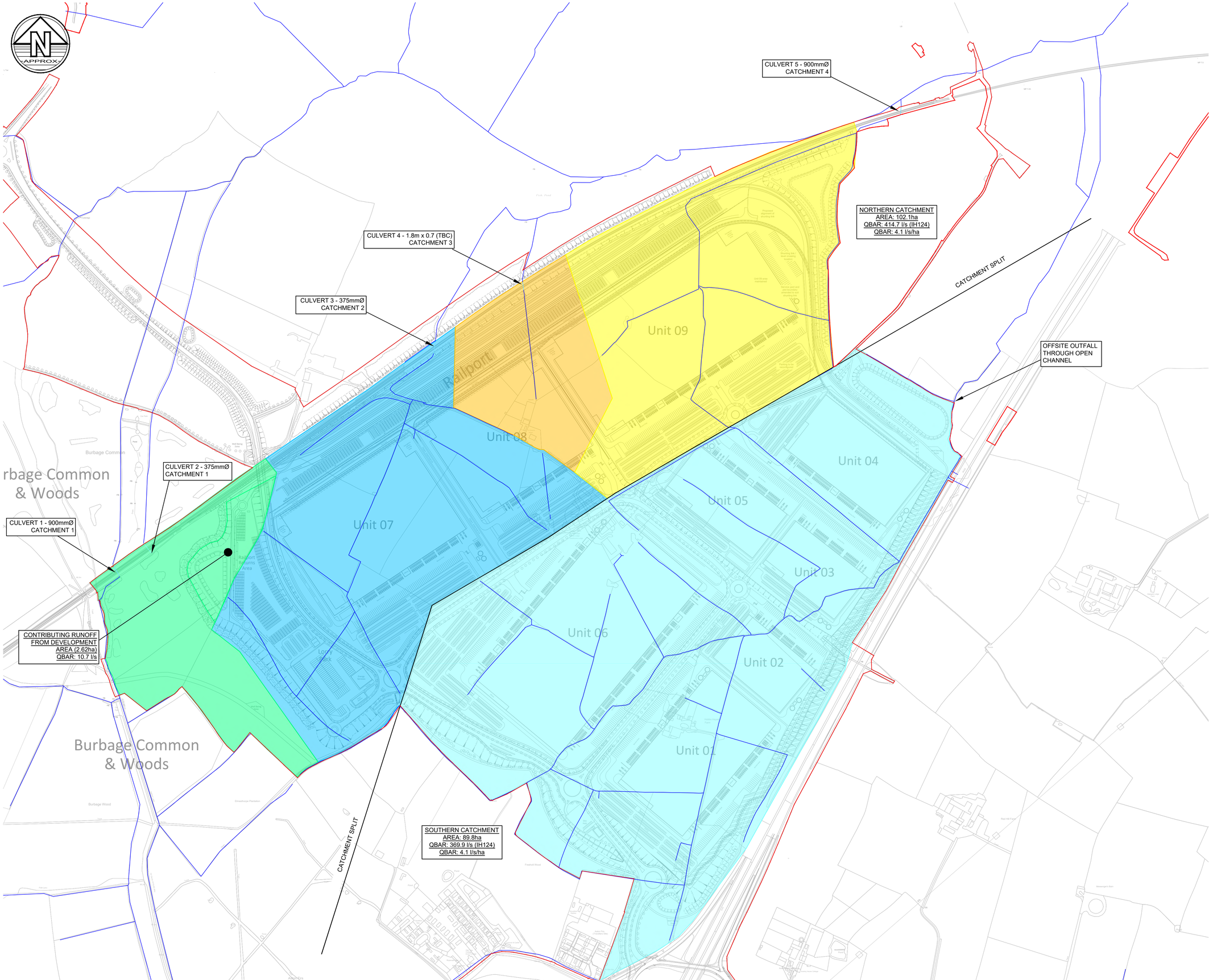
Scale Bar: 0m 10 20 40 70 100m 150 200m

APPENDICES

Appendix 2: Topographical Survey

APPENDICES

Appendix 3: Existing Catchment Plan



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Greenfield runoff calculations based on the IH124 methodology. Rates outlined within the summary table outline the QBAR rate for the corresponding catchment.

Legend

APPLICATION BOUNDARY

APPROXIMATE LINE OF EXISTING DITCHES / WATERCOURSES

CATCHMENT SUMMARY			
REFERNCE		CONTRIBUTING AREA (ha)	DISCHARGE RATE (l/s)
1		15.8	64.1
2		41.4	168.1
3		11.3	46.1
4		33.6	136.4
5		89.8	369.9

Rev	Date	Details of issue / revision	Drw	Rev
P04	05.09.22	Updated to latest site layout	RJ	CD
P03	14.12.21	Updated DCO boundary	RJ	CD
P02	01.10.21	Updated to latest masterplan	RJ	CD
P01	25.05.21	Preliminary Issue	RJ	CD

Issues & Revisions

BWB
A CAF GROUP COMPANY
Birmingham | 0121 233 3322
Leeds | 0113 233 8000
London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
www.bwbconsulting.com

Client

TRITAX SYMMETRY

Project Title

HINCKLEY RAIL FREIGHT INTERCHANGE

Drawing Title

EXISTING CATCHMENT PLAN

Drawn:	RJ		Reviewed:	CD	
BWB Ref:	NTT 2814	Date:	25.05.21	Scale@A1:	1:4000

Drawing Status

PRELIMINARY

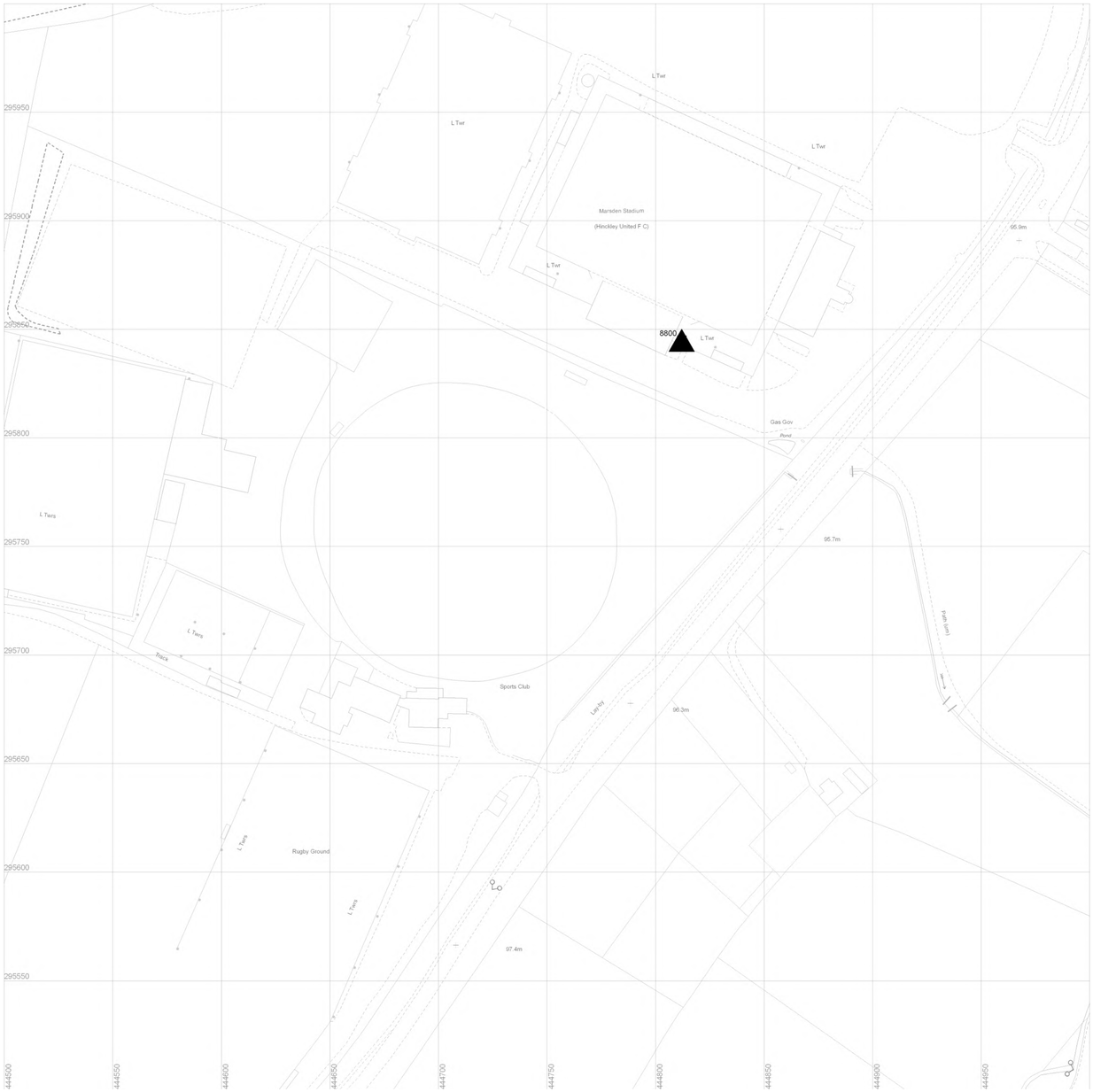
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HRF-BWB-EWE-ZZ-DR-CD-00501	S2	P04

X:\NTT\NTT2814_Hinckley Rail Freight Interchange\02. Project Delivery\01. WIP\Drawings\Water\HRF-BWB-EWE-ZZ-DR-CD-00501_Existing Catchment Plan P04.01.dwg

APPENDICES

Appendix 4: Severn Trent Water Asset Records

SP4496SE



SP4495SE

SP4395NW

SP4496NW

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse

- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N
W E
S

SEVERN TRENT WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:250

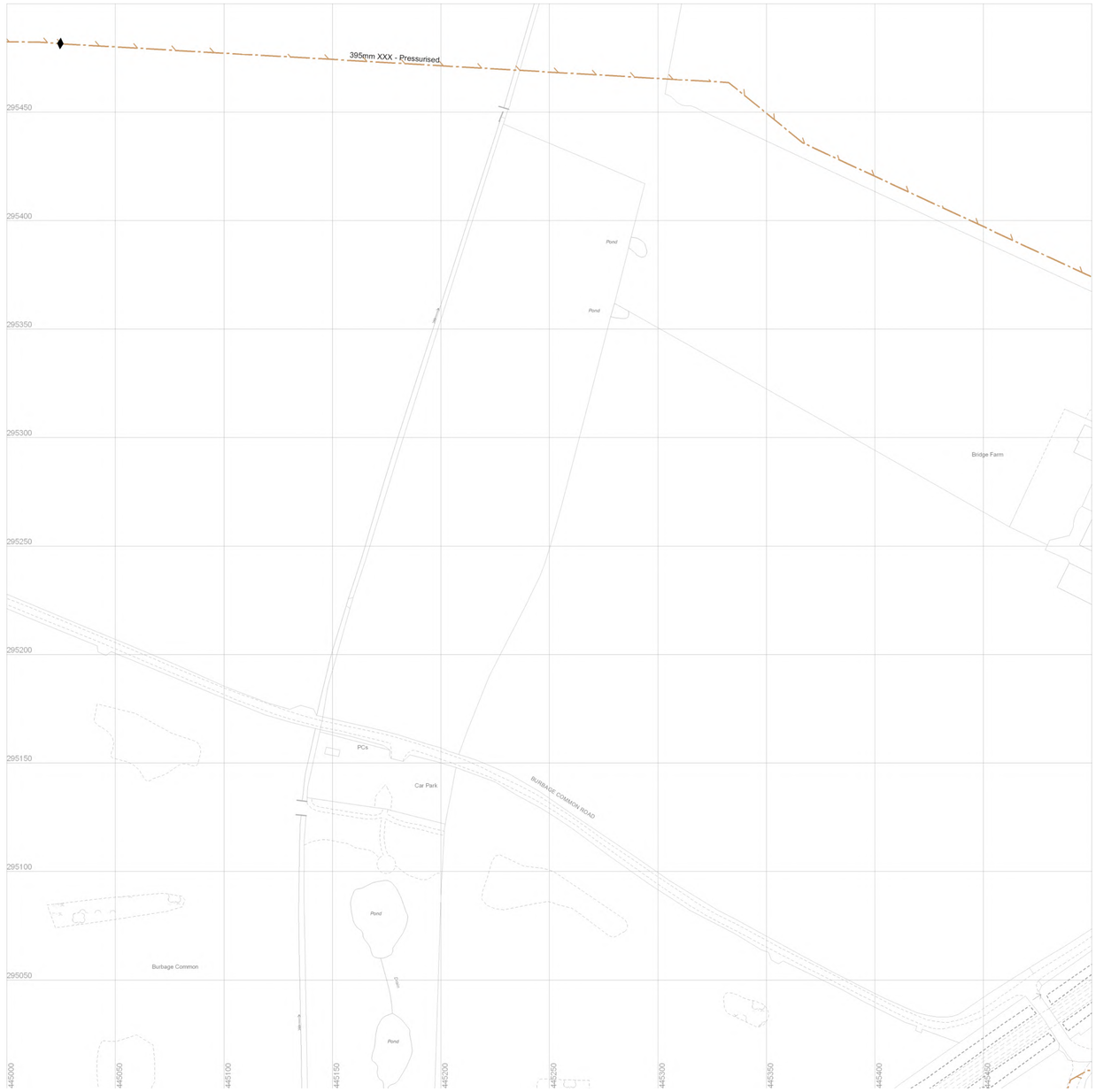
Date of issue: 04.06.19

Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:

SP4495NE

SP4595NW



SP4495SE

SP4595SE

SP4594NW

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)
- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet
- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse
- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta

All section 104 sewers are shown in green

All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N

W E

S

SEVERN TRENT WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:250

Date of issue: 04.06.19

Sheet No. 1 of 1

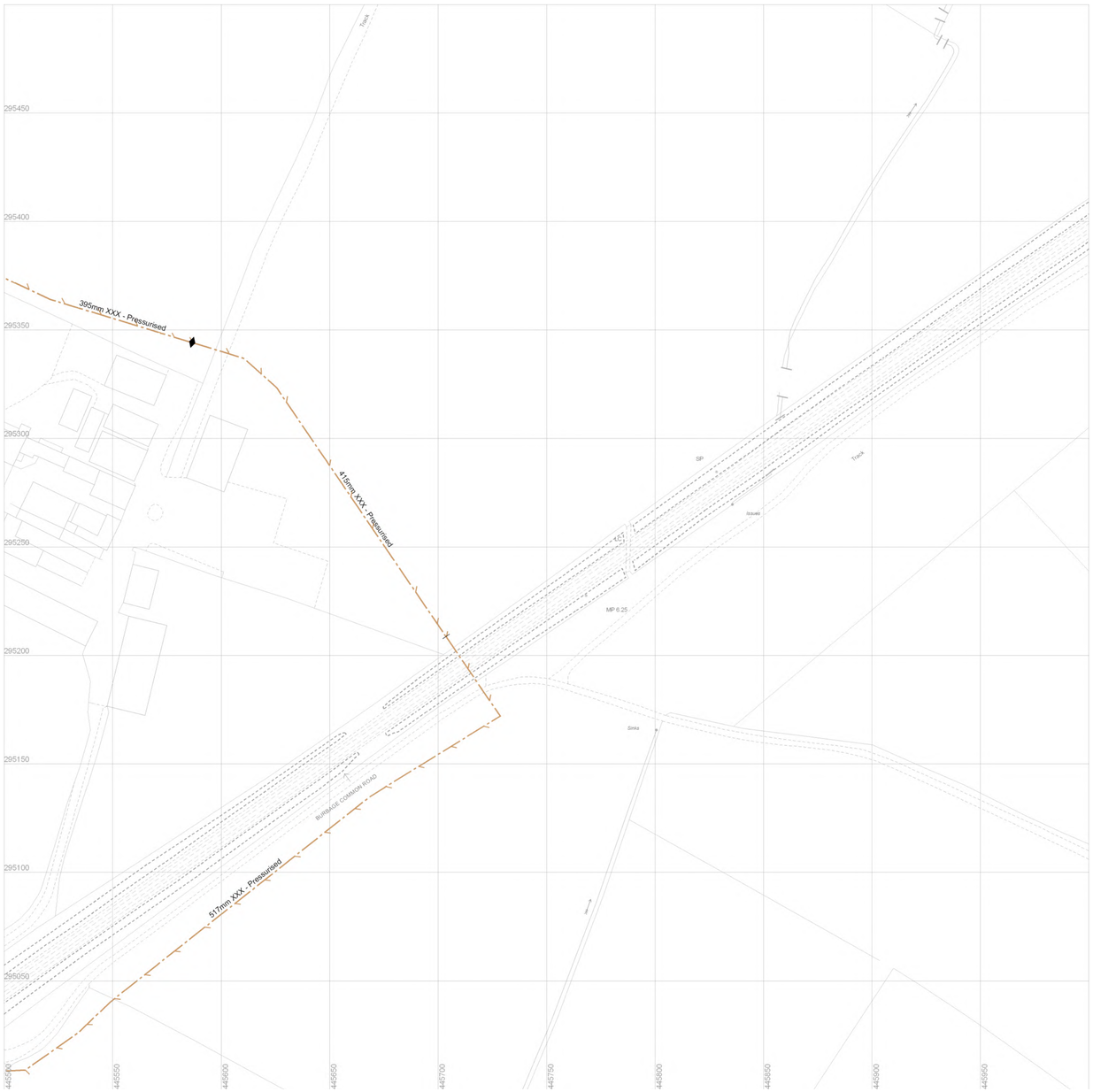
This map is centred upon:
O / S Tile reference:

SP4595SW

SP4595NE

SP4595SW

SP4695SW



SP4594NE

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse

- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N
W E
S

SEVERN TRENT WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

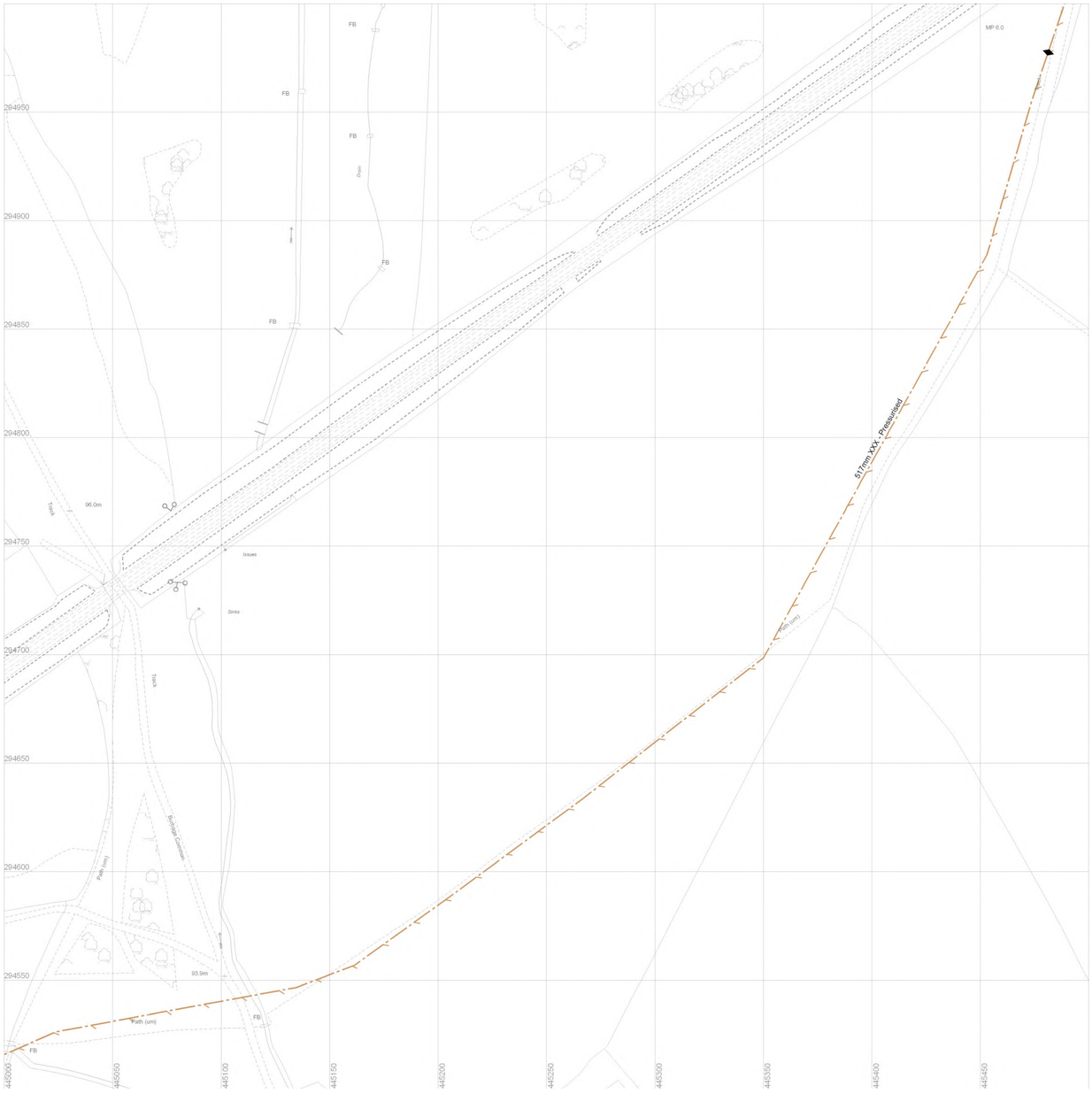
SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SP4595SE

Disclaimer Statement:
1. Do not scale off this Map.
2. This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this Map and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
3. On **1 October 2011** most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012 (date to be confirmed).
Private pumping stations, which form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 October 2016.
Severn Trent Water does not possess complete records of these assets.
These assets may not be displayed on this Map.

SP4595SW



SP4594NE

SP4694NE

SP4594SW

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)
- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet
- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse
- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N
W E
S

SEVERN TRENT WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

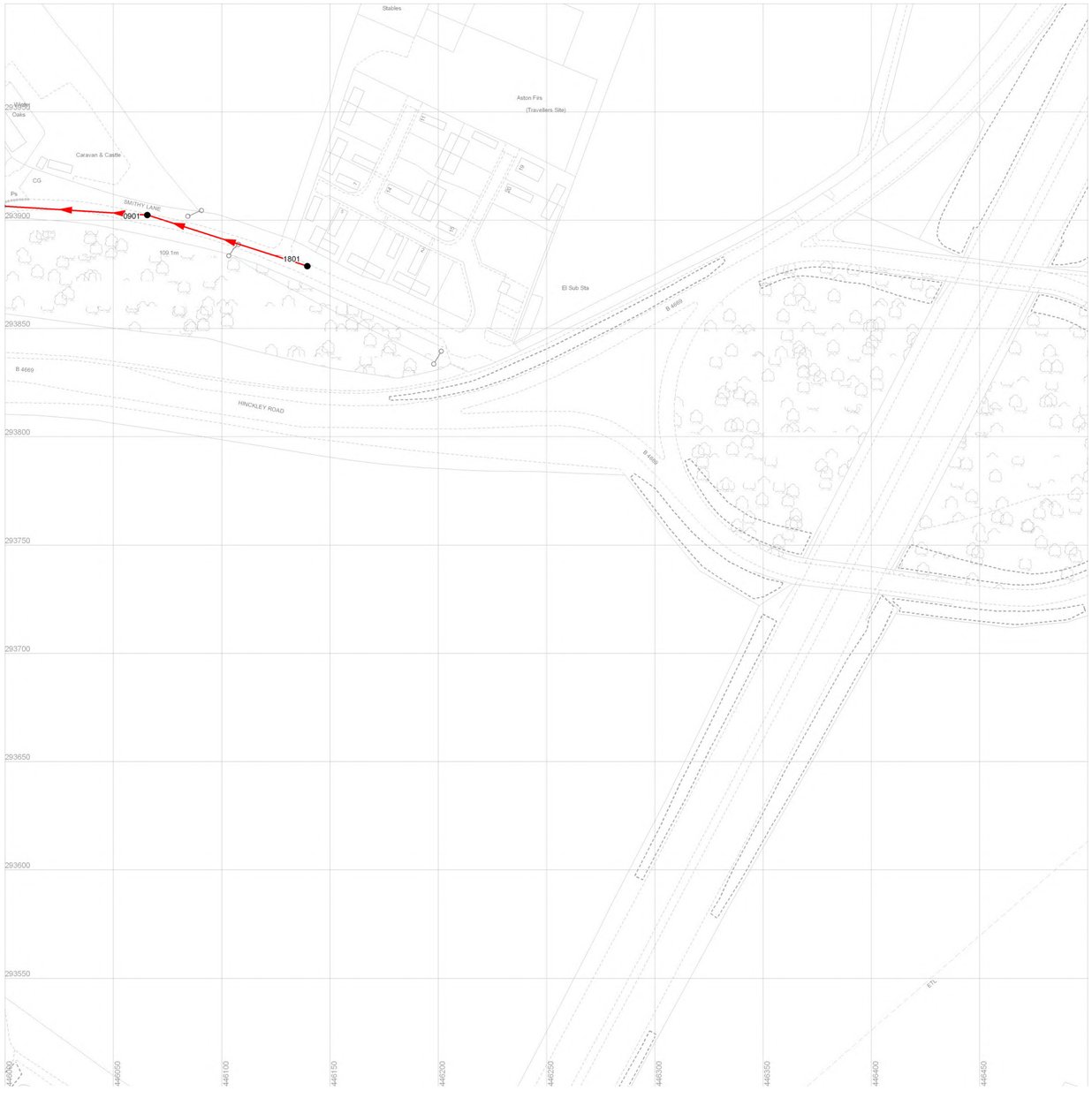
SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:

SP4594NW

SP4694SW



SP4693SW

SP4693NE

SP4793NE

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP46930901	nil	nil	105.97	C	nil	nil	nil	nil	0.00	nill
SP46931801	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse

- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. **Sewer pipe data refers to downstream sewer pipe.**

B. **Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.**

C. **Gradient is stated a 1 in...**

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N W E S

SEVERN TRENT WATER

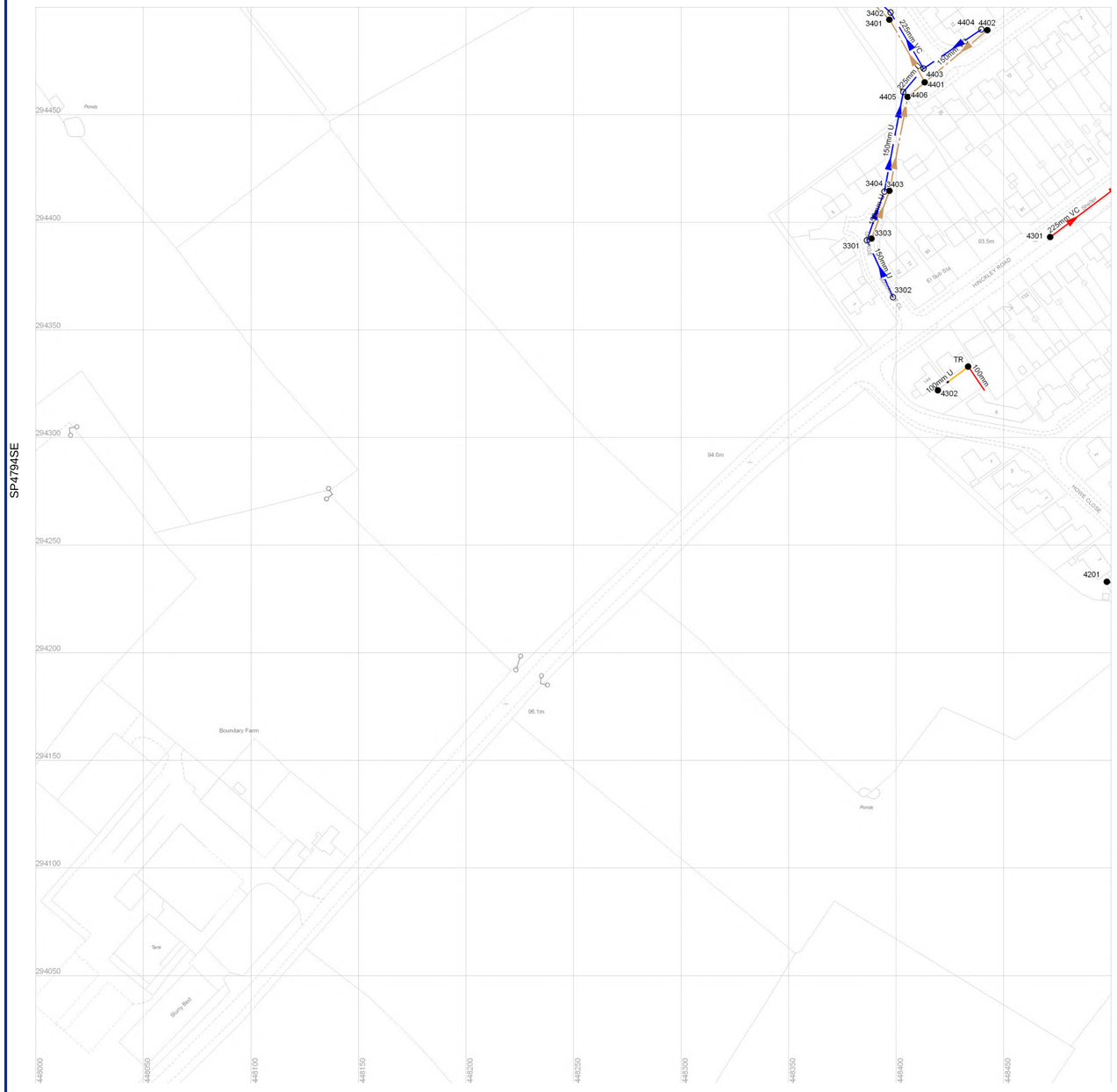
Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SP4693NW

SP4894NW



SP4794SE

SP4894SE

SP4893NW

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP48943301	92.96	91.43	91.01	S	U	C	150	nil	57.71	nill
SP48943302	93.47	91.92	91.43	S	U	C	150	nil	59.92	nill
SP48943303	92.99	90.98	90.53	F	U	C	150	nil	52.96	nill
SP48943401	91.22	88.66	88.35	F	VC	C	225	nil	115.87	1979
SP48943402	91.13	88.87	88.73	S	VC	C	225	nil	257.64	1979
SP48943403	92.61	91.01	89.25	S	U	C	150	nil	26.91	nill
SP48943404	92.50	90.53	90.52	F	U	C	150	nil	4494.00	nill
SP48944201	93.09	90.99	90.45	F	VC	C	150	nil	70.09	1979
SP48944301	93.52	91.20	90.69	C	VC	C	225	nil	94.49	1914
SP48944302	nil	nil	nil	C	U	C	100	nil	0.00	nill
SP48944401	91.57	88.79	88.67	F	VC	C	225	nil	278.83	1979
SP48944402	91.36	89.00	88.80	F	VC	C	150	nil	190.40	1979
SP48944403	91.52	89.13	88.89	S	VC	C	225	nil	127.21	1979
SP48944404	91.34	89.35	89.14	S	VC	C	150	nil	158.52	1979
SP48944405	91.59	89.09	nil	S	U	C	225	nil	0.15	nill
SP48944406	91.60	89.52	88.73	F	U	C	150	nil	12.75	nill
nil	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)
- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet
- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse
- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N
W E
S

SEVERN TRENT WATER

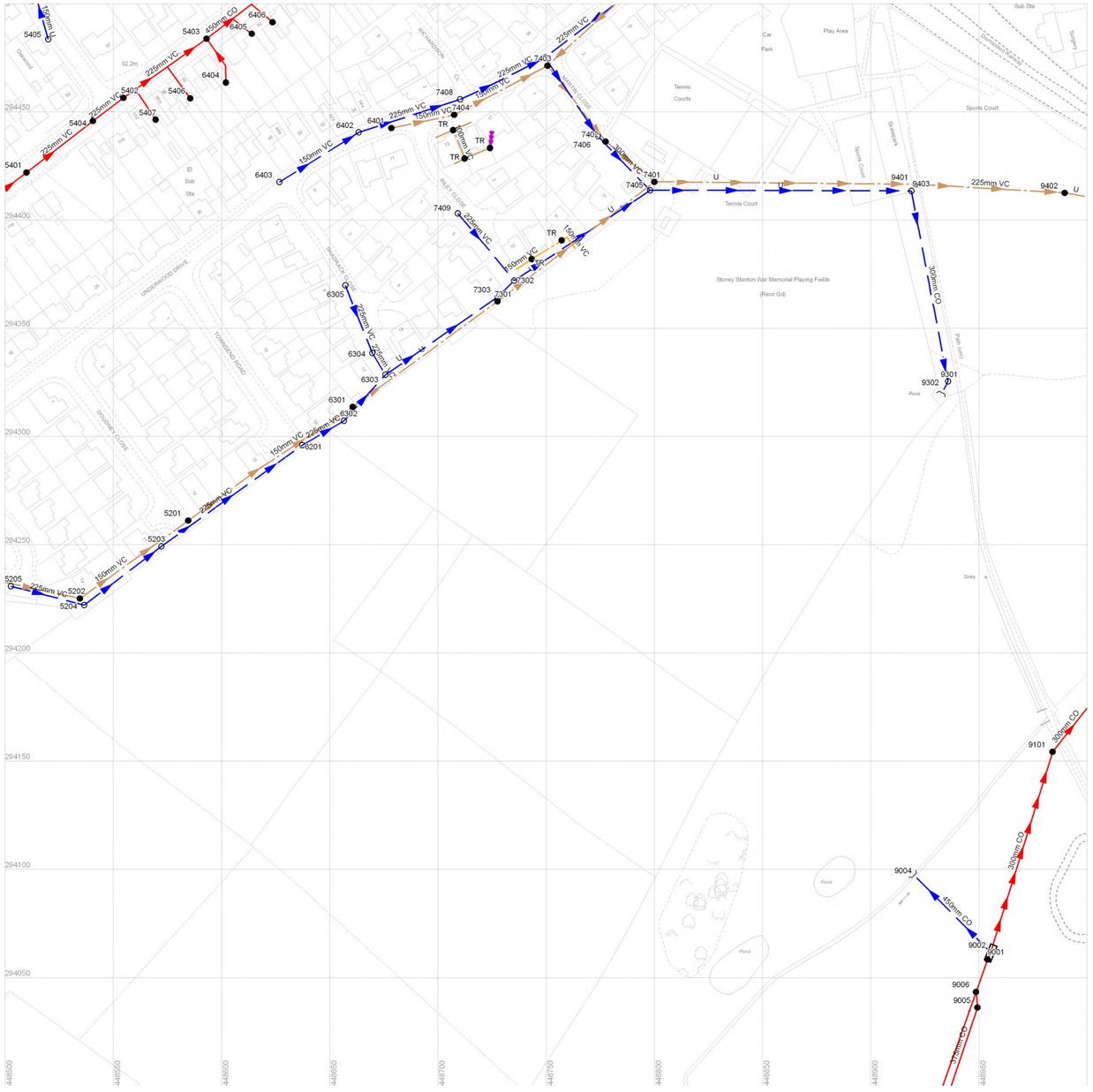
Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SP4894SW

SP4894NE



SP4893NE

Sewer Node **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP4894S201	91.17	89.88	nil	F	VC	C	150	nil	0.00	1979
SP4894S202	92.56	90.42	89.92	F	VC	C	150	nil	123.22	1979
SP4894S203	91.16	90.10	89.52	S	VC	C	225	nil	139.69	1979
SP4894S204	92.59	90.77	90.13	S	VC	C	225	nil	69.69	1979
SP4894S205	93.00	91.00	90.82	S	VC	C	225	nil	195.39	1979
SP4894S401	92.96	90.66	90.33	C	VC	C	nil	nil	117.00	1914
SP4894S402	92.45	90.45	90.26	C	VC	C	nil	nil	248.42	1914
SP4894S403	92.18	90.26	89.93	C	CO	C	nil	nil	145.76	1914
SP4894S404	92.48	90.30	90.47	C	VC	C	nil	nil	0.00	1914
SP4894S405	92.00	90.43	89.45	S	U	C	150	nil	23.27	2003
SP4894S406	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP4894S407	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP4894S201	91.11	89.49	nil	S	VC	C	225	nil	0.00	1979
SP4894S301	nil	nil	nil	F	U	U	nil	nil	0.00	2003
SP4894S302	nil	nil	nil	S	nil	nil	nil	nil	0.00	nill
SP4894S303	nil	nil	87.15	S	U	U	nil	nil	0.00	1979
SP4894S304	90.76	88.64	nil	S	VC	C	225	nil	0.00	2003
SP4894S305	90.55	88.87	88.68	S	VC	C	225	nil	176.95	2003
SP4894S401	90.29	88.06	87.64	F	VC	C	150	nil	71.02	2003
SP4894S402	90.51	88.74	87.82	S	VC	C	225	nil	53.97	2003
SP4894S403	91.37	89.82	88.82	S	VC	C	150	nil	42.72	2003
SP4894S404	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP4894S405	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP4894S406	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP4894T301	nil	nil	nil	F	U	U	nil	nil	0.00	1979
SP4894T302	nil	nil	nil	S	U	U	nil	nil	0.00	1979
SP4894T303	89.40	87.10	nil	S	VC	C	300	nil	0.00	1979
SP4894T401	nil	nil	84.42	F	U	U	nil	nil	0.00	1979
SP4894T402	88.56	86.15	nil	F	VC	C	150	nil	0.00	1979
SP4894T403	89.24	86.68	86.16	F	VC	C	150	nil	85.00	1979
SP4894T404	89.87	87.60	86.72	F	VC	C	150	nil	54.89	1979
SP4894T405	nil	nil	84.05	S	U	U	nil	nil	0.00	1979
SP4894T406	88.58	86.55	nil	S	VC	C	300	nil	0.00	1979
SP4894T407	89.27	87.18	86.57	S	VC	C	300	nil	73.20	1979
SP4894T408	89.89	87.80	87.23	S	VC	C	225	nil	76.11	1979
SP4894T409	89.45	87.74	nil	S	VC	C	225	nil	0.00	1979
SP4894S001	83.57	81.92	81.87	C	CO	C	450	nil	69.00	1979
SP4894S005	83.98	82.20	81.95	C	VC	C	375	nil	30.08	1979
SP4894S006	83.87	81.95	81.92	C	CO	C	450	nil	534.67	1979
SP4894S101	83.20	81.39	80.63	C	CO	C	300	nil	133.78	1979
SP4894S301	83.34	82.11	82.30	S	CO	C	300	nil	0.00	nill
SP4894S401	86.03	84.36	nil	F	VC	C	225	nil	0.00	1979
SP4894S402	nil	nil	82.03	F	U	U	nil	nil	0.00	1979
SP4894S403	86.04	83.94	82.22	S	CO	C	300	nil	52.11	1979
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse

- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. **Sewer pipe data refers to downstream sewer pipe.**

B. **Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.**

C. **Gradient is stated a 1 in...**

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N
W E
S

SEVERN TRENT WATER

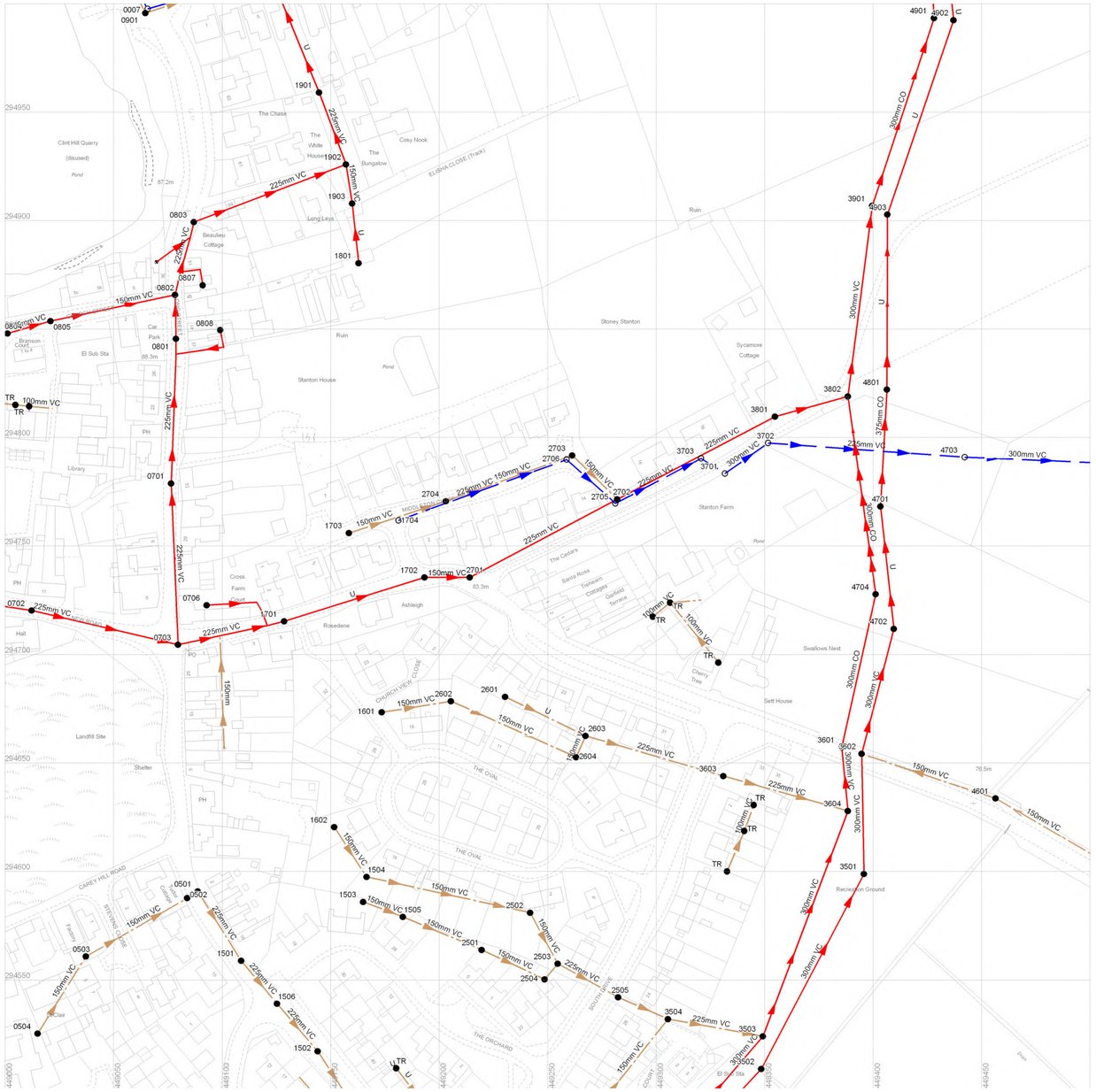
Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SP4894SE

SP4995SW



SP4994SW

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP49940007	82.21	75.76	75.44	S	nil	C	675	nil	315.50	nill
SP49940501	88.50	86.71	84.28	F	VC	C	225	nil	15.53	1979
SP49940502	88.67	87.37	86.74	F	VC	C	150	nil	9.25	1979
SP49940503	90.57	88.44	87.40	F	VC	C	150	nil	52.12	1979
SP49940504	90.44	89.33	88.45	F	VC	C	150	nil	47.94	1979
SP49940701	89.21	88.25	86.40	C	VC	C	225	nil	36.25	1979
SP49940702	92.67	90.53	88.44	C	VC	C	225	nil	32.96	1979
SP49940703	90.20	88.44	nil	C	VC	C	225	nil	0.00	1979
SP49940703	90.20	88.39	nil	C	VC	C	225	nil	0.00	1914
SP49940706	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP49940801	88.24	86.36	86.10	C	VC	C	225	nil	77.00	1979
SP49940802	87.95	86.00	85.39	C	VC	C	225	nil	56.08	1979
SP49940803	87.31	85.32	82.04	C	VC	C	225	nil	22.77	1979
SP49940804	91.95	90.34	89.31	C	VC	C	150	nil	18.14	1979
SP49940805	91.08	89.30	86.12	C	VC	C	150	nil	18.63	1979
SP49940807	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP49940808	nil	nil	nil	C	nil	nil	nil	nil	0.00	nill
SP49940901	82.28	75.73	75.46	F	nil	C	375	nil	373.93	nill
SP49941501	86.07	84.24	82.97	F	VC	C	225	nil	19.56	1979
SP49941502	83.36	81.54	80.46	F	VC	C	225	nil	32.10	1979
SP49941503	85.99	84.50	83.57	F	VC	C	nil	nil	19.76	1979
SP49941504	85.59	84.21	80.33	F	VC	C	150	nil	20.27	1979
SP49941505	85.26	83.54	81.19	F	VC	C	nil	nil	16.99	1979
SP49941506	84.56	82.95	81.58	F	VC	C	225	nil	21.22	1979
SP49941601	85.84	85.01	83.04	F	VC	C	150	nil	16.44	1979
SP49941602	86.96	85.58	84.25	F	VC	C	150	nil	20.65	1979
SP49941701	87.17	nil	82.27	C	U	U	nil	nil	0.00	1914
SP49941702	84.04	82.20	81.46	C	VC	C	150	nil	28.38	1979
SP49941703	86.13	84.51	82.42	F	VC	C	150	nil	22.69	2003
SP49941704	85.01	83.68	80.24	S	VC	C	225	nil	24.09	1979
SP49941801	nil	nil	82.52	C	U	U	nil	nil	0.00	1979
SP49941901	nil	nil	79.63	C	U	U	nil	nil	0.00	1979
SP49941902	83.80	82.02	nil	C	VC	C	225	nil	0.00	1979
SP49941903	84.17	82.22	82.03	C	VC	C	150	nil	90.84	1979
SP49942501	82.84	81.18	79.53	F	VC	C	nil	nil	19.26	1979
SP49942502	81.58	80.28	79.31	F	VC	C	nil	nil	27.22	1979
SP49942503	80.42	79.22	77.63	F	VC	C	nil	nil	20.53	1979
SP49942504	80.98	79.49	79.38	F	VC	C	150	nil	71.00	nill
SP49942505	79.73	77.59	76.84	F	VC	C	nil	nil	34.05	1979
SP49942601	nil	nil	79.55	F	U	U	nil	nil	0.00	1979
SP49942602	84.09	83.03	80.37	F	VC	C	150	nil	23.89	1979
SP49942603	81.14	79.55	77.01	F	VC	C	225	nil	26.56	1979
SP49942604	81.61	80.36	79.55	F	VC	C	150	nil	13.30	1979
SP49942701	83.33	81.44	78.88	C	VC	C	225	nil	30.40	1979
SP49942702	80.55	78.86	nil	C	VC	C	225	nil	0.00	1979
SP49942703	81.56	80.06	78.98	F	VC	C	150	nil	26.85	1979
SP49942704	84.10	82.40	80.11	F	VC	C	150	nil	27.35	1979
SP49942705	80.52	79.21	78.19	S	VC	C	225	nil	44.29	1979
SP49942706	81.64	80.22	79.31	S	VC	C	225	nil	33.49	1979
SP49943501	77.12	76.02	75.73	C	VC	C	300	nil	189.69	1979
SP49943502	77.36	76.37	76.04	C	VC	C	300	nil	309.09	1979
SP49943503	77.59	76.49	75.93	C	VC	C	300	nil	198.98	1979
SP49943504	78.43	76.80	76.57	F	VC	C	225	nil	188.04	1979
SP49943601	77.63	75.80	75.61	C	CO	C	300	nil	377.95	1979
SP49943602	77.36	75.72	nil	C	VC	C	300	nil	0.00	1979
SP49943603	78.86	77.00	76.12	F	VC	C	225	nil	67.27	1979
SP49943604	77.17	75.90	75.81	C	VC	C	300	nil	323.89	1979
SP49943701	78.68	77.73	77.05	S	VC	C	300	nil	35.90	1979
SP49943702	77.69	77.01	74.69	S	VC	C	225	nil	38.91	1979
SP49943703	78.85	78.16	77.91	S	VC	C	225	nil	52.16	nill
SP49943801	nil	nil	75.46	C	nil	nil	nil	nil	0.00	nill
SP49943802	77.02	75.29	75.13	C	VC	C	300	nil	554.25	1979
SP49943901	76.95	75.13	nil	C	CO	C	300	nil	0.00	1979
SP49944601	76.90	76.10	75.84	F	VC	C	150	nil	246.92	1979
SP49944701	76.71	75.42	nil	C	CO	C	375	nil	0.00	1979
SP49944702	nil	nil	75.43	C	U	U	nil	nil	0.00	1979
SP49944703	75.53	74.66	74.35	S	VC	C	300	nil	213.13	1979
SP49944704	76.87	75.60	75.31	C	CO	C	300	nil	316.97	1979
SP49944801	nil	nil	nil	C	U	U	nil	nil	0.00	1979
SP49944901	nil	nil	nil	C	CO	C	300	nil	0.00	1979
SP49944902	nil	nil	nil	C	U	U	nil	nil	0.00	1979
SP49944903	nil	nil	nil	C	U	U	nil	nil	0.00	1979
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	U	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse

- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N W E S

SEVERN TRENT WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

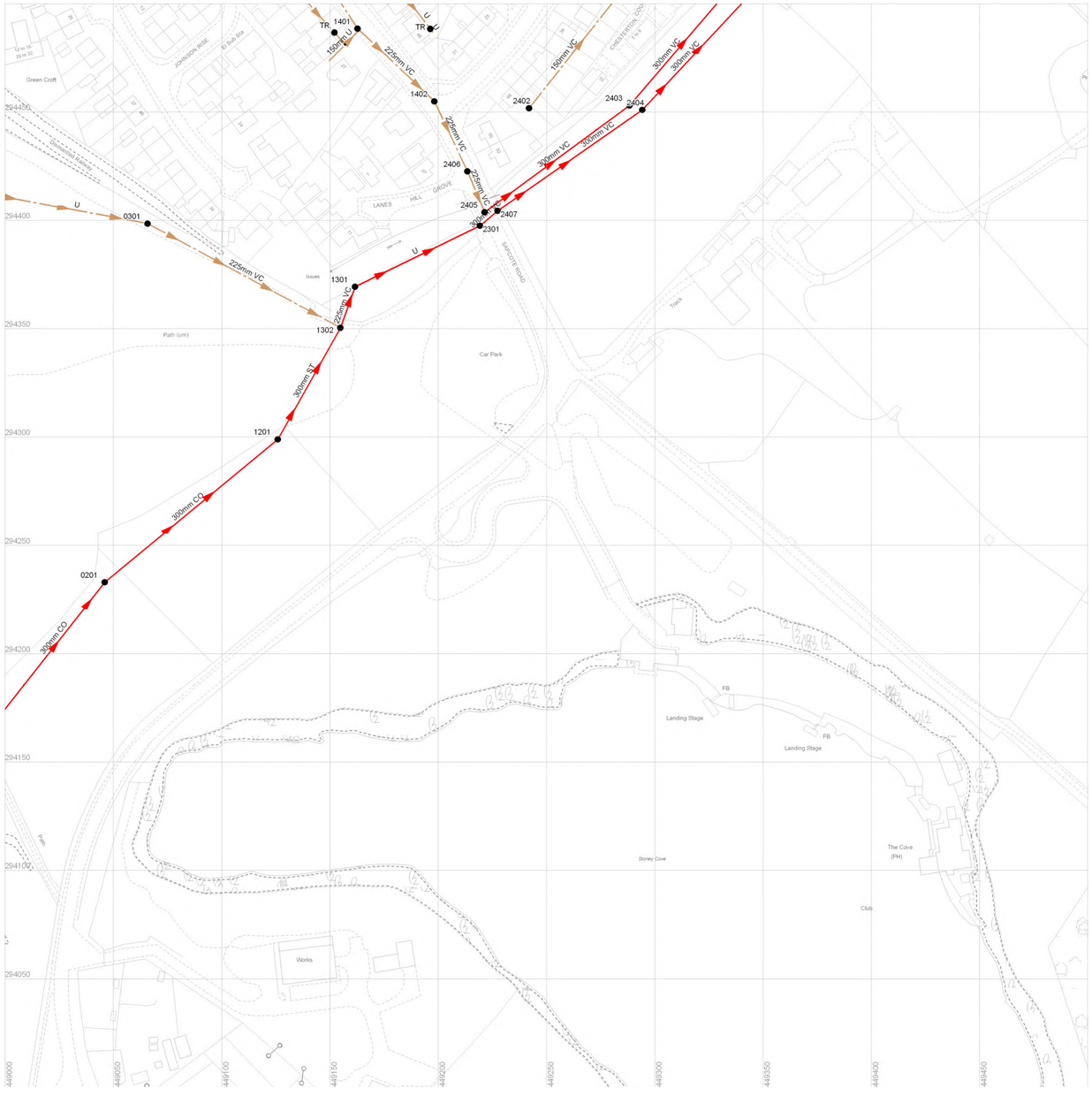
SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:

SP4994NW

SP4994NW



SP4893NW

SP4894SE

SP4994SE

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SP4994O201	82.10	80.62	79.85	C	CO	C	nil	nil	134.69	1979
SP4994O301	84.69	82.01	79.67	F	VC	C	225	nil	43.21	1979
SP4994I201	81.36	79.84	79.66	C	ST	C	300	nil	328.11	nill
SP4994I301	nil	nil	78.04	C	U	U	nil	nil	0.00	1979
SP4994I302	81.25	79.56	nil	C	VC	C	225	nil	0.00	1979
SP4994I401	82.17	80.41	79.10	F	VC	C	225	nil	36.72	1979
SP4994I402	80.83	79.05	78.37	F	VC	C	225	nil	53.93	1979
SP4994I301	79.91	77.89	77.79	C	VC	C	300	nil	104.20	1979
SP4994I402	79.61	78.82	76.91	F	VC	C	150	nil	53.80	1979
SP4994I403	77.87	76.73	76.51	C	VC	C	300	nil	425.50	1979
SP4994I404	77.87	76.80	76.39	C	VC	C	300	nil	193.29	1979
SP4994I405	79.92	77.72	76.75	C	VC	C	300	nil	84.13	1979
SP4994I406	80.04	78.36	78.00	F	VC	C	225	nil	54.72	1979
SP4994I407	79.99	77.77	76.81	C	VC	C	300	nil	83.36	1979
nil	nil	nil	nil	F	U	nil	nil	nil	0.00	nill

- Abandoned Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Trunk Combined Gravity Sewer
- Trunk Foul Use Gravity Sewer
- Trunk Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Highway Drain
- Combined Lateral Drain (SS)
- Foul Lateral Drain (SS)
- Surface Water Lateral Drain (SS)

- Cable, Earthing
- Cable Junction
- Cable, Optical Fibre/Instrumentation
- Cable, Low Voltage
- Cable, High Voltage
- Cable, Other
- Housing, Building
- Housing, Kiosk
- Disposal Site
- Sewage Treatment Works
- Housing, Other
- Pipe Support Structure
- Sewage Pumping Facility
- Sewer Facility Connection Inlet / Outlet

- Blind Shaft
- Combined Use Manhole
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node
- Hydrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- Sewer Blockage
- Sewer Collapse

- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Vent Column
- Waste Water Storage
- Culverted Watercourse
- Pre-1937 Properties

MATERIALS

AC	- ASBESTOS CEMENT
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	- CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRC	- GLASS REINFORCED CONCRETE
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
SI	- SPUN (GREY) IRON
XXX	- OTHER

CATEGORIES

W	- WEIR
C	- CASCADE
DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
HD	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
E	- EGG SHAPED
O	- OTHER
R	- RECTANGLE
S	- SQUARE
T	- TRAPEZOIDAL
U	- UNKNOWN

PURPOSE

C	- COMBINED
E	- FINAL EFFLUENT
F	- FOUL
L	- SLUDGE
S	- SURFACE WATER

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 1st October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N
W E
S

SEVERN TRENT WATER

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 04.06.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SP4994SW

APPENDICES

Appendix 5: Greenfield Runoff Rate Calculations

IH 124 Mean Annual Flood

Input

Return Period (years)	2	Soil	0.450
Area (ha)	102.100	Urban	0.000
SAAR (mm)	700	Region Number	Region 4

Results	**l/s**
QBAR Rural	414.7
QBAR Urban	414.7
Q2 years	371.6
Q1 year	344.2
Q2 years	371.6
Q5 years	510.0
Q10 years	617.8
Q20 years	737.0
Q25 years	778.7
Q30 years	812.5
Q50 years	913.1
Q100 years	1065.7
Q200 years	1252.3
Q250 years	1314.5
Q1000 years	1725.0

IH 124 Mean Annual Flood

Input

Return Period (years)	2	Soil	0.450
Area (ha)	89.800	Urban	0.000
SAAR (mm)	700	Region Number	Region 4

Results	**l/s**
QBAR Rural	369.9
QBAR Urban	369.9
Q2 years	331.5
Q1 year	307.0
Q2 years	331.5
Q5 years	455.0
Q10 years	551.1
Q20 years	657.4
Q25 years	694.7
Q30 years	724.7
Q50 years	814.5
Q100 years	950.6
Q200 years	1117.1
Q250 years	1172.6
Q1000 years	1538.8

APPENDICES

Appendix 6: Greenfield Runoff Volume Calculation

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	19.800
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	191.000
SAAR (mm)	700
CWI	105.000
Urban	0.000
SPR	47.000

Results

Percentage Runoff (%)	45.91
Greenfield Runoff Volume (m^3)	54342.670

APPENDICES

Appendix 7: Proposed Catchment Plan

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Drawing provided for illustrative purposes only. Design subject to further coordination and approvals.
6. Layout based on AJA drawing: 5905-177.
7. Attenuation indicatively sized for the 1 in 100 year storm event plus a 25% allowance for climate change for the estimated impermeable areas. Allowance made for 650m³ storage per 1ha of impermeable area. To be agreed with the LLFA.
8. Equivalent greenfield runoff rates have been estimate to be 4.1 l/s/ha. To be agreed with the LLFA.

