

MANHOLE NODE: Combined Water	MH 105A	PHOTOGRAPHIC PLAN
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EXTERNAL PHOTOGRAPH:



INTERNAL PHOTOGRAPH:

MANHOLE NODE:  
Surface Water

MH 01

PHOTOGRAPHIC PLAN

EXTERNAL PHOTOGRAPH:



INTERNAL PHOTOGRAPH:



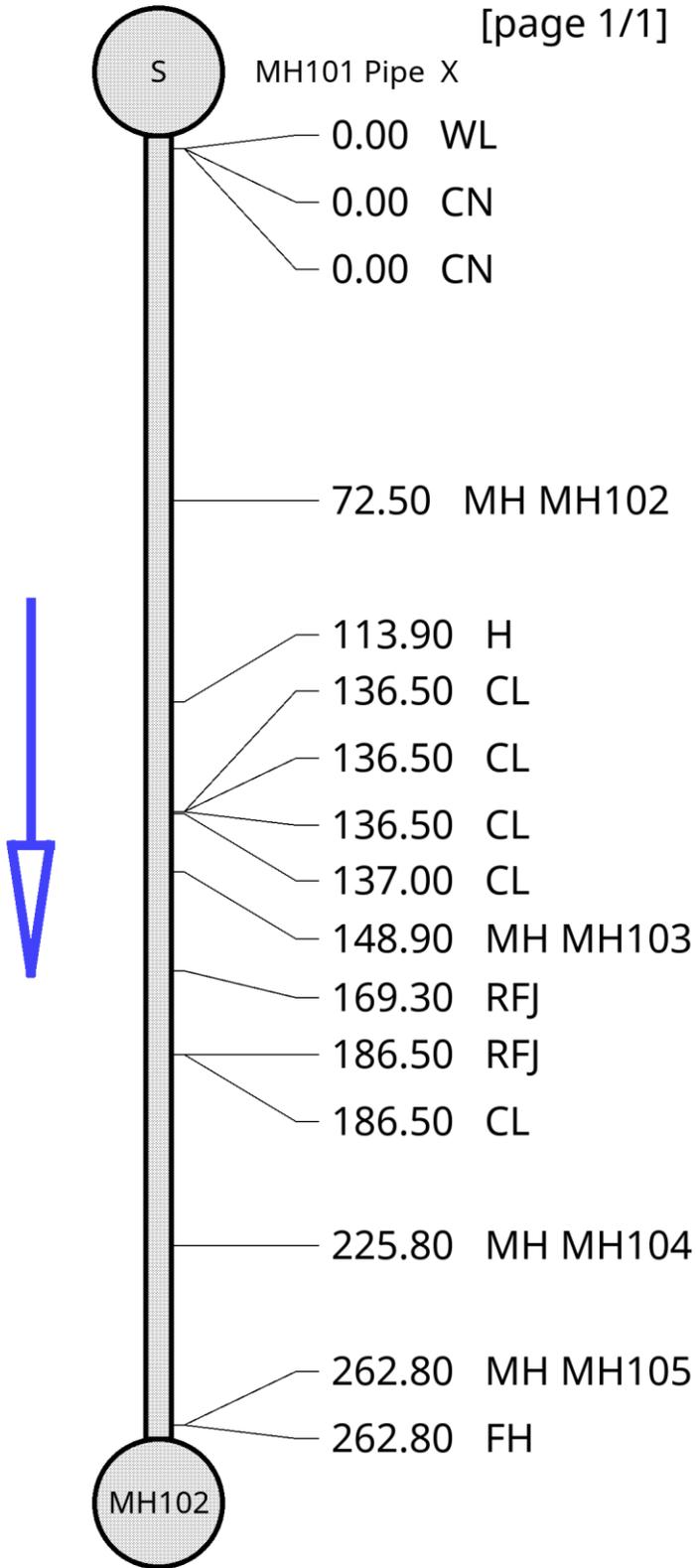
# 1 MH101 Pipe X Drain / Sewer Survey

## 1.1 Survey Header

1.1.1	Surveyed by (Operator)	Hobson-Clarke
1.1.2	Contract no.	N/A
1.1.3	Job no.	109726
1.1.4	Catchment (Drainage area)	N/A
1.1.5	Division	N/A
1.1.6	District	N/A
1.1.7	Pipeline length ref	N/AA
1.1.8	Date	200624
1.1.9	Time	09:41
1.1.10	Location	Cowersley
1.1.11	Start manhole no.	MH101 Pipe X
1.1.12	Start depth	1.96m
1.1.13	Start cover level	N/A
1.1.14	Start invert level	N/A
1.1.15	Finish manhole no.	MH102
1.1.16	Finish depth	N/Am
1.1.17	Finish cover level	N/A
1.1.18	Finish invert level	N/A
1.1.19	Use of Drain	(C) Combined
1.1.20	Direction	(D) Survey downstream (camera pointing with flow)
1.1.21	Size 1 (diameter/height)	500mm
1.1.22	Size 2 (width)	500mm
1.1.23	Shape	(C) Circular
1.1.24	Material	(CO) Concrete
1.1.25	Lining	
1.1.26	Pipe length	N/Am
1.1.27	Total length	N/Am
1.1.28	Year laid	N/A
1.1.29	Video cassette number	N/A
1.1.30	Comments: General	
1.1.31	Purpose	(F) Sample survey to determine asset condition
1.1.32	Sewer category	(Z) Not Known
1.1.33	Pre-cleaning	(N) No
1.1.34	Weather	(1) Dry
1.1.35	Location code	(C) Light road (rural roads with light traffic, town and city back streets, estate roads and parking areas)
1.1.36	Further location details	

1.2 Diagram

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### 1.3 Observations

Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
0.0	(WL) Water level ...% height/diameter Percentage: 10%	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_45_18_839.jpg 
		0:00:00
0.0	(CN) Connection at ... o'clock, diameter ...mm Clock At/From: 01 Diameter/Dimension: 150	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_45_24_162.jpg 
01		0:00:02
0.0	(CN) Connection at ... o'clock, diameter ...mm Clock At/From: 12 Diameter/Dimension: 225	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_45_57_062.jpg 
12		0:00:18
72.5	(MH) Manhole/node	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_50_32_074.jpg 
	MH102	0:04:01
113.9	(H) Hole in sewer at ... (OR from ... to ...) o'clock Clock At/From: 11 Clock To: 01 Diameter/Dimension: 100	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_53_23_273.jpg 
11 - 01		0:06:23
136.5	(CL) Crack longitudinal at ... o'clock Clock At/From: 12	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_55_39_319.jpg 
12		0:08:29

Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
136.5	(CL) Crack longitudinal at ... o'clock Clock At/From: 03	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_55_48_056.jpg 
03		0:08:30
136.5	(CL) Crack longitudinal at ... o'clock Clock At/From: 07	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_55_56_667.jpg 
07		0:08:30
137.0	(CL) Crack longitudinal at ... o'clock Clock At/From: 06	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_56_37_525.jpg 
06		0:08:56
148.9	(MH) Manhole/node	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_57_27_563.jpg 
	MH103	0:09:43
169.3	(RFJ) Roots fine at joint	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_58_42_603.jpg 
		0:10:50
186.5	(RFJ) Roots fine at joint	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-09_59_56_593.jpg 
		0:11:53

Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
186.5	(CL) Crack longitudinal at ... o'clock Clock At/From: 06	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-10_00_02_209.jpg 
06		0:11:53
225.8	(MH) Manhole/node	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-10_02_19_714.jpg 
	MH104	0:14:05
262.8	(MH) Manhole/node	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-10_16_22_651.jpg 
	MH105	0:18:45
262.8	(FH) Finish survey	./MH101-Pipe---X/MH101-Pipe---X_2024_06_20-10_16_41_854.jpg 
		0:18:50

### 1.4 Photographs

(WL) Water level ...% height/diameter ./.MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20- (CN) Connection at ... o'clock, diameter ...mm ./.MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(CN) Connection at ... o'clock, diameter ...mm ./.MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20- (MH) Manhole/node ./.MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(H) Hole in sewer at ... (OR from ... to ...) ./.MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20- (CL) Crack longitudinal at ... o'clock ./.MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(CL) Crack longitudinal at ... o'clock

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-

(CL) Crack longitudinal at ... o'clock

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(CL) Crack longitudinal at ... o'clock

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-

(MH) Manhole/node

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(RFJ) Roots fine at joint

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-

(RFJ) Roots fine at joint

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(CL) Crack longitudinal at ... o'clock

