

Development Site at Croston Road Drainage Strategy Report



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1				

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Job No

Reference

Date Created: 20th December 2011

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1 Understanding of the Requirements

1 Introduction

1.1 Understanding of the Requirements

AECOM have been commissioned by the Homes and Communities Agency a drainage strategy report for the proposed Development Site at Croston Road, Leyland, Lancashire. We understand that this report will be used to support the Homes and Communities Agency planning application for the new residential site.

The agreed deliverables of this report are to be achieved with the following actions:

1. Review existing drainage information (obtained from United Utilities) and highlight any additional information that is required;
2. Consultation with the Environment Agency (EA) to determine any restrictions on peak flow rates and storage requirements based on these consultations. Consultation with United Utilities (UU) to discuss any capacity issues with the public sewers that we intend to connect to, and subsequent flow restrictions;
3. Preparation of conceptual sketches identifying the location of potential outfalls for both foul and surface water drainage. The conceptual design will be based upon on existing information and the aforementioned consultations, adopting SUDS to attenuate flows as necessary based on greenfield runoff rates as agreed with the Environment Agency and/or United Utilities.
4. Make recommendations for additional work / investigations required to progress through to the preliminary and detailed design in the future.

2 Existing Site

2 Existing Drainage and Catchments

2.1 Existing Site and Drainage Outfalls

The existing site is currently a greenfield and drained by ditches and ponds with the proposed drainage design as shown on the Baldwin Design development layout drawing, resembling the existing drainage conditions using infiltration techniques including swales and new ponds. Percolation tests will be required to determine suitability of these techniques and it is vital that any proposal to use soakaways is first agreed with Lancashire Councils' Groundwater and Contaminated Land Team in order to ensure that sensitive aquifers do not become polluted.

The main drainage feature is the River Lostock to the east of the site. United Utilities records show that there are a number of outfalls to the river, which indicates that this has the potential to be a good point of outfall for the surface water drainage for part of the site to the north of Bannister Lane. However, for the proposed outfall to the River Lostock provisions will need to be made for an easement and construction through third party land. Appendix B includes a sketch showing the location of drainage features and potential surface water outfalls.

It is recommended that the River Lostock and the catchments it serves, is reviewed as part of the site specific Flood Risk Assessment report. We have had early discussions with the EA with a view to utilising the River Lostock as a possible outfall point particularly for part of the northern site (2b).

The 900mm diameter culvert to the south of the development (in Hugh Lane) is United Utilities preferred point of connection for the surface water runoff from the development (Manhole reference 8102). This manhole is approximately 2m deep to invert level and subject to the topography of the proposed development site may provide an opportunity for a connection. UU have stated that this culvert is not their asset and the EA have confirmed that isn't their asset either, therefore identification of ownership and approval to discharge will need to be sought during the preliminary design stage.

From United Utilities perspective, **only** once the SUDS options have been considered and ruled out as not appropriate or possible, would discharging the surface water runoff into the public sewer be an acceptable option. United Utilities have a public sewer located in Heatherleigh (manhole reference 8105) and that could provide an opportunity for a connection, given that the pipe diameter is 450mm. However, this sewer is only 1.2m deep and its suitability would be dependant upon the topography of the site.

A site this size is too large to be able to quote the standard greenfield runoff rate of 5 litres per second per hectare. In order for UU to approve a specific flow rate, they have requested the use of the Institute of Hydrology Report No. 124: Flood Estimation Handbook for Small Catchments (FEH) for determining a greenfield runoff rate. The EA has also requested that flow rates into River Lostock be limited to greenfield runoff based on FEH / IH124 calculations. Our review of IH124, and use of WinDes to determine a 'Quick Storage Estimate' provides a discharge rate for the 40Ha site of 255l/s. (Appendix C). However; the greenfield runoff rate using 5l/s gives a total runoff of 200l/s so for this drainage strategy we will use the more conservative greenfield runoff rate of 200l/s.

From UU records it would appear that there are combined sewers surrounding both development plots so providing consent to discharge can be obtained from UU then discharging the foul drainage would not be an issue. Foul drainage is discussed further later in this report.

3 Surface Water Drainage

3 Surface Water Drainage Design

3.1 Drainage Design Overview

Planning Policy Statement 25 (PPS25) identifies the SUDS hierarchy to be explored in the drainage strategy for a new development, as living roofs, basins and ponds, filter strips and swales, infiltration devices, permeable surfaces and filter drains and tanked systems. The draft development drawings propose to utilise the existing ditches and ponds and provide new ponds to provide the required attenuation. The options for SUDS should be further reviewed during the preliminary and detailed design.

The various drainage design elements of the scheme will be required to work as a whole, whilst also meeting specific constraints and requirements unique to the element they each service. These elements are categorised as follows;

Highway Drainage: The drainage system for the proposed adoptable highways within the site.

Building Drainage: The drainage system that is to serve the proposed residential buildings and associated permeable and impermeable areas (car parks, access roads, hard standing areas, verges).

Integration of both Highways & Building Drainage: Whilst it is feasible to discharge some drainage into ponds and swales, it may be necessary to combine as a single drainage network.

3.2 Highway Drainage

The drainage infrastructure for the highway scheme, according to the requirements set out in Sewers for Adoption 6th Edition, shall be designed to store all surface water runoff for a 1 in 30 return period design storm, with no flooding occurring for this return period.

The surface drainage that is to discharge into the River Lostock will need to have a flow rate that has been agreed with the Environment Agency, with an additional 20% flow allowance included for climate change in accordance with PPG 25.

Should the highways drainage be suitable for the use of SUDS the system will be designed in accordance with CIRIA document C697: 'The SUDS Manual' and also in accordance with Wallingford document W5-074/A/TR/1 - Preliminary rainfall runoff management for developments'.

For collecting the surface run-off from the highways, it is anticipated that a conventional kerb and gully system will be used, however, combined kerb drainage systems could be used as an alternative, to provide additional online storage upstream of the main attenuation feature.

A petrol interceptor and silt trap with refuse screen may be required to be incorporated in the highway drainage design should there be large areas of car parking. These elements are included in order to maintain the runoff water quality entering River Lostock and assist the maintenance regime for the attenuation feature. Guidance on such measures has been taken from PPG3: 'The Pollution Prevention Guidelines - Use and design of oil separators in surface water drainage systems'.

3.3 Building Drainage

The Building drainage, assumed to be designed by the Architect, should be designed in accordance with Building Regulations: Part H and satisfy the Building control officer during construction.

Confirmation of the position of the foul outlets to the buildings will also be required to develop the foul drainage design and confirm the location of suitable connections to the United Utilities Public Sewers and the topography of the site. Possible locations of foul connection points are detailed in the section of this report dealing with foul drainage.

3.4 Integration of Highway and Building Drainage Systems

The adoptable highway drainage infrastructure is to be designed for a 30 year return period plus 20% additional flow allowance for climate change. The building drainage design is to be designed for a 100 year return period. The three drainage systems (Building, Highways & Car parks) will discharge into different locations dependant on the feasibility of discharging to the nearest swale, pond, carrier pipe or the River Lostock.

4 Surface Water – Design Approach

4 Surface Water Drainage Design Approach

4.1 Description of the Site

Architect Baldwin Design Consultancy have provided AECOM with a layout of the proposed development site to the south of Bannister Lane (Drawing No LH/CR/MP/01) shown in Appendix A which we have used to assess the impermeable and permeable areas contributing to the surface water run-off. However, for the development site to the north of the Bannister Lane a layout plan is not yet available, therefore we have used the same ratio of permeable and impermeable areas as for the southern site to determine the total run-off.

For the drainage strategy report, we have assessed 40% of the total area as impermeable. A more accurate assessment of the permeable areas for the site will need to be made once an AutoCAD version of the development plans and details of the northern site are available. The total area for the site is as follows:

- Approx Site 1, south of Bannister Lane – 15 Ha
- Approx Site 2a, northern part of the site to the north of Bannister Lane – 15 Ha
- Approx Site 2b, southern part of the site to the north of Bannister Lane – 10 Ha

Total – **40 Ha**

4.2 Attenuation

For catchments that are more than 60% permeable, the method of determining the rural runoff rate is the Institute of Hydrology Report 124: Flood Estimation for Small Catchments (IH124 Method). This is carried out using Microdrainage Source Control Software which allows the user to input the variables needed to calculate the rural runoff for specific return periods.

AECOM's initial conversations with the Environment Agency Flood Risk and Development Officer (Gareth Owen) on 15th December 2011 reached an agreement in principle that all proposed outfalls into any Environment Agency asset will be restricted to the rural runoff peak flow as calculated using the IH124 method.

From our review of IH124, and use of WinDes to determine a 'Quick Storage Estimate' a discharge rate for the 40Ha site of 255l/s has been calculated (Appendix C). However; as the greenfield runoff rate using 5l/s gives a total runoff of 200l/s we propose to use this figure for this drainage strategy as it is more conservative.

4.3 Description of Outfalls and Attenuation

Subject to a suitable topography of the development site to allow a gravity drainage network, we anticipate two outfalls, one from the north (site 2a) approximately 10Ha in size taking surface water directly into the River Lostock to the east; and the second from site 1 to the 900mm dia culvert in Hugh Lane (manhole 8102). Appendix B includes a sketch showing the location of drainage features and potential surface water outfall locations

Using the green field runoff rate of 5l/s/Ha the discharge rate for site 2a will be limited to 50l/s and a holding pond of approximately 1950m³ is required. The exact location of this pond or other attenuation feature will require agreement with the Architect during the preliminary design stage.

For the outfall to the River Lostock, provision will need to be made for an easement and construction through third party land. If agreements cannot be reached to take the drainage from site 2a to the River Lostock, it may be possible to combine the flows with the proposal for sites 1 and 2b, by increasing the storage, i.e. providing larger ponds or other attenuation methods.

A further option for the site to the north of Bannister Road (2b) would be to construct a drain to outfall to a UU public sewer located in Riverside Avenue to the east of the site (manhole reference 2602). This sewer is shallow at 2.26m deep, so the ability to provide a gravity connection will depend upon the topography of the site. This option would also require an easement to construct a sewer through private land in the

vicinity of 398 Croston Road. Alternatively it may be possible to find a route along adopted highway of Croston Road but this will require further investigation when the development layout to the north of Bannister Lane has been prepared.

The total discharge from sites 1 and 2b based upon the same run-off calculations is 150l/s. We propose to discharge Site 2b to the north of Bannister Lane, through site 1 to the outfall in Hugh Lane (manhole referenced 8102). Therefore site 1 will be designed with an allowance of 75l/s from site 2b, with the total discharge into the 900 diameter culvert in Hugh Lane being 150 l/s. Two holding ponds (one being the existing pond in the south-west of site (1a) will be required within each site designed to retain approximately 2,900m³.

The proposed drainage networks have been modelled using Microdrainage software (WinDes Version 12.5).

