A Tables – Base Information

Table A1 Properties and Population

The business customer base numbers are for mid year and include changes in the customer base in the first 6 months of the year due to customers moving to meters, meter rightsizing and customers moving to LUVA tariffs. The mid year base does not reflect the data cleansing that happened as part of the migration to the unified billing system. Rateable value and volumes are at year end.

Introduction to Future Years

- Generally budget figures for Report Year +1 are consistent with Scheme of Charges.
- No forecasts have yet been produced for 2004/05 so the forecast figures are as per the budget.
- Report Year +2 figures are based on those for report year +1.

A1.1-11 Unmeasured Domestic - Properties

Data for these lines have been derived from data sourced from the Scottish Executive relating to the total number of domestic properties listed on the Council Tax Valuation List at the beginning of September 2003, which is compiled from individual local authority returns (CT1 forms). This source data is at the highest aggregate level and makes no distinction for properties that are billed for water (or waste). The WIC 4 report of billed properties has been used but is still incomplete. A few remaining councils are yet to submit.

The data supplied has been adjusted in respect of the following:

The Scottish figures for billed households have been derived by summing the number of billed households for each council. For councils with a WIC4 reporting capability the numbers of connected households reported has been used. This will ensure that the figures are consistent with WIC4 reports to WICS. 30 September figures have been derived by interpolation between periodic reports. For councils that do not have an adequately reliable reporting capability, estimated connection rates have been developed using the periodic revenue reports and data from the Ctax base returns. For the non-reporting councils the connection rate for a best-matching council that does not submit reports, has been adopted for the non-reporting council.

Exempt properties have been identified in total and entered into new line number A1.10a.

There are still a few remaining councils yet to submit WIC4 reports and we are still relying on adjustments made to the Scottish Executive figures. However as the majority of councils have now provided WIC4 reports this leads to an overall improvement in the information and a confidence level for this group of B2.

Future Years

Budget figures for Report Year +1 are consistent with Scheme of Charges.
No forecasts have yet been produced for 2004/05 so the forecast figures are as per the budget.
Budget for 2005/06 assumes 0.7% increase in the number of band D equivalent properties.

A1.12-13 Measured Domestic – Properties

The number of metered properties is based on information extracted from our three separate legacy billing systems and reported through WIC 22. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

Future Years

Assumes no change for 2004/05 and 2005/06. No forecasts have yet been produced for 2004/05 so the forecast figures are as per the budget.

A1.14-23 Measured Non-Domestic - Properties

All data has been derived from WIC22, as at September '03, sourced from our three separate legacy billing systems. The number of metered customers has reduced due to more accurate data from WIC22. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

In 2002/03 void properties were not reported. The 2003/04 figure is an estimate of void properties.

A1.24-42 Measured Non-Domestic - Meter Sizes: Actual and
A1.43-61 Measured Non-Domestic - Meter sizes: "Tariff" Meters

Data has been derived from the 'Meter' report from WIC22. Also see comments for lines A1.14 to A1.23. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

A1.62-67 Unmeasured Non-Domestic - Properties

All data has been derived from WIC22, as at September '03, sourced from our three separate legacy billing systems. The increase in accuracy obtained from this report coupled with customers moving to meters and customer base erosion explains the overall decrease in figures. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

A1.68-70 Summary – Properties

A1.68 and **A1.69** are calculated fields.

A1.70 - All figures are obtained from corporate workflow systems in former North and East Authorities. Figures in former West were obtained from an equally reliable hand knitted Access database which is well managed.

A1.71-72 Summary – Population

A.71
Source data:

- Council Tax Valuation List 2002, Scottish Executive;

- Census 2001 and GRO Population Projections

The data supplied has been adjusted in respect of the following:

- An occupancy rate (2.149) was determined using the GRO population projections of census data. This multiplied by the number of metered households in our billing systems determined the metered population.
- The total population of unmeasured households was determined as the projected census population in households less the above measured population. This population figure has then been multiplied by the percentage of properties connected (derived from the council tax data) to get an unmeasured population in connected properties.
- The total domestic population for winter is the sum of the measured population, the unmeasured population in connected properties and the non-household population that accounts for 1.7% of the population according to the Census 2001.

A1.72

Source data:

- VisitScotland publication 'Tourism in Scotland 2002'
- YellowPoint Data

The data supplied has been adjusted in respect of the following

- Tourist Board figures for bed spaces are not conclusive. The number of bed spaces available was given for only half the holiday property types. Data held elsewhere in the tourism report was used along with YellowPoint data to derive the remaining number of bed spaces.
- The water supply zones (and sewered area boundaries) have been extracted from GIS and used to identify those properties and populations which are connected to the water (and wastewater) network and those which are not connected.

A1.73-75 Domestic – Population

Source Data:

- Council Tax Valuation List 2002, Scottish Executive
- Census 2001
- Scottish Water Meter Billing Systems, Custima and Rapid

A1.73 - the population supplied derived for A1.71 and A1.72 has been reduced by 1,310 to reflect the population of the 610 measured domestic properties. A multiplier of 2.149 (occupancy rate) has been used to determine the population of the 610 properties. The non-household population of 1.7% as stated in Census 2001 has also reduced it.

A1.74 - the population of measured domestic properties has been calculated using the figure from A1.12 (610 properties) and a multiplier of 2.149 (occupancy rate).