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-

(MH) Manhole/node

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



(MH) Manhole/node

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20- (FH) Finish survey

./MH101-Pipe---X/MH101-Pipe---X\_2024\_06\_20-



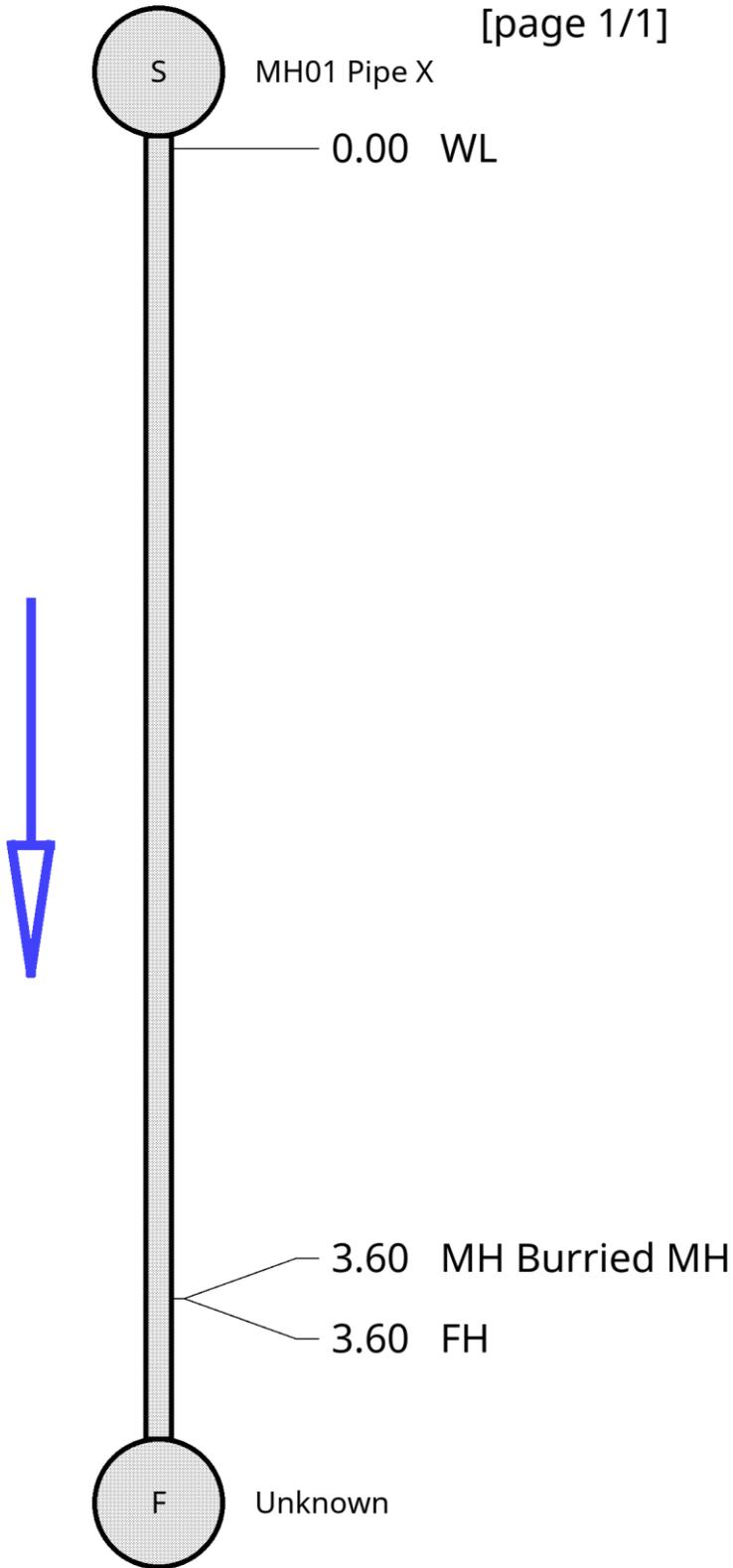
## 2 MH01 Pipe X Drain / Sewer Survey

### 2.1 Survey Header

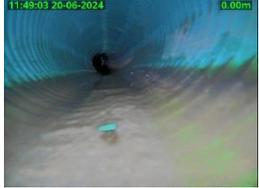
2.1.1	Surveyed by (Operator)	Hobson-Clarke
2.1.2	Contract no.	N/A
2.1.3	Job no.	109726
2.1.4	Catchment (Drainage area)	N/A
2.1.5	Division	N/A
2.1.6	District	N/A
2.1.7	Pipeline length ref	N/AA
2.1.8	Date	200624
2.1.9	Time	11:46
2.1.10	Location	Cowersley
2.1.11	Start manhole no.	MH01 Pipe X
2.1.12	Start depth	0.82m
2.1.13	Start cover level	N/A
2.1.14	Start invert level	N/A
2.1.15	Finish manhole no.	Unknown
2.1.16	Finish depth	N/Am
2.1.17	Finish cover level	N/A
2.1.18	Finish invert level	N/A
2.1.19	Use of Drain	(S) Surface Water
2.1.20	Direction	(D) Survey downstream (camera pointing with flow)
2.1.21	Size 1 (diameter/height)	225mm
2.1.22	Size 2 (width)	225mm
2.1.23	Shape	(C) Circular
2.1.24	Material	(CO) Concrete
2.1.25	Lining	
2.1.26	Pipe length	N/Am
2.1.27	Total length	N/Am
2.1.28	Year laid	N/A
2.1.29	Video cassette number	N/A
2.1.30	Comments: General	
2.1.31	Purpose	(F) Sample survey to determine asset condition
2.1.32	Sewer category	(Z) Not Known
2.1.33	Pre-cleaning	(N) No
2.1.34	Weather	(1) Dry
2.1.35	Location code	(C) Light road (rural roads with light traffic, town and city back streets, estate roads and parking areas)
2.1.36	Further location details	

2.2 Diagram

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### 2.3 Observations

Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
0.0	(WL) Water level ...% height/diameter Percentage: 5%	./MH01-Pipe-----X/MH01-Pipe-----X_2024_06_20-11_49_03_667.jpg 
		0:00:00
3.6	(MH) Manhole/node	./MH01-Pipe-----X/MH01-Pipe-----X_2024_06_20-11_52_01_920.jpg 
	Burried MH	0:02:38
3.6	(FH) Finish survey	./MH01-Pipe-----X/MH01-Pipe-----X_2024_06_20-11_52_10_717.jpg 
		0:02:38

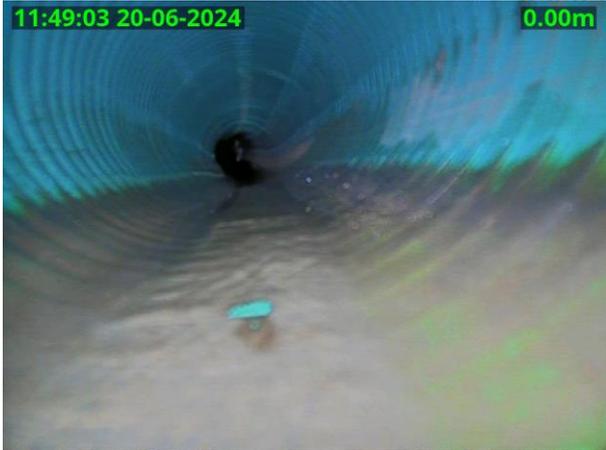
## 2.4 Photographs

(WL) Water level ...% height/diameter

./MH01-Pipe-----X/MH01-Pipe-----X\_2024\_06\_20-

(MH) Manhole/node

./MH01-Pipe-----X/MH01-Pipe-----X\_2024\_06\_20-



(FH) Finish survey

./MH01-Pipe-----X/MH01-Pipe-----X\_2024\_06\_20-



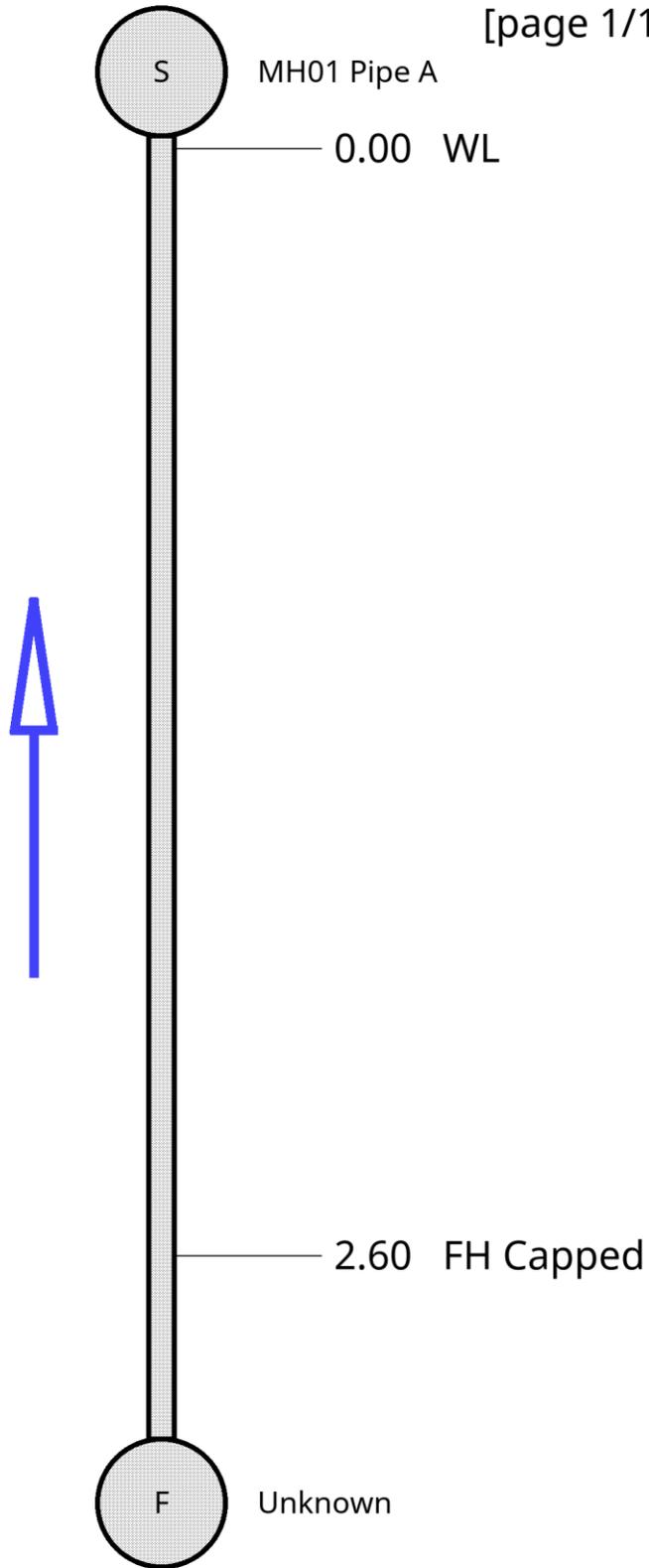
### 3 MH01 Pipe A Drain / Sewer Survey

#### 3.1 Survey Header

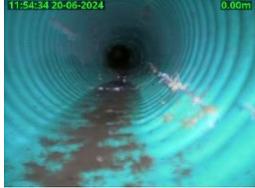
3.1.1	Surveyed by (Operator)	Hobson-Clarke
3.1.2	Contract no.	N/A
3.1.3	Job no.	109726
3.1.4	Catchment (Drainage area)	N/A
3.1.5	Division	N/A
3.1.6	District	N/A
3.1.7	Pipeline length ref	N/AA
3.1.8	Date	200624
3.1.9	Time	11:54
3.1.10	Location	Cowersley
3.1.11	Start manhole no.	MH01 Pipe A
3.1.12	Start depth	0.32m
3.1.13	Start cover level	N/A
3.1.14	Start invert level	N/A
3.1.15	Finish manhole no.	Unknown
3.1.16	Finish depth	N/Am
3.1.17	Finish cover level	N/A
3.1.18	Finish invert level	N/A
3.1.19	Use of Drain	(S) Surface Water
3.1.20	Direction	(U) Survey upstream (camera pointing against flow)
3.1.21	Size 1 (diameter/height)	150mm
3.1.22	Size 2 (width)	150mm
3.1.23	Shape	(C) Circular
3.1.24	Material	(PVC) Polyvinyl chloride
3.1.25	Lining	
3.1.26	Pipe length	N/Am
3.1.27	Total length	N/Am
3.1.28	Year laid	N/A
3.1.29	Video cassette number	N/A
3.1.30	Comments: General	
3.1.31	Purpose	(F) Sample survey to determine asset condition
3.1.32	Sewer category	(Z) Not Known
3.1.33	Pre-cleaning	(N) No
3.1.34	Weather	(1) Dry
3.1.35	Location code	(C) Light road (rural roads with light traffic, town and city back streets, estate roads and parking areas)
3.1.36	Further location details	