4.4 Storm Return Periods

The Design Manual for Roads and Bridges (DMRB), Volume 4 Section 2 Part 3 (HD 33/06 Surface and Sub-Surface Drainage Systems for Highways) states that sealed carrier drains must be designed for a return period of one year with no surcharge. The networks must also be designed to ensure that surcharge levels for the return period of 5 years do not exceed the cover levels of the manhole / catchpit chambers. An allowance for climate change of 20% is also to be included.

CIRIA C697 The SUDS Manual, states the drainage system should be designed to cater for the 30 year return period without causing significant unplanned flooding. It also states that for the 100 year return period, protection against flooding from any watercourse also needs to be considered. Therefore any online storage (ponds and swales currently anticipated) directly upstream of a watercourse is required to be designed to accommodate the maximum water level for the 100 year return period critical storm.

4.5 The Proposed Drainage Layouts

The highway runoff from the proposed highway, car parking and private drives will be conveyed to sealed carrier drains via ancillary drainage to the proposed storage ponds and swales. This ancillary drainage we anticipate will be in the form of kerb and gullies, as per details shown in the Manual of Contract Documents for Highway Works; Highway Construction Details. The use of kerb drains may also be employed; however the precise method of surface water collection is beyond the scope of this report and should be confirmed at the preliminary design stage.

4.6 Earthworks and Land Drainage

At this stage it is not known whether there will be a need to utilise earthworks in the development (landscape mounding or terracing). If earthworks are adopted then filter drains are usually used to collect run-off and convey to the carrier pipe network and into the proposed attenuation features

4.7 Contributing Areas

The design of the drainage pipe network does not form part of this commission, but will be developed during the preliminary design. For this report we have determined approximate impermeable areas for the purpose of calculating and obtaining 'in principle' agreement to the run-off from the EA.

For development of the surface water drainage design, the contributing area for each pipe is calculated, from the impermeable areas (made up of carriageways, footways and cycleways) and permeable areas (made up of roadside verges, earthworks). For permeable areas, a runoff coefficient is applied. The runoff coefficient for a permeable area can be between 0 and 0.3 (Table E.3 2008, from BS EN 752:2008). For this scheme a figure of 0.3 will be used. Design Manual for Roads and Bridges Volume 4: HA37/97 can then be used to determine the effective width (W_e) of a section of highway using the formula: $W_e = W + a$. W = width of impermeable part of catchment, a = runoff coefficient for the permeable area of cutting, and is the average plan width of the cutting (in metres).

4.8 Pollution Control Measures

The adoption of SUDS has a beneficial effect over conventional drainage for the control of pollution from surface water run-off. In swales the runoff flows across the surface, being filtered and trapped by vegetation, which traps silt and solid contaminants; in ponds and wetlands runoff is held back long enough for solids to settle and plants such as reeds can be used to treat the pollutants. In infiltration devices/ soakaways as the runoff soaks into the ground it is filtered and biological action reduces organic pollutants.

Depending upon the size of car parking within the development oil separators may be required upstream of the outfall locations to prevent pollution entering the water courses. This is a requirement set out in The Environment Agency published document: Pollution Prevention Guideline - Use and design of oil separators in surface water drainage systems: PPG3.

Earthworks drainage, if required, will incorporate sumps to reduce the risk of sand / silt reaching the outfall. This level of detail is outside the scope of this report and should be developed in the preliminary and detailed design stages.

5 Foul Drainage

5 Foul Drainage

5.1 Existing Layout and Potential Connections

Appendix D shows the United Utilities records with locations of possible outfalls for the foul drainage.

The site north of Bannister Lane (sites 2a and 2b) a number of potential outfalls to the UU manholes running through the site (between the manholes 3004, to the north-east and 8701, to the south-west) into a 675mm dia combined sewer which has a depth varying between 6.78m and 3.79m.

The southern site 1, has the potential to outfall to the same 675mm diameter combined sewer between the manholes 8601 and 7302. The invert depths are 2.78m and 3.94m respectfully.

In addition, there are other potential foul outfalls along Croston Road utilising the 375mm / 450mm diameter combined sewer. The depth of the pipe varies between 2.62m at manhole 2705 and 4.51m at manhole 0201.

5.2 Consultation with United Utilities

From early discussions with UU regarding foul water discharges, the conceptual design should split the proposed connections to the public sewers using a number of connection points. UU have suggested a typical foul flow rate of 0.05l per dwelling for the purposes of this drainage strategy. For this site this equates to a total of 30 l/sec.

Using guidance given in the document 'Surveyor 30 Jan 1992', the dry weather flow rate (DWF) for a general housing dwelling is 600 litres per day per property. Foul sewer design is based on 6 times DWF+10%. Therefore for the proposed site it equates to 27.5 litres/second.

The combined sewer between MH 3004 and 7302 has an easement in place at a width of 4m either side of the pipe (8m total width). This easement cannot be mitigated via a Build-over Agreement in this instance, due to the critical nature of this pipe in the United Utilities network.

United Utilities have identified their future plans to upgrade the local Leyland Treatment Plant (which will ultimately take the foul discharge of the development). The proposals for the upgrade have not progressed beyond identification of the scheme, but UU have requested that the Croston Road development proposals are discussed further at the preliminary design stage as they have concerns that capacity may be an issue.

The foul drainage design and network should be developed at preliminary design when the site layout has been suitably developed, when the locations of foul outlets to buildings are known in conjunction with a topographical survey is available.

6 Recommendations

6 Recommendations

6.1 Further Investigations

The following investigations, discussions and reports are recommended to support any future planning application and provide information to progress the drainage design through preliminary and detail design stages:

- Early discussions and negotiation with United Utilities are recommended to confirm the current restriction over the 8m wide easement on the 675mm dia public sewer running through both the northern and southern sites. United Utilities have stated that this easement cannot be mitigated via a Build-over Agreement, due to the critical nature of this pipe in the United Utilities network. This would appear to affect the layout for the additional plot of land to the west of site 1 south of Bannister Lane.
- Further discussions with United Utilities regarding their future plans to upgrade the Leyland Treatment Plant and measures to mitigate the anticipated under capacity of the plant to treat the foul discharge from the development.
- Discussions with 3rd parties to explore the option of taking flows from the site directly into the River Lostock.
- Commissioning of a topographical survey including the corridor to the River Lostock. The survey should include identification of the proposed UU manholes including invert levels.
- Geotechnical desk based study followed by ground investigation site works to determine ground conditions, obtain and evaluate data on subsurface soil including permeability, bedrock and groundwater conditions at the site. Furthermore the ground investigation should also provide information on contaminants such as oil, organic substances and toxic metals that could affect the ability to use infiltration as a SUDS option.
- Commission a CCTV survey with condition report and connectivity survey of the existing foul and surface sewers.
- Connectivity survey of the existing ditches and ponds including identification of outfalls away from the site.
- As stated previously as the development site is greater than 1 Ha in size, a site specific Flood Risk Assessment will be required to support any future planning application.
- An Environmental Impact Assessment will be required for any future planning application to ensure that the proposed drainage strategy does not have an adverse impact on the existing environment in particular the existing ponds and ditches.

Appendix A

Appendix A - Baldwin Design Consultancy Drawing No LH/CR/MP/01

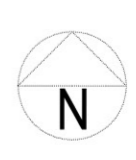
Key

-  2 & 3 Bed mews housing
-  3 & 4 Bed detached family housing
-  Footpath links
-  Existing surrounding built environment
-  Trees and vegetation retained
-  Green linkage corridors
-  Existing drainage ditches
-  Development served off Hugh Lane
-  Development served off Bannister Lane
- ① Proposed alterations to existing junction
- ② Proposed primary access to new development
- ③ Proposed additional access, with highway improvements
- ④ Emergency link
- ⑤ Green lung at primary access point
- ⑥ Landmark building
- ⑦ Existing play area
- ⑧ Retained pond
- ⑨ Proposed pond
- ⑩ Existing electricity pylon
- ⑪ Proposed green walk linkage
- ⑫ Small area of development served off Hugh Lane. Buildings to front out towards Heatherlea
- ⑬ Small area of development served off Bannister Lane with upgraded road and turning facility.



Baldwin Design
 Consultancy Ltd

A - 09/11/11 - Highway engineers comments incorporated



Project Title:
Residential Redevelopment

Address:
**Croston Road,
 Leyland.**

Drawing:
Proposed Site Layout

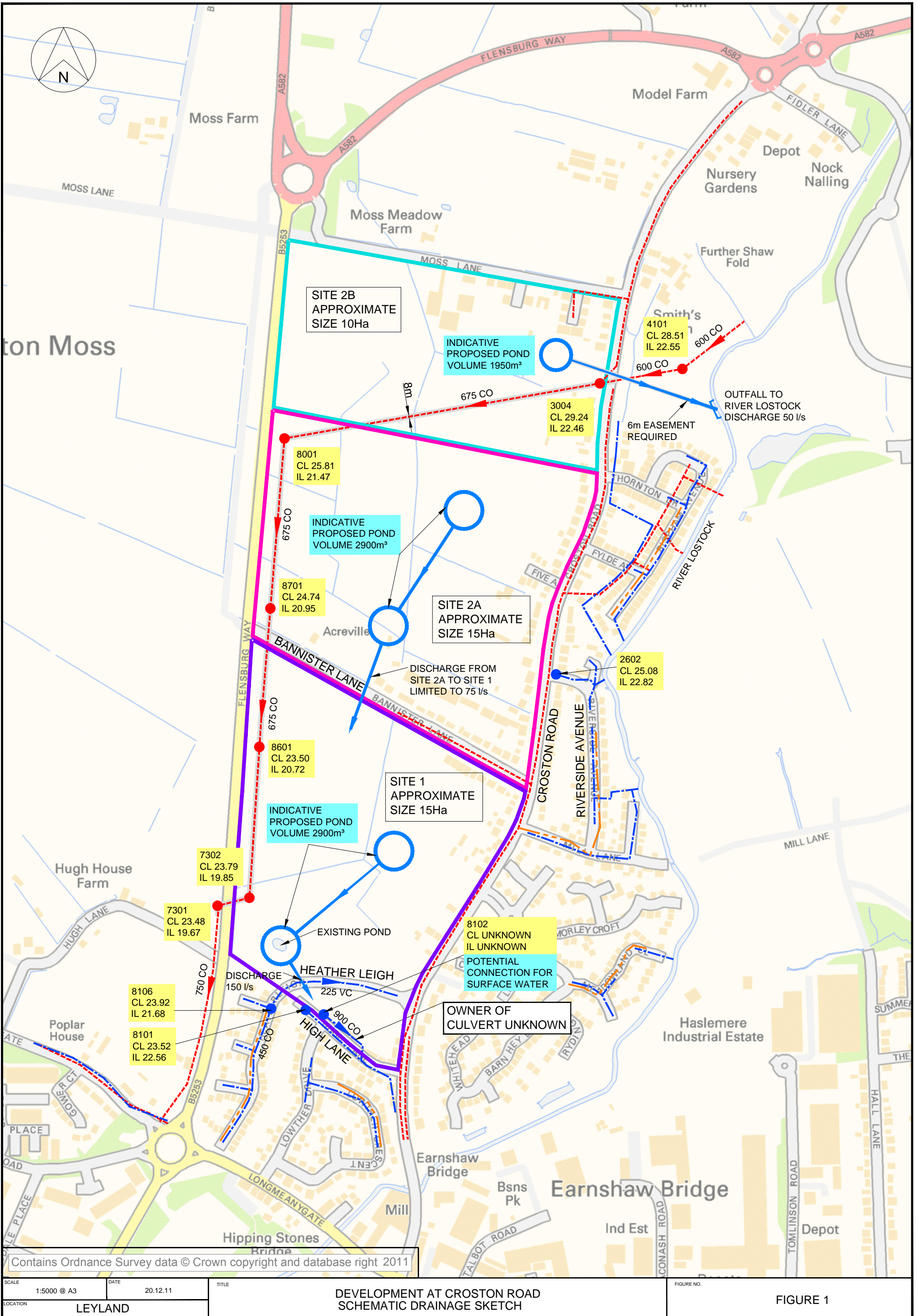
Drawing No:
LH/CR/MP/01

Drawn: GB Date: 28/10/10
 Scale: 1:1000 Paper Size: A1

Town Farm, 17 Oxford Close, Gillingham, Warrington, Cheshire, WA3 3WP Tel: 01942 719513 e-mail: graham.baldwin@bdc.co.uk

Appendix B

Appendix B – Drainage Strategy Concept Plan



Contains Ordnance Survey data © Crown copyright and database right 2011

SCALE	DATE	TITLE
1:5000 @ A3	20.12.11	
LOCATION	LEYLAND	

DEVELOPMENT AT CROSTON ROAD
SCHEMATIC DRAINAGE SKETCH

FIGURE NO.