A1.76-79 Rateable Value Base

All data has been derived from WIC22, as at 31/03/04, sourced from HiAffinity. 2002/03 reported Net Rateable Values in accordance with 2002/03 billing methods. This year Gross Rateable Values (G.R.Vs) are reported, as billing is now uniformly based on G.R.Vs. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

A1:77 Figures adjusted for removal of relief in 2005/06.

Table A2 Water Volumes

Introduction:

A2.1-4 Unmeasured Domestic

A2.1: **Water Delivered**

The WIC definition specifies that Unmeasured Domestic Water Delivered includes supply pipe leakage. This is in conformity managing leakage terminology[1], where Unmeasured Domestic Water Delivered (UDWD) is made up of three components: customer use (CU), plumbing losses (PL), and underground supply pipe leakage (USPL): use and plumbing losses make up consumption.

Customer Use vs. Consumption

In contrast with the above definitions, the per capita consumption (PCC) values used to calculate UDWD in the previous Annual Returns (2001/02 and 2002/03) were assumed not to include plumbing losses. These PCC values were extracted from 'Domestic Water Consumption Study 1999' a report by the three former Scottish water authorities, Research Consultancy Services and RPS Water Services.

This assumption is based on the methodology applied to estimate consumption from measured zonal flow data in the 1999 Study. Zonal consumption estimates were obtained by subtracting an estimate of non domestic consumption and leakage from measured flow into the zones (ref. section 5.7 p. 28). Leakage itself was estimated by subtracting an estimate of non domestic night use from 15-min minimum night flow values (ref. section 5.5 p. 27).

Based on this methodology, the zonal leakage estimates were therefore implicitly inclusive of any domestic consumption (inc. plumbing losses), which may have been occurring in the 15-min intervals corresponding to the periods of minimum night flow each night. Consequently, the domestic consumption estimates in the 1999 Study are exclusive of plumbing losses and, in strict Managing Leakage terminology, correspond to 'customer use' as opposed to consumption.

Estimation of Customer Use

The 1999 Study provided PCC estimates for each of the three former Scottish Authorities. The current structure of Scottish Water, split into four areas, makes these estimates unusable. Any attempt to estimate area-specific PCC values based on the data supporting the 1999 Study would be undermined by the limited number of sample zones in each area leading to potential statistical bias.

It is therefore recommended that the same all-Scotland PCC estimate be used for all area calculations. As recommended in the 1999 Study (p. 33 and 42), the median value of 139.10l/hd/day should be used in preference to the mean value, as it is not distorted by extreme values.

Calculation of Unmeasured Domestic Water Delivered

In order to derive an estimate of UDWD for each of the four operational areas, the following formula was used:

$$\text{UDWD (Ml/d)} = \text{CU} + \text{PL} + \text{UGSPL}$$
$$= [(\text{PCC}*\text{POP})+(\text{PLav}*\text{PROP}*\text{PCF}*\text{ICF}*\text{HDF})+(\text{USPLR}*\text{PROP})]*10^{-6}$$

[1] ref. WRc Managing Leakage Report D, 1994, p. 1, 21, 22, 23, Fig. A2, A3, A4

where PCC = per capita consumption = 139.10 l/head/day (not area-specific)
POP = population (No), should be equal to value entered in A1.73
PLav = average plumbing losses = 0.5 (l/prop/hour, not area-specific)
PCF = Pressure Correction Factor (dimensionless, area-specific when available)
ICF = Infrastructure Condition factor (dimensionless, area-specific when available)
HDF = Hour-Day Factor (hours, area-specific when available)
USPLR = underground supply pipe leakage ratio (l/prop/day, not area-specific)
UDWD for Scotland, which is the value to be entered in row A2.1, consists of the sum of the 4-Area UDWDs.

Plumbing Losses
A UK-average value for plumbing losses (PLav) is provided in the Managing Leakage Report E p.15 (Table 4.1) based on research into night flow measurements:

PLav = 0.5 l/prop/hour (at period of minimum night flow, assuming AZNP = 50m and average infrastructure condition).

This estimate was used as follows to calculate plumbing losses in each operational area:

PL (Ml/d) = Plav * PROP * HDF * PCF * ICF * 10^-6

With Plav = 0.5 l/prop/hour
PROP = number of properties in the Area
HDF = Hour-Day factor in the Area
PCF = Pressure Correction Factor = $(AZNP/50)^{1.5}$
ICF = Infrastructure Condition Factor (note that ICF reflects the condition of the distribution system infrastructure, and is used here as a surrogate for the condition of the domestic plumbing systems in the area concerned)

A2.2 Underground Supply Pipe Leakage

This section covers lines as detailed below:
A2.2 Unmeasured domestic UGSP – Billed
A2.3 Unmeasured domestic UGSP – Void
A2.6 Measured domestic UGSP – Void
A2.20 Measured non-domestic UGSP- voids
A2.29 Unmeasured non-domestic UGSP – Billed
A2.30 Unmeasured non-domestic UGSP – Void

Background

Supply pipe leakage estimates are required for different categories of properties, namely metered and unmetered, household and non-household, billed and voids. Recent pilot studies in different areas of Scottish Water made it possible to derive an estimate of average supply pipe leakage across Scotland. However, the studies do not provide the level of detail necessary to produce specific values for the different categories of properties shown in Table A2 (Water Balance).

