APPENDIX D: FEH CATCHMENT DATA & DESCRIPTIONS

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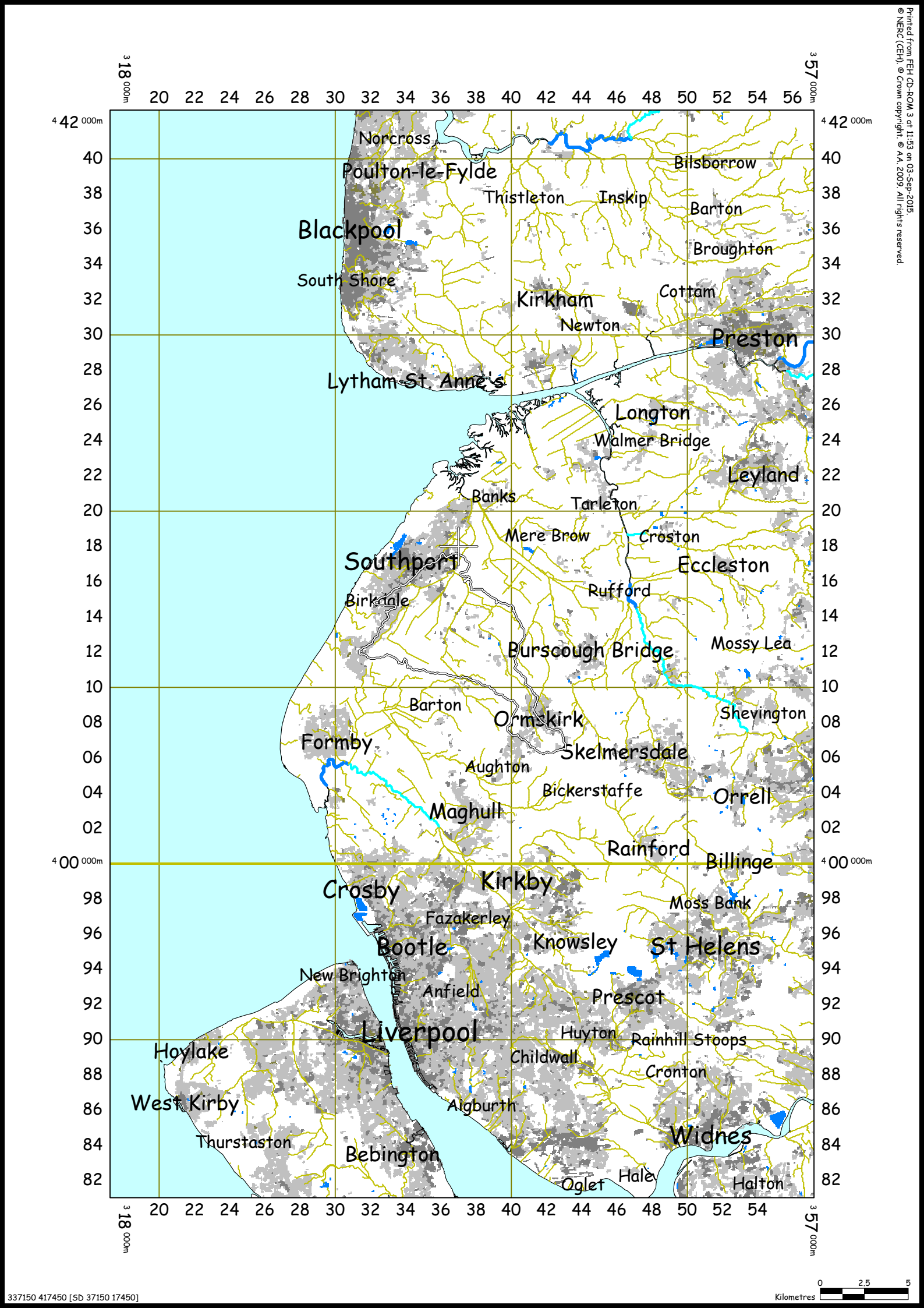


337150 417450 [SD 37150 17450]

0 2.5 5
Kilometres

VERSION	FEH CD-ROM	Version	3	exported at	10:53:32	GMT	Thu	03-Sep-15	
CATCHMENT	GB	337150	417450	SD 37150 17450					
CENTROID	GB	337181	412649	SD 37181 12649					
AREA	49.4								
ALTBAR	16								
ASPBAR	352								
ASPVAR	0.31								
BFIHOST	0.683								
DPLBAR	7.41								
DPSBAR	8.2								
FARL	0.994								
LDP	16.8								
PROPWET	0.42								
RMED-1H	10.7								
RMED-1D	34.5								
RMED-2D	45.6								
SAAR	864								
SAAR4170	879								
SPRHOST	19.01								
URBCONC1990	0.799								
URBEXT1990	0.095								
URBLOC1990	0.93								
C	-0.02466								
D1	0.34323								
D2	0.32268								
D3	0.31278								
E	0.28816								
F	2.50753								
C(1 km)	-0.025								
D1(1 km)	0.343								
D2(1 km)	0.317								
D3(1 km)	0.341								
E(1 km)	0.288								
F(1 km)	2.478								

DESIGN RAINFALL DEPTHS

Calculate : Design rainfall for

catchment 337150 417450 [SD 37150 17450]
1 km grid point 337000 418000 [SD 37000 18000]
Manually entered values for a point

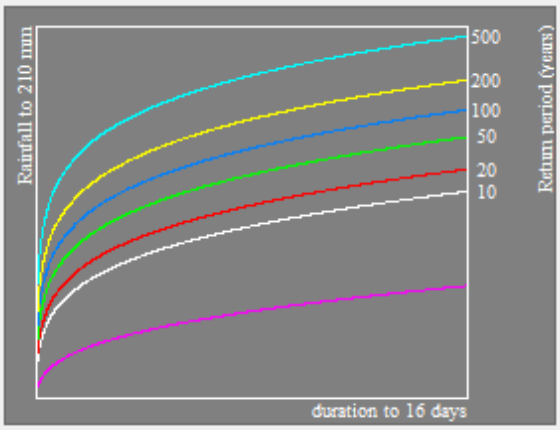
Area : 49.4000 km²

C : -0.02466 D3 : 0.31278
D1 : 0.34323 E : 0.28816
D2 : 0.32268 F : 2.50753

Duration : 6 Hours — Fixed / Sliding

Return period : 1.0004 Years — AM / POT

Rainfall depth 12.6886 mm



Calculate... Export... Cancel

An areal reduction factor of 0.923 has been applied to a point rainfall of 13.7 mm to yield a catchment design rainfall of 12.7 mm.

Calculate : Design rainfall for

catchment 337150 417450 [SD 37150 17450]
1 km grid point 337000 418000 [SD 37000 18000]
Manually entered values for a point

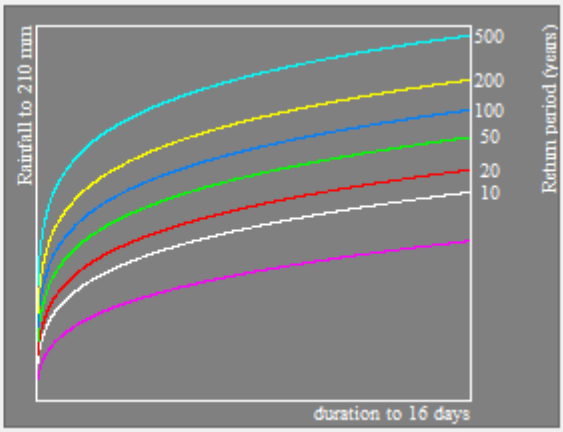
Area : 49.4000 km²

C : -0.02466 D3 : 0.31278
D1 : 0.34323 E : 0.28816
D2 : 0.32268 F : 2.50753

Duration : 6 Hours — Fixed / Sliding

Return period : 2.0 Years — AM / POT

Rainfall depth 22.9208 mm



Calculate... Export... Cancel

An areal reduction factor of 0.923 has been applied to a point rainfall of 24.8 mm to yield a catchment design rainfall of 22.9 mm.

Calculate : Design rainfall for

catchment 337150 417450 [SD 37150 17450]
1 km grid point 337000 418000 [SD 37000 18000]
Manually entered values for a point

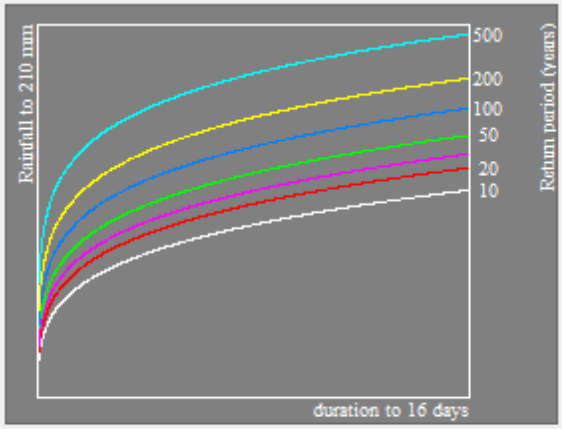
Area : 49.4000 km²

C : -0.02466 D3 : 0.31278
D1 : 0.34323 E : 0.28816
D2 : 0.32268 F : 2.50753

Duration : 6 Hours — Fixed / Sliding

Return period : 30.0 Years — AM / POT

Rainfall depth 47.8613 mm



Calculate... Export... Cancel

An areal reduction factor of 0.923 has been applied to a point rainfall of 51.8 mm to yield a catchment design rainfall of 47.9 mm.