FIGURE 1

Appendix C

Appendix C – Quick Storage Estimate

Site 1 & 2A 1 in 30 Year Storage

Quick Storage Estimate

Variables | Result | Design | Overview 2D | Overview 3D | Vt

Region:

Return Period (years):

Map:

Ratio R:

Cv (Summer):

Cv (Winter):

Impermeable Area (ha):

Maximum Allowable Discharge (l/s):

Infil Coefficient (m/hr):

Safety Factor:

Climate Change %:

Quick Storage Estimate

Variables | **Result** | Design | Overview 2D | Overview 3D | Vt

Global Variables require approximate storage of between 1624 m³ and 2512 m³.

These values are estimates only and should not be used for design purposes.

Site 1 & 2A
1 in 100 Year Storage

Quick Storage Estimate

Variables | Result | Design | Overview 2D | Overview 3D | Vt

Region	England & Wales	Cv (Summer)	0.750
Return Period (years)	100	Cv (Winter)	0.840
Map	M5-60 (mm)	Impermeable Area (ha)	6
	Ratio R	Maximum Allowable Discharge (l/s)	75
		Infil Coefficient (m/hr)	
		Safety Factor	2
		Climate Change %	20

Apply

Done Help

Quick Storage Estimate

Variables | **Result** | Design | Overview 2D | Overview 3D | Vt

Global Variables require approximate storage of between 2360 m³ and 3479 m³.

These values are estimates only and should not be used for design purposes.

Done Help

Site 2B
1 in 30 Year Storage

Variables	Result	Design	Overview 2D	Overview 3D	Vt
Region	England & Wales				
Return Period (years)	30				
Map	M5-60 (mm)	18.500			
Ratio R		0.344			
Cv (Summer)					0.750
Cv (Winter)					0.840
Impermeable Area (ha)					4
Maximum Allowable Discharge (l/s)					50
Infil Coefficient (m/hr)					
Safety Factor					2
Climate Change %					20

Buttons: Done, Help, Apply

Global Variables require approximate storage of between 1083 m³ and 1675 m³.


These values are estimates only and should not be used for design purposes.

Buttons: Done, Help

Site 2B
1 in 100 Year Storage

Quick Storage Estimate

Variables | Result | Design | Overview 2D | Overview 3D | Vt

Region	England & Wales	Cv (Summer)	0.750
Return Period (years)	100	Cv (Winter)	0.840
Map	M5-60 (mm)	Impermeable Area (ha)	4
	Ratio R	Maximum Allowable Discharge (l/s)	50
		Infil Coefficient (m/hr)	
		Safety Factor	2
		Climate Change %	20

Apply

Done Help

Quick Storage Estimate

Variables | **Result** | Design | Overview 2D | Overview 3D | Vt

Global Variables require approximate storage of between 1573 m³ and 2320 m³.

These values are estimates only and should not be used for design purposes.

Done Help

Quick Storage Estimate using IH124
Sites 1, 2A & 2B

ICP SUDS (FSR Method)

Return Period (yrs)	<input type="text" value="100"/>	FSR - Partly Urbanised Catchment (QBAR)	
Area (ha)	<input type="text" value="40.000"/>	Urban	<input type="text" value="0.000"/>
SAAR (mm)	<input type="text" value="963"/>	Region No.	<input type="text" value="10"/> ...
Soil	<input type="text" value="0.450"/>	<input type="button" value="Map"/>	

Results

QBAR rural (l/s)	<input type="text" value="255.2"/>
QBAR urban (l/s)	<input type="text" value="255.2"/>

Appendix D

Capabilities on project:

Error! Reference source not found.

Appendix D – United Utilities Mapping

**AECOM
Lynnfield House
Church Street
Altrincham
Cheshire
WA14 4DZ**

FAO: A ROBERTS

Dear Sirs

Location: BANNISTER LANE FARRINGTON MOSS PR26 6PT

I acknowledge with thanks your request dated 12/12/11 for information on the location of our services.

Please find enclosed plans showing the approximate position of our apparatus known to be in the vicinity of this site.

I attach General Condition Information sheets, which details contact numbers for additional services (i.e. new supplies, connections, diversions) which we are unable to deal with at this office. In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

I trust the above meets with you requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please telephone us on 0870 7510101.

Yours Faithfully,



Sue McManus
Operations Manager
Property Searches

United Utilities Water PLC

Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

DX 715568 Warrington

Telephone 0870 751 0101

Fax Number 0870 7510102

Property.searches@uuplc.co.uk

Your Ref: DOC-001

Our Ref: 11/ 842724

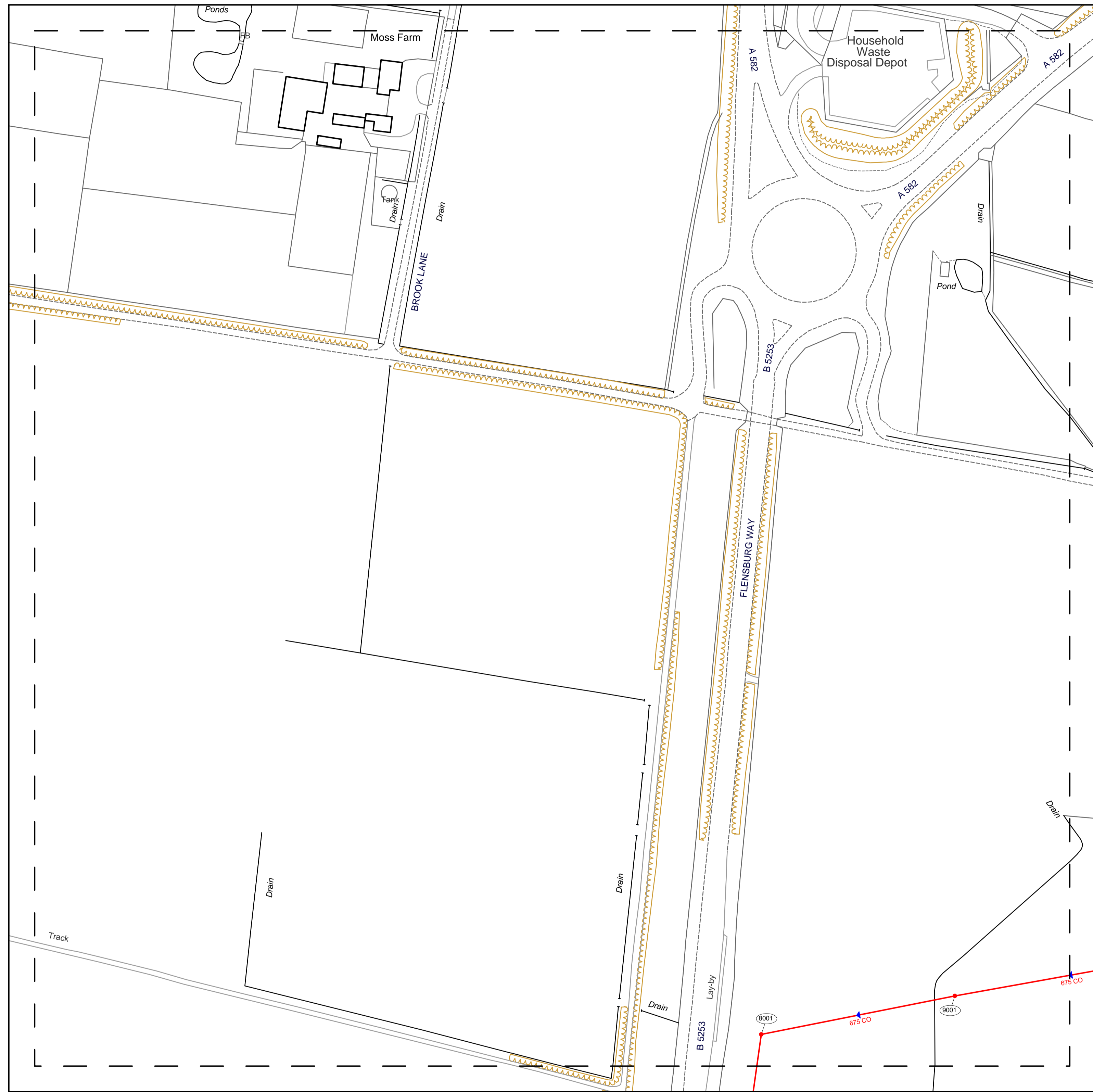
Date: 14/12/2011

TERMS AND CONDITIONS - WASTERWATER & WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UJW apparatus) of United Utilities Water PLC ("UJW").