3.2 Diagram

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### 3.3 Observations

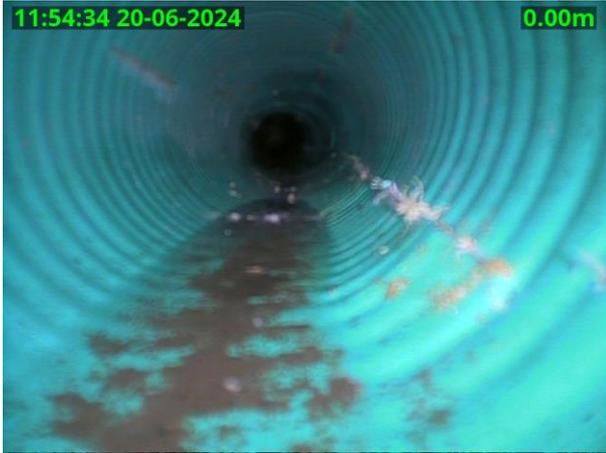
Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
0.0	(WL) Water level ...% height/diameter Percentage: 5%	./MH01-Pipe---A/MH01-Pipe---A_2024_06_20-11_54_34_686.jpg 
		0:02:39
2.6	(FH) Finish survey	./MH01-Pipe---A/MH01-Pipe---A_2024_06_20-11_55_20_368.jpg 
	Capped	0:00:42

### 3.4 Photographs

(WL) Water level ...% height/diameter

./MH01-Pipe---A/MH01-Pipe---A\_2024\_06\_20- (FH) Finish survey

./MH01-Pipe---A/MH01-Pipe---A\_2024\_06\_20-



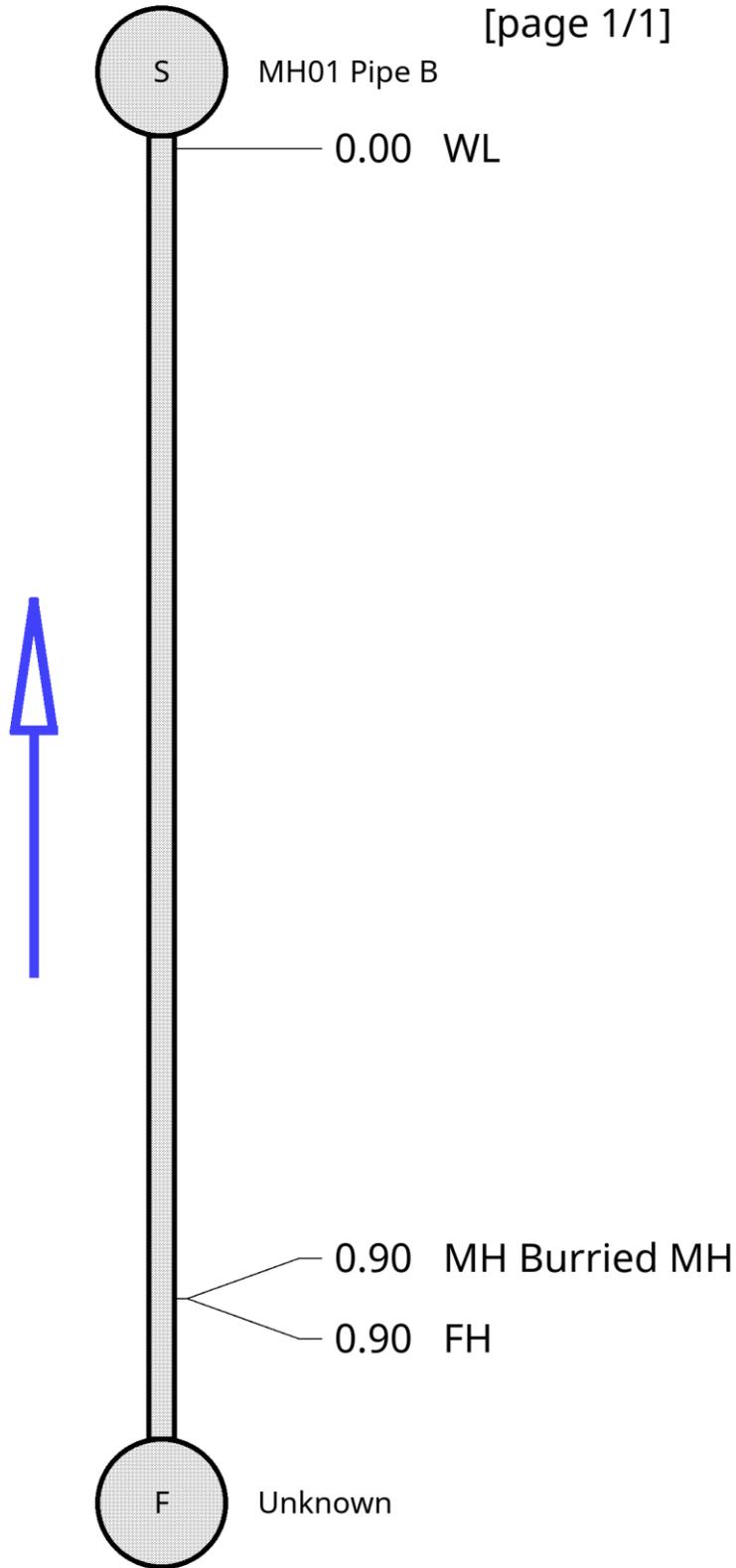
## 4 MH01 Pipe B Drain / Sewer Survey

### 4.1 Survey Header

4.1.1	Surveyed by (Operator)	Hobson-Clarke
4.1.2	Contract no.	N/A
4.1.3	Job no.	109726
4.1.4	Catchment (Drainage area)	N/A
4.1.5	Division	N/A
4.1.6	District	N/A
4.1.7	Pipeline length ref	N/AA
4.1.8	Date	200624
4.1.9	Time	11:57
4.1.10	Location	Cowersley
4.1.11	Start manhole no.	MH01 Pipe B
4.1.12	Start depth	0.80m
4.1.13	Start cover level	N/A
4.1.14	Start invert level	N/A
4.1.15	Finish manhole no.	Unknown
4.1.16	Finish depth	N/Am
4.1.17	Finish cover level	N/A
4.1.18	Finish invert level	N/A
4.1.19	Use of Drain	(S) Surface Water
4.1.20	Direction	(U) Survey upstream (camera pointing against flow)
4.1.21	Size 1 (diameter/height)	225mm
4.1.22	Size 2 (width)	225mm
4.1.23	Shape	(C) Circular
4.1.24	Material	(PVC) Polyvinyl chloride
4.1.25	Lining	
4.1.26	Pipe length	N/Am
4.1.27	Total length	N/Am
4.1.28	Year laid	N/A
4.1.29	Video cassette number	N/A
4.1.30	Comments: General	
4.1.31	Purpose	(F) Sample survey to determine asset condition
4.1.32	Sewer category	(Z) Not Known
4.1.33	Pre-cleaning	(N) No
4.1.34	Weather	(1) Dry
4.1.35	Location code	(C) Light road (rural roads with light traffic,town and city back streets,estate roads and parking areas)
4.1.36	Further location details	

4.2 Diagram

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### 4.3 Observations

Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
0.0	(WL) Water level ...% height/diameter Percentage: 5%	./MH01-Pipe---B/MH01-Pipe---B_2024_06_20-11_57_36_478.jpg 
		0:00:02
0.9	(MH) Manhole/node	./MH01-Pipe---B/MH01-Pipe---B_2024_06_20-11_59_12_213.jpg 
	Burried MH	0:00:53
0.9	(FH) Finish survey	./MH01-Pipe---B/MH01-Pipe---B_2024_06_20-11_59_20_206.jpg 
		0:00:54