Legend

CATCHMENT & OUTFALL SUMMARY			
REFERNCE		CONTRIBUTING AREA (ha)	DISCHARGE RATE (l/s)
1		9.16	10.7
2		22.45	92.0
3		11.90	46.1
4		24.39	100.0
5		14.62	59.9
6		4.77	19.6
7		24.63	100.9
8		4.54	18.6
9		11.71	48.0
10		0.95	3.9

Rev	Date	Details of issue / revision	Drw	Rev
P04	05.09.22	Updated to latest masterplan	RJ	CD
P03	14.12.21	Updated to latest masterplan	RJ	CD
P02	01.10.21	Updated to latest masterplan	RJ	CD
P01	25.05.21	Preliminary Issue	RJ	CD

Issues & Revisions

BWB
A CAF GROUP COMPANY
☐ Birmingham | 0121 233 3322
☐ Leeds | 0113 233 8000
☐ London | 020 7407 3879
☐ Manchester | 0161 233 4260
■ Nottingham | 0115 924 1100
www.bwbconsulting.com

Client

TRITAX SYMMETRY

Project Title

HINCKLEY RAIL FREIGHT INTERCHANGE

Drawing Title

PROPOSED CATCHMENT PLAN

Drawn:	RJ	Reviewed:	CD	
BWB Ref:	NTT 2814	Date:	25.05.21	Scale@A1: 1:4000

Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HRF-BWB-EWE-ZZ-DR-CD-00503	S2	P04

X:\NTT\NTT2814_Hinckley Rail Freight Interchange\02. Project Delivery\01. WIP\Drawings\Water\HRF-BWB-EWE-ZZ-DR-CD-00503_Proposed Catchment Plan P04.01.dwg

APPENDICES

Appendix 8: Source Control Calculations

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	99.112	0.412	4.1	225.5	O K
30 min Summer	99.221	0.521	4.1	294.9	O K
60 min Summer	99.326	0.626	4.1	365.2	O K
120 min Summer	99.431	0.731	4.1	440.2	O K
180 min Summer	99.491	0.791	4.1	485.4	O K
240 min Summer	99.530	0.830	4.1	515.3	O K
360 min Summer	99.574	0.874	4.1	549.2	O K
480 min Summer	99.591	0.891	4.1	563.2	O K
600 min Summer	99.596	0.896	4.1	567.0	O K
720 min Summer	99.593	0.893	4.1	564.8	O K
960 min Summer	99.575	0.875	4.1	550.1	O K
1440 min Summer	99.525	0.825	4.1	511.3	O K
2160 min Summer	99.462	0.762	4.1	463.2	O K
2880 min Summer	99.409	0.709	4.1	424.6	O K
4320 min Summer	99.318	0.618	4.1	359.6	O K
5760 min Summer	99.235	0.535	4.1	303.5	O K
7200 min Summer	99.171	0.471	4.1	262.4	O K
8640 min Summer	99.119	0.419	4.1	229.8	O K
10080 min Summer	99.077	0.377	4.1	204.0	O K
15 min Winter	99.156	0.456	4.1	252.9	O K
30 min Winter	99.276	0.576	4.1	330.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	121.903	0.0	218.8	19
30 min Summer	80.162	0.0	284.3	34
60 min Summer	50.146	0.0	371.4	64
120 min Summer	30.797	0.0	455.4	124
180 min Summer	23.054	0.0	510.0	184
240 min Summer	18.681	0.0	549.1	242
360 min Summer	13.737	0.0	599.2	362
480 min Summer	10.934	0.0	624.3	482
600 min Summer	9.112	0.0	631.3	602
720 min Summer	7.828	0.0	628.4	722
960 min Summer	6.126	0.0	617.2	960
1440 min Summer	4.308	0.0	589.1	1210
2160 min Summer	3.022	0.0	812.5	1576
2880 min Summer	2.358	0.0	844.6	1988
4320 min Summer	1.682	0.0	901.0	2808
5760 min Summer	1.338	0.0	962.4	3568
7200 min Summer	1.134	0.0	1019.0	4320
8640 min Summer	0.999	0.0	1076.3	5016
10080 min Summer	0.903	0.0	1134.1	5752
15 min Winter	121.903	0.0	244.5	19
30 min Winter	80.162	0.0	312.5	33

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	99.389	0.689	4.1	410.2	O K
120 min Winter	99.504	0.804	4.1	495.1	O K
180 min Winter	99.571	0.871	4.1	546.9	O K
240 min Winter	99.614	0.914	4.1	581.6	O K
360 min Winter	99.664	0.964	4.1	621.9	O K
480 min Winter	99.686	0.986	4.1	640.1	O K
600 min Winter	99.694	0.994	4.1	646.9	O K
720 min Winter	99.694	0.994	4.1	646.9	O K
960 min Winter	99.680	0.980	4.1	635.3	O K
1440 min Winter	99.629	0.929	4.1	593.8	O K
2160 min Winter	99.554	0.854	4.1	533.3	O K
2880 min Winter	99.488	0.788	4.1	482.7	O K
4320 min Winter	99.367	0.667	4.1	394.2	O K
5760 min Winter	99.236	0.536	4.1	304.5	O K
7200 min Winter	99.134	0.434	4.1	239.1	O K
8640 min Winter	99.053	0.353	4.1	189.6	O K
10080 min Winter	98.990	0.290	4.1	152.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	50.146	0.0	415.7	64
120 min Winter	30.797	0.0	508.8	122
180 min Winter	23.054	0.0	568.1	180
240 min Winter	18.681	0.0	607.9	240
360 min Winter	13.737	0.0	642.6	356
480 min Winter	10.934	0.0	642.3	472
600 min Winter	9.112	0.0	638.0	588
720 min Winter	7.828	0.0	632.8	702
960 min Winter	6.126	0.0	621.8	924
1440 min Winter	4.308	0.0	598.4	1344
2160 min Winter	3.022	0.0	909.6	1668
2880 min Winter	2.358	0.0	945.3	2136
4320 min Winter	1.682	0.0	1005.5	3068
5760 min Winter	1.338	0.0	1078.1	3816
7200 min Winter	1.134	0.0	1141.5	4544
8640 min Winter	0.999	0.0	1205.8	5272
10080 min Winter	0.903	0.0	1270.9	5952

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 446317 295054 SP 46317 95054
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+25

Time Area Diagram

Total Area (ha) 1.000

Time (mins) From:	To:	Area (ha)
0	4	1.000

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	480.0	0.400	612.3	0.800	760.7	1.200	925.2
0.100	511.6	0.500	647.9	0.900	800.3	1.300	968.8
0.200	544.1	0.600	684.5	1.000	840.9		
0.300	577.7	0.700	722.1	1.100	882.5		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0096-4100-1000-4100
Design Head (m)	1.000
Design Flow (l/s)	4.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	98.700
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.1
Flush-Flo™	0.294	4.1
Kick-Flo®	0.629	3.3
Mean Flow over Head Range	-	3.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	1.200	4.5	3.000	6.8	7.000	10.2
0.200	4.0	1.400	4.8	3.500	7.4	7.500	10.6
0.300	4.1	1.600	5.1	4.000	7.8	8.000	10.9
0.400	4.0	1.800	5.4	4.500	8.3	8.500	11.2
0.500	3.9	2.000	5.7	5.000	8.7	9.000	11.5
0.600	3.5	2.200	5.9	5.500	9.1	9.500	11.8
0.800	3.7	2.400	6.2	6.000	9.5		
1.000	4.1	2.600	6.4	6.500	9.9		

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	99.096	0.396	4.1	215.3	O K
30 min Summer	99.200	0.500	4.1	281.2	O K
60 min Summer	99.301	0.601	4.1	348.0	O K
120 min Summer	99.393	0.693	4.1	412.6	O K
180 min Summer	99.439	0.739	4.1	446.0	O K
240 min Summer	99.466	0.766	4.1	466.1	O K
360 min Summer	99.496	0.796	4.1	488.8	O K
480 min Summer	99.511	0.811	4.1	500.7	O K
600 min Summer	99.518	0.818	4.1	505.9	O K
720 min Summer	99.519	0.819	4.1	506.8	O K
960 min Summer	99.512	0.812	4.1	500.8	O K
1440 min Summer	99.484	0.784	4.1	480.1	O K
2160 min Summer	99.444	0.744	4.1	449.7	O K
2880 min Summer	99.404	0.704	4.1	420.6	O K
4320 min Summer	99.320	0.620	4.1	361.0	O K
5760 min Summer	99.231	0.531	4.1	301.1	O K
7200 min Summer	99.153	0.453	4.1	250.7	O K
8640 min Summer	99.084	0.384	4.1	207.9	O K
10080 min Summer	99.024	0.324	4.1	172.2	O K
15 min Winter	99.138	0.438	4.1	241.5	O K
30 min Winter	99.253	0.553	4.1	315.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	116.472	0.0	209.2	19
30 min Summer	76.493	0.0	272.4	34
60 min Summer	47.860	0.0	354.5	64
120 min Summer	28.933	0.0	428.1	124
180 min Summer	21.268	0.0	471.4	182
240 min Summer	16.995	0.0	501.4	242
360 min Summer	12.340	0.0	543.9	362
480 min Summer	9.835	0.0	574.6	482
600 min Summer	8.241	0.0	596.6	602
720 min Summer	7.130	0.0	610.7	720
960 min Summer	5.669	0.0	613.3	960
1440 min Summer	4.097	0.0	586.9	1194
2160 min Summer	2.956	0.0	794.6	1560
2880 min Summer	2.342	0.0	838.9	1988
4320 min Summer	1.685	0.0	902.8	2808
5760 min Summer	1.333	0.0	958.6	3528
7200 min Summer	1.111	0.0	998.1	4256
8640 min Summer	0.956	0.0	1030.8	5008
10080 min Summer	0.843	0.0	1058.0	5656
15 min Winter	116.472	0.0	233.9	19
30 min Winter	76.493	0.0	301.2	33

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	99.363	0.663	4.1	391.1	O K
120 min Winter	99.463	0.763	4.1	464.2	O K
180 min Winter	99.514	0.814	4.1	502.7	O K
240 min Winter	99.544	0.844	4.1	526.2	O K
360 min Winter	99.580	0.880	4.1	553.9	O K
480 min Winter	99.599	0.899	4.1	569.5	O K
600 min Winter	99.610	0.910	4.1	577.7	O K
720 min Winter	99.614	0.914	4.1	581.1	O K
960 min Winter	99.611	0.911	4.1	578.9	O K
1440 min Winter	99.583	0.883	4.1	556.6	O K
2160 min Winter	99.533	0.833	4.1	517.4	O K
2880 min Winter	99.481	0.781	4.1	477.9	O K
4320 min Winter	99.369	0.669	4.1	395.7	O K
5760 min Winter	99.231	0.531	4.1	301.5	O K
7200 min Winter	99.113	0.413	4.1	225.7	O K
8640 min Winter	99.013	0.313	4.1	166.2	O K
10080 min Winter	98.937	0.237	4.1	122.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	47.860	0.0	396.9	64
120 min Winter	28.933	0.0	478.7	122
180 min Winter	21.268	0.0	526.3	180
240 min Winter	16.995	0.0	558.8	240
360 min Winter	12.340	0.0	602.2	356
480 min Winter	9.835	0.0	626.8	472
600 min Winter	8.241	0.0	632.4	588
720 min Winter	7.130	0.0	629.0	700
960 min Winter	5.669	0.0	618.1	924
1440 min Winter	4.097	0.0	593.8	1340
2160 min Winter	2.956	0.0	889.7	1668
2880 min Winter	2.342	0.0	939.0	2132
4320 min Winter	1.685	0.0	1007.4	3068
5760 min Winter	1.333	0.0	1073.7	3808
7200 min Winter	1.111	0.0	1118.1	4536
8640 min Winter	0.956	0.0	1154.8	5184
10080 min Winter	0.843	0.0	1185.7	5840

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 1.000

Time (mins) From:	To:	Area (ha)
0	4	1.000

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	480.0	0.400	612.3	0.800	760.7	1.200	925.2
0.100	511.6	0.500	647.9	0.900	800.3	1.300	968.8
0.200	544.1	0.600	684.5	1.000	840.9		
0.300	577.7	0.700	722.1	1.100	882.5		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0096-4100-1000-4100
Design Head (m)	1.000
Design Flow (l/s)	4.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	98.700
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.1
Flush-Flo™	0.294	4.1
Kick-Flo®	0.629	3.3
Mean Flow over Head Range	-	3.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	1.200	4.5	3.000	6.8	7.000	10.2
0.200	4.0	1.400	4.8	3.500	7.4	7.500	10.6
0.300	4.1	1.600	5.1	4.000	7.8	8.000	10.9
0.400	4.0	1.800	5.4	4.500	8.3	8.500	11.2
0.500	3.9	2.000	5.7	5.000	8.7	9.000	11.5
0.600	3.5	2.200	5.9	5.500	9.1	9.500	11.8
0.800	3.7	2.400	6.2	6.000	9.5		
1.000	4.1	2.600	6.4	6.500	9.9		

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	99.156	0.456	4.1	252.9	O K
30 min Summer	99.276	0.576	4.1	331.0	O K
60 min Summer	99.390	0.690	4.1	410.3	O K
120 min Summer	99.504	0.804	4.1	494.9	O K
180 min Summer	99.570	0.870	4.1	546.3	O K
240 min Summer	99.613	0.913	4.1	580.7	O K
360 min Summer	99.662	0.962	4.1	620.5	O K
480 min Summer	99.683	0.983	4.1	638.0	O K
600 min Summer	99.690	0.990	4.1	644.0	O K
720 min Summer	99.690	0.990	4.1	643.3	O K
960 min Summer	99.673	0.973	4.1	629.9	O K
1440 min Summer	99.623	0.923	4.1	588.8	O K
2160 min Summer	99.558	0.858	4.1	537.1	O K
2880 min Summer	99.506	0.806	4.1	496.9	O K
4320 min Summer	99.424	0.724	4.1	435.4	O K
5760 min Summer	99.354	0.654	4.1	385.3	O K
7200 min Summer	99.285	0.585	4.1	337.5	O K
8640 min Summer	99.229	0.529	4.1	299.8	O K
10080 min Summer	99.183	0.483	4.1	269.9	O K
15 min Winter	99.204	0.504	4.1	283.5	O K
30 min Winter	99.335	0.635	4.1	371.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	136.531	0.0	244.5	19
30 min Summer	89.782	0.0	312.5	34
60 min Summer	56.163	0.0	415.7	64
120 min Summer	34.492	0.0	508.8	124
180 min Summer	25.821	0.0	568.1	184
240 min Summer	20.923	0.0	608.0	242
360 min Summer	15.386	0.0	643.0	362
480 min Summer	12.246	0.0	643.0	482
600 min Summer	10.205	0.0	638.9	602
720 min Summer	8.767	0.0	633.9	722
960 min Summer	6.861	0.0	623.0	960
1440 min Summer	4.825	0.0	598.9	1242
2160 min Summer	3.385	0.0	909.6	1604
2880 min Summer	2.641	0.0	945.1	2016
4320 min Summer	1.884	0.0	1002.9	2852
5760 min Summer	1.499	0.0	1078.0	3688
7200 min Summer	1.270	0.0	1141.5	4464
8640 min Summer	1.118	0.0	1205.7	5184
10080 min Summer	1.012	0.0	1270.6	5944
15 min Winter	136.531	0.0	272.4	19
30 min Winter	89.782	0.0	330.3	34

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	99.458	0.758	4.1	460.5	O K
120 min Winter	99.583	0.883	4.1	556.5	O K
180 min Winter	99.656	0.956	4.1	615.4	O K
240 min Winter	99.704	1.004	4.1	655.2	Flood Risk
360 min Winter	99.759	1.059	4.2	702.4	Flood Risk
480 min Winter	99.785	1.085	4.3	724.8	Flood Risk
600 min Winter	99.795	1.095	4.3	734.2	Flood Risk
720 min Winter	99.797	1.097	4.3	736.0	Flood Risk
960 min Winter	99.786	1.086	4.3	726.3	Flood Risk
1440 min Winter	99.739	1.039	4.2	685.6	Flood Risk
2160 min Winter	99.662	0.962	4.1	620.8	O K
2880 min Winter	99.599	0.899	4.1	569.0	O K
4320 min Winter	99.487	0.787	4.1	482.4	O K
5760 min Winter	99.386	0.686	4.1	407.6	O K
7200 min Winter	99.275	0.575	4.1	330.2	O K
8640 min Winter	99.180	0.480	4.1	268.3	O K
10080 min Winter	99.106	0.406	4.1	221.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.163	0.0	465.0	64
120 min Winter	34.492	0.0	567.0	122
180 min Winter	25.821	0.0	626.1	180
240 min Winter	20.923	0.0	649.8	240
360 min Winter	15.386	0.0	651.0	356
480 min Winter	12.246	0.0	648.0	474
600 min Winter	10.205	0.0	644.6	590
720 min Winter	8.767	0.0	641.1	704
960 min Winter	6.861	0.0	633.5	930
1440 min Winter	4.825	0.0	618.2	1356
2160 min Winter	3.385	0.0	1017.9	1692
2880 min Winter	2.641	0.0	1056.8	2160
4320 min Winter	1.884	0.0	1101.8	3072
5760 min Winter	1.499	0.0	1207.4	3976
7200 min Winter	1.270	0.0	1278.6	4760
8640 min Winter	1.118	0.0	1350.7	5456
10080 min Winter	1.012	0.0	1423.8	6160