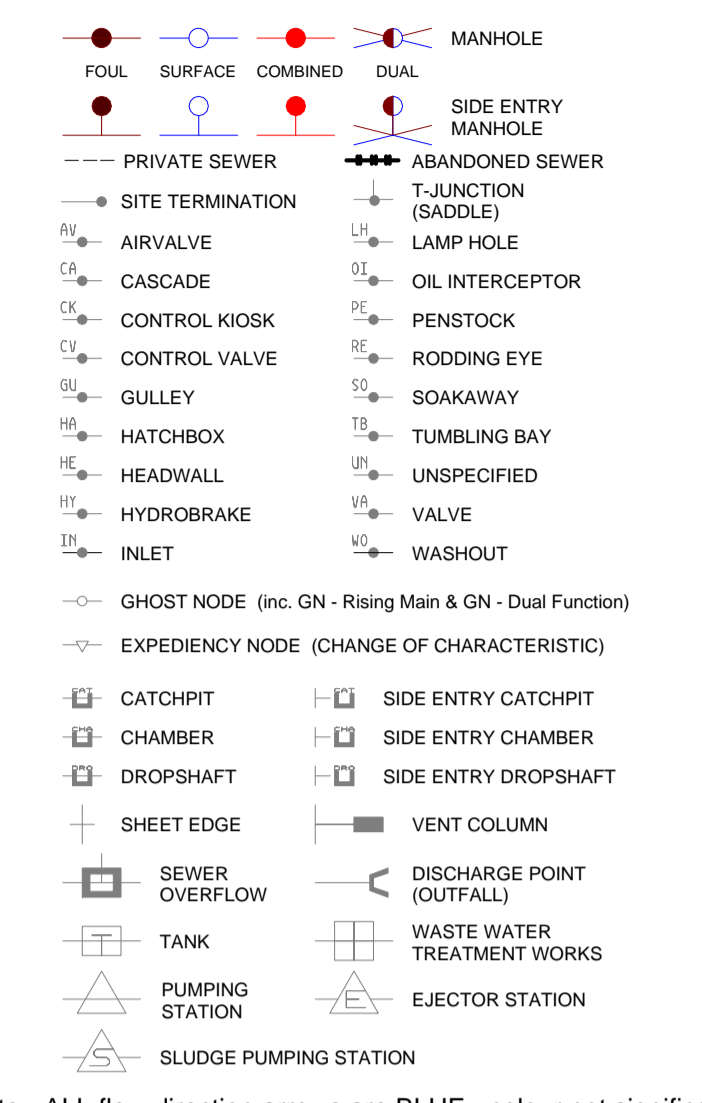
TERMS AND CONDITIONS:

1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
2. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
3. In particular, the position and depth of any UJW apparatus shown on the Map are approximate only. UJW strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UJW apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
4. The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
5. The position and depth of UJW apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UJW apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UJW apparatus by reason of the actual position and/or depths of UJW apparatus being different from those shown on the Map and any information supplied with it.
8. If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and effect.
9. This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UJW from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



Refno	Cover	Func	Type	Invert	Size	xSize	ySize	Shape	Matl	Grad	Length
8001	25.81	C	M	21.47	675			C	CO	539	86.18
9001	25.79	C	M	21.64	675			C	CO	681	95.31

WASTE WATER SYMBLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION	
F Foul	T Transition
S Surface	O Overflow
C Combined	U Unspecified
MANHOLE / NODE TYPE	
M Manhole	Z Ghost in Rising Main
J Junction	C Cascade
L Lamphole	Y Gully
H Hatchbox	E Ejector
R Rodding Eye	O Oil Injector
F Outfall	I Inlet
V Combined Sewer Overflow	B Hydrobrake
P Pumping Station	T Vent Column
S Soakaway	X Valve
D Dual Function Manhole	U Unspecified
W Treatment Works	Q Expediency Node
	G Ghost (to allow pipe bends)

SEWER SHAPE	
C Circular	T Trapezoidal
E Egg	A Arch
O Oval	B Barrel
F Flat Top	H Horseshoe
R Rectangular	U Unspecified
S Square	

SEWER MATERIAL	
AC Asbestos Cement	
BR Brick	
CI Cast Iron	
SI Spun (Grey) Iron	
CO Concrete	
CS Concrete Segments (Bolted)	
CS Concrete Segments (Unbolted)	
CC Concrete Box Culvert	
DI Ductile Iron	
GR Glass Reinforced Concrete	
GR Glass Reinforced Plastic	
PS Plastic / Steel Composite	
PV Polyvinyl Chloride	
PE Polyethylene	
RP Reinforced Plastic Matrix	
ST Steel	
VC Vitrified Clay (All Clayware)	
PP Polypropylene	
PF Pitch Fibre	
MA Masonry - In Regular Courses	
MA Masonry - Randomly Coursed	
U Unspecified	

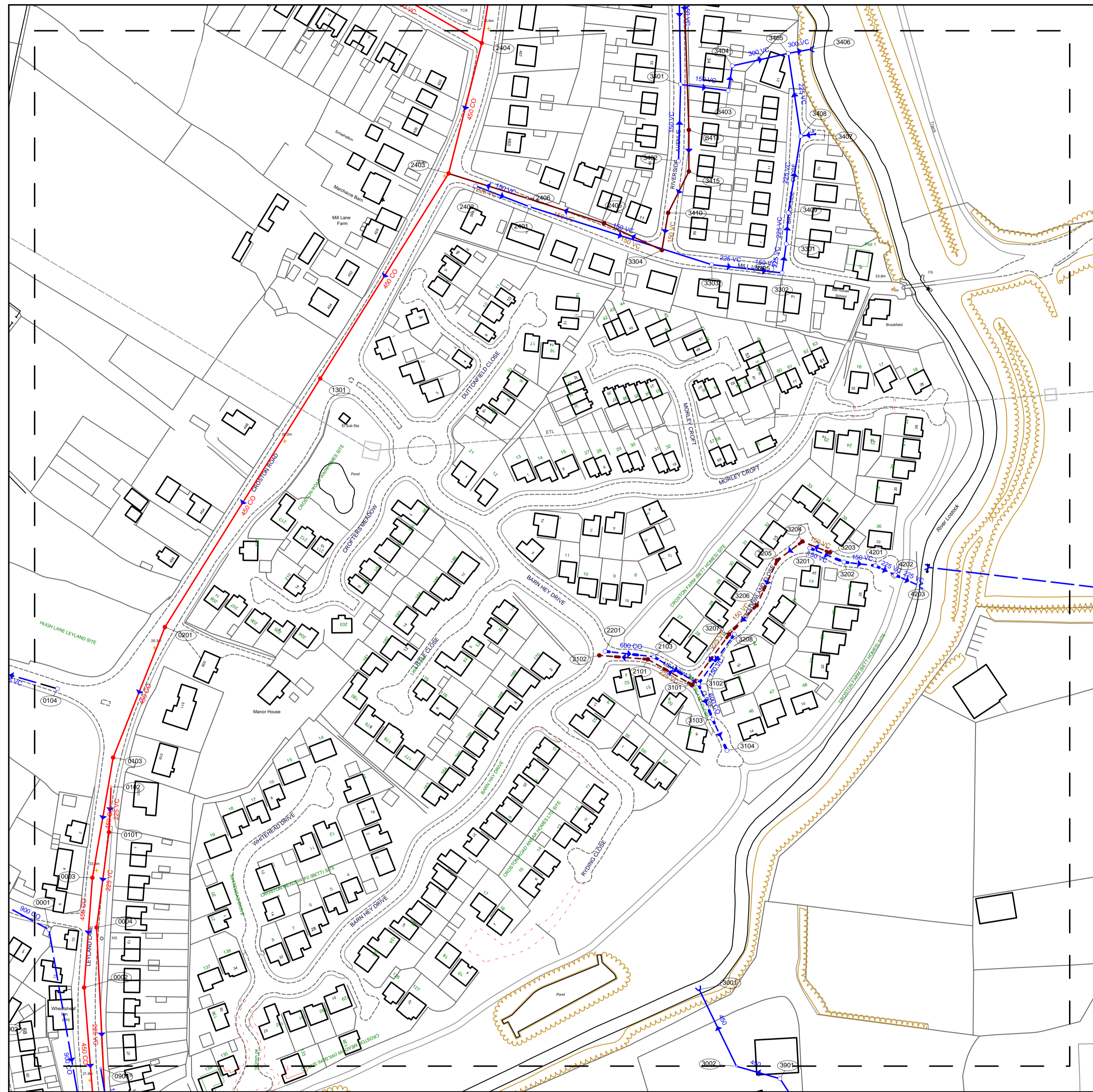
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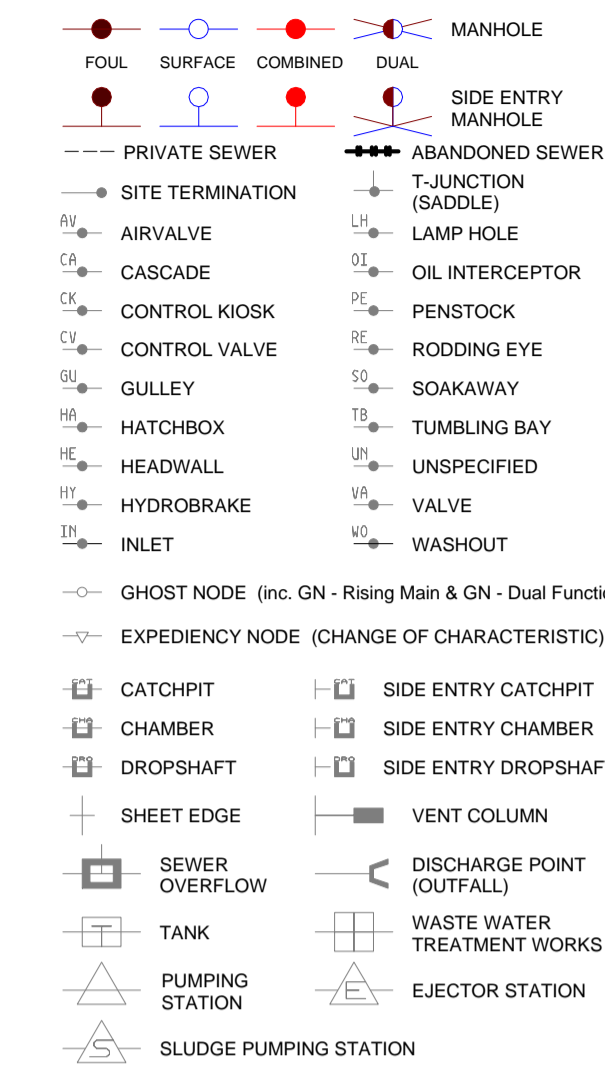
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Scale 1:1250 Date: 14-Dec-2011
2 Nodes
Sheet 1 of 1

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WASTE WATER SYMOLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