In order to apportion the all-Scotland estimate of supply pipe leakage between categories, the proportions reported for each category by Water & Sewerage companies in the 2002-03 Annual Return to OFWAT were used. It must be noted however that the property categorisation in the WIC Return differs slightly from that in the OFWAT Return. This is illustrated in the table below:

Categories of properties for which a specific estimate of supply pipe leakage is required:

OFWAT Return		WIC Return	
T10.16	Internally metered household	A2.2	Unmeasured domestic – Billed
T10.15	Externally metered household	A2.3	Unmeasured domestic – Void & Exempt
T10.14	Unmeasured household	A2.6	Measured domestic – Void
T10.17	Void properties	A2.20	Measured non domestic – Void
		A2.29	Unmeasured non-domestic – Billed
		A2.30	Unmeasured non-domestic – Void

Due to this discrepancy, a number of assumptions had to be made in order to relate OFWAT's apportionment of supply pipe leakage to the WIC categories. This is explained in the methodology below.

Methodology

1 – Estimation of Scotland average supply pipe leakage from pilot studies

An overall estimate of supply pipe leakage for Scotland was carried out based on the burst and background (BABE) methodology, using data from sample studies in Glasgow, Fife, Greenock and Black Esk. The key assumptions and results of these studies are summarised below:

- Number of DMAs with data on number of SP bursts 419
- Number of Properties covered 411,444
- Number Supply Pipe Leaks detected 806
- Assumed burst duration 365 days/yr
- Burst flow rate 1.2 m^3/hr

Results

- Supply Pipe Burst Leakage 51.6 l/prop/d
- Supply Pipe Background Leakage 13.2 l/prop/d
- **Supply Pipe Total Leakage 64.8 l/prop/d**

2 - Apportionment of all-Scotland average supply pipe leakage to different categories in Table A2

The following assumptions were made in order to apportion the total supply pipe leakage estimate between the required property categories based on values from E&W Water and Sewerage companies:

- The difference between supply pipe leakage in void properties and in billed properties is the same in relative terms for all property types and is equal to the difference reported between total void and total billed properties.
- The ratio of metered to unmetered void properties is the same as that of metered to unmetered billed (split not available in OFWAT Returns).

Based on the above assumptions, it was possible to extrapolate supply pipe leakage estimates for the categories not explicitly reported in the OFWAT Returns but needed to derive component values for the WIC Return. The result of this analysis is summarised below.

Summary Results – Supply Pipe Leakage			A1 Line Ref.	A2 Line Ref.	Property Count ('000)*	UGSP Leakage (l/prop/d) **	UGSP Leakage Ml/d
Billed Properties	Domestic	Unmeasured	A1.1	A2.2	2218	66.2	146.9
		Measured	A1.12	N/A	0.7	32.8	0.0
	Non domestic	Unmeasured	A1.66	A2.29	55.61	56.8	3.2
		Measured	A1.22	N/A	80.8	28.1	2.3
Void Properties	Domestic	Unmeasured + exempt	A1.11+A1. 10a	A2.3	91.7	69.7	6.4
		Measured	A1.13	A2.6	0.0	34.5	0.0
	Non domestic	Unmeasured	A1.67	A2.30	30.0	59.7	1.8
		Measured	A1.23	A2.20	1.3	29.6	0.0
Total (A1.69)			**A1.69**	**N/A**	**2478.5**	**64.8**	**160.6**

** Source: Table A1*

*** from 'Calculation' spreadsheet*

WIC Return Simplifying Assumptions

The WIC makes a number of simplifying assumptions in calculating total supply pipe leakage from the component values. These assumptions are as follows:

- Billed measured domestic SP Leakage = Billed unmeasured domestic (in l/p/d)
- Billed measured non-domestic SP Leakage = Billed unmeasured non-domestic (in l/p/d)
- These simplifying assumptions do not apply to void properties

These assumptions do not appear to reconcile with the OFWAT Return reported values, where measured SP leakage is significantly lower than unmeasured SP leakage. Since we used OFWAT component values to apportion Scottish Water total supply pipe leakage, this leads to a discrepancy between our analysis of supply pipe leakage by component and the WIC Return own calculations.

In populating the Return, we had no choice but respecting the WIC assumptions when required, while using the result of our analysis for the other components. This leads to a slight discrepancy in the Total Supply Pipe Leakage value in Ml/d (164.8 Ml/d vs. 162.5 Ml/d). The summary results after adjusting for the WIC assumptions are shown below.

Summary Results – Supply Pipe Leakage			A1 Line Ref.	A2 Line Ref.	Property Count ('000)*	UGSP Leakage (l/prop/d) **	UGSP Leakage Ml/d
Billed Properties	Domestic	Unmeasured	A1.1	A2.2	2218	66.2	146.9
		Measured	A1.12	N/A	0.7	**66.2**	0.0
	Non domestic	Unmeasured	A1.66	A2.29	55.61	56.8	3.2
		Measured	A1.22	N/A	80.8	**56.8**	4.6
Void Properties	Domestic	Unmeasured + exempt	A1.11+A1. 10a	A2.3	91.7	69.7	6.4
		Measured	A1.13	A2.6	0.0	34.5	0.0
	Non domestic	Unmeasured	A1.67	A2.30	30.0	59.7	1.8
		Measured	A1.23	A2.20	1.3	29.6	0.0
Total (A1.69)			**A1.69**	**N/A**	**2478.5**	**64.8**	**160.6**

** Source: Table A1*

*** from 'Calculation' spreadsheet*

Supply Pipe Leakage Confidence Grade

Reliability Band

The estimation of total supply pipe leakage (in l/p/d) this year was based on Scotland-specific data, which is an improvement upon last year's extrapolation from the England & Wales average value. However, Scottish Water recognise that this year's estimation could still be improved, notably by carrying out further sample field tests to improve the reliability of supply pipe burst flow rates. Due to these limitations, SW consider that the reliability grade C used last year still applies (reliability C is defined as "extrapolation from limited sample for which Grade A or B data is available"). Based on this definition, the supply pipe leakage values (in l/p/d) extrapolated for the various property categories that are reported in Table A2 were also given a Reliability Grade C.