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 446317 295054 SP 46317 95054
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.000

Time (mins) From:	To:	Area (ha)
0	4	1.000

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	480.0	0.400	612.3	0.800	760.7	1.200	925.2
0.100	511.6	0.500	647.9	0.900	800.3	1.300	968.8
0.200	544.1	0.600	684.5	1.000	840.9		
0.300	577.7	0.700	722.1	1.100	882.5		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0096-4100-1000-4100
Design Head (m)	1.000
Design Flow (l/s)	4.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	98.700
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.1
Flush-Flo™	0.294	4.1
Kick-Flo®	0.629	3.3
Mean Flow over Head Range	-	3.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	1.200	4.5	3.000	6.8	7.000	10.2
0.200	4.0	1.400	4.8	3.500	7.4	7.500	10.6
0.300	4.1	1.600	5.1	4.000	7.8	8.000	10.9
0.400	4.0	1.800	5.4	4.500	8.3	8.500	11.2
0.500	3.9	2.000	5.7	5.000	8.7	9.000	11.5
0.600	3.5	2.200	5.9	5.500	9.1	9.500	11.8
0.800	3.7	2.400	6.2	6.000	9.5		
1.000	4.1	2.600	6.4	6.500	9.9		

Summary of Results for 100 year Return Period (+25%)

Half Drain Time : 1472 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.328	0.328	0.0	45.3	45.3	2683.4	O K
30 min Summer	8.430	0.430	0.0	46.1	46.1	3514.7	O K
60 min Summer	8.534	0.534	0.0	46.1	46.1	4362.3	O K
120 min Summer	8.647	0.647	0.0	46.1	46.1	5283.4	O K
180 min Summer	8.717	0.717	0.0	46.1	46.1	5857.1	O K
240 min Summer	8.765	0.765	0.0	46.1	46.1	6253.3	O K
360 min Summer	8.824	0.824	0.0	46.1	46.1	6735.7	O K
480 min Summer	8.854	0.854	0.0	46.1	46.1	6973.5	O K
600 min Summer	8.867	0.867	0.0	46.1	46.1	7084.6	O K
720 min Summer	8.872	0.872	0.0	46.1	46.1	7121.3	O K
960 min Summer	8.864	0.864	0.0	46.1	46.1	7061.1	O K
1440 min Summer	8.827	0.827	0.0	46.1	46.1	6757.8	O K
2160 min Summer	8.775	0.775	0.0	46.1	46.1	6331.1	O K
2880 min Summer	8.727	0.727	0.0	46.1	46.1	5942.7	O K
4320 min Summer	8.650	0.650	0.0	46.1	46.1	5308.4	O K
5760 min Summer	8.586	0.586	0.0	46.1	46.1	4789.2	O K
7200 min Summer	8.537	0.537	0.0	46.1	46.1	4384.1	O K
8640 min Summer	8.496	0.496	0.0	46.1	46.1	4053.3	O K
10080 min Summer	8.464	0.464	0.0	46.1	46.1	3788.3	O K
15 min Winter	8.368	0.368	0.0	45.8	45.8	3008.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	121.903	0.0	1976.0	26
30 min Summer	80.162	0.0	2661.5	41
60 min Summer	50.146	0.0	3973.9	70
120 min Summer	30.797	0.0	4894.6	130
180 min Summer	23.054	0.0	5473.7	190
240 min Summer	18.681	0.0	5873.1	248
360 min Summer	13.737	0.0	6365.6	368
480 min Summer	10.934	0.0	6628.1	486
600 min Summer	9.112	0.0	6763.8	604
720 min Summer	7.828	0.0	6817.3	724
960 min Summer	6.126	0.0	6757.3	962
1440 min Summer	4.308	0.0	6338.3	1246
2160 min Summer	3.022	0.0	9246.5	1608
2880 min Summer	2.358	0.0	9564.6	1968
4320 min Summer	1.682	0.0	10020.3	2768
5760 min Summer	1.338	0.0	11286.3	3536
7200 min Summer	1.134	0.0	11927.5	4328
8640 min Summer	0.999	0.0	12551.8	5096
10080 min Summer	0.903	0.0	13130.9	5848
15 min Winter	121.903	0.0	2245.7	26

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.483	0.483	0.0	46.1	46.1	3942.4	O K
60 min Winter	8.599	0.599	0.0	46.1	46.1	4897.4	O K
120 min Winter	8.727	0.727	0.0	46.1	46.1	5939.5	O K
180 min Winter	8.807	0.807	0.0	46.1	46.1	6594.3	O K
240 min Winter	8.862	0.862	0.0	46.1	46.1	7042.1	O K
360 min Winter	8.929	0.929	0.0	46.1	46.1	7586.3	O K
480 min Winter	8.962	0.962	0.0	46.1	46.1	7862.7	O K
600 min Winter	8.979	0.979	0.0	46.1	46.1	7999.5	O K
720 min Winter	8.986	0.986	0.0	46.1	46.1	8054.1	O K
960 min Winter	8.981	0.981	0.0	46.1	46.1	8017.1	O K
1440 min Winter	8.943	0.943	0.0	46.1	46.1	7700.3	O K
2160 min Winter	8.875	0.875	0.0	46.1	46.1	7148.7	O K
2880 min Winter	8.816	0.816	0.0	46.1	46.1	6670.7	O K
4320 min Winter	8.700	0.700	0.0	46.1	46.1	5716.3	O K
5760 min Winter	8.600	0.600	0.0	46.1	46.1	4898.3	O K
7200 min Winter	8.520	0.520	0.0	46.1	46.1	4248.5	O K
8640 min Winter	8.456	0.456	0.0	46.1	46.1	3727.0	O K
10080 min Winter	8.406	0.406	0.0	46.0	46.0	3315.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	80.162	0.0	2978.2	41
60 min Winter	50.146	0.0	4465.9	70
120 min Winter	30.797	0.0	5469.3	128
180 min Winter	23.054	0.0	6077.1	186
240 min Winter	18.681	0.0	6480.7	244
360 min Winter	13.737	0.0	6937.4	362
480 min Winter	10.934	0.0	7119.5	478
600 min Winter	9.112	0.0	7149.1	592
720 min Winter	7.828	0.0	7088.7	708
960 min Winter	6.126	0.0	6902.0	932
1440 min Winter	4.308	0.0	6491.3	1360
2160 min Winter	3.022	0.0	10336.2	1696
2880 min Winter	2.358	0.0	10658.9	2164
4320 min Winter	1.682	0.0	11106.4	3028
5760 min Winter	1.338	0.0	12655.2	3816
7200 min Winter	1.134	0.0	13381.4	4608
8640 min Winter	0.999	0.0	14091.0	5360
10080 min Winter	0.903	0.0	14759.4	6056

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 446317 295054 SP 46317 95054
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+25

Time Area Diagram

Total Area (ha) 11.900

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	3.960	4	8	3.970	8	12	3.970

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	8600.0	0.0	1.100	0.0	0.0
1.000	8600.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0284-4610-1000-4610
Design Head (m)	1.000
Design Flow (l/s)	46.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	284
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	46.1
Flush-Flo™	0.435	46.1
Kick-Flo®	0.777	40.8
Mean Flow over Head Range	-	37.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.9	1.200	50.3	3.000	78.4	7.000	118.5
0.200	29.3	1.400	54.2	3.500	84.5	7.500	122.6
0.300	44.8	1.600	57.8	4.000	90.2	8.000	126.5
0.400	46.0	1.800	61.2	4.500	95.5	8.500	130.3
0.500	45.9	2.000	64.4	5.000	100.6	9.000	134.0
0.600	45.0	2.200	67.5	5.500	105.3	9.500	137.6
0.800	41.4	2.400	70.4	6.000	109.9		
1.000	46.1	2.600	73.2	6.500	114.3		

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.285	0.285	2.8	130.6	O K
30 min Summer	9.363	0.363	2.8	170.6	O K
60 min Summer	9.438	0.438	2.8	210.8	O K
120 min Summer	9.514	0.514	2.8	253.6	O K
180 min Summer	9.557	0.557	2.8	278.9	O K
240 min Summer	9.585	0.585	2.8	295.3	O K
360 min Summer	9.614	0.614	2.8	313.0	O K
480 min Summer	9.624	0.624	2.8	319.2	O K
600 min Summer	9.624	0.624	2.8	319.6	O K
720 min Summer	9.620	0.620	2.8	316.6	O K
960 min Summer	9.601	0.601	2.8	305.2	O K
1440 min Summer	9.563	0.563	2.8	282.4	O K
2160 min Summer	9.513	0.513	2.8	253.0	O K
2880 min Summer	9.468	0.468	2.8	227.5	O K
4320 min Summer	9.387	0.387	2.8	183.1	O K
5760 min Summer	9.325	0.325	2.8	150.7	O K
7200 min Summer	9.277	0.277	2.8	126.4	O K
8640 min Summer	9.239	0.239	2.8	107.7	O K
10080 min Summer	9.210	0.210	2.8	93.6	O K
15 min Winter	9.317	0.317	2.8	146.4	O K
30 min Winter	9.402	0.402	2.8	191.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	121.903	0.0	126.3	19
30 min Summer	80.162	0.0	165.6	34
60 min Summer	50.146	0.0	215.0	64
120 min Summer	30.797	0.0	264.0	124
180 min Summer	23.054	0.0	296.1	182
240 min Summer	18.681	0.0	319.6	242
360 min Summer	13.737	0.0	351.5	362
480 min Summer	10.934	0.0	371.8	482
600 min Summer	9.112	0.0	385.8	600
720 min Summer	7.828	0.0	395.8	720
960 min Summer	6.126	0.0	407.3	896
1440 min Summer	4.308	0.0	402.9	1124
2160 min Summer	3.022	0.0	471.1	1512
2880 min Summer	2.358	0.0	489.8	1932
4320 min Summer	1.682	0.0	523.2	2680
5760 min Summer	1.338	0.0	558.0	3456
7200 min Summer	1.134	0.0	590.7	4176
8640 min Summer	0.999	0.0	623.8	4848
10080 min Summer	0.903	0.0	657.1	5552
15 min Winter	121.903	0.0	141.5	19
30 min Winter	80.162	0.0	184.4	33

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.485	0.485	2.8	237.0	O K
120 min Winter	9.568	0.568	2.8	285.3	O K
180 min Winter	9.616	0.616	2.8	314.4	O K
240 min Winter	9.647	0.647	2.8	333.4	O K
360 min Winter	9.681	0.681	2.8	354.7	O K
480 min Winter	9.694	0.694	2.8	363.3	O K
600 min Winter	9.697	0.697	2.8	365.3	O K
720 min Winter	9.694	0.694	2.8	363.4	O K
960 min Winter	9.678	0.678	2.8	353.3	O K
1440 min Winter	9.633	0.633	2.8	324.7	O K
2160 min Winter	9.572	0.572	2.8	288.1	O K
2880 min Winter	9.515	0.515	2.8	254.3	O K
4320 min Winter	9.397	0.397	2.8	188.4	O K
5760 min Winter	9.301	0.301	2.8	138.4	O K
7200 min Winter	9.229	0.229	2.8	102.7	O K
8640 min Winter	9.177	0.177	2.8	77.9	O K
10080 min Winter	9.142	0.142	2.7	61.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	50.146	0.0	240.8	62
120 min Winter	30.797	0.0	295.4	122
180 min Winter	23.054	0.0	331.1	180
240 min Winter	18.681	0.0	357.0	238
360 min Winter	13.737	0.0	391.4	356
480 min Winter	10.934	0.0	412.1	472
600 min Winter	9.112	0.0	424.6	584
720 min Winter	7.828	0.0	430.9	698
960 min Winter	6.126	0.0	429.0	914
1440 min Winter	4.308	0.0	410.3	1182
2160 min Winter	3.022	0.0	527.6	1624
2880 min Winter	2.358	0.0	548.5	2080
4320 min Winter	1.682	0.0	585.9	2896
5760 min Winter	1.338	0.0	625.1	3632
7200 min Winter	1.134	0.0	661.8	4328
8640 min Winter	0.999	0.0	698.9	5008
10080 min Winter	0.903	0.0	736.5	5640

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 446317 295054 SP 46317 95054
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+25

Time Area Diagram

Total Area (ha) 0.580

Time (mins) From:	To:	Area (ha)
0	4	0.580

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	415.0	0.300	506.2	0.600	606.4	0.900	715.7
0.100	444.4	0.400	538.6	0.700	641.8	1.000	754.1
0.200	474.8	0.500	572.0	0.800	678.3		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0084-2800-0700-2800
Design Head (m)	0.700
Design Flow (l/s)	2.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	84
Invert Level (m)	9.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	2.8
Flush-Flo™	0.210	2.8
Kick-Flo®	0.462	2.3
Mean Flow over Head Range	-	2.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	3.6	3.000	5.5	7.000	8.2
0.200	2.8	1.400	3.8	3.500	5.9	7.500	8.5
0.300	2.7	1.600	4.1	4.000	6.3	8.000	8.7
0.400	2.6	1.800	4.3	4.500	6.6	8.500	9.0
0.500	2.4	2.000	4.5	5.000	7.0	9.000	9.3
0.600	2.6	2.200	4.7	5.500	7.3	9.500	9.5
0.800	3.0	2.400	4.9	6.000	7.6		
1.000	3.3	2.600	5.1	6.500	7.9		

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.317	0.317	2.8	146.4	O K
30 min Summer	9.402	0.402	2.8	191.5	O K
60 min Summer	9.485	0.485	2.8	237.1	O K
120 min Summer	9.568	0.568	2.8	285.2	O K
180 min Summer	9.615	0.615	2.8	314.1	O K
240 min Summer	9.646	0.646	2.8	333.0	O K
360 min Summer	9.680	0.680	2.8	353.9	O K
480 min Summer	9.692	0.692	2.8	362.0	O K
600 min Summer	9.695	0.695	2.8	363.5	O K
720 min Summer	9.691	0.691	2.8	361.2	O K
960 min Summer	9.673	0.673	2.8	349.9	O K
1440 min Summer	9.634	0.634	2.8	325.3	O K
2160 min Summer	9.583	0.583	2.8	294.3	O K
2880 min Summer	9.540	0.540	2.8	269.1	O K
4320 min Summer	9.468	0.468	2.8	227.6	O K
5760 min Summer	9.399	0.399	2.8	189.7	O K
7200 min Summer	9.347	0.347	2.8	162.1	O K
8640 min Summer	9.305	0.305	2.8	140.5	O K
10080 min Summer	9.271	0.271	2.8	123.4	O K
15 min Winter	9.351	0.351	2.8	164.2	O K
30 min Winter	9.445	0.445	2.8	214.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	136.531	0.0	141.5	19
30 min Summer	89.782	0.0	184.4	34
60 min Summer	56.163	0.0	240.8	64
120 min Summer	34.492	0.0	295.4	124
180 min Summer	25.821	0.0	331.1	182
240 min Summer	20.923	0.0	357.0	242
360 min Summer	15.386	0.0	391.5	362
480 min Summer	12.246	0.0	412.2	482
600 min Summer	10.205	0.0	424.7	602
720 min Summer	8.767	0.0	431.0	720
960 min Summer	6.861	0.0	429.1	934
1440 min Summer	4.825	0.0	409.4	1152
2160 min Summer	3.385	0.0	527.5	1536
2880 min Summer	2.641	0.0	548.4	1956
4320 min Summer	1.884	0.0	585.1	2768
5760 min Summer	1.499	0.0	625.0	3520
7200 min Summer	1.270	0.0	661.7	4256
8640 min Summer	1.118	0.0	698.8	5008
10080 min Summer	1.012	0.0	736.2	5744
15 min Winter	136.531	0.0	158.2	19
30 min Winter	89.782	0.0	203.8	33

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.535	0.535	2.8	266.1	O K
120 min Winter	9.627	0.627	2.8	320.8	O K
180 min Winter	9.679	0.679	2.8	353.9	O K
240 min Winter	9.714	0.714	2.8	375.9	Flood Risk
360 min Winter	9.752	0.752	2.9	401.0	Flood Risk
480 min Winter	9.768	0.768	2.9	411.8	Flood Risk
600 min Winter	9.773	0.773	2.9	415.2	Flood Risk
720 min Winter	9.772	0.772	2.9	414.2	Flood Risk
960 min Winter	9.758	0.758	2.9	404.9	Flood Risk
1440 min Winter	9.713	0.713	2.8	375.4	Flood Risk
2160 min Winter	9.653	0.653	2.8	337.1	O K
2880 min Winter	9.598	0.598	2.8	303.2	O K
4320 min Winter	9.498	0.498	2.8	244.4	O K
5760 min Winter	9.391	0.391	2.8	185.3	O K
7200 min Winter	9.309	0.309	2.8	142.4	O K
8640 min Winter	9.244	0.244	2.8	110.3	O K
10080 min Winter	9.196	0.196	2.8	87.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.163	0.0	269.6	64
120 min Winter	34.492	0.0	330.4	122
180 min Winter	25.821	0.0	369.7	180
240 min Winter	20.923	0.0	397.5	240
360 min Winter	15.386	0.0	431.7	356
480 min Winter	12.246	0.0	445.6	472
600 min Winter	10.205	0.0	446.3	586
720 min Winter	8.767	0.0	443.4	700
960 min Winter	6.861	0.0	435.8	922
1440 min Winter	4.825	0.0	418.2	1312
2160 min Winter	3.385	0.0	590.7	1644
2880 min Winter	2.641	0.0	614.0	2104
4320 min Winter	1.884	0.0	654.1	3024
5760 min Winter	1.499	0.0	700.1	3800
7200 min Winter	1.270	0.0	741.3	4472
8640 min Winter	1.118	0.0	783.0	5184
10080 min Winter	1.012	0.0	825.1	5848