### 4.4 Photographs

(WL) Water level ...% height/diameter

.MH01-Pipe---B/MH01-Pipe---B\_2024\_06\_20-

(MH) Manhole/node

.MH01-Pipe---B/MH01-Pipe---B\_2024\_06\_20-



(FH) Finish survey

.MH01-Pipe---B/MH01-Pipe---B\_2024\_06\_20-



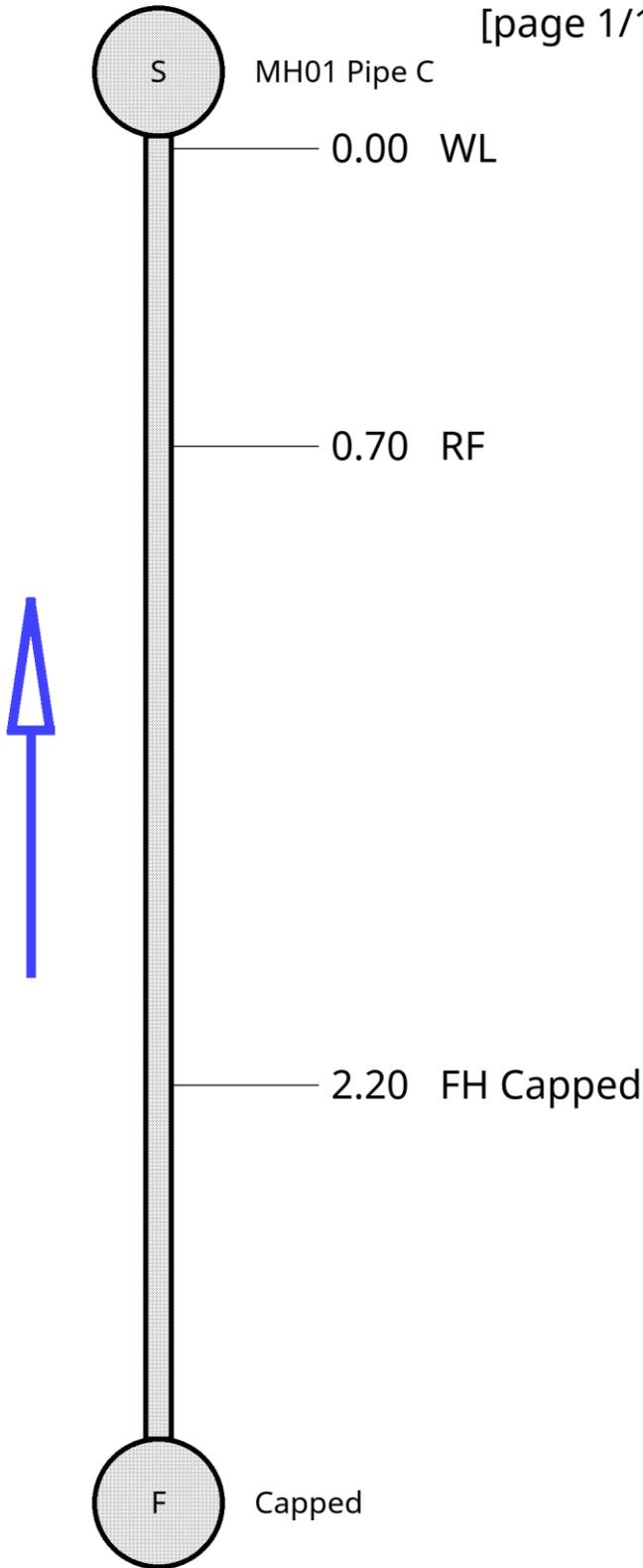
## 5 MH01 Pipe C Drain / Sewer Survey

### 5.1 Survey Header

5.1.1	Surveyed by (Operator)	Hobson-Clarke
5.1.2	Contract no.	N/A
5.1.3	Job no.	109726
5.1.4	Catchment (Drainage area)	N/A
5.1.5	Division	N/A
5.1.6	District	N/A
5.1.7	Pipeline length ref	N/AA
5.1.8	Date	200624
5.1.9	Time	11:59
5.1.10	Location	Cowersley
5.1.11	Start manhole no.	MH01 Pipe C
5.1.12	Start depth	0.33m
5.1.13	Start cover level	N/A
5.1.14	Start invert level	N/A
5.1.15	Finish manhole no.	Capped
5.1.16	Finish depth	N/Am
5.1.17	Finish cover level	N/A
5.1.18	Finish invert level	N/A
5.1.19	Use of Drain	(S) Surface Water
5.1.20	Direction	(U) Survey upstream (camera pointing against flow)
5.1.21	Size 1 (diameter/height)	150mm
5.1.22	Size 2 (width)	150mm
5.1.23	Shape	(C) Circular
5.1.24	Material	(PVC) Polyvinyl chloride
5.1.25	Lining	
5.1.26	Pipe length	N/Am
5.1.27	Total length	N/Am
5.1.28	Year laid	N/A
5.1.29	Video cassette number	N/A
5.1.30	Comments: General	
5.1.31	Purpose	(F) Sample survey to determine asset condition
5.1.32	Sewer category	(Z) Not Known
5.1.33	Pre-cleaning	(N) No
5.1.34	Weather	(1) Dry
5.1.35	Location code	(C) Light road (rural roads with light traffic,town and city back streets,estate roads and parking areas)
5.1.36	Further location details	

5.2 Diagram

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### 5.3 Observations

Distance	Condition code and attributes	Photo Ref
Cont. Defect		
Clock (At - To)		
Junta	Remarks	Video Ref
0.0	(WL) Water level ...% height/diameter Percentage: 5%	./MH01-Pipe-C/MH01-Pipe-C_2024_06_20-12_00_29_935.jpg 
		0:00:55
0.7	(RF) Roots fine	./MH01-Pipe-C/MH01-Pipe-C_2024_06_20-12_00_47_766.jpg 
		0:00:15
2.2	(FH) Finish survey	./MH01-Pipe-C/MH01-Pipe-C_2024_06_20-12_01_20_276.jpg 
	Capped	0:00:43

### 5.4 Photographs

(WL) Water level ...% height/diameter

/MH01-Pipe-C/MH01-Pipe-C\_2024\_06\_20-

(RF) Roots fine

/MH01-Pipe-C/MH01-Pipe-C\_2024\_06\_20-



(FH) Finish survey

/MH01-Pipe-C/MH01-Pipe-C\_2024\_06\_20-



## Appendix 9 – Drainage Strategy





- GENERAL NOTES:**
- DO NOT USE THIS DRAWING IN ISOLATION. THIS DRAWING HAS BEEN PREPARED AS PART OF A SET AND MUST THEREFORE BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER PRIOR TO COMMENCING WORKS.
  - THIRD PARTY INFORMATION IS USED TO PREPARE THE ENGINEERING DESIGN (INCLUDING ARCHITECTURAL LAYOUT, GROUND INVESTIGATION, EXISTING UTILITIES RECORDS AND SPECIALIST DESIGN ITEMS). THE ENGINEERING DESIGN MUST THEREFORE BE READ IN CONJUNCTION WITH ALL THIRD PARTY INFORMATION PRIOR TO COMMENCING WORKS. QUEENSBERRY DESIGN LTD ARE NOT RESPONSIBLE FOR ANY THIRD PARTY INFORMATION OR DETAILS.
  - DRAWING STATUS WILL REMAIN PRELIMINARY UNTIL FULL TECHNICAL APPROVAL IS RECEIVED FROM LOCAL AUTHORITY AND SEWERAGE UNDERTAKER. WORKS COMMENCED PRIOR TO TECHNICAL APPROVAL ARE DONE AT RISK AND MAY BE SUBJECT TO CHANGE.
  - THE CONTRACTOR IS EXPECTED TO PREPARE APPROPRIATE CONSTRUCTION METHOD STATEMENTS FOR ALL ASPECTS OF APPOINTED WORK. THIS SHOULD INCLUDE ANY TEMPORARY PROTECTION WORKS.
  - LAND DRAINAGE IS NOT PERMITTED TO DISCHARGE INTO THE PUBLIC SEWER NETWORK. ANY NEED FOR LAND DRAINAGE SHOULD BE ASSESSED BY THE GROUND WORKER AND LANDSCAPER DURING CONSTRUCTION AND PLACEMENT OF CURBS IN AN INDIVIDUAL PLOT BASIS. IF LAND DRAINAGE DESIGNS ARE REQUIRED, THEY SHOULD BE APPOINTED PRIOR TO PLOT COMPLETION.
  - THE CONTRACTOR IS EXPECTED TO CROSS CHECK ALL DRAINAGE INVERTS PRIOR TO COMMENCING WORK. THIS MAY INVOLVE COMPLETION OF TRIAL HOLES IF INVERT LEVELS HAVE BEEN INTERPOLATED. THE POSITION, LINE AND DIAMETER OF ALL EXISTING DRAINAGE APPARATUS SHOULD BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.
  - THE CONTRACTOR MUST MONITOR THE "AS BUILT" PROGRESS OF EACH CONSTRUCTION STAGE (ROADS/SEWER/LOT WORKS ETC.) TO ENABLE THE NEXT STAGES OF CONSTRUCTION TO BE CHECKED BEFORE INSTALLATION.
  - ALL WORKS TO BE UNDERTAKEN IN COMPLIANCE WITH BS 800 WORKMANSHIP ON BUILDING SITES.

- HIGHWAYS**
- ALL HIGHWAY WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATIONS.
  - ALL EXCAVATIONS BELOW PROPOSED AND EXISTING HIGHWAYS TO BE BACK FILLED WITH GRANULAR TYPE 3 SUB BASE AND WELL COMPACTED TO EXCEEDING 150MM, UNLESS OTHERWISE AGREED.
  - HIGHWAY AUTHORITY TO BE NOTIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.