Accuracy Band

A sensitivity test was carried out by varying simultaneously and randomly the key inputs going into the estimation of total supply pipe leakage, using the @Risk statistical package. The accuracy range attributed to each of the key inputs was based on expert judgment and knowledge of the input values used by some companies in England & Wales (e.g. for supply pipe burst flow rates). The results of this test suggest an accuracy "to or within +/-25% but more than +/-10%" which corresponds to accuracy band 4. This means that the actual total supply pipe leakage is believed to lie somewhere between 57 and 72 l/p/d. Note that this is only an estimated range, as some judgment had to be applied to determine the accuracy of the input values.

Recommendations for improving future estimates

Scottish Water will continue to use the same methodology as this year to estimate supply pipe leakage, while trying to progressively improve the reliability of the various Scottish Water specific data that feed into the estimation. SW are notably considering extending the sample field test carried out this year in order to improve the estimation of supply pipe burst flow rates.

A2.4 –Unmeasured Domestic Per Capita Consumption

This is a calculated field [Water Delivered – USPL (billed) – USPL(void)]. Unlike the value of PCC used in line A2.1, this figure includes plumbing losses.

A2.1 –A2.4 Future Years

Future projections in line A2.1 are based on the predicted change in population and property count for future years. This shows a slight increase in unmeasured domestic water delivered. Although the domestic population is forecast to decline, there is a predicted increase in the number of domestic properties.

Lines A2.2-A2.3 have been brought forward from this year as there is no trend available to predict changes to underground supply pipe leakage.

A2.5-8 Measured Domestic

A2.5 - All data has been derived from WIC22, as at 31/03/04, sourced from our HiAffinity Billing System**.** The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A looks for properties where a bill has been generated this financial year. Line A2.5 Water Delivered has a confidence grade of B2.

A2.7 - Scottish Water does not undertake routine meter calibration of the domestic customers. However a meter under-registration figure of 3.2% is applied. This is the water and sewerage companies average for 2002-03 as stated in table 16a of the "Security of supply, leakage and the efficient use of water 2002-2003" report. Research shows that there is negligible change in the meter under-registration each year. A mix of Class B and D meters are installed in households.

A2.9-21 Measured Non-Domestic

A2.9 – A2.15 All data has been derived from WIC22, as at 31/03/04, sourced from our HiAffinity Billing System. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

A2.17 Measured Non-Domestic Water Delivered (non-potable)

Data for this year's Return is based on last year's submission and comprises data from the legacy East and West authorities only. The North area previously reported no non-potable water delivered to non-domestic customers.

The task of identifying all similar supplies in the north area has not yet been carried out. The total therefore may rise upon completion of this exercise. As a result the confidence grade has lowered from B2 to C3.

A2.19 - Scottish Water does not undertake routine meter calibration of the non-domestic customers. However a meter under-registration figure of 4.7% is applied. This is the water and sewerage companies average for 2002-03 as stated in table 16a of the "Security of supply, leakage and the efficient use of water 2002-2003" report. Research shows that there is negligible change in the meter under-registration each year. A mix of Class B and D meters are installed in households.

A2.22-25 Unmeasured Non-Domestic

All data has been derived from WIC22, as at 31/03/04, sourced from our HiAffinity Billing System. The number in this section may differ slightly from WIC22, as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A is populated with properties for which a bill has been generated this financial year. The confidence grade is B2.

A2.31 There is an error in the calculated cell for this line. The result is that the actual figures have been multiplied by 1,000. Therefore the actual values in this line on the table should read 1013.060, 869.883, 869.883 and 878.551.

The basis for the charge changed from 90 litres per £1k of RV to 37.3 litres per £1k of RV.

A2.32-40 Water balance

Refer to page 17 for schematics of Scottish Water's water balance.

A2.32 – Total water delivered to domestic and non-domestic properties

Calculated field – no comment.

A2.33 Distribution system operational use (DSOU)

Estimates were based on a detailed analysis of the different components of DSOU for the whole of Scotland, using as much area-specific data as possible.

Operational Use methodology was made up of the following components:

1. Total volume from reservoir cleaning and remedial works
   The Tank cleaning programme was used with assumptions that reservoirs are drained to distribution to the last 300mm.

2. New mains commissioning & disinfection and mains rehabilitation
   New mains are charged, swabbed and flushed to remove sediment or pipe debris. After disinfection if the pipe sample fails the main re-flushed and re-chlorinated. An average main diameter was taken from last year's return of 160mm.

3. Water Quality (Customer Complaints)
   The total number of water quality complaints were obtained from the Customer Services Management Systems. Following discussions with Network Operators, water quality complaints were identified that gave rise to flushing both at hydrants and the customer tap.

4. Water Quality (Regulation)
   The number of samples taken at service reservoirs, water treatment works and within distribution. There is also a small number of continuously running sample taps.

5. Planned flushing and swabbing.
   The majority of flushing and swabbing events are reactive, with an insignificant number being planned. Hence no methodology is included here.

6. Mains Shutdowns (Repair of Bursts and Events)
   The number of burst events was obtained from corporate systems (consistent with those reported in Line E6.11). An average burst volume found in last year's Return was applied.

