



Professional surveyors to the water industry



Company Profile 2010

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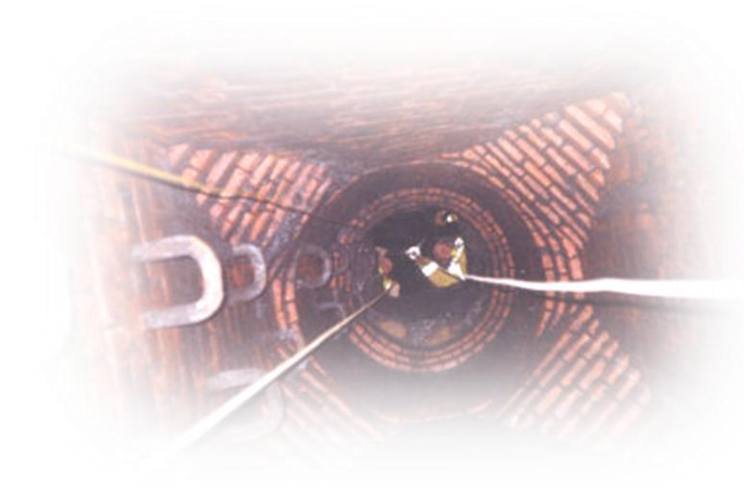
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About Invek Surveys Ltd

Established in 1993, Invek Surveys Ltd provides a specialised and professional surveying service to the Water Industry.

The founding members brought with them a wealth of experience and knowledge, combining to forge an enthusiastic and dynamic team.

Our Commitment to Quality and Health & Safety has enabled the company to evolve into one of the UK's leading sewer survey consultants.

Clients

Our ever growing client base includes:

- *Alfred McAlpine*
- *Black & Veatch*
- *Carillion*
- *Costain*
- *Dwr Cymru*
- *Environment Agency*
- *Aecom*
- *Hyder Consulting*
- *Imtech Process*
- *Mouchel Parkman*
- *Morgan Est*
- *MWH*
- *United Utilities*
- *Yorkshire Water*
- *Morrison*
- *Galliford Try*

Associated with

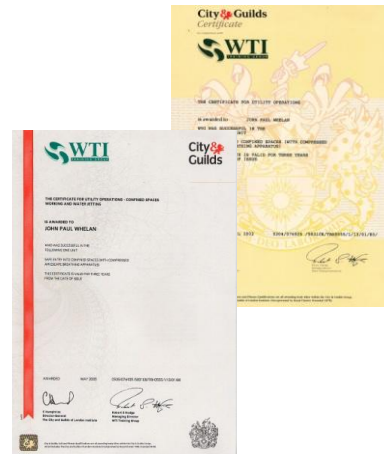


Health & Safety

Health and Safety issues are of paramount importance to us as a company and the very latest training techniques are an integral part of our success within the industry.

Key Personnel are fully trained and competent in the following areas:

- **Confined Spaces**
- **Signing, Lighting & Guarding**
- **CSCS Cards**
- **Emergency First Aid**
- **IOSH**



Survey Work

Water companies are reliant on accurate sewer records to perform their statutory obligations. We can obtain this data where no records exist, or verify existing data.

Our comprehensive ranges of surveying services include:

- **Manhole & CSO Survey**
- **Outfall Surveys**
- **Pumping Station Surveys**
- **Waste Water Treatment Works Surveys**
- **Private Drainage & Connectivity Surveys**
- **Impermeable Area Surveys**
- **Sewer Mapping & Connectivity Surveys**
- **Level Surveys using GPS technology**
- **Water Sampling**
- **Culvert & Sewer Walkthrough Inspection**
- **Environmental Studies**
- **Contamination Investigations**



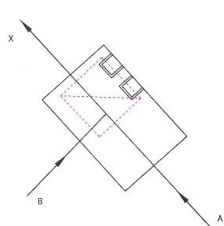
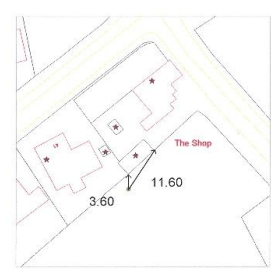
Manhole / CSO Survey Card

We carry out full manhole, CSO & Outfall surveys to obtain:

- Cover sizes
- Shaft sizes
- Pipe sizes & depths
- Weir depths
- Chamber dimensions
- Pipe centre lines
- Photographs
- Any other additional information
- Node positions using GPS
- Levels using GPS to generate invert levels etc

The information is processed and the following document is produced in STC25 data format, along with a CAD sketch & location plan.