Calculate : Design rainfall for

catchment 337150 417450 [SD 37150 17450]
1 km grid point 337000 418000 [SD 37000 18000]
Manually entered values for a point

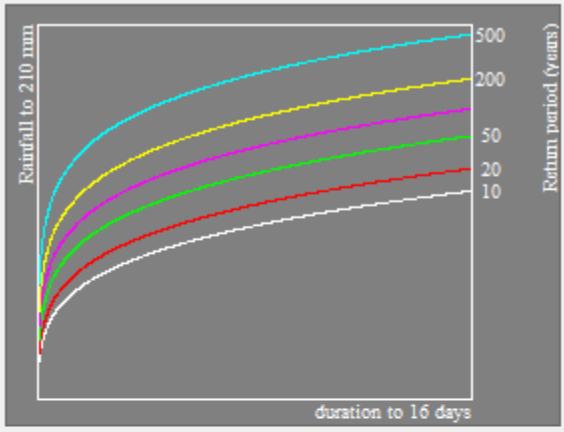
Area : 49.4000 km²

C : -0.02466 D3 : 0.31278
D1 : 0.34323 E : 0.28816
D2 : 0.32268 F : 2.50753

Duration : 6 Hours — Fixed / Sliding

Return period : 100.0 Years — AM / POT

Rainfall depth 64.3892 mm



Calculate... Export... Cancel

An areal reduction factor of 0.923 has been applied to a point rainfall of 69.7 mm to yield a catchment design rainfall of 64.4 mm.

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APPENDIX E: NPPF EXTRACTS

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Table 1: Flood zones

(Note: These flood zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 1 - low probability

Definition
This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

Appropriate uses
All uses of land are appropriate in this zone.

Flood risk assessment requirements
For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention.

Policy aims
In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems[2].

Zone 2 - medium probability

Definition
This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.

Appropriate uses
Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses, as set out in table 2, are appropriate in this zone. The highly vulnerable uses are *only* appropriate in this zone if the Exception Test is passed.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage systems.

Zone 3a - high probability

Definition
This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses
The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.

The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;

- relocate existing development to land in zones with a lower probability of flooding; and
- create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b - the functional floodplain

Definition
This zone comprises land where water *has* to flow or be stored in times of flood.

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

Appropriate uses
Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
- relocate existing development to land with a lower probability of flooding.

Table 2: Flood risk vulnerability classification

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use[3]. • Installations requiring hazardous substances consent[4]. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure")[5].
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste[6]. • Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*[7]
Less vulnerable • Police, ambulance and fire stations which are *not* required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non–residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do *not* need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to a specific warning and evacuation plan.*

APPENDIX F: UU SEWER RECORDS & CORRESPONDENCE

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Kirsty Williams

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 04 September 2015 14:43
To: Kirsty Williams
Subject: RE: MOSS LANE, SOUTHPORT

Good afternoon

I can confirm that there are no recorded historical sewer flooding issues within the vicinity of the proposed development site.

Please note that United Utilities Water plc (UUW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the 'at risk' register.

Also, this does not include any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UUW has no control and not a facet of sewer capacity.

Should you require any further information please do not hesitate to contact me.

Thanks

Louise Kitchingman
Building Control Analyst
Developer Services and Planning
Operational Services
United Utilities
T: 01925 679363 (internal 79363)
unitedutilities.com

From: Kirsty Williams [mailto:kirstywilliams@betts-associates.co.uk]
Sent: 02 September 2015 15:59
To: Wastewater Developer Services
Subject: FRA: MOSS LANE, SOUTHPORT

To whom it may concern,

LAND AT MOSS LANE, SOUTHPORT, PR9 7QT

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment for the above site (location plan attached), including details of historical flooding; this would be greatly appreciated.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

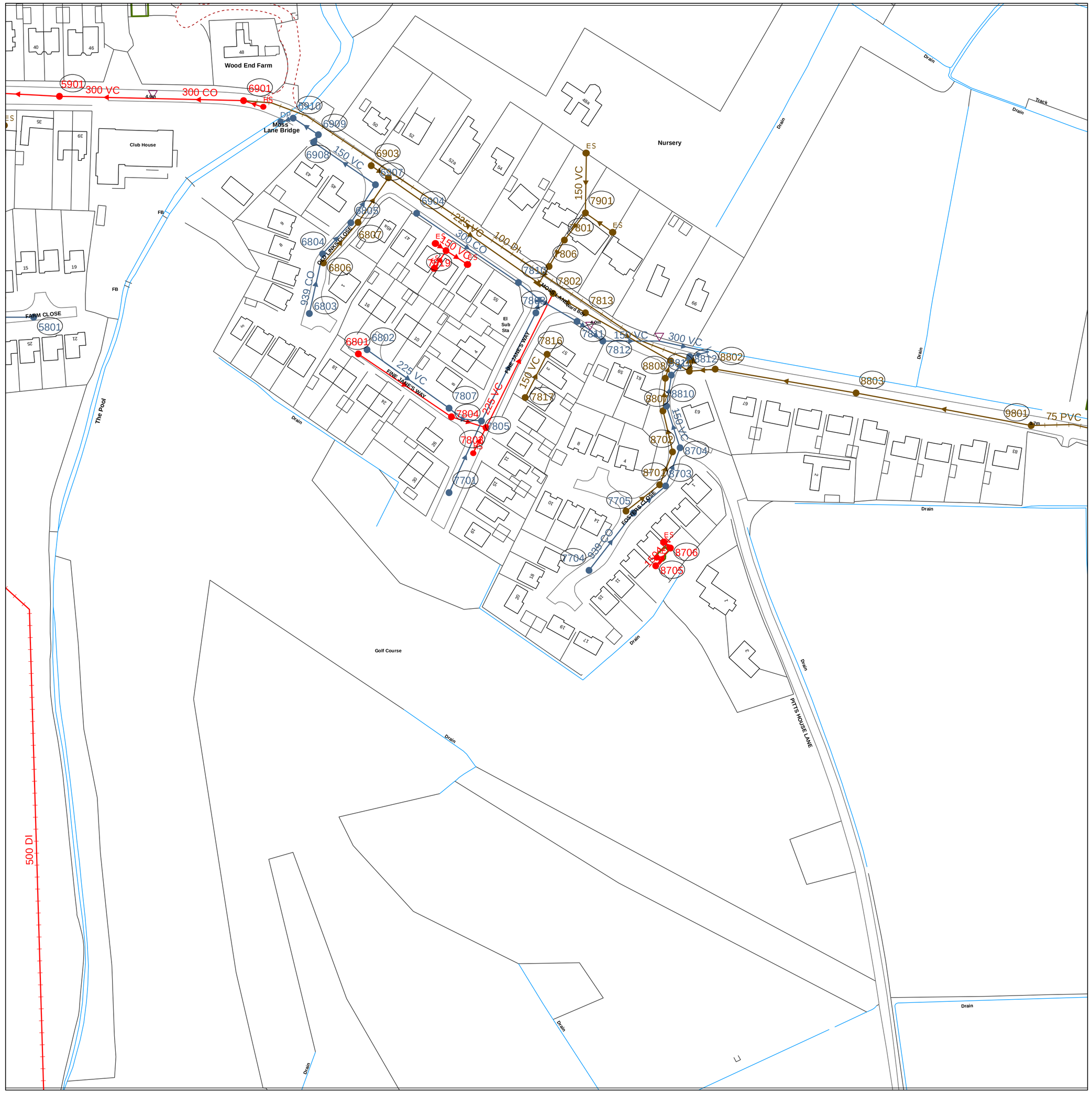
Kind Regards

Kirsty Williams
Graduate Flood Risk Analyst

Betts Associates Ltd
Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
T - 01244 288178

kirstywilliams@betts-associates.co.uk
www.betts-associates.co.uk

CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | TECHNICAL DUE DILIGENCE
FLOOD RISK MANAGEMENT | STRUCTURAL SURVEYS | PARTY WALL DUTIES | ECOLOGY



Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
5801	5.47	SW	4.22	225		CI	VC	48	282
5901	4.91	CO	3.21	300		CI	VC	39.05	651
6801	5.1	CO	3.27	225		CI	VC	51.87	115
6802	5.1	SW	4.1	225		CI	VC	46.62	233
6803		SW	0	939		CI	CO	28.26	
6804		SW							
6805		SW							
6806		FO	0	225		CI	VC	24.65	
6807		FO							
6901	4.52	CO							
6902		FO	0	225		CI	VC	92.92	
6903	4.16	FO	2.91	225		CI	VC	9.73	
6904	4.39	SW	3.38	300		CI	CO	56.86	
6907		SW							
6908		SW							
6909		SW							
6910		SW							
7701	5.09	SW	3.99	225		CI	VC	36.25	201
7703		FO	0	225		CI	VC	19.73	
7704		SW	0	939		CI	CO	33.46	
7705		SW							
7801		FO							
7802	4.05	FO	2.26	225		CI	VC	17.49	
7803	4.95	CO	2.73	225		CI	VC	69.32	204
7804	4.98	CO							
7805	4.99	SW							
7806		FO							
7807	4.94	SW	3.89	225		CI	VC	16.87	211
7808	4.29	SW							
7810	4.3	SW	3.61	300		CI	CO	32.53	
7811	4.25	SW							
7812	4.25	SW	3.64	150		CI	VC	26	
7813	4.02	FO							
7816		FO							
7817		FO							
7819		FO							
7901		FO							
8701		FO							
8702		FO							
8703		SW							
8704		SW							
8705		CO							
8706		CO							
8802	3.84	FO	0.83	225		CI	VC	12.04	602
8803	3.83	FO	0.95	225		CI	VC	65.92	599
8806	3.95	FO							
8807		FO							
8808		FO							
8809		FO	0	225		CI	VC	9.88	
8810		SW							
8811		SW							
8812		SW							
9801	3.66	FO							
5902		CO							
6905		CO	0	300		CI	CO	9.49	
7702		CO	0	225		CI	VC	13.42	
7814		SW							
8804		SW							
7809		SW							
7815		FO							
8709		CO							
8801		FO	0			CI	DI	241.41	