- ADAPTABLE DRAINAGE**
- ALL ADAPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE DESIGN AND CONSTRUCTION GUIDANCE (DOCS FOR ADOPTION), THE RELEVANT BRITISH/EN/BS AND YORKSHIRE WATERS STANDARDS/REQUIREMENTS/LOCAL PRACTICES FOR THE ADOPTION OF SMALL SUBMERSIBLE FOLLS AND SURFACE WATER PUMPING STATIONS AND KITEMARKED.
  - MANHOLE COVERS SHALL HAVE A CLEAR OPENING OF 600MM AND SHALL BE CLASS D400 TO BS EN 124 WITH 150MM DEEP FRAMES IN HIGHWAYS.
  - FILLED GULLIES MUST BE FILLED AND COVERED WITH THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATERS BEFORE ANY SEWER WORKS ARE CARRIED OUT.
  - YORKSHIRE WATERS IS NOT OBLIGED TO ACCEPT FILTER DRAIN / LAND DRAINAGE RUNOFF INTO THE PUBLIC SEWER NETWORK OR ADAPTABLE DRAINAGE SYSTEM DIRECTLY OR INDIRECTLY. AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUNOFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO CONSULT WITH THE LOCAL AUTHORITY LAND DRAINAGE SECTION WITH REGARDS TO THE DISPOSAL OF THE FILTER DRAIN / LAND DRAINAGE RUNOFF.
  - COVER SLABS MUST CARRY THE BS KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE INTERMEDIATE PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600MM/600MM FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. SLABS REFER TO CONCRETE PIPE SYSTEM ASSOCIATION (CPSA) TECHNICAL BULLETIN ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES. 600 X 600MM ACCESS COVER SLABS ARE NOW AVAILABLE WHICH MUST BE KITEMARKED FOR USE ON YORKSHIRE WATERS NETWORK.
  - SUBPANS RESISTANT CHEMICALS AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
  - SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES OR THE WIDTH OF THE CAMPGY (IF AVAILABLE).
  - SEWERS MUST HAVE 3 METRES CLEARANCE FROM TREES AND HEDGES. REFER TO SFA FIGURE 2 FOR FURTHER RESTRICTIONS ON TREE PLANTING ADJACENT TO SEWERS.
  - SEWERS LAD IN CLASS 7 ARE TO BE COVERED WITH 150MM GRANULAR BED AND SURROUND. THE DEPTH OF COVER TO TOP OF SEWER IS LESS THAN 1.2M IN HIGHWAY AND VERGES OR LESS THAN 900MM IN NON VEHICLE ACCESS AREAS. WHEN A CONCRETE SLAB ROAD IS PROVIDED ABOVE GRANULAR BED AND SURROUND.
  - BEHIND AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 48-02 (TABLE A2).
  - ALL ADAPTABLE SEWERS TO BE BS KITEMARK (CERTIFIED TO BS 5951).
  - ADAPTABLE SEWER PIPES TO BE LAD IN MAXIMUM 3M LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS. 12 BEHIND AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 48-02 (TABLE A2).
  - PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND YORKSHIRE WATER WOULD PREFER CLAYWARE CHANNEL IN MANHOLES. WE HAVE FOUND THAT PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BEHINDING.
  - THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED IN ACCORDANCE TO ACCOMMODATE THE CONNECTIONS AND BEHINDING.
  - YORKSHIRE WATER POLICY IS NOT TO ACCEPT TYPE 'C' BRICK MANHOLES AND 100MM DIA MANHOLE RINGS. INSTEAD IT IS PREFERRED THAT YOU USE TYPE 'B' MANHOLE WITH 100MM DIA OR 150MM DIA RINGS WITH THE OPENING SIZES OVER THE CHAMBER. WHERE DEPTH OF COVER TO PIPE IS 1-1.5M.
  - CONCRETE PIPES SHOULD BE CLASS D20 TO EN 1916 / BS 8911-1:2002.
  - THE POSITION, LINE AND DIAMETER OF ALL EXISTING DRAINAGE APPARATUS SHOULD BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.
  - THE CONNECTION OF FOLLS AND SURFACE WATER DRAINAGE TO THE EXISTING PUBLIC SEWER SYSTEM SHALL BE SUBJECT TO THE APPROVAL OF THE LOCAL SEWERAGE UNDERTAKER. THE CONTRACTOR IS EXPECTED TO APPLY FOR RELEVANT PERMITS PRIOR TO COMMENCING THE WORKS.
  - 1500mm CHAMBER RINGS ARE ALLOWED ON THE ADAPTABLE NETWORK AND ARE TO BE KITEMARKED.
  - THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED IN ACCORDANCE TO ACCOMMODATE THE CONNECTIONS AND BEHINDING.
  - ADAPTABLE PLASTIC SEWER PIPES TO BE BS KITEMARKED (CERTIFIED TO BS 5951) AND SUBMERSIBLE ADAPTABLE SEWER PIPES TO BE LAD IN MAXIMUM 3M LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS. PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND YORKSHIRE WATER WOULD PREFER CLAYWARE CHANNEL IN MANHOLES. WE HAVE FOUND THAT PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BEHINDING.
  - WHERE A BS COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING KEYS SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.
  - THE POSITION, LINE AND DIAMETER OF ALL EXISTING DRAINAGE APPARATUS SHOULD BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.
  - THE CONNECTION OF FOLLS AND SURFACE WATER DRAINAGE TO THE EXISTING PUBLIC SEWER SYSTEM SHALL BE SUBJECT TO THE APPROVAL OF THE LOCAL SEWERAGE UNDERTAKER. THE CONTRACTOR IS EXPECTED TO APPLY FOR RELEVANT PERMITS PRIOR TO COMMENCING THE WORKS.
  - THEIR MUST BE ENOUGH CLEARANCE AT CROSSOVERS TO ACCOMMODATE BEDDING TO BOTH PIPES. APPROX. 300MM IF CROSSOVER IS NEAR THE ROCKER THEN THE CLEARANCE NEEDED MAY BE INCREASED.
  - THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100MM DIA 40NMM / 150MM DIA 40NMM / 200MM DIA 40NMM AND 300MM DIA 72NMM. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE: CLASS D20 TO EN 1916/BS8911-1:2002. PLASTIC PIPES SHOULD CONFORM TO WS 4-05-01 AND BS EN 1916.

**EXISTING SERVICES**

PRIOR TO THE COMMENCEMENT OF ANY WORKS UNDER GROUND MAPPING SURVEYS AND CONSTRAINTS PLANS IS TO BE REFERRED TO ANY DISCREPANCIES ARE TO BE REPORTED TO ENGINEER.

ANY EXISTING SERVICES WHICH MAY BE AFFECTED BY THE PROPOSED WORKS SHOULD BE LOCATED BY MEANS OF A HAND DIG IN CLOSE LIAISON WITH THE STATUTORY SERVICE AUTHORITIES. THE CONTRACTOR SHALL INFORM THE DEVELOPER OF ANY SERVICES THAT MAY AFFECT THE PROPOSED DESIGN. CONTRACTOR TO NOTIFY STATUTORY SERVICE AUTHORITIES PRIOR TO COMMENCEMENT OF WORK. AS CONSTRUCTED INFORMATION IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE THE FOLLOWING AS CONSTRUCTED DRAWINGS TO THE DEVELOPER UPON THE COMPLETION OF THE WORKS COVERED BY THE CONTRACT:

- POSITIONS/COORDINATES OF ALL ADAPTABLE MANHOLES.
- INVERT AND COVER LEVELS OF ALL ADAPTABLE MANHOLES.
- NEW GULLY POSITIONS AND CONNECTIONS.
- POSITION AND DEPTH OF SERVICE DUCTS FOR WATER, GAS, ELECTRIC, BT, CABLE AND STREET LIGHTING, STATING SIZE AND NUMBER OF DUCTS.

Rev	Date	Revision Details	Drawn	Checked
P01	24.09.24	FIRST ISSUE	JR	ND

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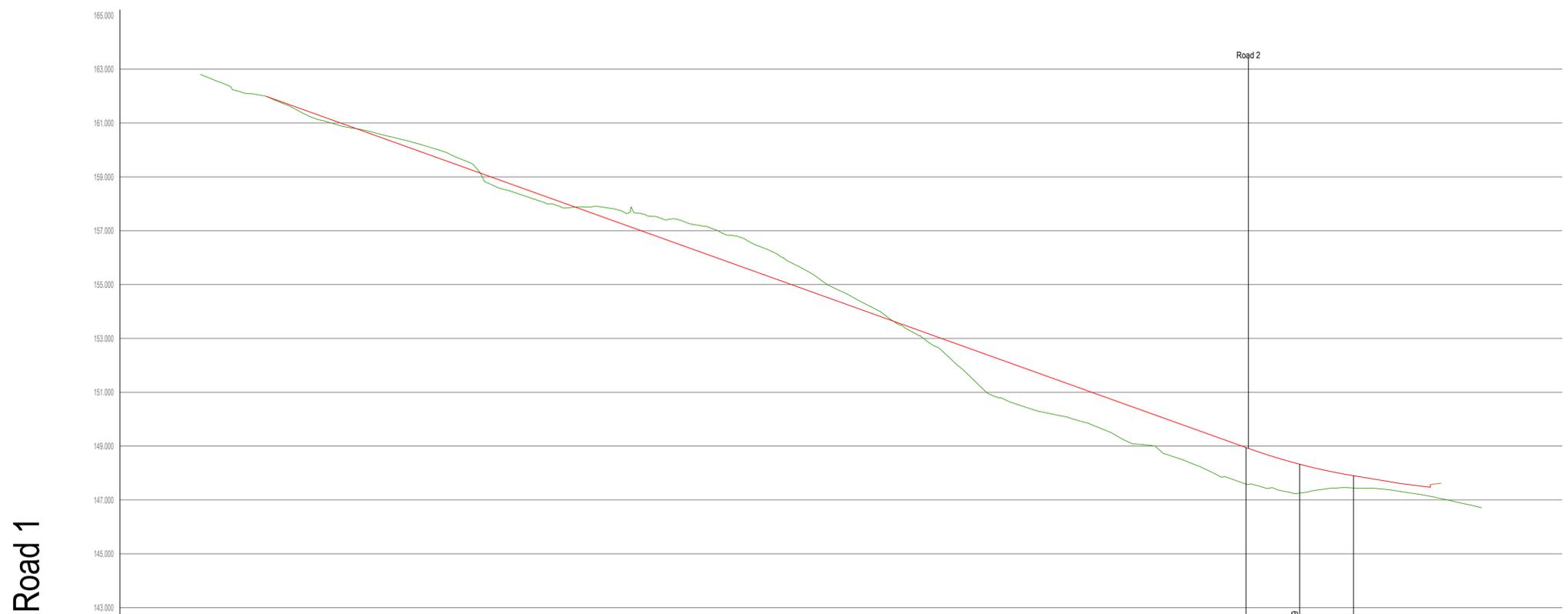


Client: STRATA THIRTEEN

Project: MAIN AVENUE COWERSLEY

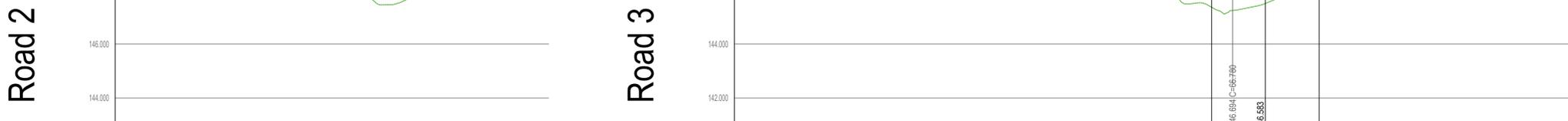
Title: PROPOSED LONGSECTIONS

Drawn	JR	Checked	ND	Date	24.09.2024
Drawing Number	2153-QD-XX-HR-DR-C-00-02				
Drawing Status	FEASIBILITY		Scale	1:500/500 - A1	
Rev	P01				