Last year's methodology consisted of using a Strumap expression to trace from each burst/event to the nearest valves available to isolate the network and calculate the length of main. The diameter and volume then calculated the volume of water to be drained. The burst events were linked to Work Order numbers to allow details of whether the main was shut down.

Non burst events for this year were based on the ratio of last year's burst to non-burst events.

The result is an estimated operational use of 7.41 Ml/d or 0.159 m^3/km/day (compared with 5.63 Ml/day in 2002-03 or 0.123 m^3/km/day). This is about 2 times lower than the average England & Wales re-estimate of 0.303 m^3/km/day (which, if extrapolated to Scotland, would result in a value of 14 Ml/d for operational use). This difference may be explained by different operational practices but may also be due to incorrect assumptions being used in deriving certain components of operational use in Scotland. More work would be required to refine these assumptions, notably through field trials, in order to produce a more robust estimate next year. In the mean time, 7.41 Ml/day remains the best available Scotland-specific estimate for operational use.

For comparison, below are OFWAT estimates for Operational Use from 1996/97 to 2000/02:

OFWAT Operational Use Estimates

Operational Use, OFWAT all-industry average	96/97	97/98	98/99	99/00	00/01	01/02	02/03
m^3/km/day	0.190	0.205	0.226	0.262	0.257	0.303	0.303
% of DI	0.36	0.42	0.49	0.57	0.57	0.65	0.65

The above table shows a steady upward trend from 1996/97 to 2001/02 (60% increase in m^3/km/day) but remains steady this year. No explanation could be found on this trend in OFWAT reports, probably due to the lack of significance of this component in the overall water balance.

A2.34 Water taken legally unbilled (WTLU)

In the absence of a consistent analysis of WTLU across Scottish Water, the OFWAT 2002-03 average value of 7.4 l/prop/day was used for all four areas of Scottish Water (l/prop/day is considered the best normalising factor for this component of the water balance). This is an increase of 2.4 l/prop/day from last year where the OFWAT 1996-99 to 1999-00 average value of 5 l/prop/day was used.

A2.35 Water taken illegally unbilled (WTIU)

The WIC commentary states that

"*Illegally taken water should only be reported here and included in the water delivered total if it is based on actual occurrences using sound and auditable identification and recording procedures. If it is not based on these it should be classified as distribution losses (A2.36)."*

Hence this component is assumed to be zero in the absence of any firm evidence to the contrary.

A2.36 Distribution losses

Total Leakage minus Unmeasured Domestic supply pipe losses = Distribution Losses. Refer to section A2.2 WIC Return Simplifying Assumptions above.

A2.37 Total Leakage

Method 1 Night Flow Measurement: The independent estimate of total leakage is 928.44 Ml/d. This is based on a limited night flow monitoring coverage of about 31% of total properties in Scotland and cannot yet be considered as reliable. This is however a significant improvement from last year: this year's 31% coverage is split into 28% of DMA night flow coverage and 3% of Water Supply Zone night flow coverage, against last year's 14% of DMA coverage and 11% of Water Supply Zone coverage. This is the result of an extensive DMA implementation programme in the South West (including Glasgow), Fife, Inverness and Black Esk.

Despite this improved coverage, the difference between the 'bottom-up' and the 'top-down' estimate of leakage remains large. This can partly be explained by the fact that the areas for which night flow data are available are also the areas where leakage detection and subsequent burst repairs have taken place. Additionally, the current night flow monitoring coverage is still limited and cannot be assumed to be representative of the whole of Scotland. Finally, other elements of the water balance are still uncertain, not least the estimated unmeasured domestic consumption, which makes up a significant proportion of total distribution input.

Water Balance Comparison – 2001-02 / 2002-03 / 2003/04 – Integrated Flow Method (IFM) and Night Flow Method

Scottish Water	2001-02 Return (Ml/d)	2002-03 Return (Ml/d)	**2003-04 Return (Ml/d)**	Difference 03 and 04 (Ml/d)	Reasons for differences in 03 and 04 Returns
A2.38 Distribution Input (Ml/d)	2390.9	2377.9	**2386.51**	8.61	Actual measured increase in distribution input
Assessed components of demand					
A2.1 Unmeasured domestic	827.7	837.7	**854.15**	16.45	Increase in supply pipe leakage estimates due to change in methodology (now Scotland specific values) and increase in domestic properties
A2.5 Measured domestic	0.49	0.33	**0.25**	-0.08	
A2.9-16 Measured non-domestic	529.7	443.3	**467.42**	24.12	Measured increase in consumption in billing system
A22-24 Unmeasured non-domestic	40.09	93	**56.34**	-36.66	New methodology of 37.3 m3/£1000RV. 2000-01 used assumed consumption of 90m3/£1000RV/year,2001-02 Estimation of NHNM methodology.
A2.33 DSOU	17.72	5.63	**7.41**	1.78	Unchanged methodology
A2.34 Water taken legally unbilled	40.09	11.95	**18.33**	6.38	Based on 7.4 l/prop/d from E&W W&S Companies 2002-03 (increase from 5 l/prop/d used previously)
Total difference				20.6	Note: Water delivered also includes UGSPL
Leakage Estimates					
Bottom Up Total leakage (DMA/ WSZ)	1020.3	885.8	**928.44**	42.64	Better DMA coverage (increase from 14% to 28% property coverage)
Top Down Total Leakage (Reported in A2.37)	1065.42	1132.1	**1145.53**	13.43	

Note: For line A2.37, the top-down estimate of leakage was used, as the independent 'bottom-up' estimate was still considered unreliable this year. Only when sufficient DMA coverage is achieved and the two estimates approximately reconcile will Scottish Water start using the DMA or 'bottom-up' estimate to populate this line (see further explanations in commentary on Line A2.39 below).