Node Table Abbreviations

Refno	Cover	Func	Type	Invert	Size	x	Size	y	Shape	Matl	Grad	Length
0001	22.9	S	M	21.08	900	C	CO			CO	127.91	
0002	22.84	C	M	20.27	450	C	CO	292		CO	75.95	
0003	23.62	C	M	21.46	450	C	CO	45		CO	53.15	
0004	23.4	C	M	21.45	225	C	VC	93		CO	103.52	
0101	23.9	C	M	22.01	225	C	VC	83		CO	46.39	
0102		C	G		225	C	VC			CO	22.02	
0103	24.49	C	M	20.69	450	C	CO	-76		CO	58.86	
0104	24.59	S	M	23.27	225	C	VC	141		CO	46.64	
0201	25.54	C	M	21.03	450	C	CO	199		CO	67.78	
1301	26.2	C	M	21.55	450	C	CO	272		CO	141.51	
2101		F	M		225	C	VC			CO	23.5	
2102		F	M									
2103		S	M		600	C	CO			CO	25.23	
2201		S	M		600	C	CO			CO	23.65	
2401	26.13	S	M	25.11	150	C	VC	162		CO	92.35	
2402		S	M		150	C	VC			CO	27.86	
2403	25.8	C	M	21.78	450	C	CO	508		CO	116.81	
2404	25.63	C	M	21.77	450	C	CO	-2167		CO	65	
2405		F	M		150	C	VC			CO	38.9	
2406		F	Q		225	C	VC			CO	39.85	
3001		S	F									
3002		S	G		450	C				CO	41.15	
3101		F	M		225	C	VC			CO	24.67	
3102		S	M		600	C	CO			CO	18.36	
3103		S	M		600	C	CO			CO	16.62	
3104		S	M									
3201		S	M		150	C	VC			CO	17.89	
3202		S	M		150	C	VC			CO	15.27	
3203		F	M		150	C	VC			CO	14.31	
3204		F	M		150	C	VC			CO	15.2	
3205		F	M		150	C	VC			CO	23.83	
3206		F	M		150	C	VC			CO	19.36	
3207		F	M		225	C	VC			CO	30.22	
3208		S	M		150	C	VC			CO	29.66	
3301		S	M		225	C	VC			CO	15.03	
3302	25.98	S	M	24.25	225	C	VC			CO	14.14	
3303	26.18	S	M	24.61	225	C	VC	156		CO	17.12	
3304	26.46	F	M	23.37	150	C	VC			CO	30.87	
3305		S	Q	24.5	150	C	VC	156		CO	17.12	
3401	25.28	S	M	23.55	150	C	VC			CO	23.19	
3402	25.89	S	M	24.13	150	C	VC	74		CO	37.01	
3403		S	M		150	C	VC			CO	12.17	
3404		S	M		300	C	VC			CO	27.66	
3405	25.35	S	M	22.94	300	C	VC	11		CO	11.18	
3406		S	F									
3407		S	L		150	C	VC			CO	7.07	
3408	25.65	S	M	23.43	225	C	VC	92		CO	40.45	
3409		S	M		225	C	VC			CO	37.48	
3410	26.25	F	M		150	C	VC			CO	18.25	
3411		F	M		150	C	VC			CO	20	
3415		F	M		150	C	VC			CO	22.36	
4201		S	M		225	C	VC			CO	10.55	
4202		S	M		225	C	VC			CO	13.09	
4203		F	F									
4205		F	F									

MANHOLE FUNCTION

- F Foul
- S Surface
- C Combined
- T Transition
- O Overflow
- U Unspecified

MANHOLE / NODE TYPE

- M Manhole
- J Junction
- L Lamphole
- H Hatchbox
- R Rodding Eye
- F Outfall
- V Combined Sewer Overflow
- S Soakaway
- D Dual Function Manhole
- W Treatment Works
- Z Ghost in Rising Main
- C Cascade
- Y Gulley
- E Ejector
- O Oil Injector
- I Inlet
- B Hydrobrake
- T Vent Column
- X Valve
- U Unspecified
- Q Expediency Node
- G Ghost
- (to allow pipe bends)

SEWER SHAPE

- C Circular
- E Egg
- O Oval
- F Flat Top
- R Rectangular
- S Square
- T Trapezoidal
- A Arch
- B Barrel
- H Horseshoe
- U Unspecified

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- CI Cast Iron
- SI Spun (Grey) Iron
- CO Concrete
- CS Concrete Segments (Bolted)
- CS Concrete Segments (Unbolted)
- CC Concrete Box Culvert
- DI Ductile Iron
- GR Glass Reinforced Concrete
- GR Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polyethylene
- RP Reinforced Plastic Matrix
- ST Steel
- VC Vitrified Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

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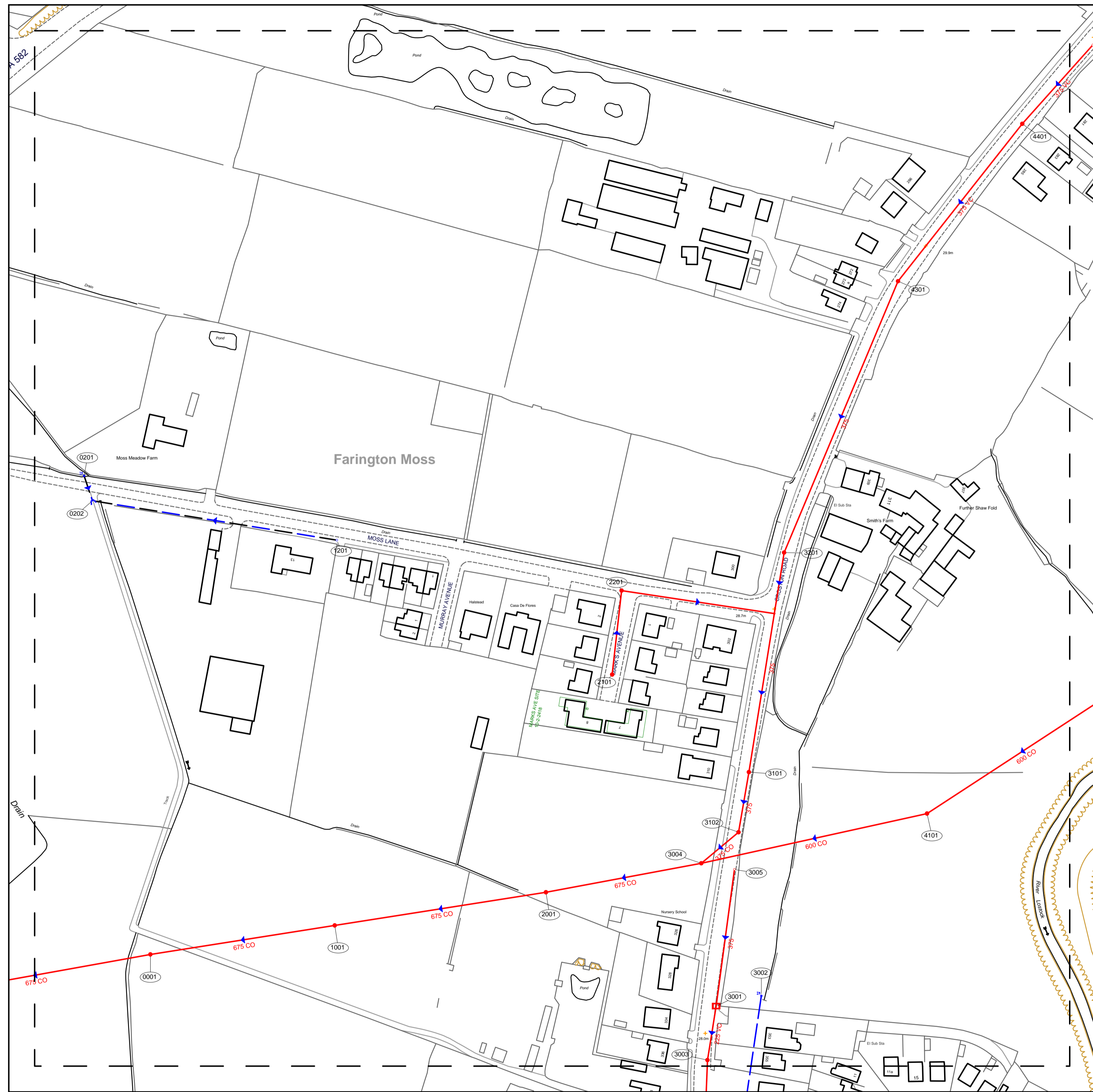
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55 Nodes
Sheet 1 of 1

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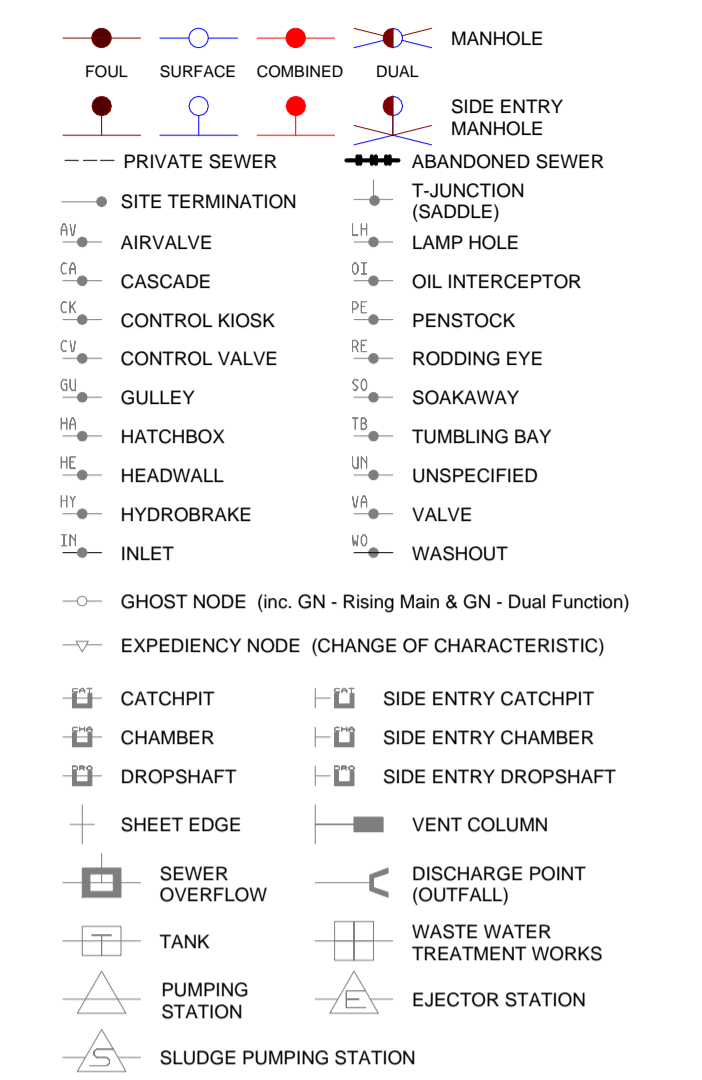




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WASTE WATER SYMBOLLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

- MANHOLE FUNCTION**
- F Foul
 - S Surface
 - C Combined
 - T Transition
 - O Overflow
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 - O Oil Injector
 - I Inlet
 - B Hydrobrake
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 - X Valve
 - U Unspecified
 - Q Expediency Node
 - G Ghost
 - (to allow pipe bends)