Vertical Exaggeration: 5  
Datum: 141.000M AOD

EXISTING LEVELS (m)	CHAINAGE ON CENTRELINE (m)	LEVELS ON CENTRELINE (m)	VERTICAL DESIGN	HORIZONTAL DESIGN
161.991	0.000	-161.991	GRADIENT -7.2% (-1 in 14) LENGTH = 182.37m	STRAIGHT LENGTH = 22.190m
161.633	5.000	-161.560		
161.275	10.000	-161.110	R = 30.000 L = 15.328	R = 30.000 L = 11.104
160.918	15.000	-160.645		
160.560	20.000	-160.190	R = 28.257 L = 22.236	R = 30.000 L = 11.104
160.202	25.000	-160.400		
159.845	30.000	-160.129	STRAIGHT LENGTH = 22.190m	R = 30.000 L = 11.104
159.487	35.000	-159.763		
159.129	40.000	-159.084	R = 30.000 L = 11.104	R = 30.000 L = 11.075
158.771	45.000	-158.499		
158.414	50.000	-158.165	STRAIGHT LENGTH = 22.190m	STRAIGHT LENGTH = 35.099m
158.056	55.000	-157.870		
157.698	60.000	-157.875	R = 30.000 L = 11.104	R = 30.000 L = 11.075
157.341	65.000	-157.801		
156.983	70.000	-157.626	R = 30.000 L = 11.104	R = 30.000 L = 11.075
156.625	75.000	-157.426		
156.268	80.000	-157.215	STRAIGHT LENGTH = 28.701m	STRAIGHT LENGTH = 35.099m
155.910	85.000	-156.899		
155.552	90.000	-156.579	R = 30.000 L = 11.104	R = 30.000 L = 11.075
155.194	95.000	-156.142		
154.837	100.000	-155.574	STRAIGHT LENGTH = 28.701m	STRAIGHT LENGTH = 35.099m
154.479	105.000	-154.941		
154.121	110.000	-154.435	R = 30.000 L = 11.104	R = 30.000 L = 11.075
153.764	115.000	-153.880		
153.406	120.000	-153.269	STRAIGHT LENGTH = 28.701m	STRAIGHT LENGTH = 35.099m
153.048	125.000	-152.669		
152.691	130.000	-151.781	R = 30.000 L = 11.104	R = 30.000 L = 11.075
152.333	135.000	-150.889		
151.975	140.000	-150.534	STRAIGHT LENGTH = 28.701m	STRAIGHT LENGTH = 35.099m
151.617	145.000	-150.242		
151.260	150.000	-150.016	R = 284.540 L = 20.000	R = 20.000 L = 9.959
150.902	155.000	-149.882		
150.544	160.000	-149.193	STRAIGHT LENGTH = 17.924m	STRAIGHT LENGTH = 17.924m
150.187	165.000	-149.010		
149.829	170.000	-148.532	R = 20.000 L = 9.959	R = 20.000 L = 9.959
149.471	175.000	-148.123		
149.114	180.000	-147.754	STRAIGHT LENGTH = 17.924m	STRAIGHT LENGTH = 17.924m
148.757	185.000	-147.501		
148.400	190.000	-147.300	GRADIENT -3.3% L = 8.814m	GRADIENT -3.3% L = 8.814m
148.043	195.000	-147.347		
147.686	200.000	-147.455	R = 20.000 L = 9.959	R = 20.000 L = 9.959
147.329	205.000	-147.431		
146.972	210.000	-147.311	STRAIGHT LENGTH = 17.924m	STRAIGHT LENGTH = 17.924m
146.615	215.000	-147.311		
146.258	220.000	-147.339	STRAIGHT LENGTH = 17.924m	STRAIGHT LENGTH = 17.924m
145.901	225.000	-147.339		



Vertical Exaggeration: 5  
Datum: 142.000M AOD

EXISTING LEVELS (m)	CHAINAGE ON CENTRELINE (m)	LEVELS ON CENTRELINE (m)	VERTICAL DESIGN	HORIZONTAL DESIGN
149.729	0.000	-148.320	GRADIENT -4.3% (-1 in 23) LENGTH = 20.663m	STRAIGHT LENGTH = 9.860m
149.514	5.000	-148.079		
149.300	10.000	-147.777	R = 72.750 L = 7.186	STRAIGHT LENGTH = 9.860m
149.085	15.000	-147.833		
148.871	20.000	-147.456	STRAIGHT LENGTH = 9.860m	STRAIGHT LENGTH = 9.860m
148.656	25.000	-147.456		

Vertical Exaggeration: 5  
Datum: 140.000M AOD

EXISTING LEVELS (m)	CHAINAGE ON CENTRELINE (m)	LEVELS ON CENTRELINE (m)	VERTICAL DESIGN	HORIZONTAL DESIGN
147.589	0.000	-147.589	GRADIENT -1.4% (-1 in 73) LENGTH = 62.879m	STRAIGHT LENGTH = 72.055m
147.514	5.000	-147.419		
147.445	10.000	-147.263	R = 284.540 L = 20.000	R = 20.000 L = 9.959
147.377	15.000	-147.107		
147.309	20.000	-146.985	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
147.240	25.000	-146.883		
147.171	30.000	-146.672	R = 20.000 L = 9.959	R = 20.000 L = 9.959
147.103	35.000	-146.539		
147.034	40.000	-146.532	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
146.966	45.000	-146.517		
146.897	50.000	-146.328	R = 284.540 L = 20.000	R = 20.000 L = 9.959
146.829	55.000	-146.254		
146.760	60.000	-146.520	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
146.692	65.000	-146.143		
146.624	70.000	-146.359	GRADIENT 5.7% (1 in 15) LENGTH = 30.455m	GRADIENT 5.7% (1 in 15) LENGTH = 30.455m
146.556	75.000	-146.684		
146.488	80.000	-146.174	R = 20.000 L = 9.959	R = 20.000 L = 9.959
146.420	85.000	-146.751		
146.352	90.000	-147.251	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
146.284	95.000	-147.674		
146.216	100.000	-148.053	R = 20.000 L = 9.959	R = 20.000 L = 9.959
146.148	105.000	-148.378		
146.080	110.000	-148.792	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
146.012	115.000	-149.114		

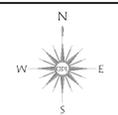


Vertical Exaggeration: 5  
Datum: 142.000M AOD

EXISTING LEVELS (m)	CHAINAGE ON CENTRELINE (m)	LEVELS ON CENTRELINE (m)	VERTICAL DESIGN	HORIZONTAL DESIGN
149.729	0.000	-148.320	GRADIENT -4.3% (-1 in 23) LENGTH = 20.663m	STRAIGHT LENGTH = 9.860m
149.514	5.000	-148.079		
149.300	10.000	-147.777	R = 72.750 L = 7.186	STRAIGHT LENGTH = 9.860m
149.085	15.000	-147.833		
148.871	20.000	-147.456	STRAIGHT LENGTH = 9.860m	STRAIGHT LENGTH = 9.860m
148.656	25.000	-147.456		

Vertical Exaggeration: 5  
Datum: 140.000M AOD

EXISTING LEVELS (m)	CHAINAGE ON CENTRELINE (m)	LEVELS ON CENTRELINE (m)	VERTICAL DESIGN	HORIZONTAL DESIGN
147.589	0.000	-147.589	GRADIENT -1.4% (-1 in 73) LENGTH = 62.879m	STRAIGHT LENGTH = 72.055m
147.514	5.000	-147.419		
147.445	10.000	-147.263	R = 284.540 L = 20.000	R = 20.000 L = 9.959
147.377	15.000	-147.107		
147.309	20.000	-146.985	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
147.240	25.000	-146.883		
147.171	30.000	-146.672	R = 20.000 L = 9.959	R = 20.000 L = 9.959
147.103	35.000	-146.539		
147.034	40.000	-146.532	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
146.966	45.000	-146.517		
146.897	50.000	-146.328	R = 284.540 L = 20.000	R = 20.000 L = 9.959
146.829	55.000	-146.254		
146.760	60.000	-146.520	STRAIGHT LENGTH = 28.033m	STRAIGHT LENGTH = 28.033m
146.692	65.000	-146.143		
146.624	70.000	-146.359	GRADIENT 5.7% (1 in 15) LENGTH = 30.455m	GRADIENT 5.7% (1 in 15) LENGTH = 30.455m
146.556	75.000	-146.684		
146.488	80.000	-146.174	R = 20.000 L = 9.959	R = 20.000 L = 9.959



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**GENERAL NOTES:**

1. THIS DRAWING IS A PRELIMINARY DESIGN. THE DRAWING HAS BEEN PREPARED AS PART OF A FEASIBILITY STUDY AND IS NOT TO BE USED FOR CONSTRUCTION. ANY DISCREPANCIES MUST BE REPORTED TO THE DESIGNER PRIOR TO COMMENCING WORK. THE DESIGNER SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE INFORMATION PROVIDED.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.
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10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND OTHER RELEVANT AGENCIES PRIOR TO COMMENCING WORK.