OS Sheet No: SD3617NE

Scale: 1: 1250 Date: 08/09/2015

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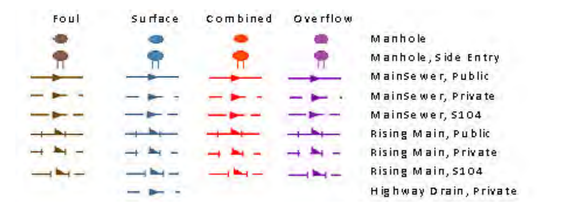
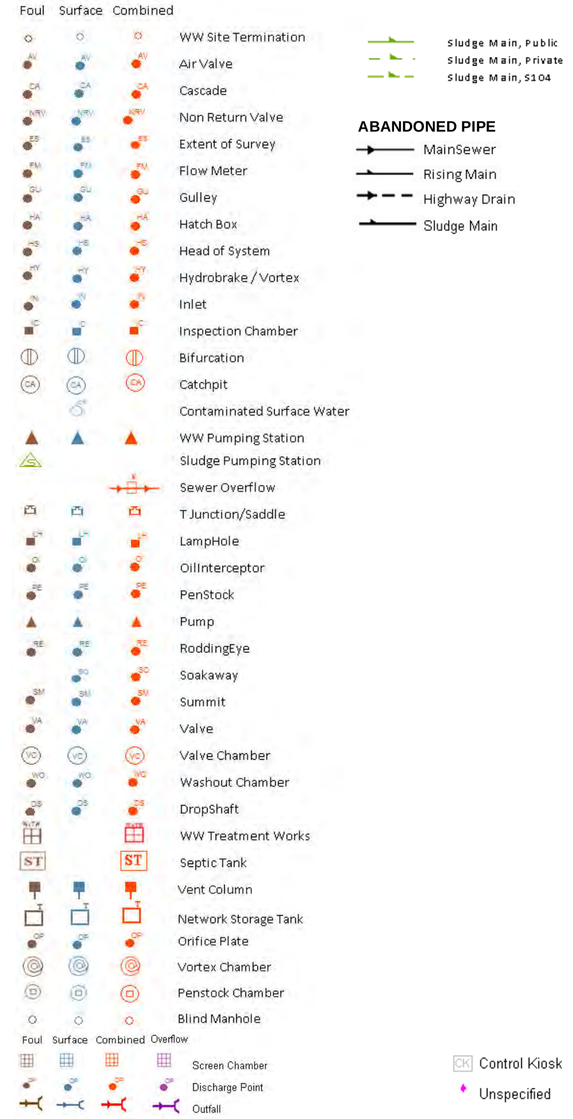
WASTE WATER SYMBOLOGY





LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: SD3617NE
Scale: 1: 1250 Date: 08/09/2015
62 Nodes
Sheet 1 of 1

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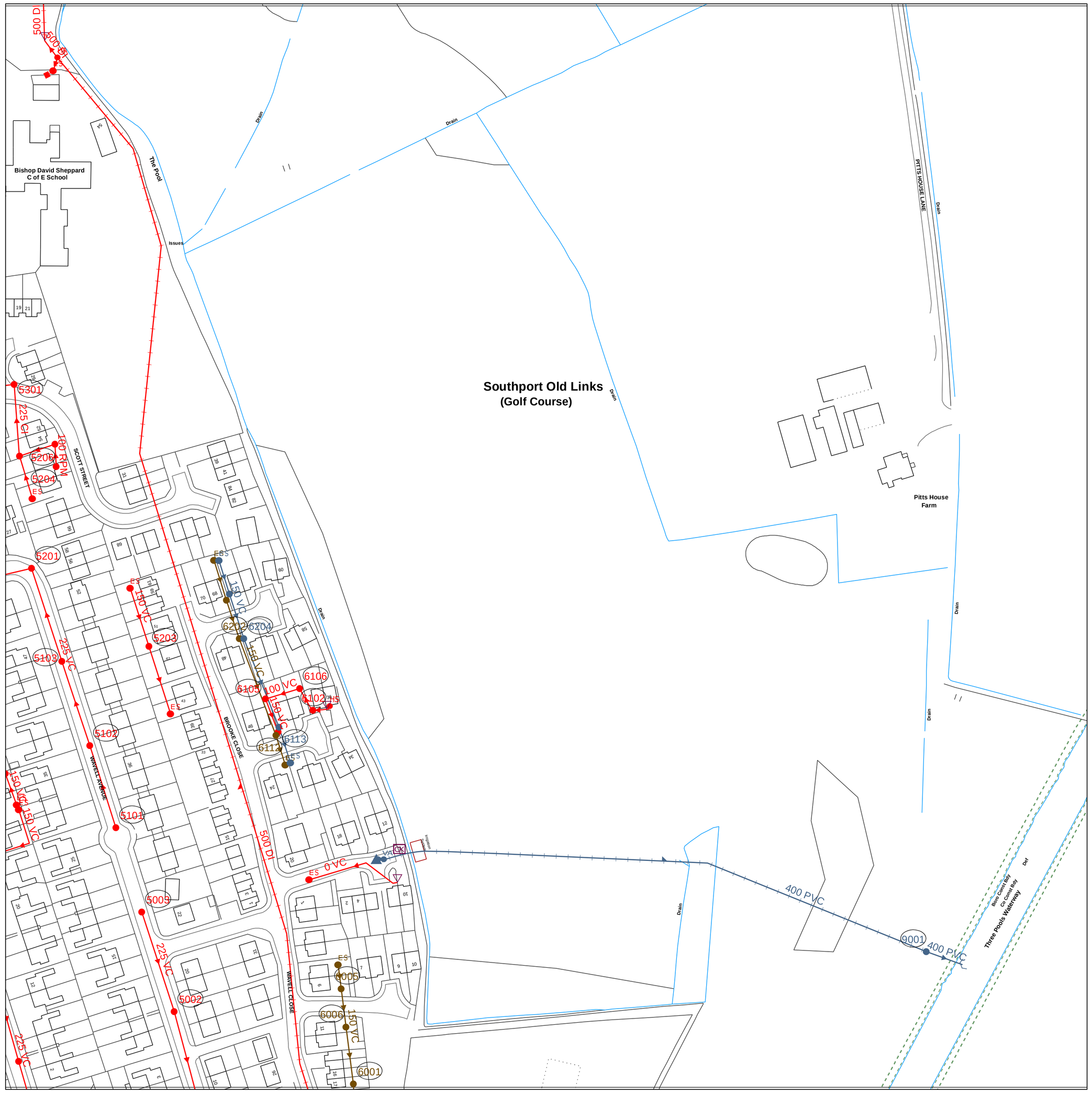
SEWER RECORDS



Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
5001	5.35	CO	3.58	225		CI	VC	50	238
5002	5.31	CO	3.7	225		CI	VC	46.57	245
5003	5.45	CO	3.96	225		CI	VC	48.38	194
5101	5.49	CO	3.99	225		CI	VC	39.85	190
5102	5.43	CO							
5103	5.26	CO							
5201	5.03	CO							
5203		CO							
5204		CO							
5205		CO							
5206		CO							
5301	5.24	CO	3.52	225		CI	VC	26.17	52
6001		FO							
6005		FO							
6006		FO							
6102		CO							
6104		CO							
6105		CO							
6106		CO							
6112		FO							
6113		SW							
6201		FO							
6202		FO							
6203		SW							
6204		SW							
9001		SW							
5401		CO	0			CI	DI	790.31	
6004		CO		0		CI	VC	45.01	
6107		CO							
6109		CO							
5404		CO							
6101		SW	0			CI	PVC	3.49	

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad

OS Sheet No: SD3617SE

Scale: 1: 1250 Date: 08/09/2015

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WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Foul Surface Combined

- WW Site Termination
- Air Valve
- Cascade
- Non Return Valve
- Extent of Survey
- Flow Meter
- Gulley
- Hatch Box
- Head of System
- Hydrobrake / Vortex
- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- Contaminated Surface Water
- WW Pumping Station
- Sludge Pumping Station
- Sewer Overflow
- TJunction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works
- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

Foul Surface Combined Overflow

- Screen Chamber
- Discharge Point
- Outfall
- Control Kiosk
- Unspecified

- Sludge Main, Public
- Sludge Main, Private
- Sludge Main, S104

ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.
The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded.
United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown.

OS Sheet No: SD3617SE
Scale: 1: 1250 Date: 08/09/2015
32 Nodes
Sheet 1 of 1

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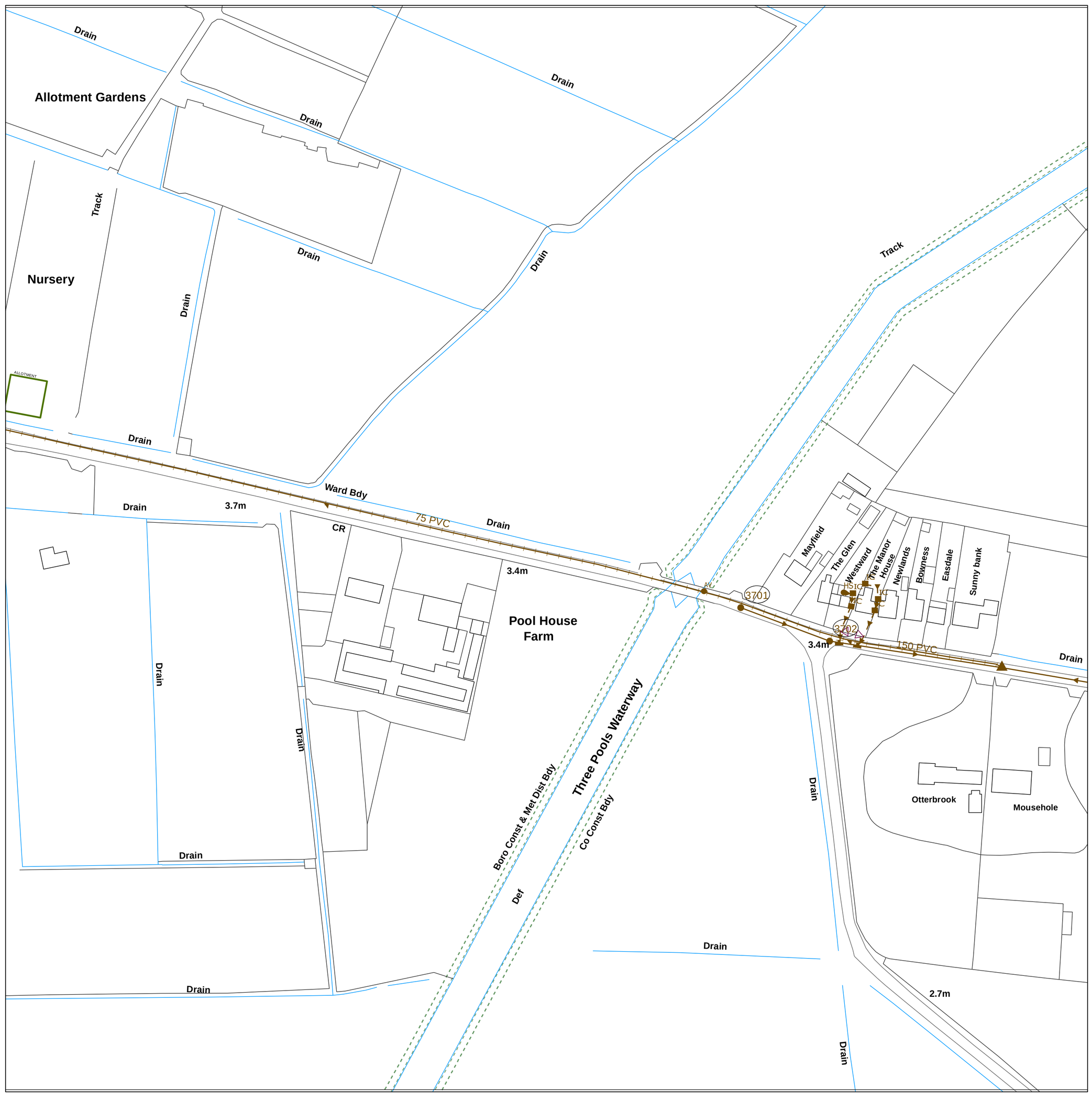
SEWER RECORDS



Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
3701	4.03	FO	2.7	150		CI	PVC	43.85	183
3702	3.94	FO							
3705		FO							
3708		FO							
3711		FO							
3704		FO							
3707		FO							
4601	3.89	FO	1.89			CI	PVC	142.52	
3703		FO	0			CI	PVC	357.67	

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad

Printed By: Property Searches

OS Sheet No: SD3717NW

Scale: 1: 1250 Date: 08/09/2015

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Foul Surface Combined

- WW Site Termination
- Air Valve
- Cascade
- Non Return Valve
- Extent of Survey
- Flow Meter
- Gulley
- Hatch Box
- Head of System
- Hydrobrake / Vortex
- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- Contaminated Surface Water
- WW Pumping Station
- Sludge Pumping Station
- Sewer Overflow
- TJunction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works
- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

Foul Surface Combined Overflow

- Screen Chamber
- Discharge Point
- Outfall
- Control Kiosk
- Unspecified

- Sludge Main, Public
- Sludge Main, Private
- Sludge Main, S104

ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: SD3717NW
Scale: 1: 1250 Date: 08/09/2015
9 Nodes
Sheet 1 of 1

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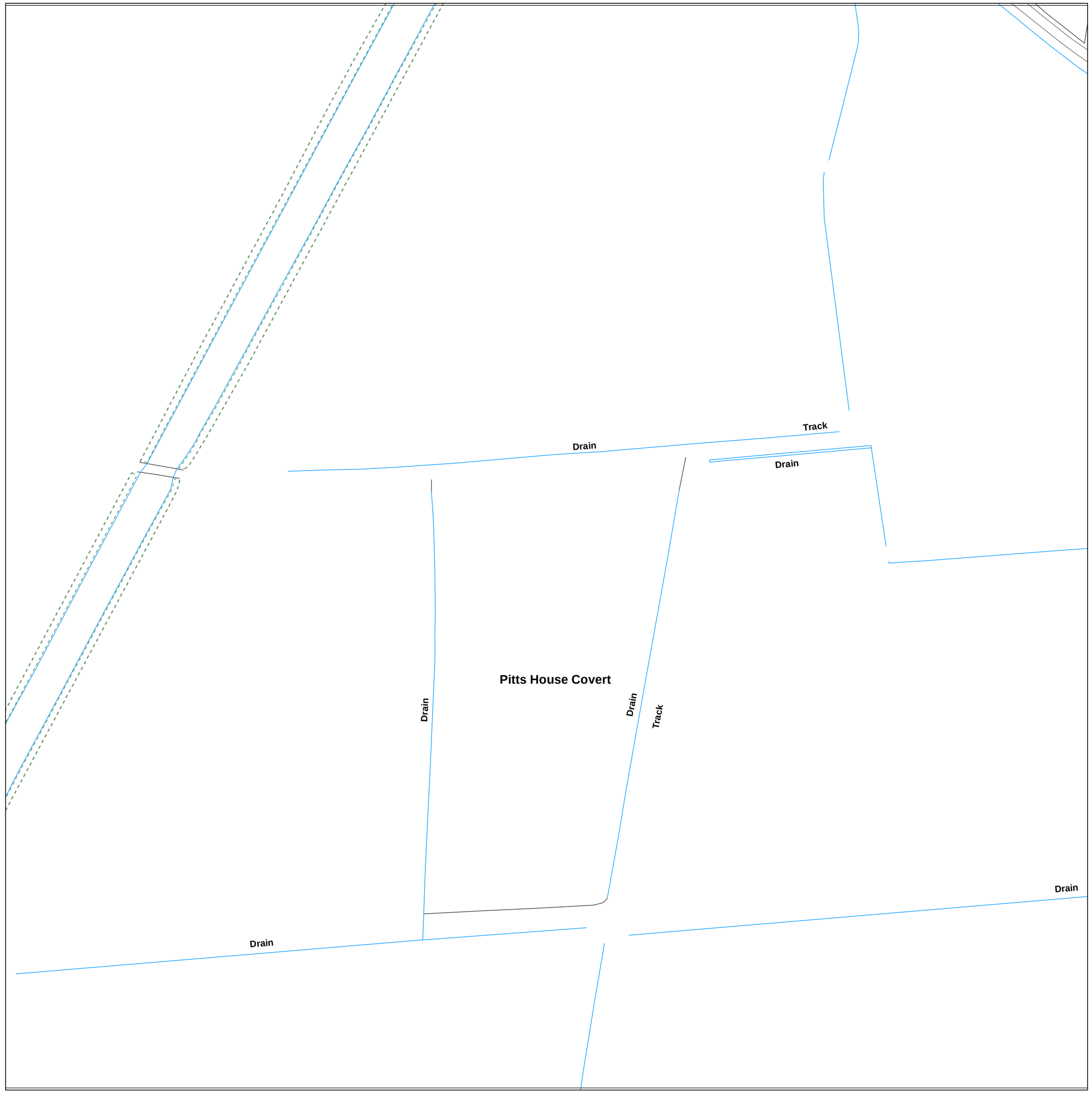
SEWER RECORDS



Refno Cover Func Invert Size.x Size.y Shape Matl Length Grad

Refno Cover Func Invert Size.x Size.y Shape Matl Length Grad

OS Sheet No: SD3717SW

Scale: 1: 1250 Date: 08/09/2015

Printed By: Property Searches

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

Manhole
Manhole, Side Entry
MainSewer, Public
MainSewer, Private
MainSewer, S104
Rising Main, Public
Rising Main, Private
Rising Main, S104
Highway Drain, Private

Foul Surface Combined

WW Site Termination
Air Valve
Cascade
Non Return Valve
Extent of Survey
Flow Meter
Gulley
Hatch Box
Head of System
Hydrobrake / Vortex
Inlet
Inspection Chamber
Bifurcation
Catchpit
Contaminated Surface Water
WW Pumping Station
Sludge Pumping Station
Sewer Overflow
T Junction/Saddle
LampHole
OilInterceptor
PenStock
Pump
RoddingEye
Soakaway
Summit
Valve
Valve Chamber
Washout Chamber
DropShaft
WW Treatment Works
Septic Tank
Vent Column
Network Storage Tank
Orifice Plate
Vortex Chamber
Penstock Chamber
Blind Manhole

Foul Surface Combined Overflow

Screen Chamber
Discharge Point
Outfall

Control Kiosk
Unspecified

Sludge Main, Public
Sludge Main, Private
Sludge Main, S104

ABANDONED PIPE

MainSewer
Rising Main
Highway Drain
Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.
The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded.
United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown.

OS Sheet No: SD3717SW
Scale: 1: 1250 Date: 08/09/2015
0 Nodes
Sheet 1 of 1

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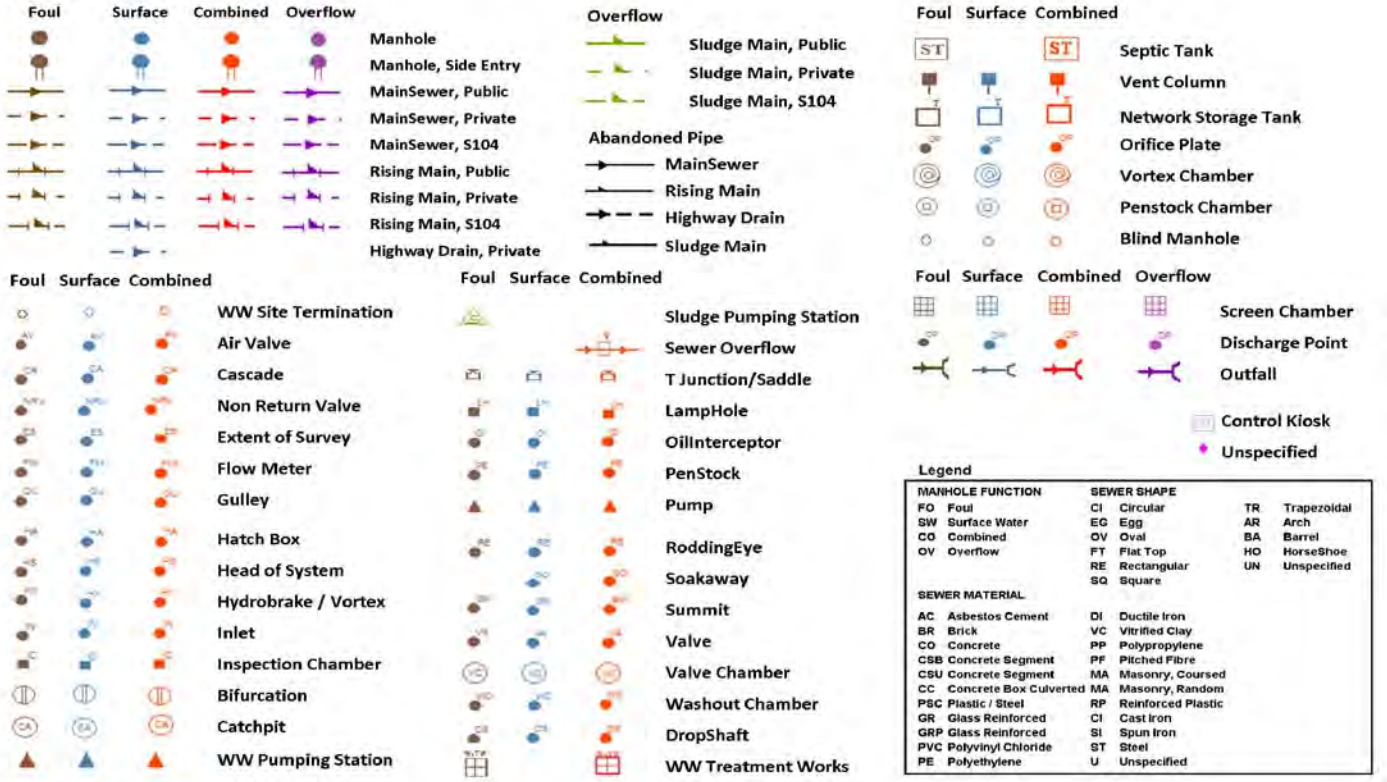
SEWER RECORDS