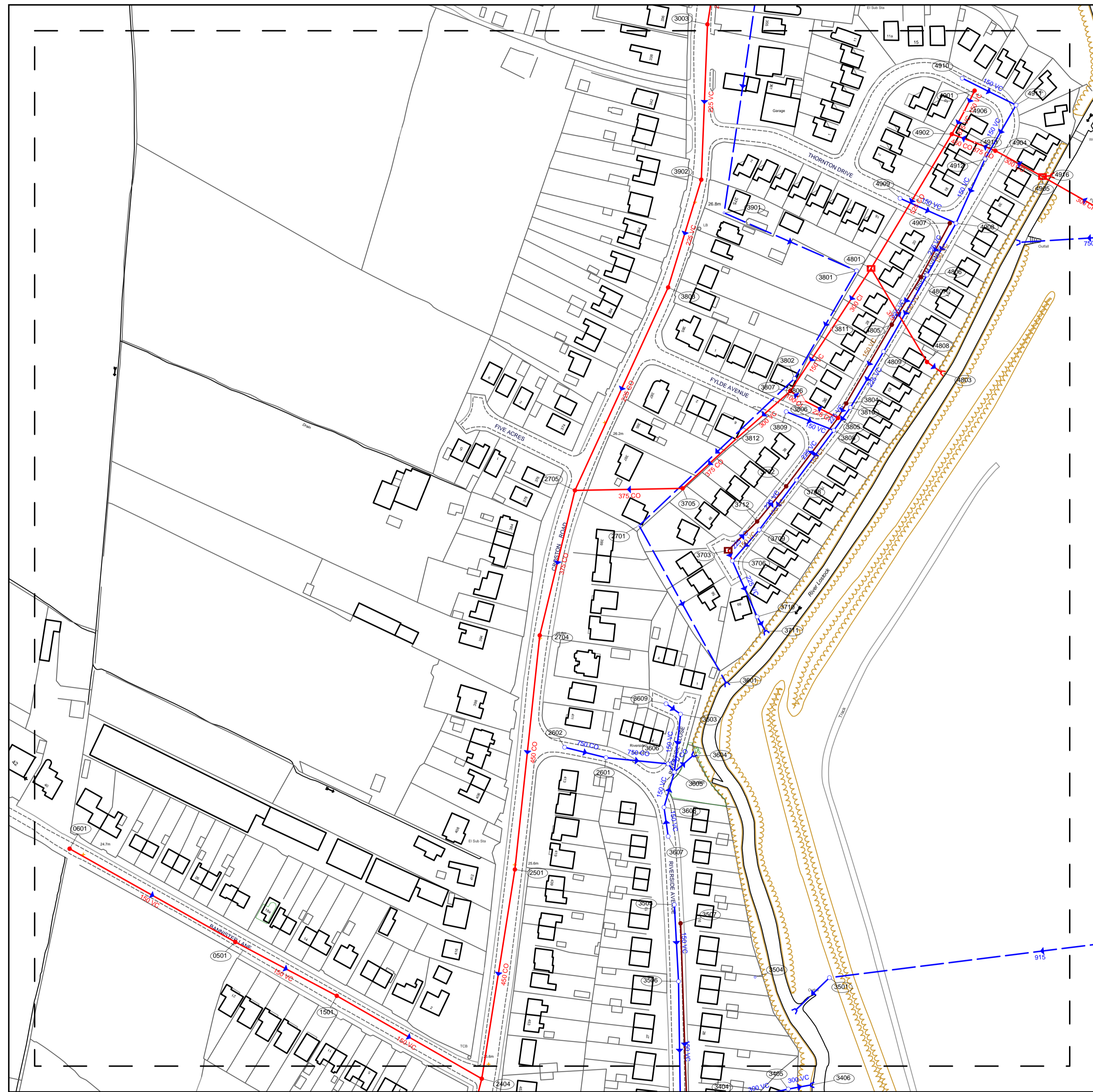
- SEWER SHAPE**
- C Circular
 - E Egg
 - O Oval
 - F Flat Top
 - R Rectangular
 - S Square
 - T Trapezoidal
 - A Arch
 - B Barrel
 - H Horseshoe
 - U Unspecified
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 - GR Glass Reinforced Plastic
 - PS Plastic / Steel Composite
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 - PE Polyethylene
 - RP Reinforced Plastic Matrix
 - ST Steel
 - VC Vitrified Clay (All Clayware)
 - PP Polypropylene
 - PF Pitch Fibre
 - MA Masonry - In Regular Courses
 - MA Masonry - Randomly Coursed
 - U Unspecified

Refo	Cover	Func	Type	Invert	Size	xSize	y	Shape	Matl	Grad	Length
0001		C	M	675				C	CO		113.33
0201		S	I								12.65
0202		S	F								
1001		C	M	675				C	CO		90.09
1201		S	G								119.52
2001	29.02	C	M	22.35	675			C	CO		103.25
2101		C	M								40.8
2201		C	M								74.58
3001		C	V	25.95	225			C	VC		26.4
3002		S	I								123.32
3003		C	M	225				C	VC		75.96
3004	29.24	C	M	22.46	675			C	CO	76.3	76.3
3005		C	G	375							66.52
3101	28.61	C	M	26.31	375			C			29.43
3102		C	M	375				C	CO		23.43
3200		F	J	375				C			77.53
3201	28.56	C	M	26.58	375			C			29.82
4101	28.51	C	M	22.55	600			C	CO		111.61
4301	29.6	C	M	26.9	375			C		444	142.08
4401	30.23	C	M	27.16	375			C	VC	372	96.83

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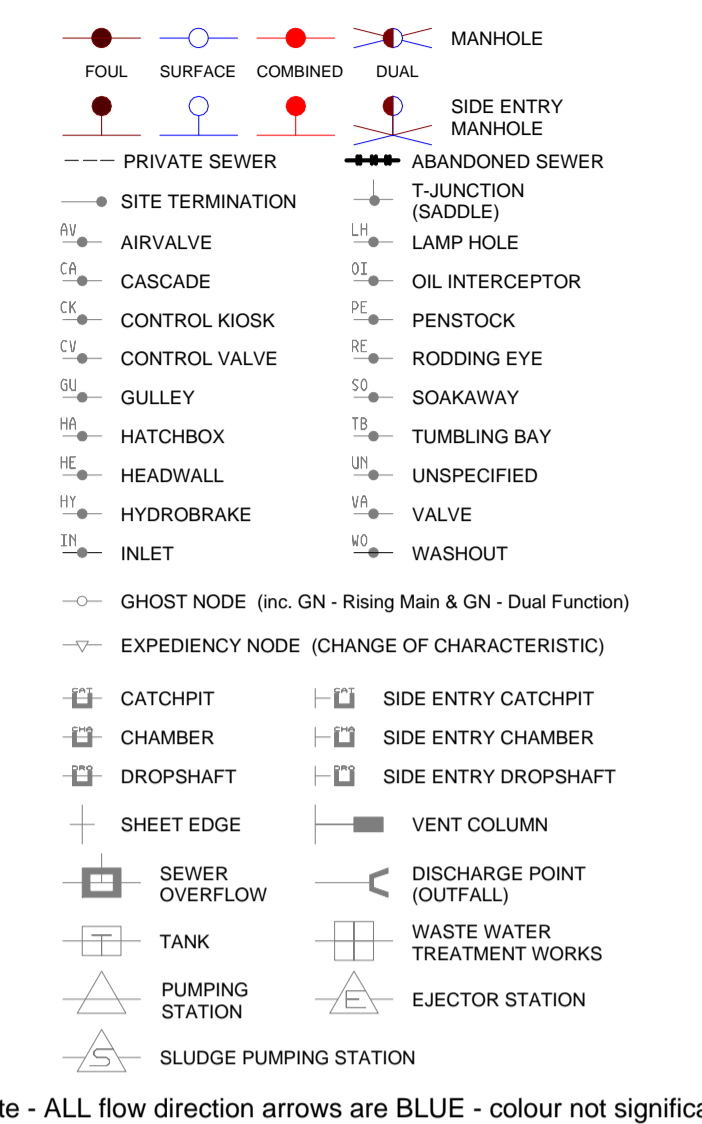
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 20 Nodes
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Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
0501	C	M		150			C	VC	55.47	
0601	C	M		150			C	VC	91.79	
1501	C	M		150			C	VC	80.62	
2501	25.33	C	M	22.24	450		C	CO	218	102.26
2601		S	M	750			C	CO		30.15
2602	25.08	S	M	22.82	750		C	CO		20.62
2701		S	G							86.83
2704	25.38	C	M	22.56	450		C	CO	355	113.64
2705	25.63	C	M	23.01	375		C	CO	160	72.03
3501		S	M							22.49
3502		F	F							
3504		S	G							
3505	24.11	S	M		150		C	VC		37.05
3506	24.5	S	M	23.83	150		C	VC	279	67.01
3507		F	M	150			C	VC		117.07
3601		S	F							
3603		S	M	150			C	VC		28.16
3604		S	F							
3605	24.15	S	M	22.12	750		C	CO		12.04
3606		S	M	750			C	CO		5
3607	23.82	S	M	22.65	150		C	VC		14.14
3608		S	M	150			C	VC		17.72
3609	23.82	S	M	22.71	150		C	VC		8.6
3702		F	M	150			C	CI		41.4
3703		F	V	150			C	VC		19.74
3703		F	V	150			C	PVC		5.5
3705	24.63	C	M	23.58	375		C	CO	867	52.01
3706	23.59	S	M	22.59	225		C	VC		29.55
3708		S	M	225			C	VC		30
3709		S	M	225			C	VC		19.85
3710		S	M	225			C	VC		8.06
3711		S	F							
3712		F	M	150			C	VC		22.02
3801		S	M							60.03
3802		S	M							103.28
3803	26.41	C	M	24.18	225		C	CO	105	107.84
3804		F	M	150			C	CI		8.96
3805		C	M	225			C	CI		20.27
3806		C	P	100			C	CI		6.22
3807	24.7	C	M	23.17	300		C	VC	-112	34.71
3808	24.16	S	M	23.17	225		C	VC		30
3809		S	M	150			C	VC		24.7
3810		S	M	225			C	VC		13.6
3811		C	Q	23.98	150		C	CO	100	36.06
3812		C	Q	23.48	375		C	CO	-114	35.38
3901		S	G							69.86
3902	27	C	M	24.68	225		C	VC	109	54.41
4800		F	F							
4801		C	V	24.34	300		C	CI	97	34.8
4801		C	V	375			C			52.63
4803		O	F							
4805		F	M	150			C	VC		43.91
4806		S	M	225			C	VC		42.54
4807		F	M	150			C	VC		26.93
4808		O	M	375			C			8.6
4809		S	M	225			C	VC		31.38
4901	26.67	C	M	25.79	150		C	CO	39	11.18
4902	26.26	C	M	25.14	525		C	CO	252	75.67
4904	26.17	C	M	25.33	375		C	CO	108	10.77
4905		C	V	25.57	300		C	CO	118	25.96
4905		C	V	150			C	PE		4.27
4906		C	Q	25.5	375		C	VC	45	12.53
4907		F	M	150			C	VC		29.53
4908	25.67	S	M	24.39	225		C	VC		28.65
4909	26.09	S	M	24.46	150		C	VC	591	29.55
4910	26.62	S	M	25.43	150		C	VC	61	29.07
4911	26.21	S	M	24.93	150		C	VC		30.02
4912		S	M	150			C	VC		34.01
4913		C	Q	25.23	450		C	CO	130	11.7
4916		O	F							