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.262	0.262	2.8	187.3	O K
30 min Summer	9.336	0.336	2.8	245.4	O K
60 min Summer	9.410	0.410	2.8	304.6	O K
120 min Summer	9.486	0.486	2.8	369.0	O K
180 min Summer	9.532	0.532	2.8	408.9	O K
240 min Summer	9.563	0.563	2.8	435.9	O K
360 min Summer	9.599	0.599	2.8	468.2	O K
480 min Summer	9.616	0.616	2.8	484.0	O K
600 min Summer	9.624	0.624	2.8	491.2	O K
720 min Summer	9.627	0.627	2.8	493.2	O K
960 min Summer	9.621	0.621	2.8	488.3	O K
1440 min Summer	9.594	0.594	2.8	463.6	O K
2160 min Summer	9.555	0.555	2.8	428.5	O K
2880 min Summer	9.522	0.522	2.8	400.2	O K
4320 min Summer	9.470	0.470	2.8	354.8	O K
5760 min Summer	9.421	0.421	2.8	314.5	O K
7200 min Summer	9.385	0.385	2.8	284.5	O K
8640 min Summer	9.356	0.356	2.8	260.7	O K
10080 min Summer	9.331	0.331	2.8	241.4	O K
15 min Winter	9.291	0.291	2.8	210.0	O K
30 min Winter	9.374	0.374	2.8	275.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	121.903	0.0	170.3	23
30 min Summer	80.162	0.0	215.5	38
60 min Summer	50.146	0.0	301.7	68
120 min Summer	30.797	0.0	367.3	126
180 min Summer	23.054	0.0	406.2	186
240 min Summer	18.681	0.0	428.5	246
360 min Summer	13.737	0.0	438.4	366
480 min Summer	10.934	0.0	434.2	484
600 min Summer	9.112	0.0	429.5	604
720 min Summer	7.828	0.0	424.7	724
960 min Summer	6.126	0.0	415.3	962
1440 min Summer	4.308	0.0	396.4	1370
2160 min Summer	3.022	0.0	667.0	1692
2880 min Summer	2.358	0.0	690.7	2076
4320 min Summer	1.682	0.0	718.0	2900
5760 min Summer	1.338	0.0	797.1	3680
7200 min Summer	1.134	0.0	843.9	4464
8640 min Summer	0.999	0.0	890.8	5192
10080 min Summer	0.903	0.0	937.3	5952
15 min Winter	121.903	0.0	189.2	23
30 min Winter	80.162	0.0	229.7	37

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.454	0.454	2.8	342.1	O K
120 min Winter	9.539	0.539	2.8	414.7	O K
180 min Winter	9.590	0.590	2.8	459.9	O K
240 min Winter	9.624	0.624	2.8	490.8	O K
360 min Winter	9.665	0.665	2.8	528.5	O K
480 min Winter	9.685	0.685	2.8	547.6	O K
600 min Winter	9.695	0.695	2.8	557.1	O K
720 min Winter	9.699	0.699	2.8	560.9	O K
960 min Winter	9.697	0.697	2.8	558.3	O K
1440 min Winter	9.673	0.673	2.8	536.1	O K
2160 min Winter	9.625	0.625	2.8	492.2	O K
2880 min Winter	9.587	0.587	2.8	457.5	O K
4320 min Winter	9.519	0.519	2.8	397.1	O K
5760 min Winter	9.452	0.452	2.8	339.9	O K
7200 min Winter	9.390	0.390	2.8	288.6	O K
8640 min Winter	9.340	0.340	2.8	248.6	O K
10080 min Winter	9.299	0.299	2.8	216.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	50.146	0.0	336.9	66
120 min Winter	30.797	0.0	405.8	126
180 min Winter	23.054	0.0	437.7	184
240 min Winter	18.681	0.0	443.1	242
360 min Winter	13.737	0.0	439.1	360
480 min Winter	10.934	0.0	435.0	476
600 min Winter	9.112	0.0	431.3	592
720 min Winter	7.828	0.0	427.8	708
960 min Winter	6.126	0.0	420.8	936
1440 min Winter	4.308	0.0	406.6	1374
2160 min Winter	3.022	0.0	744.1	1776
2880 min Winter	2.358	0.0	766.9	2216
4320 min Winter	1.682	0.0	750.5	3152
5760 min Winter	1.338	0.0	892.9	4032
7200 min Winter	1.134	0.0	945.4	4824
8640 min Winter	0.999	0.0	998.3	5536
10080 min Winter	0.903	0.0	1051.0	6352

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 446317 295054 SP 46317 95054
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+25

Time Area Diagram

Total Area (ha) 0.830

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.415	4	8	0.415

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	666.0	0.300	780.3	0.600	903.7	0.900	1036.1
0.100	703.1	0.400	820.4	0.700	946.8	1.000	1082.2
0.200	741.2	0.500	861.5	0.800	990.9		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0084-2800-0700-2800
Design Head (m)	0.700
Design Flow (l/s)	2.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	84
Invert Level (m)	9.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	2.8
Flush-Flo™	0.210	2.8
Kick-Flo®	0.462	2.3
Mean Flow over Head Range	-	2.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.5	1.200	3.6	3.000	5.5	7.000	8.2
0.200	2.8	1.400	3.8	3.500	5.9	7.500	8.5
0.300	2.7	1.600	4.1	4.000	6.3	8.000	8.7
0.400	2.6	1.800	4.3	4.500	6.6	8.500	9.0
0.500	2.4	2.000	4.5	5.000	7.0	9.000	9.3
0.600	2.6	2.200	4.7	5.500	7.3	9.500	9.5
0.800	3.0	2.400	4.9	6.000	7.6		
1.000	3.3	2.600	5.1	6.500	7.9		

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.291	0.291	2.8	210.0	O K
30 min Summer	9.374	0.374	2.8	275.3	O K
60 min Summer	9.455	0.455	2.8	342.1	O K
120 min Summer	9.539	0.539	2.8	414.7	O K
180 min Summer	9.590	0.590	2.8	459.7	O K
240 min Summer	9.623	0.623	2.8	490.4	O K
360 min Summer	9.664	0.664	2.8	527.8	O K
480 min Summer	9.684	0.684	2.8	546.6	O K
600 min Summer	9.694	0.694	2.8	555.7	O K
720 min Summer	9.697	0.697	2.8	559.1	O K
960 min Summer	9.694	0.694	2.8	555.6	O K
1440 min Summer	9.668	0.668	2.8	531.3	O K
2160 min Summer	9.627	0.627	2.8	493.3	O K
2880 min Summer	9.594	0.594	2.8	463.4	O K
4320 min Summer	9.543	0.543	2.8	418.7	O K
5760 min Summer	9.503	0.503	2.8	383.7	O K
7200 min Summer	9.470	0.470	2.8	355.4	O K
8640 min Summer	9.438	0.438	2.8	328.4	O K
10080 min Summer	9.413	0.413	2.8	307.1	O K
15 min Winter	9.324	0.324	2.8	235.5	O K
30 min Winter	9.415	0.415	2.8	308.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	136.531	0.0	189.2	23
30 min Summer	89.782	0.0	229.6	38
60 min Summer	56.163	0.0	336.9	68
120 min Summer	34.492	0.0	405.8	126
180 min Summer	25.821	0.0	437.6	186
240 min Summer	20.923	0.0	443.0	246
360 min Summer	15.386	0.0	439.1	366
480 min Summer	12.246	0.0	435.1	484
600 min Summer	10.205	0.0	431.5	604
720 min Summer	8.767	0.0	428.1	724
960 min Summer	6.861	0.0	421.1	962
1440 min Summer	4.825	0.0	406.5	1426
2160 min Summer	3.385	0.0	743.9	1732
2880 min Summer	2.641	0.0	766.1	2108
4320 min Summer	1.884	0.0	737.5	2940
5760 min Summer	1.499	0.0	892.8	3752
7200 min Summer	1.270	0.0	945.1	4608
8640 min Summer	1.118	0.0	998.0	5368
10080 min Summer	1.012	0.0	1050.4	6152
15 min Winter	136.531	0.0	208.3	23
30 min Winter	89.782	0.0	233.4	37

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.504	0.504	2.8	384.0	O K
120 min Winter	9.596	0.596	2.8	465.8	O K
180 min Winter	9.652	0.652	2.8	516.9	O K
240 min Winter	9.690	0.690	2.8	552.1	O K
360 min Winter	9.736	0.736	2.9	595.6	Flood Risk
480 min Winter	9.759	0.759	2.9	618.2	Flood Risk
600 min Winter	9.771	0.771	2.9	630.1	Flood Risk
720 min Winter	9.777	0.777	2.9	635.5	Flood Risk
960 min Winter	9.776	0.776	2.9	634.8	Flood Risk
1440 min Winter	9.755	0.755	2.9	614.0	Flood Risk
2160 min Winter	9.708	0.708	2.8	568.9	Flood Risk
2880 min Winter	9.669	0.669	2.8	532.1	O K
4320 min Winter	9.603	0.603	2.8	472.2	O K
5760 min Winter	9.547	0.547	2.8	421.4	O K
7200 min Winter	9.497	0.497	2.8	377.8	O K
8640 min Winter	9.444	0.444	2.8	333.1	O K
10080 min Winter	9.397	0.397	2.8	294.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.163	0.0	374.7	66
120 min Winter	34.492	0.0	438.4	126
180 min Winter	25.821	0.0	445.6	184
240 min Winter	20.923	0.0	443.8	242
360 min Winter	15.386	0.0	441.2	360
480 min Winter	12.246	0.0	439.7	476
600 min Winter	10.205	0.0	438.3	594
720 min Winter	8.767	0.0	436.9	710
960 min Winter	6.861	0.0	433.9	938
1440 min Winter	4.825	0.0	426.7	1384
2160 min Winter	3.385	0.0	823.8	1976
2880 min Winter	2.641	0.0	829.1	2228
4320 min Winter	1.884	0.0	764.5	3160
5760 min Winter	1.499	0.0	999.9	4088
7200 min Winter	1.270	0.0	1058.4	4976
8640 min Winter	1.118	0.0	1117.8	5800
10080 min Winter	1.012	0.0	1177.5	6560

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.051	0.551	2.7	146.4	O K
30 min Summer	9.180	0.680	2.7	191.5	O K
60 min Summer	9.298	0.798	2.7	236.9	O K
120 min Summer	9.413	0.913	2.7	284.6	O K
180 min Summer	9.478	0.978	2.7	313.2	O K
240 min Summer	9.519	1.019	2.7	332.0	O K
360 min Summer	9.563	1.063	2.7	352.7	O K
480 min Summer	9.579	1.079	2.7	360.6	O K
600 min Summer	9.582	1.082	2.7	361.9	O K
720 min Summer	9.577	1.077	2.7	359.3	O K
960 min Summer	9.552	1.052	2.7	347.5	O K
1440 min Summer	9.494	0.994	2.7	320.5	O K
2160 min Summer	9.422	0.922	2.7	288.3	O K
2880 min Summer	9.364	0.864	2.7	263.6	O K
4320 min Summer	9.269	0.769	2.7	225.2	O K
5760 min Summer	9.181	0.681	2.7	191.8	O K
7200 min Summer	9.094	0.594	2.7	161.1	O K
8640 min Summer	9.026	0.526	2.7	138.2	O K
10080 min Summer	8.971	0.471	2.7	120.7	O K
15 min Winter	9.103	0.603	2.7	164.2	O K
30 min Winter	9.242	0.742	2.7	215.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	121.903	0.0	146.1	19
30 min Summer	80.162	0.0	190.2	34
60 min Summer	50.146	0.0	243.4	64
120 min Summer	30.797	0.0	298.7	124
180 min Summer	23.054	0.0	335.1	182
240 min Summer	18.681	0.0	361.5	242
360 min Summer	13.737	0.0	396.6	362
480 min Summer	10.934	0.0	415.5	482
600 min Summer	9.112	0.0	420.7	602
720 min Summer	7.828	0.0	419.7	720
960 min Summer	6.126	0.0	413.9	960
1440 min Summer	4.308	0.0	397.6	1180
2160 min Summer	3.022	0.0	529.7	1556
2880 min Summer	2.358	0.0	550.9	1960
4320 min Summer	1.682	0.0	588.7	2768
5760 min Summer	1.338	0.0	626.1	3632
7200 min Summer	1.134	0.0	663.0	4328
8640 min Summer	0.999	0.0	700.5	5024
10080 min Summer	0.903	0.0	738.8	5752
15 min Winter	121.903	0.0	163.4	19
30 min Winter	80.162	0.0	207.6	33

Summary of Results for 100 year Return Period (+25%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.369	0.869	2.7	266.0	O K
120 min Winter	9.494	0.994	2.7	320.5	O K
180 min Winter	9.565	1.065	2.7	353.6	O K
240 min Winter	9.610	1.110	2.7	375.5	O K
360 min Winter	9.660	1.160	2.8	400.7	O K
480 min Winter	9.681	1.181	2.8	411.5	O K
600 min Winter	9.688	1.188	2.8	414.8	O K
720 min Winter	9.686	1.186	2.8	413.9	O K
960 min Winter	9.668	1.168	2.8	404.4	O K
1440 min Winter	9.607	1.107	2.7	374.2	O K
2160 min Winter	9.523	1.023	2.7	333.7	O K
2880 min Winter	9.449	0.949	2.7	300.4	O K
4320 min Winter	9.319	0.819	2.7	245.1	O K
5760 min Winter	9.187	0.687	2.7	194.3	O K
7200 min Winter	9.044	0.544	2.7	144.4	O K
8640 min Winter	8.938	0.438	2.7	110.5	O K
10080 min Winter	8.854	0.354	2.7	85.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	50.146	0.0	272.5	64
120 min Winter	30.797	0.0	334.3	122
180 min Winter	23.054	0.0	374.4	180
240 min Winter	18.681	0.0	402.4	240
360 min Winter	13.737	0.0	427.1	356
480 min Winter	10.934	0.0	428.0	472
600 min Winter	9.112	0.0	426.1	588
720 min Winter	7.828	0.0	423.5	700
960 min Winter	6.126	0.0	417.9	924
1440 min Winter	4.308	0.0	405.4	1338
2160 min Winter	3.022	0.0	593.2	1660
2880 min Winter	2.358	0.0	616.9	2108
4320 min Winter	1.682	0.0	658.5	3024
5760 min Winter	1.338	0.0	701.3	3920
7200 min Winter	1.134	0.0	742.6	4608
8640 min Winter	0.999	0.0	784.7	5272
10080 min Winter	0.903	0.0	827.6	5944

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 446317 295054 SP 46317 95054
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+25

Time Area Diagram

Total Area (ha) 0.650

Time (mins) From:	To:	Area (ha)
0	4	0.650

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 8.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	205.0	0.400	294.3	0.800	399.6	1.200	521.0
0.100	225.8	0.500	319.1	0.900	428.4	1.300	553.9
0.200	247.6	0.600	344.9	1.000	458.3	1.400	587.8
0.300	270.4	0.700	371.7	1.100	489.1	1.500	622.6

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0077-2800-1200-2800
Design Head (m)	1.200
Design Flow (l/s)	2.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	77
Invert Level (m)	8.500
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.8
Flush-Flo™	0.336	2.7
Kick-Flo®	0.683	2.2
Mean Flow over Head Range	-	2.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.1	1.200	2.8	3.000	4.3	7.000	6.4
0.200	2.6	1.400	3.0	3.500	4.6	7.500	6.6
0.300	2.7	1.600	3.2	4.000	4.9	8.000	6.8
0.400	2.7	1.800	3.4	4.500	5.2	8.500	7.0
0.500	2.6	2.000	3.5	5.000	5.4	9.000	7.2
0.600	2.4	2.200	3.7	5.500	5.7	9.500	7.3
0.800	2.3	2.400	3.8	6.000	5.9		
1.000	2.6	2.600	4.0	6.500	6.1		

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.103	0.603	2.7	164.3	O K
30 min Summer	9.242	0.742	2.7	215.0	O K
60 min Summer	9.369	0.869	2.7	266.0	O K
120 min Summer	9.493	0.993	2.7	320.1	O K
180 min Summer	9.563	1.063	2.7	352.9	O K
240 min Summer	9.608	1.108	2.7	374.6	O K
360 min Summer	9.657	1.157	2.7	399.3	O K
480 min Summer	9.678	1.178	2.8	409.5	O K
600 min Summer	9.683	1.183	2.8	412.3	O K
720 min Summer	9.680	1.180	2.8	410.7	O K
960 min Summer	9.659	1.159	2.7	399.9	O K
1440 min Summer	9.600	1.100	2.7	370.8	O K
2160 min Summer	9.527	1.027	2.7	335.6	O K
2880 min Summer	9.469	0.969	2.7	309.2	O K
4320 min Summer	9.379	0.879	2.7	270.0	O K
5760 min Summer	9.305	0.805	2.7	239.5	O K
7200 min Summer	9.241	0.741	2.7	214.4	O K
8640 min Summer	9.176	0.676	2.7	190.1	O K
10080 min Summer	9.111	0.611	2.7	166.9	O K
15 min Winter	9.160	0.660	2.7	184.2	O K
30 min Winter	9.309	0.809	2.7	241.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	136.531	0.0	163.4	19
30 min Summer	89.782	0.0	207.6	34
60 min Summer	56.163	0.0	272.5	64
120 min Summer	34.492	0.0	334.3	124
180 min Summer	25.821	0.0	374.4	184
240 min Summer	20.923	0.0	402.5	242
360 min Summer	15.386	0.0	427.7	362
480 min Summer	12.246	0.0	428.9	482
600 min Summer	10.205	0.0	427.3	602
720 min Summer	8.767	0.0	424.9	722
960 min Summer	6.861	0.0	419.4	960
1440 min Summer	4.825	0.0	406.6	1214
2160 min Summer	3.385	0.0	593.2	1580
2880 min Summer	2.641	0.0	616.9	1988
4320 min Summer	1.884	0.0	658.0	2808
5760 min Summer	1.499	0.0	701.2	3632
7200 min Summer	1.270	0.0	742.6	4464
8640 min Summer	1.118	0.0	784.6	5272
10080 min Summer	1.012	0.0	827.5	5952
15 min Winter	136.531	0.0	182.2	19
30 min Winter	89.782	0.0	212.1	34