United Utilities

WASTE WATER SYMBOLOGY



Legend

MANHOLE FUNCTION		SEWER SHAPE			
FO	Foul	CI	Circular	TR	Trapezoidal
SW	Surface Water	EG	Egg	AR	Arch
CO	Combined	OV	Oval	BA	Barrel
OV	Overflow	FT	Flat Top	HO	HorseShoe
		RE	Rectangular	UN	Unspecified
		SQ	Square		

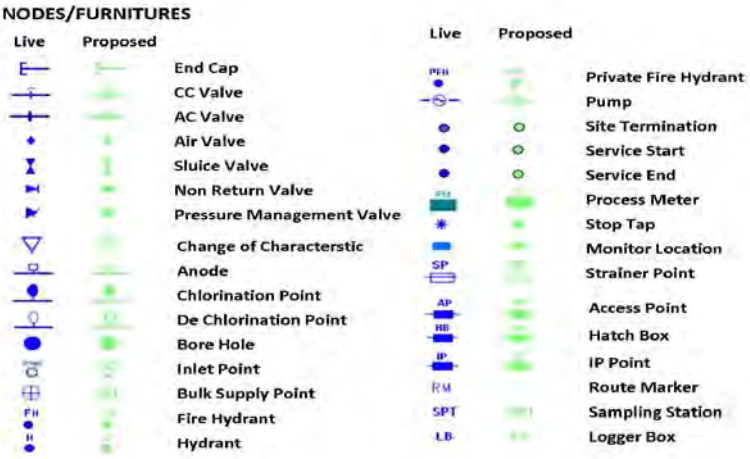
SEWER MATERIAL			
AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	VC	Vitrified Clay
CO	Concrete	PP	Polypropylene
CSB	Concrete Segment	PF	Pitched Fibre
CSU	Concrete Segment	MA	Masonry, Coursed
CC	Concrete Box Culverted	MA	Masonry, Random
PSC	Plastic / Steel	RP	Reinforced Plastic
GR	Glass Reinforced	CI	Cast Iron
GRP	Glass Reinforced	SI	Spun Iron
PVC	Polyvinyl Chloride	ST	Steel
PE	Polyethylene	U	Unspecified

CLEAN WATER SYMBOLOGY

PIPE WORK

ABANDONED PIPE

NODES/FURNITURES



PROPERTY TYPES

Legend

MATERIAL TYPES		LINING TYPES	
AC	ASBESTOS CEMENT	CL	CEMENT LINING
CI	CAST IRON	TB	TAR OR BITUMEN
CU	COPPER	ERL	EPOXY RESIN
CO	CONCRETE		
DI	DUCTILE IRON	INSERTION TYPES	
GI	GALVANISED IRON		
GR	GREY IRON	DD	DIE DRAWN
OT	OTHERS	DR	DIRECTIONAL DRILLING
PB	LEAD	MO	MOLING
PV	uPVC	PI	PIPELINE
SI	SPUN IRON	SL	SLIP LINED
ST	STEEL		
UN	UNKONWN		
PE	POLYETHYLENE		

Kirsty Williams

From: Lunt, John <John.Lunt@uuplc.co.uk>
Sent: 02 October 2015 10:02
To: Kirsty Williams
Cc: Wastewater Developer Services
Subject: (UU ref: DE1495) Moss Lane, Maghull
Attachments: mg_info.txt

Hi Kirsty,

In reply, I can confirm that UU would have no objection in principle to the drainage strategy proposed below.

If I can be of any further help at all then please don't hesitate to get in touch.

Regards,

John

John Lunt
Developer Query Engineer
Developer Services and Planning
Operational Services
United Utilities

T; 01925 679411 (Int; 79411)
unitedutilities.com

From: Kirsty Williams [mailto:kirstywilliams@betts-associates.co.uk]
Sent: 21 September 2015 09:49
To: Wastewater Developer Services
Subject: Moss Lane, Maghull

To Whom it May Concern,

Please find attached a copy of the Pre-Dev Enquiry form for your review regarding a proposed residential development in Southport. We have previously been in contact regarding any historic flood information you had for the site/neighbouring areas as we are completing and FRA, and as part of the FRA we are looking at the potential surface water and foul water management strategies for the site (such are detailed in brief below). As the proposals are outline at present we are looking for an agreement in principle to the proposed strategy (attached) so that we might progress with the approach further.

Foul Water:
The foul water flows generated by the development site are proposed to outfall to the public foul water gravity sewer (225mm dia.) to the north-west of site. The proposed point of connection from site would be at UU Manhole Ref. 9801 (or alternative downstream location). It is assumed that a pumped solution will be likely, based on the existing ground levels; however further investigation during detailed design will be required to confirm such. Consents to discharge to the public sewer network will be required from United Utilities prior to approval, furthermore any downstream capacity constraints on the system should be established through early consultations; the preferred point(s) of connection and discharge rates should be discussed and agreed.

Surface Water:
Should infiltration be deemed not feasible following soakaway testing to BRE365, then the next sought outfall in the hierarchical approach, for the management of surface water run-off should be to mimic the existing regime and discharge to watercourse on the eastern boundary (Three Pools Waterway). Detailed design will be required to confirm feasibility of the strategy following more detailed levels and layout review. Consents to outfall and

agreement of the discharge rate(s) will be required from the Environment Agency and some discussion may be required with the Lead Local Flood Authority (SC); therefore early discussion is advised. Appropriate easements must be incorporated into the design and discussed with the EA at an early stage.

Kind Regards

Kirsty Williams
Graduate Flood Risk Analyst

Betts Associates Ltd
Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
T - 01244 288178

kirstywilliams@betts-associates.co.uk
www.betts-associates.co.uk

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FLOOD RISK MANAGEMENT | STRUCTURAL SURVEYS | PARTY WALL DUTIES | ECOLOGY

APPENDIX G: LPA/LLFA CORRESPONDENCE

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Kirsty Williams

From: Kirsty Williams
Sent: 02 September 2015 16:20
To: 'Flooding'
Subject: FRA: MOSS LANE, SOUTHPORT
Attachments: redsouthportpolicymap_publicationdraftfinal.pdf; LOCATION PLAN.pdf

To whom it may concern,

LAND AT MOSS LANE, SOUTHPORT, PR9 7QT

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment for the above site (location plan attached), including details of historical flooding; this would be greatly appreciated. Furthermore we have identified that the site is allocated for residential housing and are enquiring any additional information which may be available to review regarding the sites sequential/exception test outcomes.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards

Kirsty Williams
Graduate Flood Risk Analyst

Betts Associates Ltd
Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

kirstywilliams@betts-associates.co.uk
www.betts-associates.co.uk

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FLOOD RISK MANAGEMENT | STRUCTURAL SURVEYS | PARTY WALL DUTIES | ECOLOGY