Invek Surveys 6.16										Manhole Details	
19/01/10											
OS ref		SC3994319574						M/H no SC39943504			
Location FIELD R/O CARRICK PARK											
Year laid		Status PU		Function C		Type M		Survey date 16/01/10			
COVER		Shape D	Hinged N	Lockable N	Duty H	Size 910	x 610	Toxic N			
SHAFT		Side N	Noreg	Depth 350		Size 900	x 600	Vermin N			
CHAMBER		Soffit C	Steps 3	Ladders 0	Lndgs 0	Size 900	x 630	Const B			
		Depth flow 30	Depth silt 20	Ht surch 30		Cover level	15.02				
-----Up/dn ref---Shp-----Size-----Bdrop---Mat---Lng-----Depth---Invert---											
In A		C	150	x		PF	IS	1.65	13.37		
B		C	150	x		VC		1.63	13.39		
C				x							
D				x							
E				x							
F				x							
-----TV---Crt-----											
Ou X		C	150	x	N	C	PF	IS	1.66	13.36	
Y				x	N	C					
Attention Cover N Step/Lad N Shaft N Chamb N Bch/ch N Other N											
Remarks DAC											



Pumping Station Surveys

Pumping Station Surveys include:

- Cover sizes
- Shaft sizes
- Pipe sizes & depths
- Chamber dimensions
- Pump details, controls, pump information, pump operating levels & drop tests
- Photographs
- Any other additional information
- Positions using GPS
- Levels using GPS to generate invert levels etc

INVEK SURVEYS LTD. Pumping Station Survey Document

Station Name: Berthengam
 Location: In compound s/o Glen Llyn
 Node Reference: SJ1179470 Grid Reference: 311871 / 379403
 Operator: Arfon Reavinds Client Name: Intach Process
 Survey Date: 7th July 2009 Time (24hrs): -

Public: ☒ Foul
 Private: ☐ Surface
 Unknown: ☐ Combined ☒

Cover Level (m AOD): 184.47
 Overall Depth (m): 3.34 Level (m AOD): 181.13
 Taper Depth (m): 3.19 Level (m AOD): 181.28

Cover	Shape	Size (mm)	Duty	No.

Shaft	Depth (mm)	Size (mm)	Inch/Steps	Lead

Chamber	Material	Size (mm)	Well Area (m ²)	Surf
	Pre-Cast	1350	1.43	Slab

*Main cover and shaft details recorded

Inlet and Overflow Pipes at Station

Pipe	Size (mm)	Shape	Material	Backdrop	Depth (m)	IL (m AOD)
A	150	C	VC		2.15	182.32
B	150	C	VC		1.12	183.35
C						
D						
E						
F						
X	150	C	VC		1.69	182.78
Y						
Z						

Rising Mains Exiting Station

Pipe	Size (mm)	Shape	Material	Backdrop	Depth (m)	IL (m AOD)
P	100	C	CI		1.14	183.33
Q						

Additional Information

Pipe X is an assumed overflow. Suspected to drain to a soak-away.
 High level marker after a storm = 183.32m AOD

Berthengam SPS Station Survey Card.doc Invek Surveys Ltd 3 of 2

Pumping Station Controls

	Normal	Alarm
Ultrasonic	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Floats	<input type="checkbox"/>	<input type="checkbox"/>
Electrodes	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

Pump Information

Pump No.	Type	Make	Serial No.	Remarks
1	Submersible	Fygt	-	-
2	Submersible	Fygt	-	-

Pump Operation

Pump No.	Duty/Standby	Duty/Assist	Site	Records
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Normal Operating Levels