Method 2 Integrated Flow Method: For reporting and comparison purposes, the most reliable leakage estimate remains that based on the Integrated Flow Method (Total Leakage = Distribution Input minus all demand components other than leakage), i.e. 1020 Ml/d in 2001/02, 1132 Ml/day in 2002/03 and 1146 in 2003/04.

Taking into account the uncertainty around those estimates, it must be noted that the apparent increase observed between 2002/03 and 2003/04 does not mean that total leakage has truly increased (in other words, the observed variation between the two estimates is not statistically significant). The top-down estimate of leakage relies on the accuracy of the other key components of the water balance, notably of the estimated domestic per capita consumption (PCC). In the absence of a continuous domestic consumption monitor, the change in PCC over the past three years is unknown, and domestic PCC was simply assumed to remain constant.

It is therefore difficult to draw any firm conclusion from the last three year's leakage trend other than the fact that the limited detection activity carried out as part of the DMA implementation programme is as yet insufficient in scale to produce a significant reduction in leakage for Scotland overall. Only when further DMA coverage and a systematic policy of active leakage control is implemented across a large proportion of Scottish Water's areas will a significant and sustained decrease in leakage be observed. This is what Scottish Water is aiming to achieve with a target DMA coverage of 60% by 2006 and a forecast reduction in leakage of 218.9 Ml/d (reflected in the improved confidence grade of B3 in 2005/06).

A2.38 Distribution Input

This value is calculated from works output meter readings and has an accompanying confidence grade of C4. The reliability grade is based on the distribution input reconciling to 9% of the sum of the separately estimated water balance components. Work has been done to identify and prioritise DI meters for replacement as part of a meter improvement programme, which will improve the accuracy band in future Returns.

A2.39 Difference in water balance

As stated in Line A2.37 (Total Leakage), the most reliable leakage estimate remains that based on the Integrated Flow Method (Total Leakage = Distribution Input minus all demand components other than leakage), i.e. 1146 Ml/d this year. This is the estimate that should be used for reporting and comparison purposes.

The Water Balance relies on an accurate coverage of night flow measurement as described in section A2.37 but also on customer billing records. Using the Integrated Flow Method, any error in reporting measured and non-measured water delivered will be reflected in the leakage figure, instead of appearing as the Difference in Water Balance (A2.39). The reported difference in water balance will therefore be zero. However, Scottish Water will still report the independent estimate of leakage in the commentary together with the actual difference in water balance.

When the difference in water balance resulting from using the independent estimate of total leakage becomes less than 5%, it is suggested that the water balance should be reconciled using the MLE methodology, as recommended in OFWAT reporting requirements. Scottish Water will however keep reporting the pre-MLE water balance in the commentary.

For future years, the forecast change in distribution input was calculated to reflect exactly the change in its components. This ensures consistency in the calculations. As a result, the difference in the water balance remains constant over the next two years.

A2.40 – Assessment of overall water balance

This year's water balance has been given a confidence grade of C4 as per last year. Following definitions and guidelines, the reliability band for the overall water balance has been awarded a C as the water balance components reconcile with measured distribution input to within 10% (to achieve band B, the water balance components must reconcile with measured distribution input to within 5%). The accuracy band of 4 was based on the individual components of the water balance.

A2.41-43 Bulk Supplies

A2.41 – Bulk supply imports

Scottish Water has no bulk supply imports or exports.

A2.42 – Bulk supply exports

as A2.41

A2.43 – % of distribution input through PFI treatment works

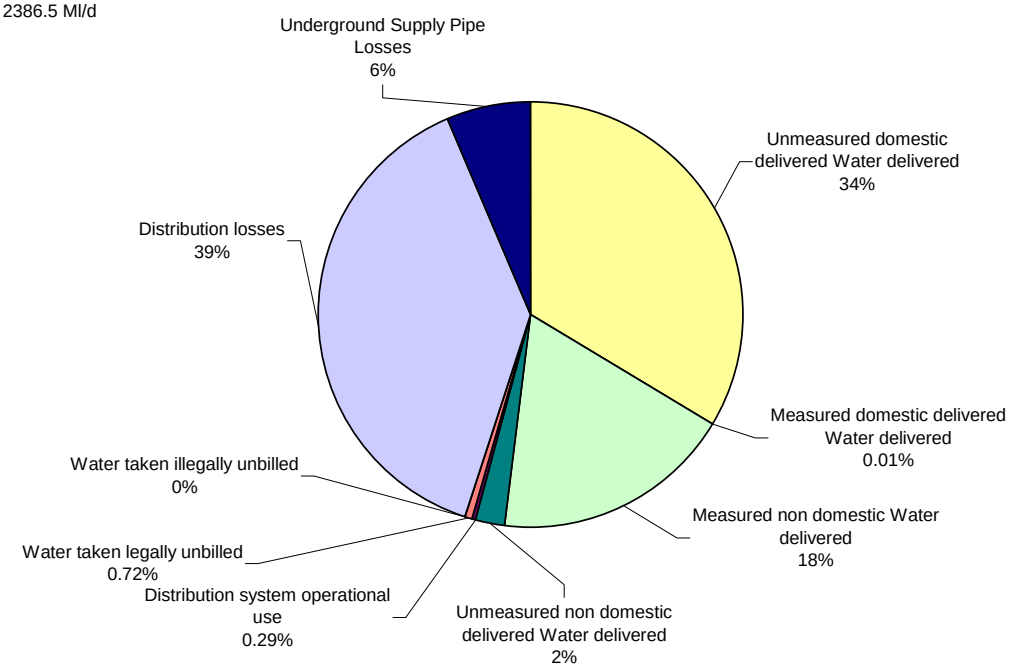
Scottish Water does not have any water treatment PFI works.