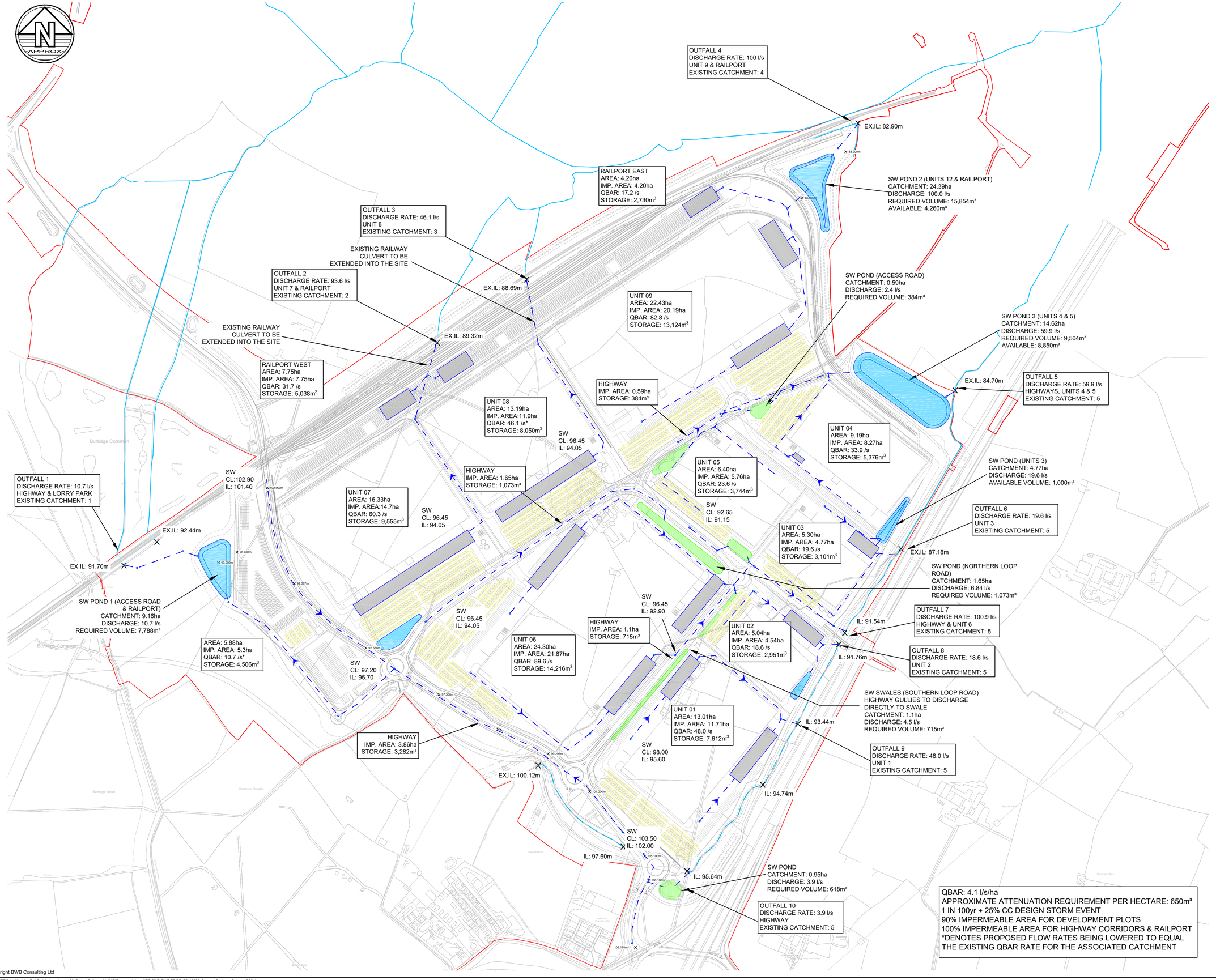
Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.445	0.945	2.7	298.6	O K
120 min Winter	9.579	1.079	2.7	360.4	O K
180 min Winter	9.655	1.155	2.7	398.1	O K
240 min Winter	9.705	1.205	2.8	423.5	Flood Risk
360 min Winter	9.760	1.260	2.9	453.2	Flood Risk
480 min Winter	9.785	1.285	2.9	466.7	Flood Risk
600 min Winter	9.795	1.295	2.9	471.9	Flood Risk
720 min Winter	9.795	1.295	2.9	472.1	Flood Risk
960 min Winter	9.780	1.280	2.9	464.0	Flood Risk
1440 min Winter	9.725	1.225	2.8	434.2	Flood Risk
2160 min Winter	9.639	1.139	2.7	390.2	O K
2880 min Winter	9.569	1.069	2.7	355.4	O K
4320 min Winter	9.447	0.947	2.7	299.3	O K
5760 min Winter	9.338	0.838	2.7	252.8	O K
7200 min Winter	9.235	0.735	2.7	212.1	O K
8640 min Winter	9.108	0.608	2.7	165.9	O K
10080 min Winter	9.006	0.506	2.7	131.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.163	0.0	305.1	64
120 min Winter	34.492	0.0	373.5	122
180 min Winter	25.821	0.0	415.3	180
240 min Winter	20.923	0.0	431.5	240
360 min Winter	15.386	0.0	434.0	356
480 min Winter	12.246	0.0	433.3	474
600 min Winter	10.205	0.0	432.2	590
720 min Winter	8.767	0.0	431.1	702
960 min Winter	6.861	0.0	428.4	926
1440 min Winter	4.825	0.0	422.9	1354
2160 min Winter	3.385	0.0	664.2	1684
2880 min Winter	2.641	0.0	690.6	2136
4320 min Winter	1.884	0.0	731.0	3064
5760 min Winter	1.499	0.0	785.4	3928
7200 min Winter	1.270	0.0	831.8	4824
8640 min Winter	1.118	0.0	878.9	5536
10080 min Winter	1.012	0.0	927.0	6160

APPENDICES

Appendix 9: Concept Drainage Strategy Plans



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Drawing provided for illustrative purposes only. Design subject to further coordination and approvals.
6. Layout based on AJA drawing: 5905-177.
7. Attenuation indicatively sized for the 1 in 100 year storm event plus a 25% allowance for climate change for the estimated impermeable areas. Allowance made for 650m³ storage per 1ha of impermeable area. To be agreed with the LLFA.
8. Equivalent greenfield runoff rates have been estimate to be 4.1 l/s/ha. To be agreed with the LLFA.
9. Foul water connection and site wide pumping requirements to be discussed and agreed with Severn Trent Water.

Legend

- APPLICATION BOUNDARY
- EXISTING WATERCOURSE
- PROPOSED WATERCOURSE DIVERSION
- INDICATIVE SURFACE WATER DRAINAGE RUN
- ABOVE GROUND ATTENUATION FEATURE
- HIGHWAY SWALE/ATTENUATION
- BELOW GROUND ATTENUATION FEATURE
- PERMEABLE PAVING AND SUB-BASE STORAGE

Rev	Date	Details of issue / revision	Drw	Rev
P05	20.12.23	Updated site layout	RJ	CD
P04	05.09.22	Updated climate change allowance	LR	RJ
P03	14.12.21	Updated DCO boundary	RJ	CD
P02	30.09.21	Updated to latest masterplan	RJ	CD
P01	25.05.21	Preliminary Issue	RJ	CD

Issues & Revisions

BWB A CAF GROUP COMPANY
Birmingham | 0121 233 3322
Leeds | 0113 233 8000
London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
www.bwbconsulting.com

Client
TRITAX SYMMETRY

Project Title
HINCKLEY RAIL FREIGHT INTERCHANGE

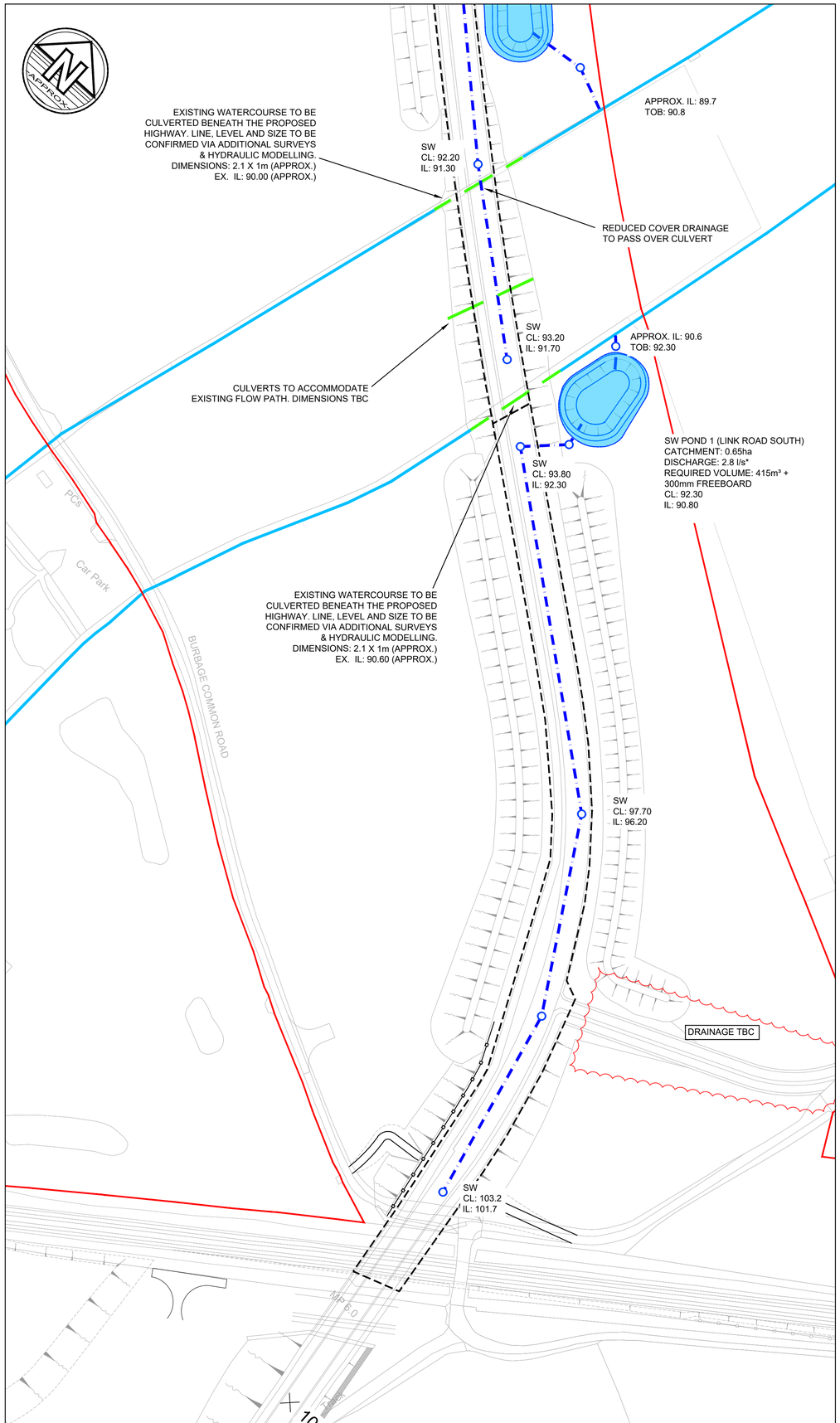
Drawing Title
CONCEPT DRAINAGE STRATEGY PLAN

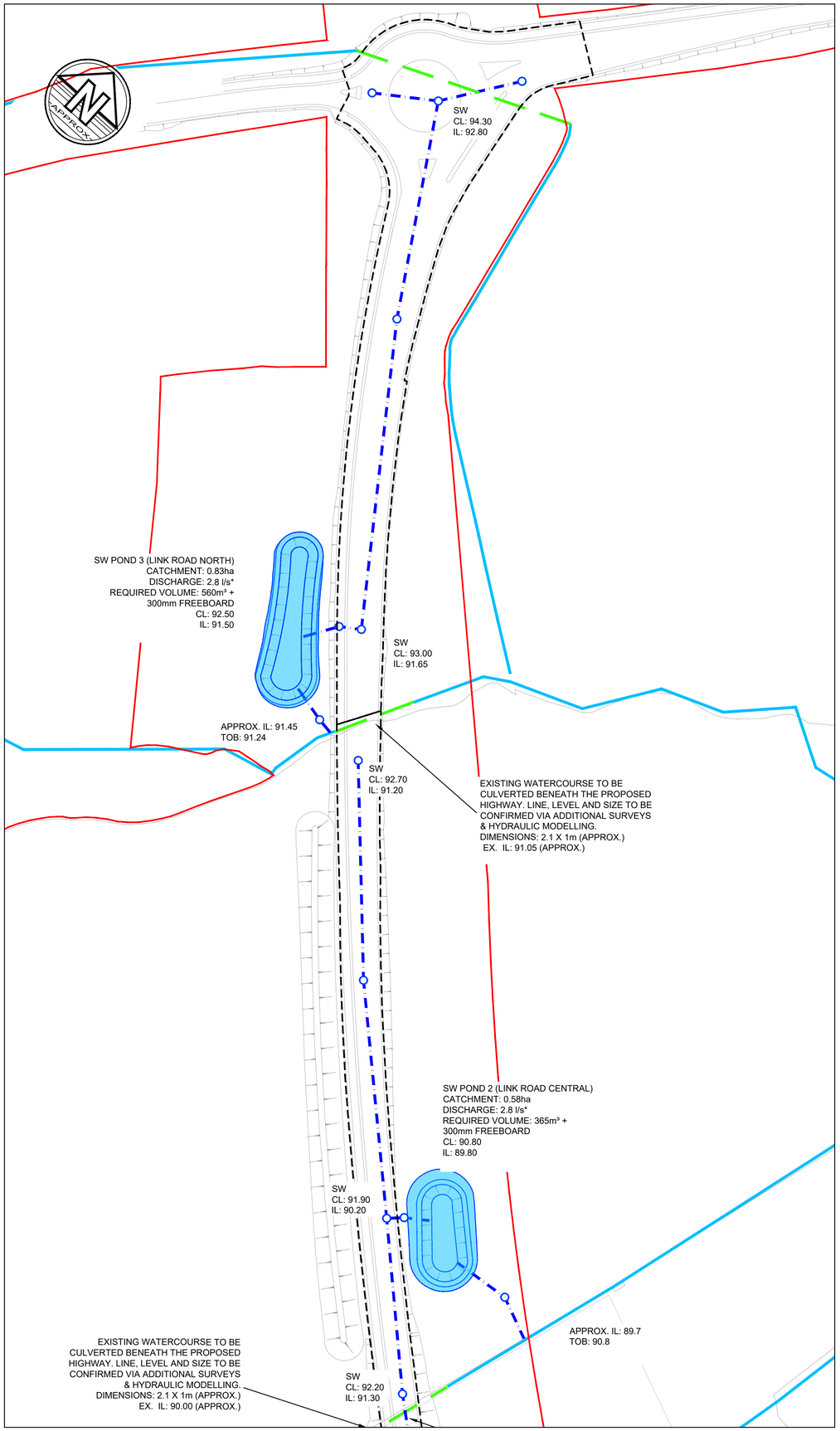
Drawn:	RJ	Reviewed:	CD	
BWB Ref:	NTT 2814	Date:	25.05.21	Scale@A1: 1:4000

Drawing Status
PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HRF-BWB-EWE-ZZ-DR-CD-00502	S2	P05

X:\NTT\NTT2814_Hinckley Rail Freight Interchange\02. Project Delivery\01. WIP\Drawings\Water\HRF-BWB-EWE-ZZ-DR-CD-00502_Concept Drainage Strategy P05.dwg





Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Drawing provided for illustrative purposes only. Design subject to further coordination and approvals.
6. Layout based on AJA drawing: 5905-177.
7. Attenuation indicatively sized for the 1 in 100 year storm event plus a 25% allowance for climate change for the estimated impermeable areas.
8. Equivalent greenfield runoff rates have been estimate to be 4.1 l/s/ha. To be agreed with the LLFA.
9. Foul water connection and site wide pumping requirements to be discussed and agreed with Severn Trent Water.

Legend

- APPLICATION BOUNDARY
- EXISTING WATERCOURSE
- PROPOSED CULVERT
- INDICATIVE SURFACE WATER DRAINAGE RUN
- ABOVE GROUND ATTENUATION FEATURE
- MEASURED IMPERMEABLE AREA

REFER TO BWB WATERCOURSE SURVEY DRAWINGS FOR FURTHER DETAILS OF THE EXISTING CHANNELS. 'HNRFI-BWB-00-00-M2-G-0060' SERIES. FURTHER SURVEYS REQUIRED TO INFORM LEVELS DESIGN.
PROPOSED DISCHARGE RATES SPLIT EVENLY BETWEEN THE THREE CATCHMENTS TO AVOID SMALL DISCHARGE RATES.
TOTAL IMPERMEABLE AREA: 2.06ha
GREENFIELD RUNOFF: 4.1 l/s/ha (QBAR)
TOTAL RUNOFF: 8.4 l/s

Rev	Date	Details of issue / revision	Drw	Rev
P03	05.09.22	Updated CC allowances	RJ	CD
P02	14.12.21	Updated to latest highways GA	RJ	CD
P01	22.07.21	Preliminary Issue	RJ	CD

Issues & Revisions

BWB A CAF GROUP COMPANY
Birmingham | 0121 233 3322
Leeds | 0113 233 8000
London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
www.bwbconsulting.com

Client
TRITAX SYMMETRY

Project Title
HINCKLEY RAIL FREIGHT INTERCHANGE

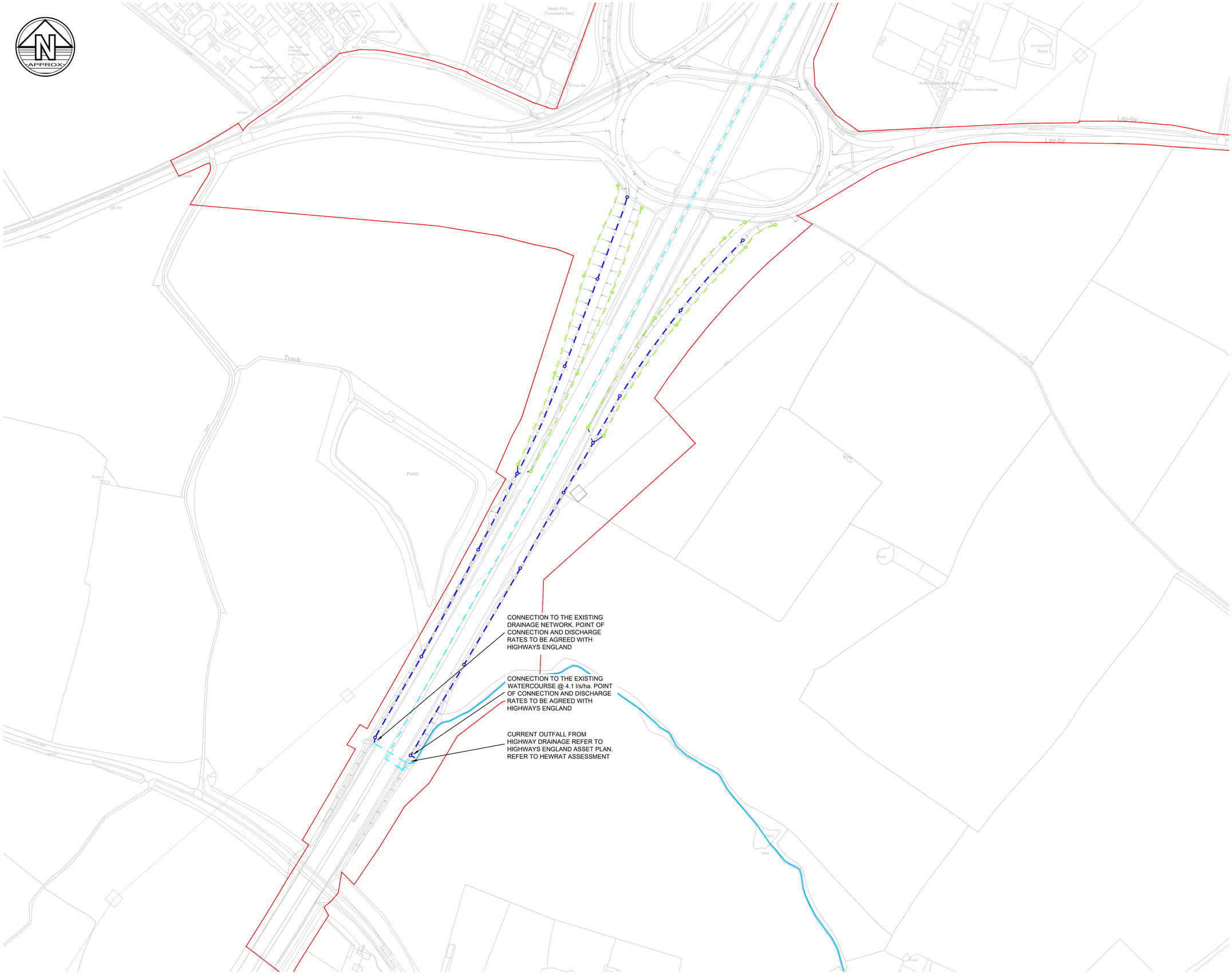
Drawing Title
LINK ROAD DRAINAGE STRATEGY PLAN