APPENDIX H: SURFACE WATER RUN-OFF CALCULATIONS

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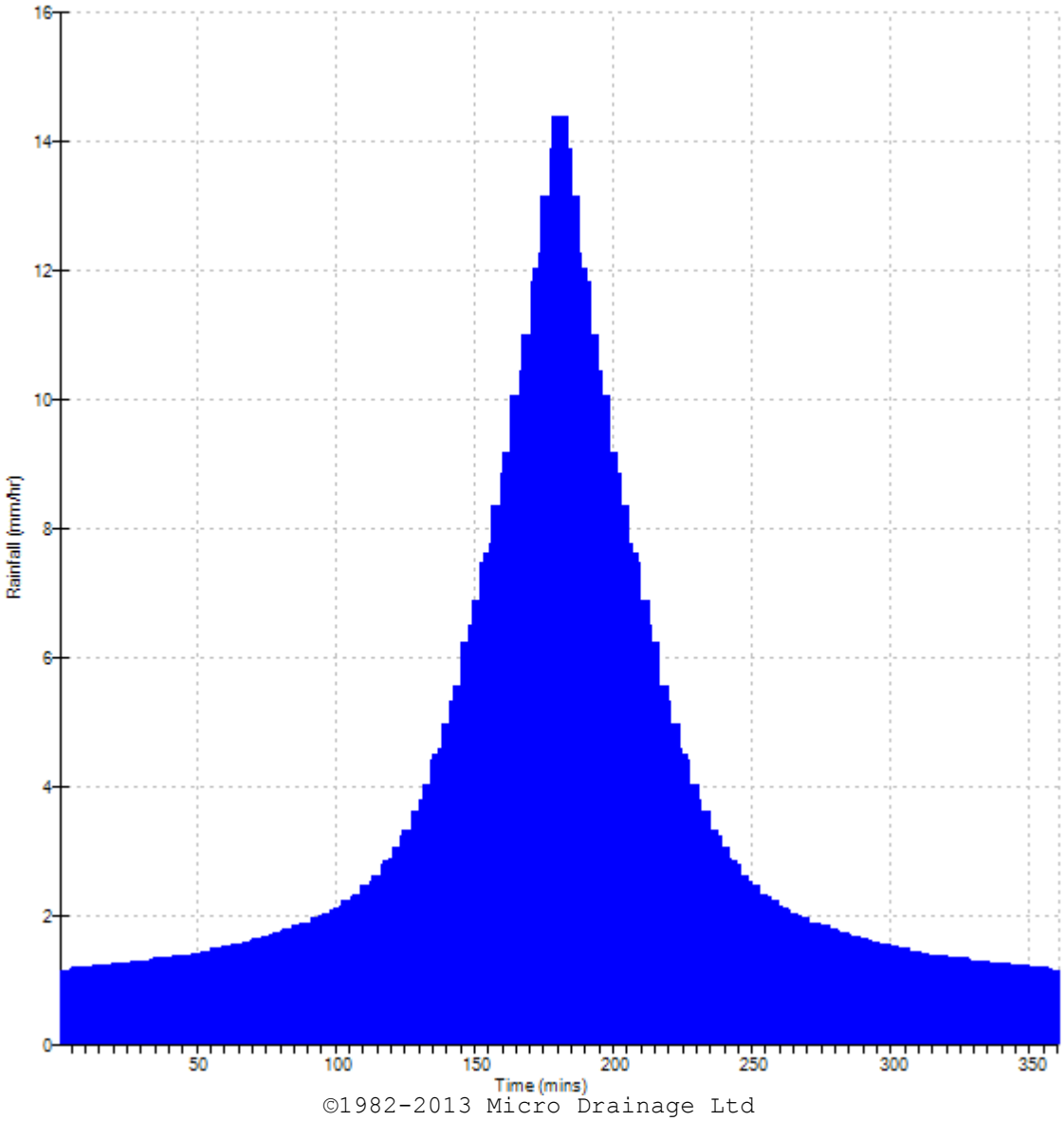
Rainfall profile

Storm duration (mins) 360

FEH Data

C(1km)	-0.025
D1(1km)	0.343
D2(1km)	0.317
D3(1km)	0.341
E(1km)	0.288
F(1km)	2.478
Peak Intensity (mm/hr)	14.395
Ave. Intensity (mm/hr)	3.672
Return Period (years)	1

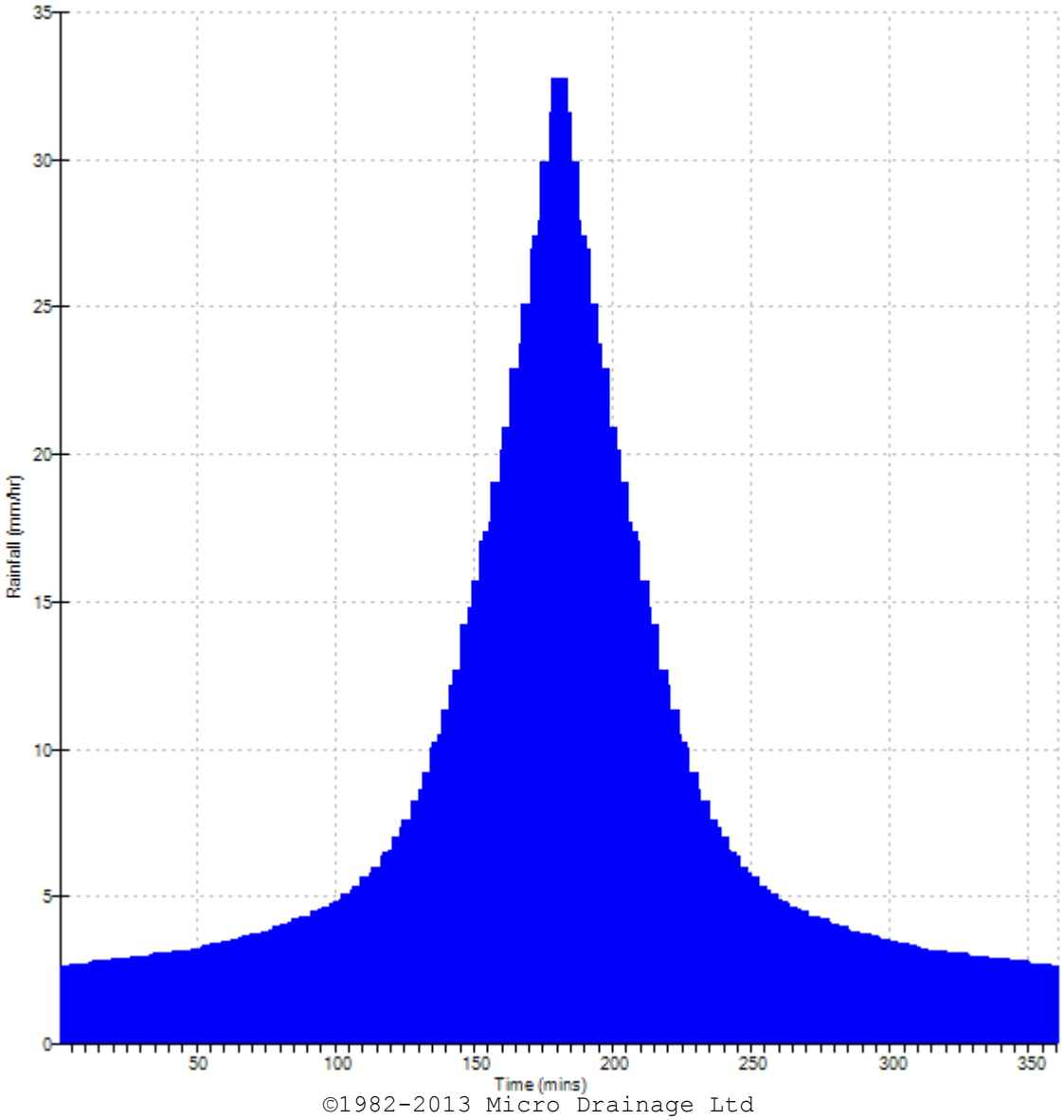


Rainfall profile

Storm duration (mins) 360

FEH Data

C(1km)	-0.025
D1(1km)	0.343
D2(1km)	0.317
D3(1km)	0.341
E(1km)	0.288
F(1km)	2.478
Peak Intensity (mm/hr)	32.786
Ave. Intensity (mm/hr)	8.364
Return Period (years)	30

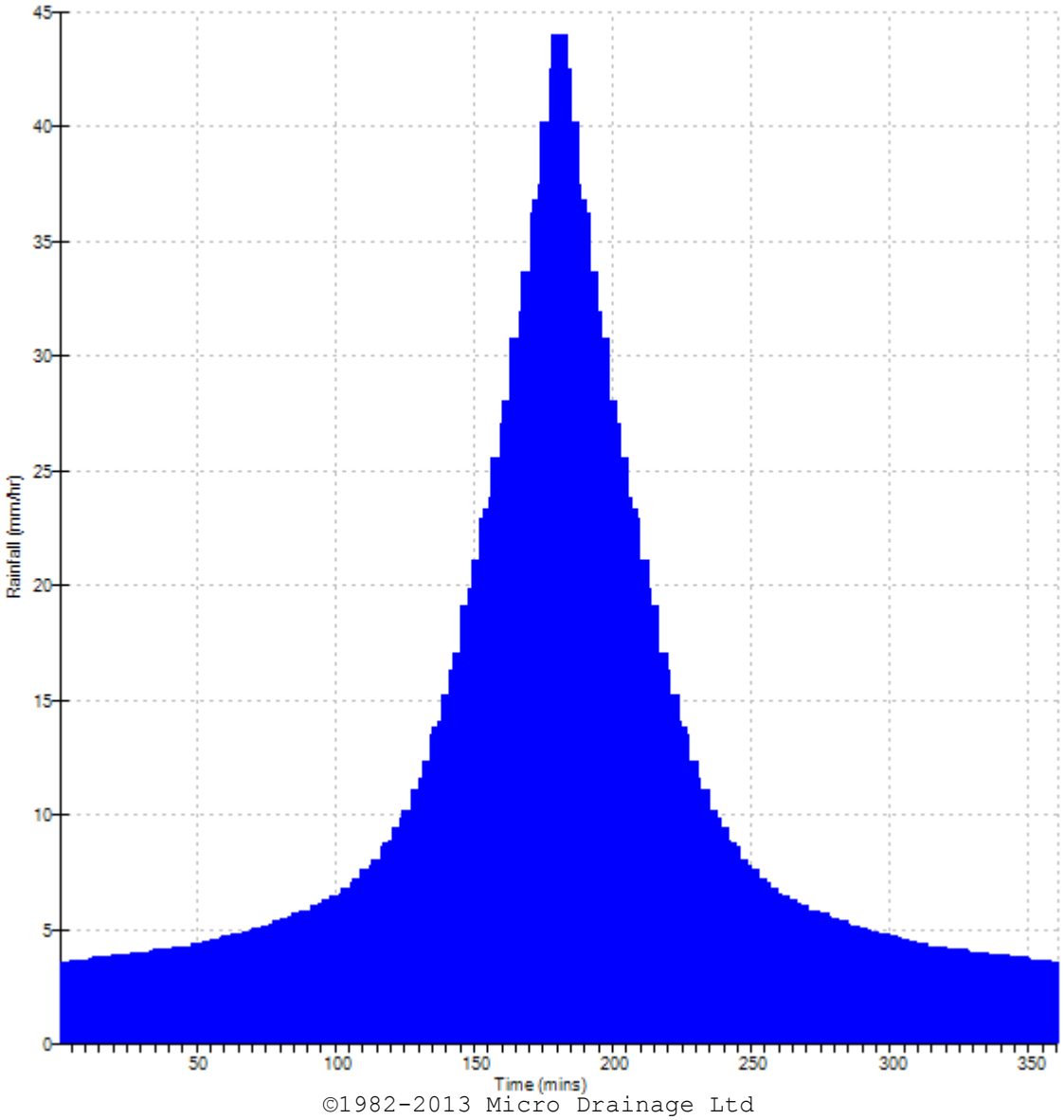


Rainfall profile

Storm duration (mins) 360

FEH Data

C(1km)	-0.025
D1(1km)	0.343
D2(1km)	0.317
D3(1km)	0.341
E(1km)	0.288
F(1km)	2.478
Peak Intensity (mm/hr)	44.066
Ave. Intensity (mm/hr)	11.241
Return Period (years)	100



ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	17.968	Urban	0.000
SAAR (mm)	864	Region Number	Region 10

Results l/s

QBAR Rural	41.9
QBAR Urban	41.9
Q1 year	36.4
Q1 year	36.4
Q30 years	71.0
Q100 years	87.1

Greenfield Runoff Volume

FEH Data

Return Period (years)	1
Storm Duration (mins)	360
Site Location	GB 337150 417450 SD 37150 17450
C(1km)	-0.025
D1(1km)	0.343
D2(1km)	0.317
D3(1km)	0.341
E(1km)	0.288
F(1km)	2.478
Areal Reduction Factor	1.00
Area (ha)	17.968
SAAR (mm)	864
CWI	120.442
SPR Host	19.010
URBEXT (1990)	0.0950

Results

Percentage Runoff (%)	20.92
Greenfield Runoff Volume (m^3)	828.075

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
Site Location	GB 337150 417450 SD 37150 17450
C(1km)	-0.025
D1(1km)	0.343
D2(1km)	0.317
D3(1km)	0.341
E(1km)	0.288
F(1km)	2.478
Areal Reduction Factor	1.00
Area (ha)	17.968
SAAR (mm)	864
CWI	120.442
SPR Host	19.010
URBEXT (1990)	0.0950

Results

Percentage Runoff (%)	25.22
Greenfield Runoff Volume (m^3)	3056.632

SURFACE WATER RUN-OFF CALCULATION SHEET

Development	Moss Lane, Southport
Project No.	HYD008

Revision	1.1	**Completed by**	KW
Date	18.09.15	**Checked by**	RDN

BETTS ASSOCIATES
CONSULTING ENGINEERS

Areas

Total Site	18.926	ha
Development Area (for SW Strategy)	18.926	ha
Existing Impermeable	0.958	ha
Existing Impermeable (for SW Strategy)	0.958	ha (5%)
Existing Pervious	17.968	ha
Existing Pervious (for SW Strategy)	17.968	ha
Proposed Impermeable (total)	7.570	ha (40%)
Proposed Impermeable (domestic only)		ha

Catchment Charateristics

SAAR	864	mm
SPR	19.01	%
i_1	14.4	mm/hr
i_{30}	32.8	mm/hr
i_{100}	44.1	mm/hr
d_1	12.7	mm
d_{100}	64.4	mm

Run-off Rates

Pre-development

Impermeable	1yr	38.3	l/s
	30yr	87.2	l/s
	100yr	117.3	l/s
	50mm/hr	133.1	l/s
Pervious	1yr	36.4	l/s
	30yr	71.0	l/s
	100yr	87.1	l/s
	QBar	41.9	l/s
Total	1yr	74.7	l/s
	30yr	158.2	l/s
	100yr	204.4	l/s

Post-development

Impermeable (total)	1yr	302.7	l/s
	30yr	689.4	l/s
	100yr+CC	1204.6	l/s
Impermeable (domestic only)	1yr		l/s
	30yr		l/s
	100yr+CC		l/s

Volumes

Pre-development

Impermeable	1yr	121.7	cu.m
	100yr	617.0	cu.m
Pervious	1yr	828.1	cu.m
	100yr	3056.6	cu.m
Total	1yr	949.7	cu.m
	100yr	3673.6	cu.m

Post-development

Impermeable (total)	1yr	961.4	cu.m
	100yr+CC	6337.6	cu.m
Impermeable (domestic only)	1yr		cu.m
	100yr+CC		cu.m
Reduction (total)	-73%	-2664.0	cu.m
Reduction (domestic only)			cu.m

Quick storage Estimate

		low	high	mean	Imp. Area (ha)	Max. Discharge (l/s)	Rainfall	CC
Return Period	1yr	559	1055	807	7.570	59.8	FEH	0
Return Period	30yr	1534	2387	1961	7.570	126.6	FEH	0
Return Period	100yr+CC	3178	4561	3870	7.570	163.5	FEH	30%
Return Period	1yr			0	7.570		FSR	0
Return Period	30yr			0	7.570		FSR	0
Return Period	100yr+CC			0	7.570		FSR	30%

APPENDIX I: IMPERMEABLE AREAS PLANS

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DO NOT SCALE

LEGEND:

- SITE BOUNDARY
- LAND DRAINAGE
- THREE POOLS WATERWAY (EA MAIN RIVER)
- PRE-DEVELOPMENT IMPERMEABLE AREAS (0.958ha)

TOTAL SITE AREA - 18.926ha

Pool House Farm

Pitts House Farm

Southport Old Links
(Golf Course)

Moss Lane

Three Pools Waterway (EA Main River)

Drain

REV	DATE	BY	DESCRIPTION	CHK
A	16.09.15	KV	PRELIMINARY ISSUE FOR REVIEW	RDN

DRAWING STATUS:

PRELIMINARY

BETTS ASSOCIATES
CIVIL AND STRUCTURAL ENGINEERS
Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
Tel: 01244 288178 Fax: 01244 288179 enquiries@betts-associates.co.uk

PROJECT:

MOSS LANE
SOUTHPORT

TITLE:

IMPERMEABLE AREAS PLAN
(PRE-DEVELOPMENT)