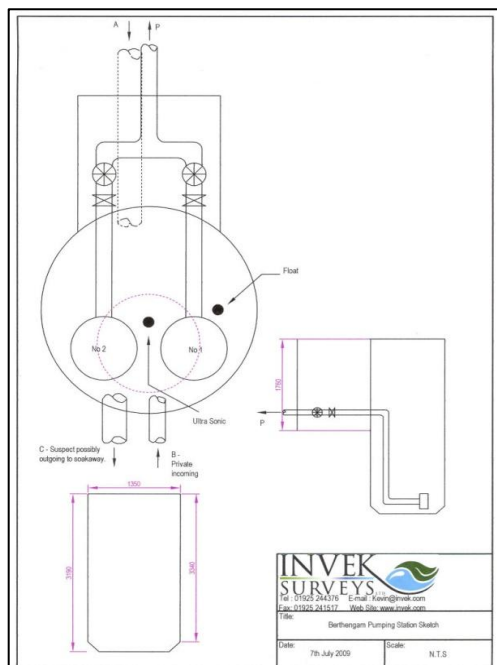
Pump Regime	Start Depth (m)	Start Level (m AOD)	Stop Depth (m)	Stop Level (m AOD)	Observing Operation	Measurement of controls	Site Records
Duty	2.74	181.73	3.2	181.27	<input checked="" type="checkbox"/>		
Assist	2.68	181.79	3.2	181.27	<input checked="" type="checkbox"/>		

Pump Tests

Pump Combination	Start Depth (m)	Stop Depth (m)	Difference (m)	Well Area (m ²)	Volume (m ³)	Time (secs)	Apparent Rate of Flow (l/s)	Actual Rate of Flow (l/s)
Inflow	2.90	2.80	0.10	1.43	0.143	415		0.34
No 1	2.65	2.75	0.10	1.43	0.143	13	11.00	11.34
No 1	2.65	2.75	0.10	1.43	0.143	13	11.00	11.34
No 1	2.65	2.75	0.10	1.43	0.143	13	11.00	11.34
No 2	2.65	2.75	0.10	1.43	0.143	12	11.92	12.26
No 2	2.65	2.75	0.10	1.43	0.143	13	11.00	11.34
No 2	2.65	2.75	0.10	1.43	0.143	12	11.92	12.26
No 1 & 2	2.65	2.75	0.10	1.43	0.143	9	15.89	16.23
No 1 & 2	2.65	2.75	0.10	1.43	0.143	9	15.89	16.23
No 1 & 2	2.65	2.75	0.10	1.43	0.143	9	15.89	16.23

Additional Pump Information

Berthengam SPS Station Survey Card.doc Invek Surveys Ltd 2 of 2

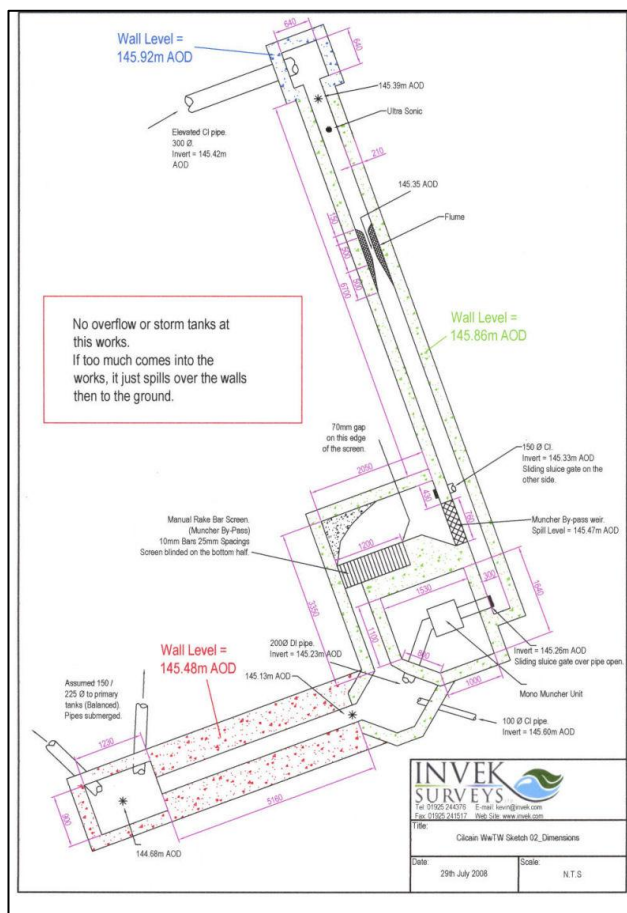


Waste Water Treatment Works

A fully dimensional survey is carried out to obtain details of:

- Inlet chambers
- Channels
- Overflow weirs
- Storm tanks
- Pipe sizes
- Positions using GPS
- Levels using GPS to generate invert levels etc
- Mechanical & electrical devices (manufacturer and model etc)
- Photographs

Information is processed in CAD to produce plan diagram as shown below.

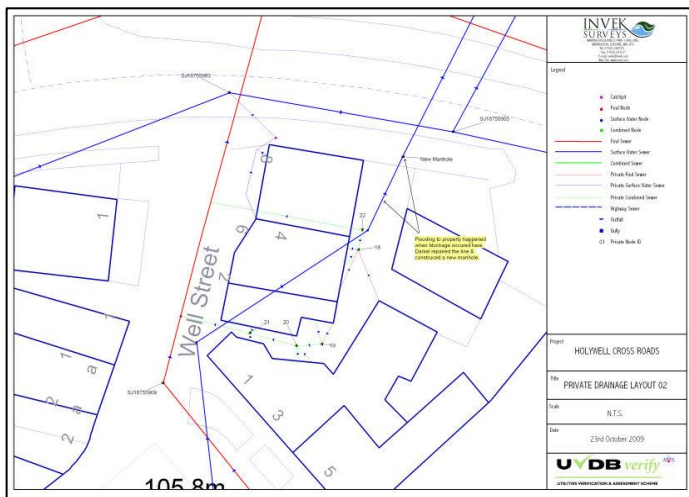


Private Drainage Surveys

We undertake private drainage surveys to determine privately owned and uncharted sewer networks. These surveys consist of:

- Identifying private manhole covers
- Determining its function i.e. foul, surface or combined
- Obtaining outgoing pipe sizes & depths
- GPS to obtain cover levels & locations of each manhole cover
- Dye testing, CCTV or electro location to determine the private sewers connectivity

The information obtained is then processed and the two documents below are produced. One document to illustrate the private sewer network & the other to provide the information on each private manhole surveyed.