WASTE WATER SYMOLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

- MANHOLE FUNCTION**
- F Foul
 - S Surface
 - C Combined
 - T Transition
 - O Overflow
 - U Unspecified
- MANHOLE / NODE TYPE**
- M Manhole
 - J Junction
 - L Lamphole
 - H Hatchbox
 - R Rodding Eye
 - F Outfall
 - V Combined Sewer Overflow
 - P Pumping Station
 - S Soakaway
 - D Dual Function Manhole
 - W Treatment Works
 - Z Ghost in Rising Main
 - C Cascade
 - Y Gulley
 - E Ejector
 - O Oil Injector
 - I Inlet
 - B Hydrobrake
 - T Vent Column
 - X Valve
 - U Unspecified
 - Q Expediency Node
 - G Ghost (to allow pipe bends)
- SEWER SHAPE**
- C Circular
 - E Egg
 - O Oval
 - F Flat Top
 - R Rectangular
 - S Square
 - T Trapezoidal
 - A Arch
 - B Barrel
 - H Horseshoe
 - U Unspecified
- SEWER MATERIAL**
- AC Asbestos Cement
 - BR Brick
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 - SI Spun (Grey) Iron
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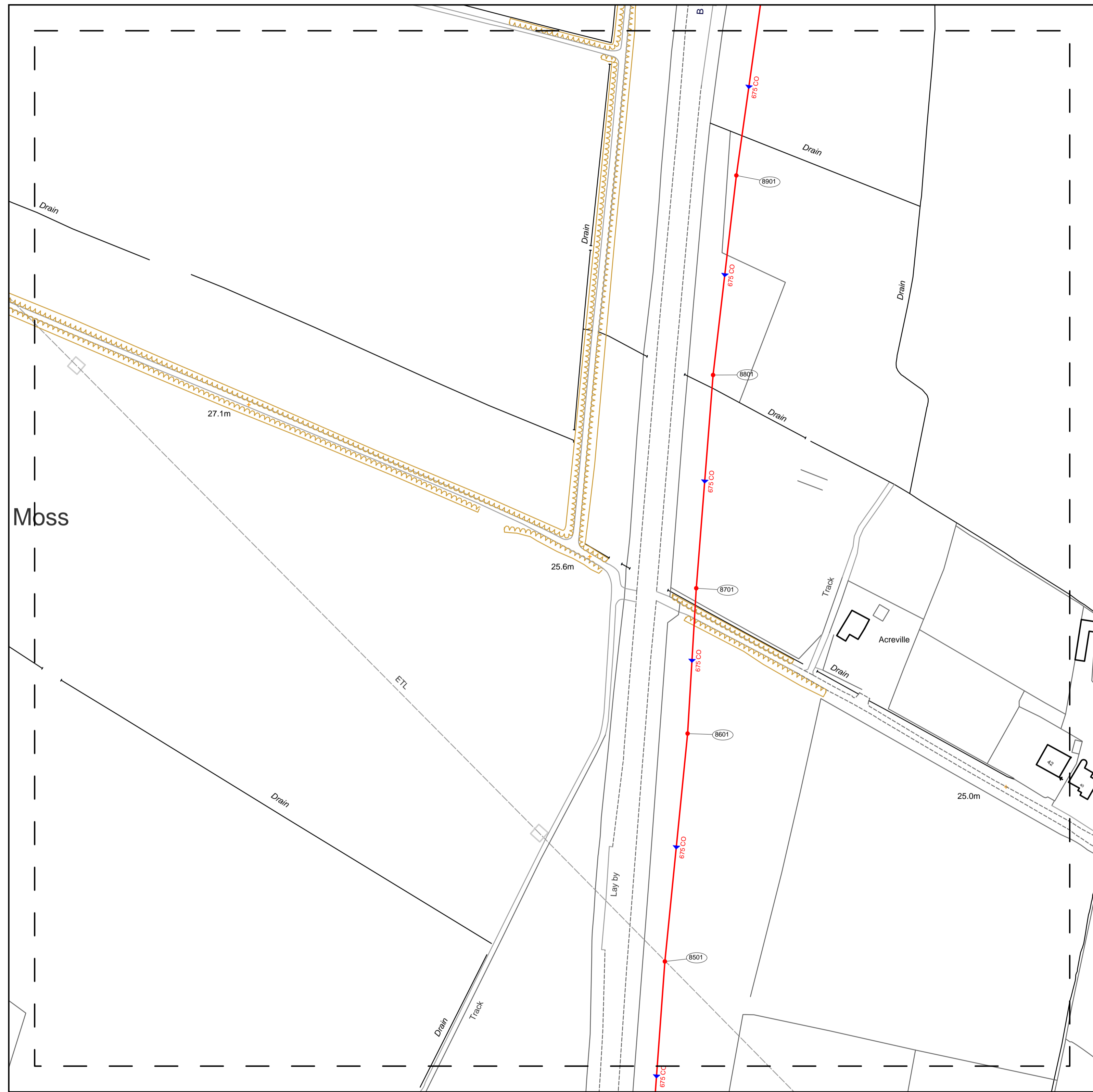
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Scale 1:1250 Date: 14-Dec-2011
70 Nodes
Sheet 1 of 1

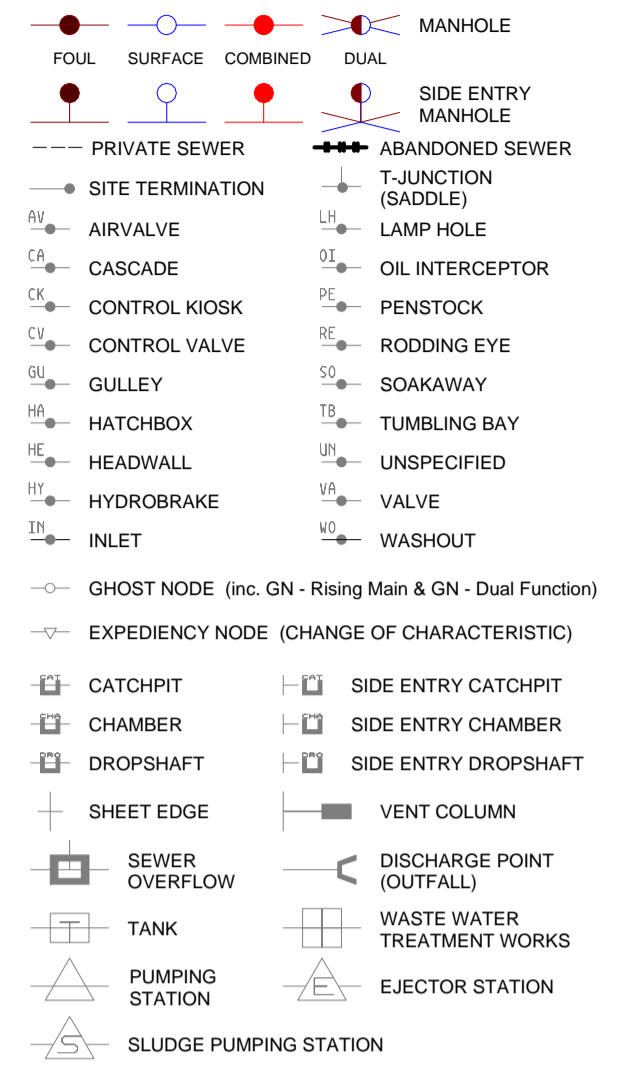
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Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
8501	23.15	C	M	20.45	675		C	CO	464	111.4
8601	23.5	C	M	20.72	675		C	CO	425	110.57
8701	24.74	C	M	20.95	675		C	CO	351	70.26
8801	25.61	C	M	21.11	675		C	CO	688	103.26
8901	26	C	M	21.29	675		C	CO	606	97

WASTE WATER SYMBLOGY



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NODE TABLE ABBREVIATIONS

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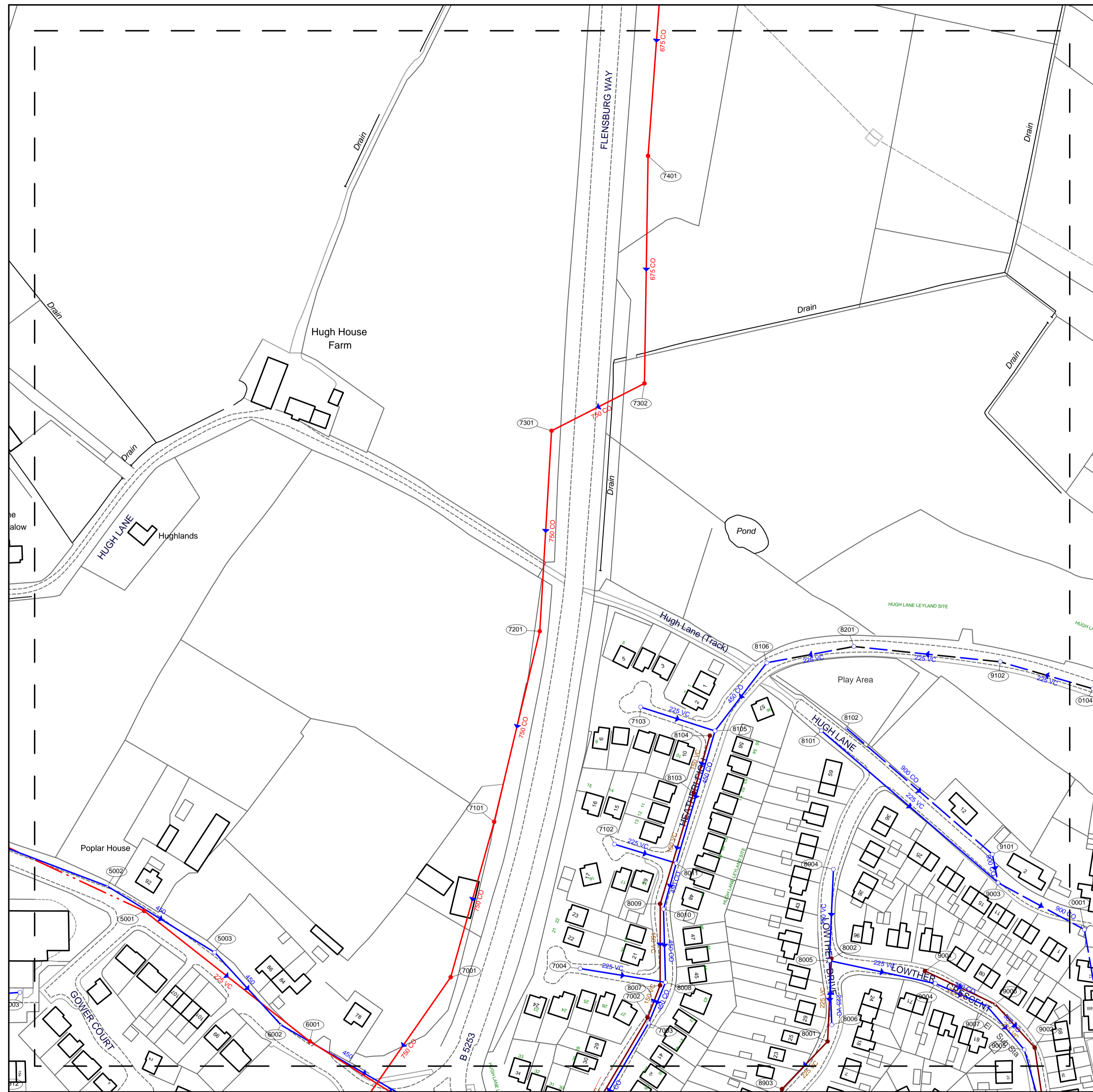
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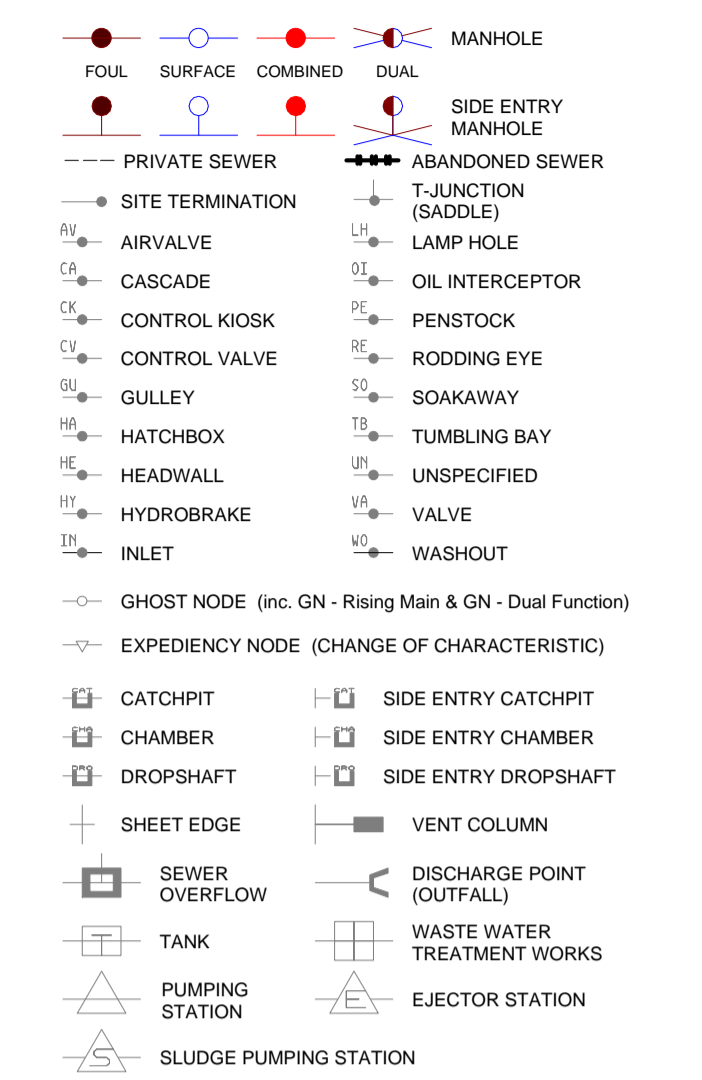
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5 Nodes
Sheet 1 of 1