**SURFACE WATER FLOODING**

**SURFACE WATER FLOW ROUTES**

Rev.	Date	Revision Details	Drawn	Checked
1	11.12.24	LAYOUT REVISIONS ADDED	ND	ND
2	15.12.24	APARTMENTS ADDED - LAYOUT REVISION	ND	ND
3	24.09.24	FIRST ISSUE	JS	ND



Client: STRATATHIRTEEN

Project: MAIN AVENUE COWERSLEY

Title: EXCEEDANCE ROUTE

Drawn:	JR	Checked:	ND	Date:	24.09.2024
Drawing Number:	2153-00-XX-HD-DR-C-00-10				
Scale:	1:250 - A0				
Sheet:	P03				

### Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.330	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

### Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.052	5.00	159.556	1350	410947.738	415089.706	1.360
S2	0.094	5.00	158.878	1350	410956.240	415092.419	1.451
S3	0.073	5.00	156.854	1350	410979.156	415108.764	1.444
S4	0.092	5.00	155.299	1350	410999.080	415117.416	1.515
S5	0.134	5.00	152.705	1350	411028.141	415139.166	1.685
S6	0.041	5.00	151.528	1350	411037.773	415152.382	2.143
S14	0.135	5.00	149.542	1350	411057.116	415189.737	2.062
S7	0.172	5.00	148.812	1350	411068.056	415175.249	2.450
S8	0.117	5.00	147.043	1350	411063.707	415227.582	1.425
S9	0.144	5.00	147.986	1350	411098.720	415184.037	1.976
S11			147.324	1350	411093.637	415194.565	2.858
S12			147.338	1350	411097.912	415196.822	2.884
TANK			147.236	1200	411099.317	415197.507	4.142
1		5.00	145.800	2100	411101.868	415215.539	2.750
2			145.800	2100	411101.233	415218.138	2.763

### Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	8.924	0.600	158.196	157.502	0.694	12.9	150	5.05	50.0
1.001	S2	S3	28.148	0.600	157.427	155.410	2.017	14.0	225	5.19	50.0
1.002	S3	S4	21.722	0.600	155.410	153.859	1.551	14.0	225	5.29	50.0
1.003	S4	S5	36.299	0.600	153.784	151.020	2.764	13.1	300	5.43	50.0
1.004	S5	S6	16.354	0.600	151.020	149.385	1.635	10.0	300	5.48	50.0
1.005	S6	S7	37.946	0.600	149.385	146.512	2.873	13.2	300	5.63	50.0
2.000	S14	S7	18.154	0.600	147.480	146.587	0.893	20.3	225	5.10	50.0
1.006	S7	S11	32.056	0.600	146.362	144.616	1.746	18.4	450	5.74	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	2.824	49.9	7.1	1.210	1.226	0.052	0.0	38	2.016
1.001	3.521	140.0	19.9	1.226	1.219	0.147	0.0	57	2.504
1.002	3.514	139.7	29.7	1.219	1.215	0.219	0.0	70	2.801
1.003	4.360	308.2	42.2	1.215	1.385	0.311	0.0	74	3.079
1.004	4.998	353.3	60.4	1.385	1.843	0.446	0.0	83	3.767
1.005	4.348	307.3	66.0	1.843	2.000	0.487	0.0	94	3.490
2.000	2.915	115.9	18.3	1.837	2.000	0.135	0.0	60	2.143
1.006	4.761	757.3	107.5	2.000	2.258	0.794	0.0	114	3.419

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.000	S8	S11	44.563	0.600	145.618	145.357	0.261	170.7	225	5.74	50.0
4.000	S9	S11	11.691	0.600	146.010	144.841	1.169	10.0	225	5.05	50.0
1.007	S11	S12	4.833	0.600	144.466	144.454	0.012	402.8	600	5.81	50.0
1.008	S12	TANK	1.563	0.600	144.454	144.450	0.004	390.8	600	5.83	50.0
1.009	1	2	2.675	0.600	143.050	143.037	0.013	205.8	600	5.03	50.0

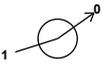
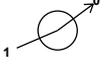
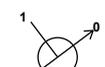
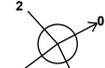
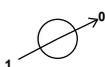
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.000	0.997	39.7	15.9	1.200	1.742	0.117	0.0	99	0.943
4.000	4.161	165.5	19.5	1.751	2.258	0.144	0.0	51	2.802
1.007	1.207	341.3	142.9	2.258	2.284	1.054	0.0	270	1.156
1.008	1.226	346.5	142.9	2.284	2.186	1.054	0.0	268	1.169
1.009	1.693	478.8	0.0	2.150	2.163	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	8.924	12.9	150	Circular	159.556	158.196	1.210	158.878	157.502	1.226
1.001	28.148	14.0	225	Circular	158.878	157.427	1.226	156.854	155.410	1.219
1.002	21.722	14.0	225	Circular	156.854	155.410	1.219	155.299	153.859	1.215
1.003	36.299	13.1	300	Circular	155.299	153.784	1.215	152.705	151.020	1.385
1.004	16.354	10.0	300	Circular	152.705	151.020	1.385	151.528	149.385	1.843
1.005	37.946	13.2	300	Circular	151.528	149.385	1.843	148.812	146.512	2.000
2.000	18.154	20.3	225	Circular	149.542	147.480	1.837	148.812	146.587	2.000
1.006	32.056	18.4	450	Circular	148.812	146.362	2.000	147.324	144.616	2.258
3.000	44.563	170.7	225	Circular	147.043	145.618	1.200	147.324	145.357	1.742
4.000	11.691	10.0	225	Circular	147.986	146.010	1.751	147.324	144.841	2.258
1.007	4.833	402.8	600	Circular	147.324	144.466	2.258	147.338	144.454	2.284
1.008	1.563	390.8	600	Circular	147.338	144.454	2.284	147.236	144.450	2.186
1.009	2.675	205.8	600	Circular	145.800	143.050	2.150	145.800	143.037	2.163

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1350	Manhole	Adoptable	S2	1350	Manhole	Adoptable
1.001	S2	1350	Manhole	Adoptable	S3	1350	Manhole	Adoptable
1.002	S3	1350	Manhole	Adoptable	S4	1350	Manhole	Adoptable
1.003	S4	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.004	S5	1350	Manhole	Adoptable	S6	1350	Manhole	Adoptable
1.005	S6	1350	Manhole	Adoptable	S7	1350	Manhole	Adoptable
2.000	S14	1350	Manhole	Adoptable	S7	1350	Manhole	Adoptable
1.006	S7	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
3.000	S8	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
4.000	S9	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
1.007	S11	1350	Manhole	Adoptable	S12	1350	Manhole	Adoptable
1.008	S12	1350	Manhole	Adoptable	TANK	1200	Manhole	Adoptable
1.009	1	2100	Manhole	Adoptable	2	2100	Manhole	Adoptable

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	410947.738	415089.706	159.556	1.360	1350					
							0	1.000	158.196	150
S2	410956.240	415092.419	158.878	1.451	1350					
							1	1.000	157.502	150
							0	1.001	157.427	225
S3	410979.156	415108.764	156.854	1.444	1350					
							1	1.001	155.410	225
							0	1.002	155.410	225
S4	410999.080	415117.416	155.299	1.515	1350					
							1	1.002	153.859	225
							0	1.003	153.784	300
S5	411028.141	415139.166	152.705	1.685	1350					
							1	1.003	151.020	300
							0	1.004	151.020	300
S6	411037.773	415152.382	151.528	2.143	1350					
							1	1.004	149.385	300
							0	1.005	149.385	300
S14	411057.116	415189.737	149.542	2.062	1350					
							0	2.000	147.480	225
S7	411068.056	415175.249	148.812	2.450	1350					
							1	2.000	146.587	225
							2	1.005	146.512	300
							0	1.006	146.362	450
S8	411063.707	415227.582	147.043	1.425	1350					
							0	3.000	145.618	225
S9	411098.720	415184.037	147.986	1.976	1350					
							0	4.000	146.010	225
S11	411093.637	415194.565	147.324	2.858	1350					
							1	4.000	144.841	225
							2	3.000	145.357	225
							3	1.006	144.616	450
							0	1.007	144.466	600
S12	411097.912	415196.822	147.338	2.884	1350					
							1	1.007	144.454	600
							0	1.008	144.454	600
TANK	411099.317	415197.507	147.236	4.142	1200					
							1	1.008	144.450	600

### Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	411101.868	415215.539	145.800	2.750	2100					
							0	1.009	143.050	600
2	411101.233	415218.138	145.800	2.763	2100					
							1	1.009	143.037	600

### Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	19.000	Drain Down Time (mins)	60
Ratio-R	0.330	Additional Storage (m <sup>3</sup> /ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

### Storm Durations

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

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

### Node 2 Online StormBrake™ Control

Flap Valve	x	Design Flow (l/s)	3.5
Replaces Downstream Link	✓	Product Code	FPM-SB1-02063-00350-1100
Invert Level (m)	143.037	Min Outlet Diameter (m)	0.100
Design Depth (m)	2.063	Min Node Diameter (mm)	1200

### Node 1 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	22.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	143.050	Main Channel Slope (1:X)	500.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.600