Water Balance Pie Chart

Using Integrated Flow Method For Leakage

WATER INDUSTRY COMMISSIONER FOR SCOTLAND

Distribution Input
2386.5 Ml/d



WATER BALANCE SCHEMATIC

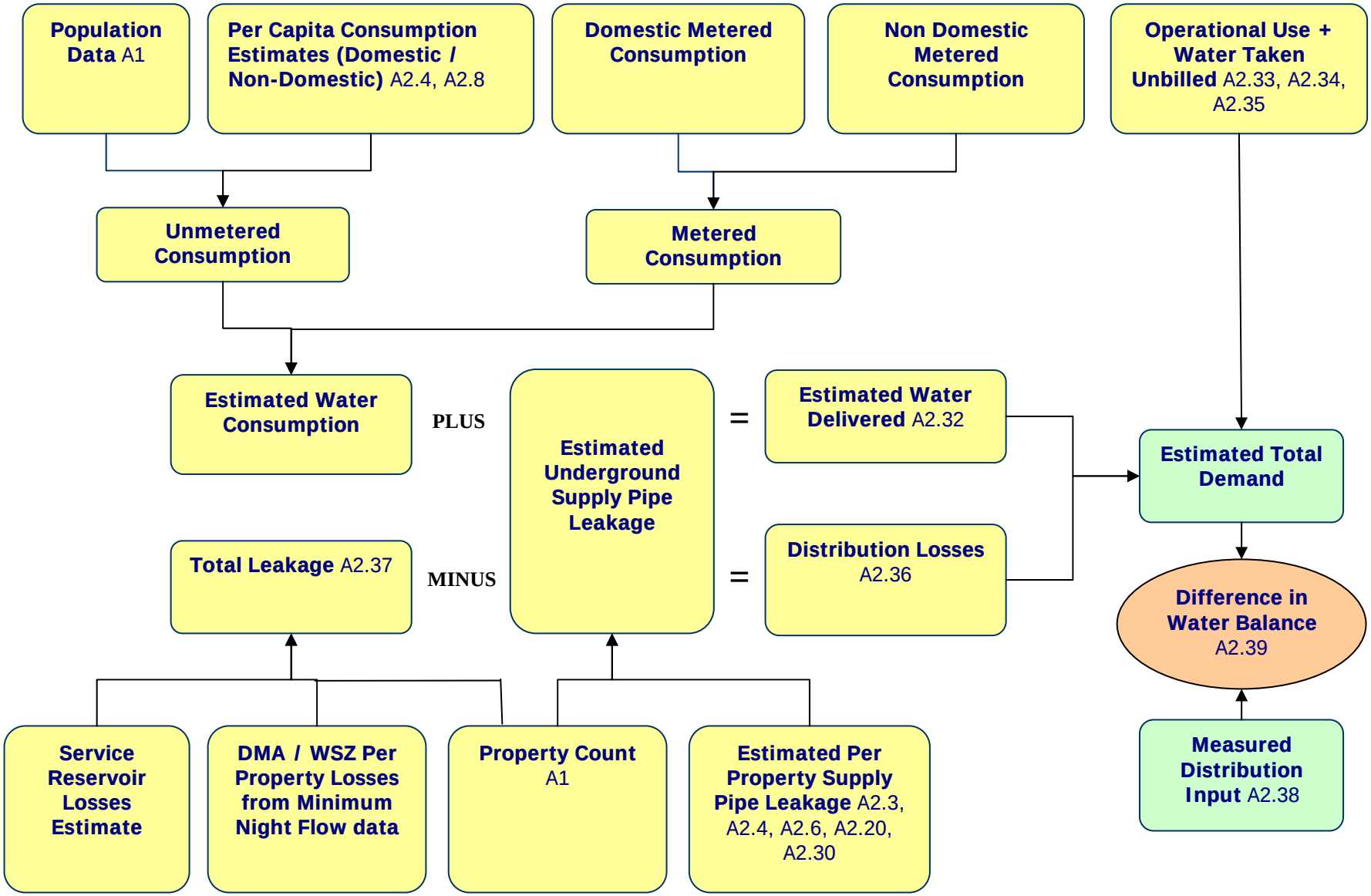


Table A3 Properties and population – wastewater

A3.1-13 Unmeasured Domestic - Properties

See lines A1.1 to A1.11

This information is obtained from WIC4 council reports. Since more councils reported in 2003/04 than in 2002/03 there was less estimation in the 2003/04 figures, making them more robust.

A3.14-17 Measured Domestic - Properties

See lines A1.12 to A1.13.

Line A3.15 is correctly stated as zero because surface water drainage is an unmetered service and on its own can only be reported under unmeasured domestic properties at line A3.11.

A3.11 is reported as zero as surface water drainage domestic 'flags' had not been set. This line will be populated in the next return. In the meantime all 'surface water drainage only' properties are reported under unmeasured non-domestic properties at line A3.74

A3.18-30 Measured Non-Domestic - Properties

See lines A1.14 to A1.23.