Drawn:	RJ		Reviewed:	CD	
BWB Ref:	NTT 2814	Date:	22.07.21	Scale@A1:	1:1000

Drawing Status
PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HRF-BWB-EWE-D1-DR-CD-00501	**S2**	**P03**

X:\NTT\NTT2814_Hinckley Rail Freight Interchange\02. Project Delivery\01. WIP\Drawings\Water\HRF-BWB-EWE-D1-DR-CD-00501_Link Road Drainage Strategy P03.1.dwg



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Drawing provided for illustrative purposes only. Design subject to further coordination and approvals.
6. Layout based on AJA drawing: 5905-177.
7. Attenuation indicatively sized for the 1 in 100 year storm event plus a 20% allowance for climate change for the estimated impermeable areas. Allowance made for 650m^3 storage per 1ha of impermeable area. To be agreed with the LLFA.
8. Equivalent greenfield runoff rates have been estimate to be 4.1 l/s/ha. To be agreed with the LLFA.
9. Existing drainage shown indicatively for illustrative purposes. point of connection and proposed discharge rates to be agreed with Highways England.

Legend

- APPLICATION BOUNDARY
- EXISTING WATERCOURSE
- EXISTING DRAINAGE
- INDICATIVE SURFACE WATER FILTER DRAIN TO SERVE PROPOSED HARD SURFACING
- INDICATIVE SURFACE WATER FILTER DRAIN TO SERVE PROPOSED EMBANKMENTS

Rev	Date	Details of issue / revision	Drw	Rev
P01	05.09.22	Preliminary Issue	RJ	CD

Issues & Revisions

BWB
A CAF GROUP COMPANY
Birmingham | 0121 233 3322
Leeds | 0113 233 8000
London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
www.bwbconsulting.com

Client

TRITAX SYMMETRY

Project Title

HINCKLEY RAIL FREIGHT INTERCHANGE

Drawing Title

M69 JUNCTION 2 DRAINAGE STRATEGY PLAN

Drawn:	RJ	Reviewed:	CD
BWB Ref:	NTT 2814	Date: 05.09.22	Scale@A1: 1:2000

Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HRF-BWB-EWE-ZZ-DR-CD-00505	S2	P01

X:\NTT\NTT2814_Hinckley Rail Freight Interchange\02. Project Delivery\01. WIP\Drawings\Water\HRF-BWB-EWE-ZZ-DR-CD-00505_M69 Junction 2 Drainage Strategy P01.1.dwg

APPENDICES

Appendix 10: HEWRAT

Highways England Water Risk Assessment Tool

Version 2.0.4 June 2019

Soluble

EQS - Annual Average Concentration

	Copper	Zinc	
Step 2	- Tier 1 fail. Go to Tier 2 (using UK TAG M-BAT tool), or Step 3 mitigation.	- Tier 1 fail. Go to Tier 2 (using UK TAG M-BAT tool), or Step 3 mitigation.	ug/l
Step 3	-	-	ug/l

Acute Impact

Copper	Zinc
Runoff Fails Toxicity Test. Try River Impact.	Runoff Fails Toxicity Test. Try River Impact.

Sediment - Chronic Impact

Runoff Fails Toxicity Test. Try River Impact.

Sediment deposition for this site is judged as:

Accumulating?	-	-	Low flow Vel m/s
Extensive?	-	-	Deposition Index

Road number	M69		HE Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	446310	Northing	293640	
OS grid reference of outfall structure (m)	Easting	446050	Northing	293100	
Outfall number	SP4693 0609c		List of outfalls in cumulative assessment		
Receiving watercourse	UOW associated with Lower Soar				
EA receiving water Detailed River Network ID			Assessor and affiliation		
Date of assessment			Version of assessment		
Notes					

Step 1 Runoff Quality

AADT: >10,000 and <50,000

Climatic region: Warm Dry

Rainfall site: Birmingham (SAAR 750mm)

Step 2 River Impacts

(Enter zero in Annual Q_{95} river flow box to assess Step 1 runoff quality only)

Annual Q_{95} river flow (m^3/s)	0	
Impermeable road area drained (ha)	0.9	
Permeable area draining to outfall (ha)	0	
Base Flow Index (BFI)	0.5	D

Freshwater EQS limits:

Bioavailable dissolved copper (µg/l)	1	D
Bioavailable dissolved zinc (µg/l)	10.9	D

Is the discharge in or within 1 km upstream of a protected site for conservation? No D

For dissolved zinc only — Water hardness: Low = <50mg CaCO3/l D

For dissolved copper only — Ambient background concentration (µg/l): 0 D

For sediment impact only — Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No D

Tier 1 — Estimated river width (m): 5

Tier 2 — Bed width (m): 3; Manning's n: 0.07 D; Side slope (m/m): 0.5; Long slope (m/m): 0.0001

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)	Attenuation for solubles - restricted discharge rate (l/s)	Settlement of sediments (%)
Existing measures		0 D	No restriction D	0 D
Proposed measures		0 D	No restriction D	0 D

Highways England Water Risk Assessment Tool

Version 2.0.4 June 2019

Soluble

EQS - Annual Average Concentration

	Copper	Zinc	
Step 2	0.18	0.45	ug/l
Step 3	-	-	ug/l

Acute Impact

Copper	Zinc
Pass	Pass

Sediment - Chronic Impact

Fail. Try Tier 2 for Velocity

Settlement needed = 33 %, proposed = 0 %

Sediment deposition for this site is judged as:

Accumulating?	Yes	0.00	Low flow Vel m/s
Extensive?	Yes	149	Deposition Index

Road number	M69		HE Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	446310	Northing	293640	
OS grid reference of outfall structure (m)	Easting	446050	Northing	293100	
Outfall number	SP4693 0609c		List of outfalls in cumulative assessment		
Receiving watercourse	UOW associated with Lower Soar				
EA receiving water Detailed River Network ID			Assessor and affiliation		
Date of assessment			Version of assessment		
Notes					

Step 1 Runoff Quality

AADT: >10,000 and <50,000

Climatic region: Warm Dry

Rainfall site: Birmingham (SAAR 750mm)

Step 2 River Impacts

(Enter zero in Annual Q_{95} river flow box to assess Step 1 runoff quality only)

Annual Q_{95} river flow (m^3/s)	0.003	
Impermeable road area drained (ha)	3.6	
Permeable area draining to outfall (ha)	289	
Base Flow Index (BFI)	0.5	D

Freshwater EQS limits:

Bioavailable dissolved copper (µg/l)	1	D
Bioavailable dissolved zinc (µg/l)	10.9	D

Is the discharge in or within 1 km upstream of a protected site for conservation? No D

For dissolved zinc only — Water hardness: Low = <50mg CaCO3/l D

For dissolved copper only — Ambient background concentration (µg/l): 0 D

For sediment impact only — Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No D

Tier 1 — Estimated river width (m): 5

Tier 2 — Bed width (m): 1.5; Manning's n: 0.07 D; Side slope (m/m): 0.5; Long slope (m/m): 0.01

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)	Attenuation for solubles - restricted discharge rate (l/s)	Settlement of sediments (%)
Existing measures		0 D	No restriction D	0 D
Proposed measures		0 D	No restriction D	0 D

Highways England Water Risk Assessment Tool

Version 2.0.4 June 2019

Soluble

EQS - Annual Average Concentration

	Copper	Zinc	
Step 2	0.18	0.45	ug/l
Step 3	-	-	ug/l

Acute Impact

Copper	Zinc
Pass	Pass

Sediment - Chronic Impact

Pass

Sediment deposition for this site is judged as:

Accumulating?	No	0.11	Low flow Vel m/s
Extensive?	No	-	Deposition Index

Road number	M69		HE Area / DBFO number		
Assessment type	Non-cumulative assessment (single outfall)				
OS grid reference of assessment point (m)	Easting	446310	Northing	293640	
OS grid reference of outfall structure (m)	Easting	446050	Northing	293100	
Outfall number	SP4693 0609c		List of outfalls in cumulative assessment		
Receiving watercourse	UOW associated with Lower Soar				
EA receiving water Detailed River Network ID			Assessor and affiliation		
Date of assessment			Version of assessment		
Notes					

Step 1 Runoff Quality

AADT: >10,000 and <50,000

Climatic region: Warm Dry

Rainfall site: Birmingham (SAAR 750mm)

Step 2 River Impacts

(Enter zero in Annual Q_{95} river flow box to assess Step 1 runoff quality only)

Annual Q_{95} river flow (m^3/s)	0.003	
Impermeable road area drained (ha)	3.6	
Permeable area draining to outfall (ha)	289	
Base Flow Index (BFI)	0.5	D

Freshwater EQS limits:

Bioavailable dissolved copper (µg/l)	1	D
Bioavailable dissolved zinc (µg/l)	10.9	D

Is the discharge in or within 1 km upstream of a protected site for conservation? No D

For dissolved zinc only — Water hardness: Low = <50mg CaCO3/l D

For dissolved copper only — Ambient background concentration (µg/l): 0 D

For sediment impact only — Is there a downstream structure, lake, pond or canal that reduces the velocity within 100m of the point of discharge? No D

Tier 1 — Estimated river width (m): 5

Tier 2 — Bed width (m): 1.5; Manning's n: 0.07 D; Side slope (m/m): 0.5; Long slope (m/m): 0.01

Step 3 Mitigation

	Brief description	Estimated effectiveness: Treatment for solubles (%)	Attenuation for solubles - restricted discharge rate (l/s)	Settlement of sediments (%)
Existing measures		0 D	No restriction D	0 D
Proposed measures		0 D	No restriction D	0 D

highways england

View Parameters | Reset Spillage Risk | Go To Interface

Assessment of Priority Outfalls

Method D - assessment of risk from accidental spillage

			Additional columns for use if other roads drain to the same outfall						
		A (main road)	B	C	D	E	F		
D1	Water body type	Surface watercourse							
D2	Length of road draining to outfall *(m)*	700							
D3	Road Type *(A-road or Motorway)*	M							
D4	If A road, is site urban or rural?								
D5	Junction type	Slip road							
D6	Location (response time for emergency services)	< 20 minutes							
D7	Traffic flow (AADT two way)	28,021							
D8	% HGV	40							
D8	Spillage factor *(no/10^9 HGVkm/year)*	0.43							
D9	Risk of accidental spillage	0.00123	0.00000	0.00000	0.00000	0.00000	0.00000		
D10	Probability factor	0.45							
D11	Risk of pollution incident	0.00055	0.00000	0.00000	0.00000	0.00000	0.00000		
D12	Is risk greater than 0.01?	**No**						**Totals**	**Return Period (years)**
D13	Return period without pollution reduction measures	0.00055	0.00000	0.00000	0.00000	0.00000	0.00000	0.0006	1805
D14	Existing measures factor	1							
D15	Return period with existing pollution reduction measures	0.00055	0.00000	0.00000	0.00000	0.00000	0.00000	0.0006	1805
D16	Proposed measures factor	1							
D17	Residual with proposed Pollution reduction measures	0.00055	0.00000	0.00000	0.00000	0.00000	0.00000	0.0006	1805

Justification for choice of existing measures factors:

Justification for choice of proposed measures factors:

Spillage Factor

Location	Serious Accidental Spillages *(Billion HGV km/ year)*	Motorways	Rural Trunk	Urban Trunk
	No junction	0.36	0.29	0.31
	Slip road	0.43	0.83	0.36
	Roundabout	3.09	3.09	5.35
	Cross road	-	0.88	1.46
	Side road	-	0.93	1.81
	Total	0.37	0.45	0.85

Indicative Pollution Risk Reduction Factors for Spillages

System	Optimum Risk Reduction Factor
Filter Drain	0.6
Grassed Ditch / Swale	0.6
Pond	0.5
Wetland	0.4
Soakaway / Infiltration basin	0.6
Sediment Trap	0.6
Unlined Ditch	0.7
Penstock / valve	0.4
Notched Weir	0.6
Oil Separator	0.5

The worksheet should be read in conjunction with DMRB 11.3.10.

APPENDICES

Appendix 11: Pre-Development Enquiry Response

WONDERFUL ON TAP

SEVERN TRENT

BWB Consulting Ltd.
5th Floor, Waterfront House
Station Street,
Nottingham
NG2 3DQ

Severn Trent Water Ltd
Leicester Water Centre
Gorse Hill
Anstey
Leicester
LE7 7GU

Tel: 024 777 16843

www.stwater.co.uk
net.dev.east@severntrent.co.uk

Contact: Asset Protection
(waste water)

FAO: Chris Dodd

Your Ref:
Our Ref: 8458909 / AP / KB

29th November 2023

Dear Chris,

Re: Hinckley National RFI Leicester – STW Consultation

Apologies that it has taken a little longer to respond to your last email.

I can agree an initial discharge rate in principle being at 12 l/sec. to MH 0601. I understand at this stage there is likely to be no trade effluent to discharge form the proposed development, as the units are all to be storage / distribution units with associated offices and will generally be discharging domestic sewage flows. Severn Trent has an obligation to prove sufficient public sewer capacity upgrades to allow for development within a reasonable timescale. Presently any scheme would be within the next AMP 8 period (2025 – 2030) but could extend into AMP 9 (2030 – 2035) which would appear to fit around the proposed development timeline. However, any changes to development proposals in terms of phasing of the development and capacity requirements must be submitted to Severn Trent as early as possible, at least 12 months.

Any sewer scheme would be designed by Severn Trent to the most appropriate strategy and design that will suit Severn Trent and to keep overall costs down. The type of improvements will be deemed the most appropriate and efficient use of resources and timings. This may vary from upgrading the local foul drainage system to pumping off site to the nearest suitable treatment works or into another drainage catchment area. The connection point from the development

may also change subject to the requirements and strategy of the proposed scheme.

We would of course expect that the development will provide maximum storage requirements at each pumping station within the development site prior to the final discharge point.

Where required on site discharges to be subject to maximum on site storage being utilised (including for any trade effluent discharges if required) and to limit final discharges, if required, until the increased network capacity has been provided.

I can also accept the Protective Provisions outlined in your earlier correspondence and in line with our standard asset protection requirements.

Meanwhile I will be raising another sewer modelling request based on a total output of 12 l/sec, to better understand the local foul sewer network, because the previous model was carried out some time ago and the models are likely to have been upgraded since then, plus there are various scenarios that I would want to model for, i.e. a slightly higher discharge rate – to allow for some trade effluent, but at a lower rate than the 14 l/sec initially given. This will help to assess the most appropriate areas to concentrate on for capacity improvements within the network.

I trust the above is sufficient for your to progress the DCO process at this stage.

Please quote the above reference number in any future correspondence (including e-mails) with STW Limited. Please send **all correspondence** to the Asset.Protection@severntrent.co.uk email inbox address, a response will be made within 15 days.

Yours sincerely,

[redacted]

Keith Baker
Senior Evaluation Technician
Asset Protection (wastewater)
Asset Strategy and Planning
Chief Engineer
Severn Trent Water

APPENDICES

Appendix 12: Concept Foul Drainage Strategy

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Drawing provided for illustrative purposes only. Design subject to further coordination and approvals.
6. Layout based on AJA drawing: 5905-177.
7. Foul water connection and site wide pumping requirements to be discussed and agreed with Severn Trent Water.
8. Foul water pumping station to be located above the 1 in 200 year flood extent.

Legend

- APPLICATION BOUNDARY
- EXISTING SEVERN TRENT WATER PUBLIC FOUL SEWER
- INDICATIVE FOUL WATER DRAINAGE RUN
- FOUL PUMPING STATION AND RISING MAIN
- APPROXIMATE LOCATION OF EXISTING RISING MAIN WITH 20m EASEMENT
- POTENTIAL DIVERSION ROUTE. TO BE AGREED WITH SEVERN TRENT WATER

Rev	Date	Details of issue / revision	Drw	Rev
P07	20.12.23	Updated site layout	RJ	CD
P06	21.11.22	Diversion route updated	RJ	CD
P05	11.08.22	Existing Rising Main / Diversion added	RJ	CD
P04	18.07.22	Text Amendments	CMD	CD
P03	14.12.21	Updated DCO boundary	RJ	CD
P02	01.10.21	Updated to latest masterplan	RJ	CD
P01	10.09.21	Preliminary Issue	RJ	CD

Issues & Revisions

BWB
A CAF GROUP COMPANY
Birmingham | 0121 233 3322
Leeds | 0113 233 8000
London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
www.bwbconsulting.com

Client

TRITAX SYMMETRY

Project Title

HINCKLEY RAIL FREIGHT INTERCHANGE

Drawing Title

CONCEPT FOUL DRAINAGE STRATEGY PLAN

Drawn:	RJ	Reviewed:	CD
BWB Ref:	NTT 2814	Date:	10.09.21	Scale@A1:	1:4000

Drawing Status

PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HRF-BWB-EWE-ZZ-DR-CD-00504	S2	P07

X:\NTT\NTT2814_Hinckley Rail Freight Interchange\02. Project Delivery\01. WIP\Drawings\Water\HRF-BWB-EWE-ZZ-DR-CD-00504_Concept Foul Drainage Strategy P07.dwg