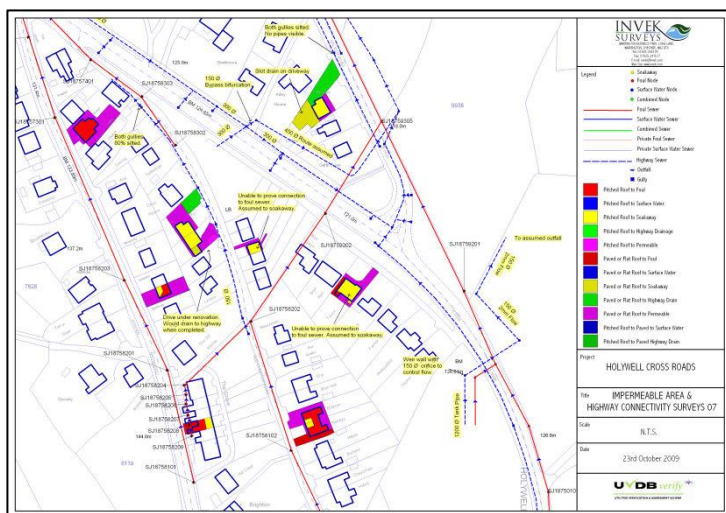


Chamber Ref	Pipe Size X	Function	Material	Depth of Pipe X (m)	Cover Level	Invert Level	Remarks
01	100	c	vc	0.98	110.87	109.59	Trap on outgoing pipe
02	100	c	vc	0.75	110.67	109.92	Trap on outgoing pipe
03	100	c	vc	0.68	110.79	110.11	
04	100	c	vc	0.53	110.40	109.77	Trap on outgoing pipe
05	100	c	vc	0.66	110.33	109.67	Trap on outgoing pipe
06	100	c	vc	0.44	110.34	109.90	
07	100	c	vc	1.15	110.38	109.23	Temp overflow fitted (100 pvc I.L. 110.14m AOD)
08	100	c	vc	0.36	110.16	109.80	
09	100	f	vc	0.91	110.15	109.24	
10	100	s	vc	1.05	110.13	109.08	Goes to combined system in High Street
11	100	f	vc	0.63	110.87	110.24	
12	100	s	vc	0.80	110.86	110.06	Channel 90% surcharged/lifted
13	100	f	vc	0.50	111.03	110.53	
14	100	f	vc	0.38	111.22	110.84	
15	100	s	vc	0.45	111.26	110.81	
16	100	s	vc	0.64	111.67	111.03	
17	100	f	vc	0.61	111.74	111.13	
18	100	c	vc	0.42	110.38	102.96	
19	100	c	vc	0.33	103.91	103.58	
20	100	c	pvc	0.60	103.94	103.34	Trap on outgoing pipe
21	100	c	vc	1.05	104.19	103.14	Trap on outgoing pipe
22	-	-	-	0.00	-	-	Buried in back garden
23	100	c	vc	0.39	109.81	109.42	
24	150	c	vc	0.54	109.63	109.09	
25	100	c	pvc	0.43	110.34	109.91	
26	100	c	vc	0.25	109.91	109.56	
27	100	c	vc	0.49	109.88	109.39	
28	100	c	vc	0.33	109.23	108.90	
29	100	c	vc	1.60	109.09	107.49	
30	100	c	vc	1.32	107.32	106.00	
31	150	c	vc	0.78	106.36	105.58	
32	100	f	vc	0.60	109.09	108.49	
33	100	f	vc	0.75	109.01	108.26	

Impermeable Area Surveys

We carry out Impermeable Area Surveys to determine where rainwater from roofs & hard standing areas (driveways & highway areas etc) drain to.

The information obtained is then processed onto a colour co-ordinated layout relative to the type of roof & which system the rainwater drains to.



Connectivity Surveys

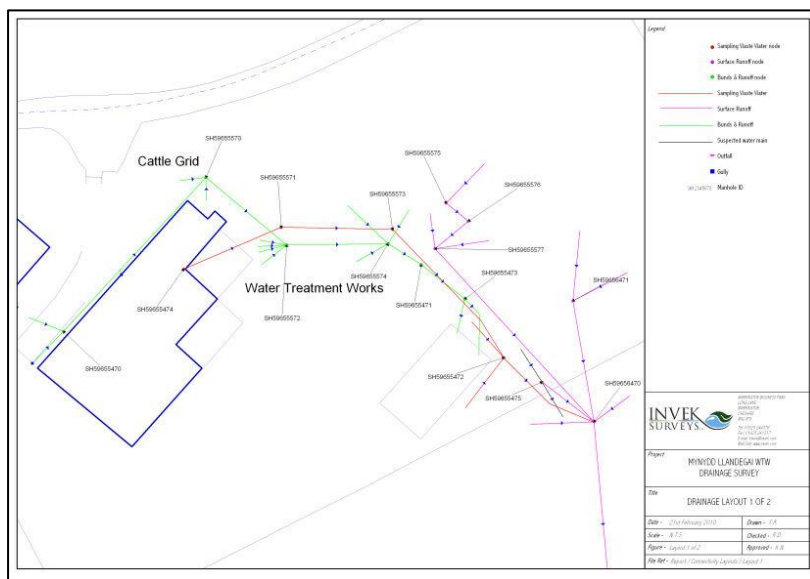
Connectivity surveys are required when unknown connections have not been determined or existing connections require confirmation.

We have several methods to determine the connectivity of sewer networks.

These including:

- **CCTV**
- **Electro location**
- **Dye Testing**
- **Audio Testing**

Using the GPS, we can then plot the relevant nodes onto a plan and produce a layout of the confirmed sewer network.



Specialist equipment

We are now using the *Leica GPS 900 Smart Net Rover* to obtain cover levels & accurate positions of manhole covers & other ancillaries.



Survey Vehicles

All our vehicles are equipped with welfare facilities and are serviced regularly to maintain our key environmental objectives and targets.



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