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WASTE WATER SYMBOLLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

- MANHOLE FUNCTION**
- F Foul
 - S Surface
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 - Z Ghost in Rising Main
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 - B Hydrobrake
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Refno	Cover	Func	Type	Invert	Size	x	Size	y	Shape	Matl	Grad	Length
5001	22.01	C	M	20.96	225				C	VC	261	101.83
5002		S	G		450				C			60.87
5003	22.14	S	M	20.19	450				C			47.42
6001	22.23	C	M	20.57	225				C	CO	297	92.11
6002		S	G		450				C			93.65
7001	22.3	C	M	19.23	750				C	CO		80.45
7002	22.29	F	M	20.88	150				C	VC	132	93.39
7003	22.3	S	M	20.21	450				C	CO	176	75.77
7004	22.28	S	M	20.93	225				C	VC	104	41.69
7101	22.82	C	M	19.31	750				C	CO	779	77.88
7102	22.77	S	M	21.48	225				C	VC	84	31.18
7103	23.61	S	M	22.23	225				C	VC	79	37.72
7201	23.57	C	M	19.56	750				C	CO	364	94.59
7301	23.48	C	M	19.67	750				C	CO	1212	96.96
7302	23.79	C	M	19.85	750				C	CO	296	50.36
7401	23.12	C	M	20.2	675				C	CO	439	109.85
8001	22.91	F	M	20.67	225				C	VC	177	31.83
8002	23.17	F	M	20.97	225				C	VC	133	40.04
8004	23.56	S	M	21.09	150				C	VC	94	44.15
8005	23.2	S	M	20.58	225				C	VC	90	52.31
8006	22.92	S	M	20.81	225				C	VC	163	31.02
8007	22.32	F	M	21.06	150				C	VC	93	16.57
8008	22.35	S	M	20.3	450				C	CO	226	21.25
8009	22.67	F	M	21.45	150				C	VC	101	39.38
8010	22.63	S	M	20.67	450				C	CO	96	35.34
8011	22.92	S	M	20.9	450				C	CO	100	23.02
8101	23.52	S	M	22.56	225				C	VC	122	112.56
8102		S	G		900				C	CO		93.11
8103	23.27	F	M	22.04	150				C	VC	95	56.07
8104	23.58	F	M	22.37	150				C	CO	87	28.57
8105	22.6	S	M	21.52	450				C	CO	107	66.56
8106	23.92	S	M	21.68	450				C	CO	258	41.29
8201	24.39	S	M	22.48	225				C	VC	74	42.81
9001	23.18	F	M	21.58	225				C	VC		37.58
9002	23.49	F	M	21.09	225				C	VC	121	80.89
9003	23.52	S	M	21.64	900				C	CO	85	47.41
9004	23.12	S	M	19.98	300				C	CO		27.31
9005	23.48	S	M	19.51	300				C	CO		63.32
9006		F	G		225				C	VC		28.32
9007		S	G		300				C	CO		27.66
9101	23.55	S	M	21.58	900				C	CO	-234	14.02
9102	25.1	S	M	22.94	225				C	VC	154	71.07

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These general conditions and precautions apply to the wastewater network of United Utilities.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. United Utilities provides the approximate locations of its sewers according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of every sewer culvert or drain, private connections from properties to the public sewers or the particulars of any private system. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated. The records do indicate the position of the nearest known public sewer from which the likely length of private connections can be estimated together with the need for any off site drainage rights or easements.
2. Special requirements relative to our sewers may be indicated. United Utilities employees or its contractors will visit any site at reasonable notice to assist in the location of its underground sewers and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, or any notification required under these General Conditions, please call us on **0845 746 2200**.
3. Where public sewers are within a site which is to be developed and do not take any drainage from outside the area, they are from an operational viewpoint redundant. The developer must identify all redundant sewers affected by the development and apply to United Utilities in writing for these sewers to be formally closed. The developer shall bear all related costs of the physical abandonment work.
4. Public sewers within the site that are still live outside the area, will be subject to a "Restricted Building zone". This would normally be a surface area equivalent to the depth of the sewer measured from the centre line of the sewer on either side. No construction will be permitted within that zone. The developer should also note that deep and wide rooted trees must not be planted in close proximity to live sewers. Access to public sewers must be maintained at all times and no interference to manholes will be permitted during construction work.
5. Where there is a public sewer along the line of a proposed development/building, arrangements shall be made by the developer at his cost to divert the sewer around the development. Where this is not possible and as a last resort, a "Building Over Agreement" will need to be completed under section 18 of the Building Act 1984. The developer shall design building foundations to ensure that no additional loading is transferred to the sewer and submit such details both to the Local Authority's Building Control Officer and to United Utilities for approval/acceptance. United Utilities on a rechargeable basis would normally undertake all aspects of design work associated with the diversion of any part of the operational wastewater network.
6. Where there is a non-main river watercourse/culvert passing through the site, the landowner has the responsibility of a riparian owner for the watercourse/culvert and is responsible for the maintenance of the fabric of the culvert and for all works involved in maintaining the unrestricted flow through it. Building over the watercourse/culvert is not recommended. The developer must contact the local authority before any works are carried out on the watercourse/culvert. Where it is necessary to discharge surface water from the site into the watercourse/culvert the developer shall make an assessment of the available capacity of the watercourse/culvert (based on a 1 in 50 year event) and ensure that the additional flow to be discharged into the watercourse/culvert will not cause any flooding. In appropriate cases, flooding may be prevented by on-site storage. The developer shall submit the relevant details required to substantiate his development proposals. Details of any outfall proposed shall also be submitted to the Environment Agency, PO Box 12, Richard Fairclough House, Knutsford Road, Warrington, Cheshire, WA4 1HT for their approval.
7. Where there is a main river watercourse/culvert passing through the site, the developer shall submit all proposals affecting the river to the Environment Agency at the address stated in paragraph 6 for approval/acceptance.

8. Your attention is drawn also to the following:

- **Private drains or sewers which may be within the site.**

United Utilities has no duty to keep records of private drains and sewers, and there are no comprehensive records kept elsewhere. Local Authority Building Control Officers may have records of recent developments and they or the developer may be able to provide information in this respect.

- **Applications to make connections to the public sewer.**

The developer must write to United Utilities requesting an application form that must be duly completed and returned. No works on the public sewer shall be carried out until a letter of consent is received from United Utilities.

- **Sewers for adoption.**

If an agreement for the adoption of sewers under Section 104 of the Water Industry Act 1991 is being contemplated, a submission in accordance with "Sewers for Adoption", Fifth Edition, published by the Water Research Centre (2001) Plc, Henley Road, Medmenham, PO Box 16, Marlow, Buckinghamshire, SL7 2HD will be required, taking into consideration any departures from the general guide stipulated by United Utilities.

- **Further consultation with United Utilities.**

Developers wishing to seek advice or clarification regarding sewer record information provided should contact United Utilities to arrange an appointment. A consultation fee may be charged, details of which will be made available at the time of making an appointment.

9. Combined sewers, foul sewers, surface water sewers, and pumped mains. These are shown separately in a range of colours or markings to distinguish them on our drawings, which are extracts from the statutory regional sewer map. A legend and key is provided on each extract for general use, although not all types of sewer will be shown on every extract.

Combined sewers shown coloured red carry both surface water and foul sewage, especially in areas where there is no separate surface water sewerage system.

Foul sewers coloured brown may also carry surface water and there may be no separate surface water system indicated in the immediate area. Both combined and foul sewers carry wastewater to our treatment works before it can safely be returned to the environment.

Surface water sewers coloured blue on our drawings are intended only to carry uncontaminated surface water (e.g. rainfall from roofs, etc) and they usually discharge into local watercourses. It is important for the protection of the environment and water quality that only uncontaminated surface water is connected to the surface water sewers. Improper connections to surface water sewers from sink wastes, washing machines and other domestic use of water can cause significant pollution of watercourses.

Pumped mains, rising mains and sludge mains will all be subject to pumping pressures and are neither suitable nor available for making new connections.

Highway drains, when included, show as blue and black dashed lines. Highway drains are not assets belonging to United Utilities and are the responsibility of local authorities.

10. For information regarding future proposals for construction of company apparatus please write to United Utilities, PO Box 453, Warrington, WA5 3QN.

11. For information regarding easements, deeds, grants or wayleaves please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU **(Tel: 01925 463 654).**



United Utilities Water PLC
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