DATE:	SCALE @ SIZE:	DRAWN:	CHECKED:
SEPT 2015	1:800 @ A0	KW	RDN

PROJECT No:	DRAWING No:	REV:
HYD008	101	A

APPENDIX J: STORMWATER STORAGE ESTIMATES

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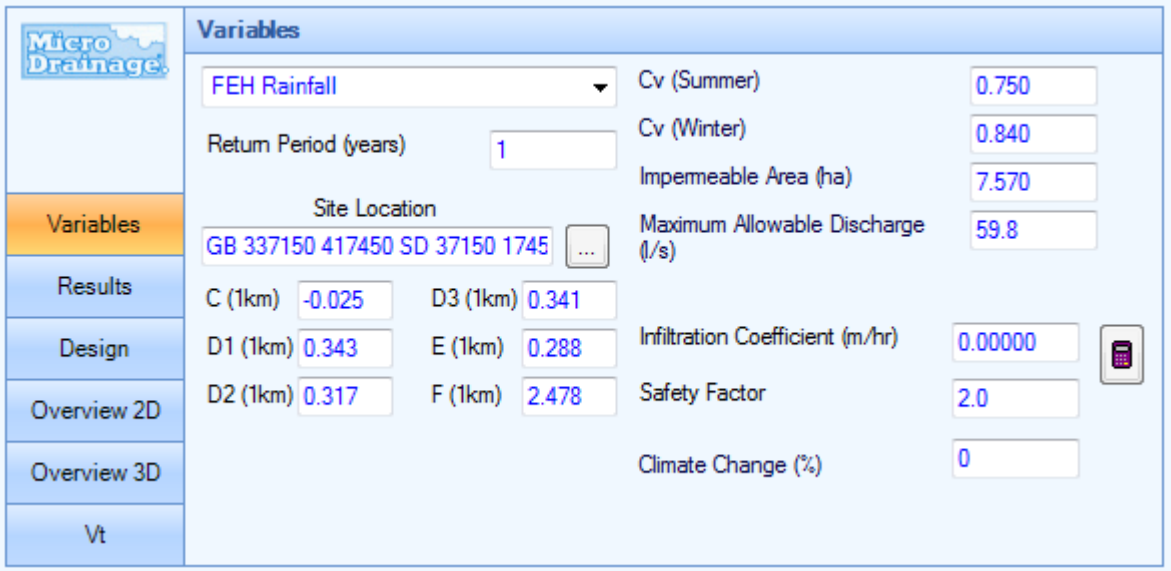
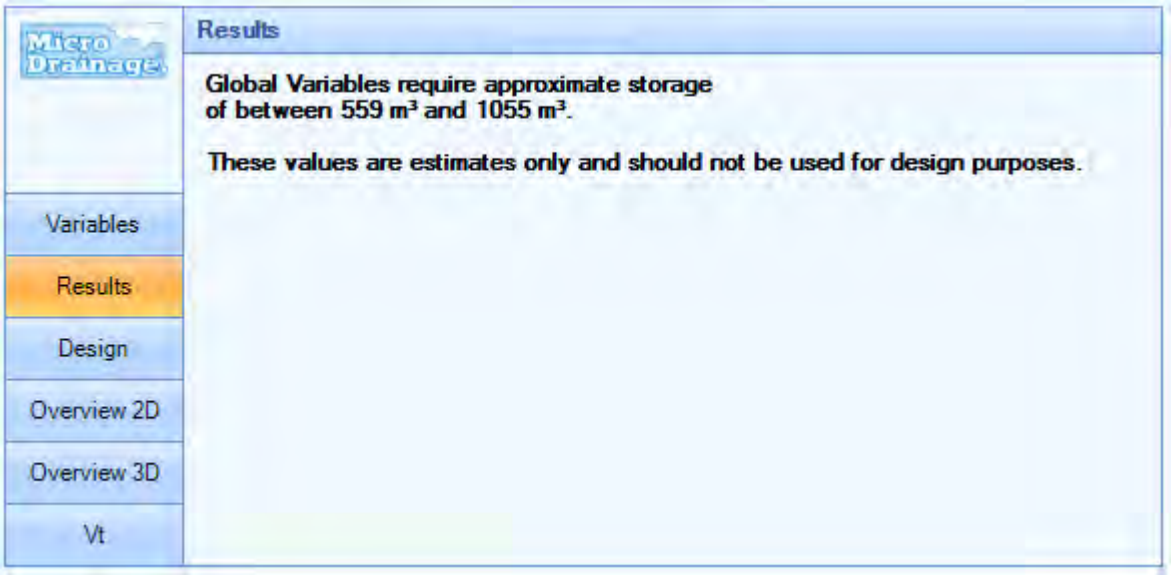
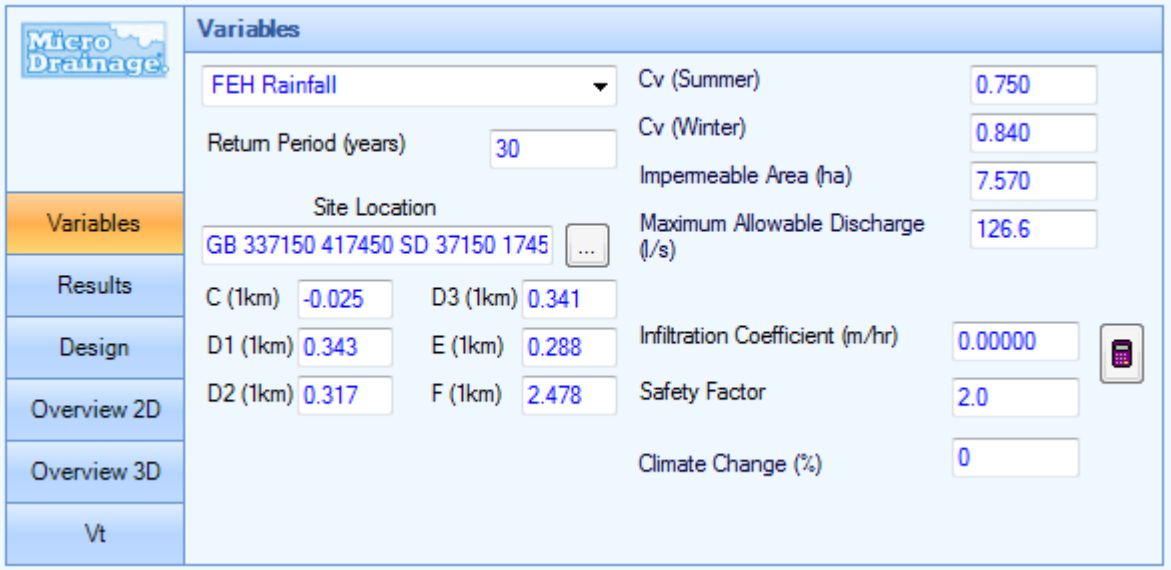
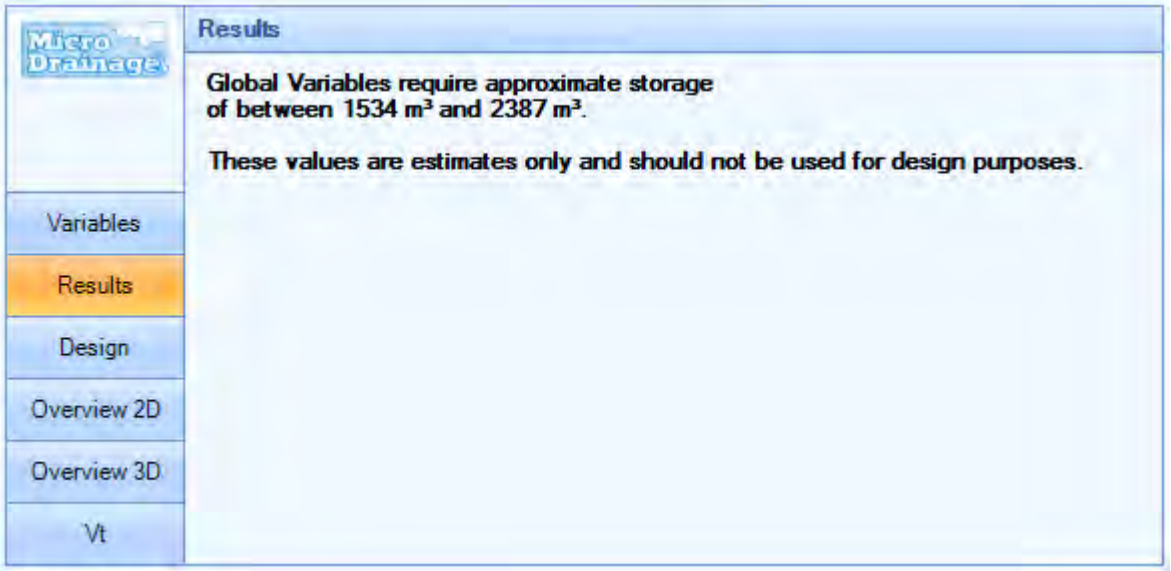
STORMWATER STORAGE ESTIMATES

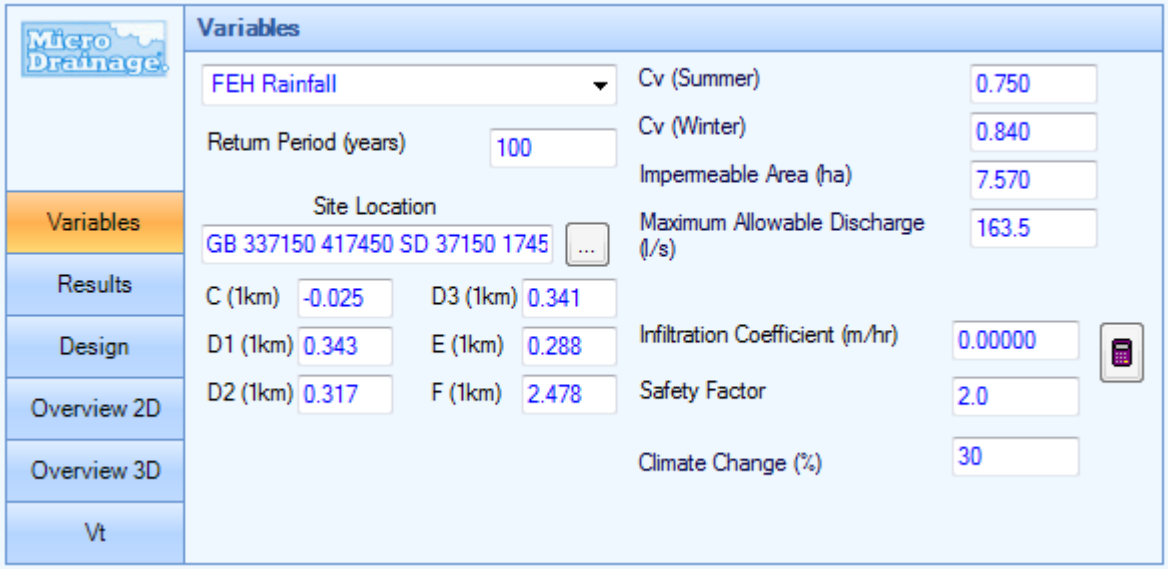
FEH

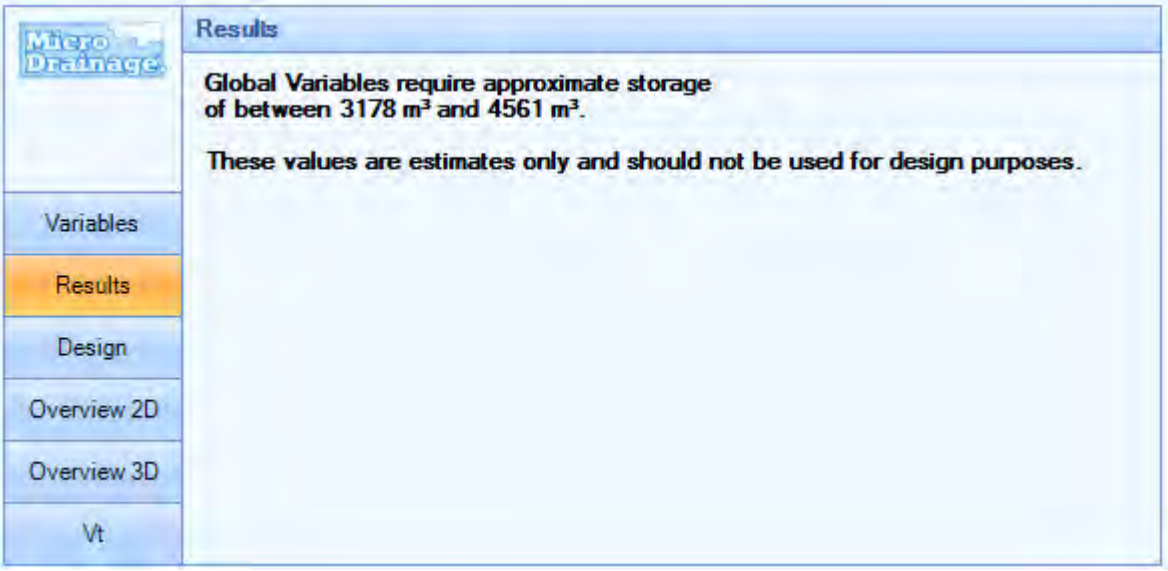





Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FEH Rainfall
Return Period (years) 30
Site Location
GB 337150 417450 SD 37150 1745
...
C (1km) -0.025
D3 (1km) 0.341
D1 (1km) 0.343
E (1km) 0.288
D2 (1km) 0.317
F (1km) 2.478
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 7.570
Maximum Allowable Discharge (l/s) 126.6
Infiltration Coefficient (m/hr) 0.00000
Safety Factor 2.0
Climate Change (%) 0


Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage of between 1534 m³ and 2387 m³.
These values are estimates only and should not be used for design purposes.


Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FEH Rainfall
Return Period (years) 100
Site Location
GB 337150 417450 SD 37150 1745
...
C (1km) -0.025
D1 (1km) 0.343
D2 (1km) 0.317
D3 (1km) 0.341
E (1km) 0.288
F (1km) 2.478
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 7.570
Maximum Allowable Discharge (l/s) 163.5
Infiltration Coefficient (m/hr) 0.00000
Safety Factor 2.0
Climate Change (%) 30


Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage of between 3178 m³ and 4561 m³.
These values are estimates only and should not be used for design purposes.