### Inlets TANK

Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )
0.000	390.0	0.0	2.000	390.0	0.0	2.001	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	97.427	27.568	30 year 360 minute summer	32.279	8.307
1 year 15 minute winter	68.370	27.568	30 year 360 minute winter	20.982	8.307
1 year 30 minute summer	65.213	18.453	30 year 480 minute summer	25.473	6.732
1 year 30 minute winter	45.763	18.453	30 year 480 minute winter	16.923	6.732
1 year 60 minute summer	45.726	12.084	30 year 600 minute summer	20.893	5.715
1 year 60 minute winter	30.379	12.084	30 year 600 minute winter	14.275	5.715
1 year 120 minute summer	29.443	7.781	30 year 720 minute summer	18.644	4.997
1 year 120 minute winter	19.561	7.781	30 year 720 minute winter	12.530	4.997
1 year 180 minute summer	23.288	5.993	30 year 960 minute summer	15.343	4.040
1 year 180 minute winter	15.138	5.993	30 year 960 minute winter	10.163	4.040
1 year 240 minute summer	18.832	4.977	30 year 1440 minute summer	11.157	2.990
1 year 240 minute winter	12.511	4.977	30 year 1440 minute winter	7.498	2.990
1 year 360 minute summer	14.747	3.795	100 year +30% CC 15 minute summer	400.651	113.370
1 year 360 minute winter	9.586	3.795	100 year +30% CC 15 minute winter	281.159	113.370
1 year 480 minute summer	11.830	3.126	100 year +30% CC 30 minute summer	272.062	76.984
1 year 480 minute winter	7.860	3.126	100 year +30% CC 30 minute winter	190.921	76.984
1 year 600 minute summer	9.836	2.690	100 year +30% CC 60 minute summer	188.962	49.937
1 year 600 minute winter	6.720	2.690	100 year +30% CC 60 minute winter	125.542	49.937
1 year 720 minute summer	8.880	2.380	100 year +30% CC 120 minute summer	118.293	31.261
1 year 720 minute winter	5.968	2.380	100 year +30% CC 120 minute winter	78.591	31.261
1 year 960 minute summer	7.450	1.962	100 year +30% CC 180 minute summer	90.913	23.395
1 year 960 minute winter	4.935	1.962	100 year +30% CC 180 minute winter	59.096	23.395
1 year 1440 minute summer	5.581	1.496	100 year +30% CC 240 minute summer	71.499	18.895
1 year 1440 minute winter	3.750	1.496	100 year +30% CC 240 minute winter	47.502	18.895
30 year 15 minute summer	238.477	67.481	100 year +30% CC 360 minute summer	54.301	13.974
30 year 15 minute winter	167.352	67.481	100 year +30% CC 360 minute winter	35.297	13.974
30 year 30 minute summer	160.302	45.360	100 year +30% CC 480 minute summer	42.638	11.268
30 year 30 minute winter	112.492	45.360	100 year +30% CC 480 minute winter	28.327	11.268
30 year 60 minute summer	110.635	29.238	100 year +30% CC 600 minute summer	34.829	9.527
30 year 60 minute winter	73.503	29.238	100 year +30% CC 600 minute winter	23.797	9.527
30 year 120 minute summer	69.224	18.294	100 year +30% CC 720 minute summer	30.972	8.301
30 year 120 minute winter	45.991	18.294	100 year +30% CC 720 minute winter	20.815	8.301
30 year 180 minute summer	53.400	13.742	100 year +30% CC 960 minute summer	25.339	6.672
30 year 180 minute winter	34.711	13.742	100 year +30% CC 960 minute winter	16.785	6.672
30 year 240 minute summer	42.212	11.155	100 year +30% CC 1440 minute summer	18.262	4.894
30 year 240 minute winter	28.045	11.155	100 year +30% CC 1440 minute winter	12.273	4.894

**Results for 1 year Critical Storm Duration. Lowest mass balance: 93.11%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	S1	10	158.234	0.038	6.6	0.0549	0.0000	OK
15 minute winter	S2	10	157.482	0.055	18.3	0.0783	0.0000	OK
15 minute winter	S3	10	155.480	0.069	27.3	0.0994	0.0000	OK
15 minute winter	S4	10	153.855	0.071	38.5	0.1015	0.0000	OK
15 minute winter	S5	10	151.102	0.082	55.2	0.1174	0.0000	OK
15 minute winter	S6	10	149.477	0.092	60.0	0.1312	0.0000	OK
15 minute winter	S14	10	147.540	0.060	16.9	0.0856	0.0000	OK
15 minute winter	S7	10	146.469	0.107	97.6	0.1536	0.0000	OK
15 minute winter	S8	11	145.713	0.094	14.7	0.1352	0.0000	OK
15 minute winter	S9	10	146.062	0.052	18.0	0.0749	0.0000	OK
15 minute winter	S11	11	144.762	0.296	128.9	0.4237	0.0000	OK
15 minute winter	S12	11	144.723	0.269	128.1	0.3848	0.0000	OK
720 minute winter	TANK	585	143.484	0.390	14.7	0.4410	0.0000	OK
720 minute winter	1	585	143.484	0.434	8.9	1.5031	0.0000	OK
720 minute winter	2	615	143.483	0.446	5.9	1.5441	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	S1	1.000	S2	6.5	1.900	0.131	0.0307	
15 minute winter	S2	1.001	S3	18.2	2.050	0.130	0.2510	
15 minute winter	S3	1.002	S4	27.0	2.667	0.193	0.2199	
15 minute winter	S4	1.003	S5	38.3	2.709	0.124	0.5134	
15 minute winter	S5	1.004	S6	54.8	3.245	0.155	0.2764	
15 minute winter	S6	1.005	S7	59.2	3.337	0.193	0.6749	
15 minute winter	S14	2.000	S7	16.7	2.036	0.144	0.1493	
15 minute winter	S7	1.006	S11	97.1	2.902	0.128	1.1736	
15 minute winter	S8	3.000	S11	14.2	0.915	0.359	0.6937	
15 minute winter	S9	4.000	S11	17.9	2.652	0.108	0.0790	
15 minute winter	S11	1.007	S12	128.1	0.984	0.375	0.6302	
15 minute winter	S12	1.008	TANK	128.5	1.161	0.371	0.1731	
720 minute winter	TANK	Flow through pond	1	8.9	0.006	0.004	160.6906	
720 minute winter	1	1.009	2	5.9	0.245	0.012	0.5928	
720 minute winter	2	StormBrake™		2.9				103.1

**Results for 30 year Critical Storm Duration. Lowest mass balance: 93.11%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	S1	10	158.259	0.063	16.1	0.0901	0.0000	OK
15 minute winter	S2	10	157.514	0.087	45.0	0.1246	0.0000	OK
15 minute winter	S3	10	155.527	0.117	67.1	0.1668	0.0000	OK
15 minute winter	S4	10	153.897	0.113	94.6	0.1622	0.0000	OK
15 minute winter	S5	10	151.157	0.137	135.5	0.1962	0.0000	OK
15 minute winter	S6	10	149.538	0.153	147.3	0.2191	0.0000	OK
15 minute winter	S14	10	147.579	0.098	41.4	0.1409	0.0000	OK
15 minute winter	S7	10	146.533	0.171	239.8	0.2446	0.0000	OK
15 minute winter	S8	11	145.787	0.169	36.0	0.2424	0.0000	OK
15 minute summer	S9	9	146.090	0.080	41.9	0.1146	0.0000	OK
15 minute winter	S11	10	144.966	0.500	317.1	0.7160	0.0000	OK
15 minute winter	S12	11	144.896	0.442	313.6	0.6318	0.0000	OK
960 minute winter	TANK	930	144.177	1.083	25.0	1.2244	0.0000	OK
960 minute winter	1	930	144.177	1.126	14.8	3.9020	0.0000	SURCHARGED
960 minute winter	2	930	144.177	1.140	11.1	3.9490	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	S1	1.000	S2	16.0	2.397	0.321	0.0596	
15 minute winter	S2	1.001	S3	44.8	2.569	0.320	0.4915	
15 minute winter	S3	1.002	S4	66.4	3.346	0.475	0.4313	
15 minute winter	S4	1.003	S5	94.2	3.385	0.306	1.0110	
15 minute winter	S5	1.004	S6	134.7	3.992	0.381	0.5520	
15 minute winter	S6	1.005	S7	145.9	4.193	0.475	1.3209	
15 minute winter	S14	2.000	S7	41.1	2.572	0.355	0.2901	
15 minute winter	S7	1.006	S11	239.0	2.883	0.316	3.0074	
15 minute winter	S8	3.000	S11	34.8	1.132	0.879	1.3714	
15 minute summer	S9	4.000	S11	41.9	3.102	0.253	0.1859	
15 minute winter	S11	1.007	S12	313.6	1.323	0.919	1.1435	
15 minute winter	S12	1.008	TANK	314.0	1.556	0.906	0.3146	
960 minute winter	TANK	Flow through pond	1	14.0	0.008	0.006	430.8999	
960 minute winter	1	1.009	2	11.1	0.264	0.023	0.7535	
960 minute winter	2	StormBrake™		2.9				140.7

**Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 93.11%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	S1	10	158.283	0.087	27.1	0.1250	0.0000	OK
15 minute winter	S2	10	157.544	0.117	75.6	0.1672	0.0000	OK
15 minute winter	S3	10	155.579	0.169	112.8	0.2418	0.0000	OK
15 minute winter	S4	10	153.937	0.153	158.9	0.2185	0.0000	OK
15 minute winter	S5	10	151.214	0.194	227.6	0.2774	0.0000	OK
15 minute winter	S6	10	149.606	0.220	247.5	0.3155	0.0000	OK
15 minute winter	S14	10	147.617	0.137	69.6	0.1960	0.0000	OK
15 minute winter	S7	10	146.598	0.236	402.7	0.3380	0.0000	OK
15 minute winter	S8	11	146.111	0.493	60.5	0.7056	0.0000	SURCHARGED
15 minute winter	S9	10	146.116	0.106	74.1	0.1510	0.0000	OK
15 minute winter	S11	10	145.184	0.718	529.7	1.0273	0.0000	SURCHARGED
15 minute winter	S12	10	145.067	0.613	526.1	0.8769	0.0000	SURCHARGED
1440 minute winter	TANK	1140	144.953	1.859	145.7	2.1030	0.0000	OK
1440 minute winter	1	1140	144.955	1.905	137.9	6.5973	0.0000	SURCHARGED
1440 minute winter	2	1140	144.956	1.919	11.2	6.6479	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	S1	1.000	S2	26.9	2.697	0.540	0.0891	
15 minute winter	S2	1.001	S3	75.3	2.833	0.538	0.7432	
15 minute winter	S3	1.002	S4	111.6	3.697	0.798	0.6546	
15 minute winter	S4	1.003	S5	158.2	3.754	0.513	1.5276	
15 minute winter	S5	1.004	S6	226.3	4.361	0.641	0.8475	
15 minute winter	S6	1.005	S7	245.0	4.656	0.797	1.9994	
15 minute winter	S14	2.000	S7	69.1	2.891	0.596	0.4338	
15 minute winter	S7	1.006	S11	400.9	2.906	0.529	3.8902	
15 minute winter	S8	3.000	S11	57.7	1.453	1.454	1.7090	
15 minute winter	S9	4.000	S11	73.8	3.160	0.446	0.3393	
15 minute winter	S11	1.007	S12	526.1	1.868	1.542	1.3613	
15 minute winter	S12	1.008	TANK	525.3	1.957	1.516	0.4069	
1440 minute winter	TANK	Flow through pond	1	-145.7	0.007	-0.063	734.2139	
1440 minute winter	1	1.009	2	11.2	0.259	0.023	0.7535	
1440 minute winter	2	StormBrake™		3.4				245.3