After thorough investigation, we have found that the figures submitted in the 2002/03 annual return were incorrect and that the submission for 2003/04 is correct. The improvement in the accuracy of the information is a direct reflection of the data cleansing projects that SW has undertaken.

A3.31-49 Measured Non-Domestic - Meter Sizes: Actual Installed Meters

See lines A1.24 to A1.42.

A3.50-68 Measured Non-Domestic - Meter Sizes: "Tariff" Meters

See lines A1.43 to A1.61.

A3.69-76 Unmeasured Non-Domestic - Properties

See lines A1.62 to A1.67

A3.77-80 Surface Water

All information taken from WIC22 as at 31 March 2004

Future Years

Budget figures for Report Year +1 are consistent with Scheme of Charges.

Report year +2 figures are based on those for report year +1 and assumes no changes.

A3.81-84 Summary – Population

A3.81 – A3.83 See lines A1.71 to A1.72

A3.84 –Scottish Water employs an assumption of a 5% non-return to sewer allowance, which is the assumption that is commonly used in England and Wales.

A3.85-119 Rateable Value Base

As the cells in line A3.113a are protected the values are as follows

Report Year	12.742	CG B2
Report Year +1 Budget	7.114	CG B2
Report Year +1 Forecast	7.114	CG B2
Report Year +2 Budget	0	CG B2

Table A4 Sewage volumes and loading

A4.1-19 Sewage – Volumes

A4.1 to A4.5 - All data has been derived from WIC22, as at 31/03/04, sourced from our HiAffinity Billing System. The volume calculation used is 36.4 m^3 per £'000 of rateable value. (36.4m3 = 1000 x 4p (per £R.V.) / 110p (per m3)). The number in this section may differ slightly from WIC22 as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A looks for properties where a bill has been generated this financial year. The confidence grade is B2.

Future Years

Budget figures for Report Year +1 are consistent with Scheme of Charges.
Report year +2 figures are based on those for report year +1 and assumes static domestic population. 2.5% reduction in unmeasured waste water RV for business customers moving to metering. Figures offset by customers where relief ends.

Budget figures for Report Year +1 are consistent with Scheme of Charges. Volumes are based on an average annual water use of 36.4m^3 / £1,000 RV.

(36.4m^3 = 1000 x 4.08p (per £RV) / 112.2p (per m^3)

No forecasts have been produced for 2003/04 so the forecast figures are as per the budget.

Budget for 2004/05 assumes underlying 2.5% reduction in unmeasured RV.

A4.7

A4.7 to A4.15 - All data has been derived from WIC22, as at 31/03/04, sourced from our HiAffinity Billing System. The number in this section may differ slightly from WIC22 as WIC22 looks for customers/properties with service 'in_use' flags equal to yes. Table A looks for properties where a bill has been generated this financial year. Volumes were derived as 95% of the water volumes for the majority of properties where they are connected to the wastewater system. Some properties have return values different to 95%.The confidence grade is B2.

Future Years

Volumes of domestic sewage held constant for report year plus one and report year plus two.

A4.8 to A4.15

Future Years

Budget figures for Report Year +1 are consistent with Scheme of Charges.
Report year +2 figures are based on those for report year +1 and assumes a 2% underlying reduction in volumes of wastewater at metered business premises.

A4.16 to A4.53 – Please refer to the previous commentary submitted in the June 2003-04 annual return.

A4.19 - The number of tanks emptied is recorded at the area offices and is accurate, although in the South East Area the number of public septic tanks is not recorded separately from the private tanks.

Private domestic and public tank volumes are not known, and the following figures have been assumed for the purposes of estimating this line:
Private domestic tanks – $3m^3$
Public tanks – $25m^3$
Commercial septic tanks volumes are recorded directly

An internal reporting system has been put in place this year, which has provided more accurate records of the number of tank emptyings. This accounts for the much higher figure than last year. It is not a large proportion of the total flow, but it is expected to increase by about 0.6% per annum in line with the general population increase.

Last year's figures were under-reported. As stated in the commentary the new internal reporting system is providing more accurate records of the number of tank emptyings. This accounts for the much higher figure than the previous year.

A4.20-39 Sewage – Loads

A4.20 This figure is a brought forward figure from Line A3.83 Population Connected to the Wastewater Service (winter) population. This figure has been derived by using 2001 General Register Office for Scotland (GRO) 2001 Census extrapolated to the mid Report year. These figures are available by Unitary Authority boundary which were used to transfer an occupancy rate to the corporate address point file. A summation of those address points and attached population within the Scottish Water Sewered Area boundaries provided a connected population per Sewered Area. These figures were adjusted to align with those provided by the Unitary Authorities for billed addresses, an adjustment which is required to take account of the backlog of updates to the Sewered Area boundaries which would capture more properties than at present. The populations within the Sewered Areas were summed according to which Operational Area they are within and summed for Scotland as a whole.

In comparison with the 2002 – 2003 Annual Return the figures have decreased slightly, consistent with the GRO projections of a general population decline in Scotland. The change is attributable to changes in the Unitary Authority provided data on connected properties.

As the population and address point databases have been utilised it has been possible to assign connected populations to individual sewered areas and therefore to individual wastewater treatment plants. This has been used in this year's Return to assist with the assessment of sewage loading to treatment plants.

A4.21 - A4.23 - Resident populations have been allocated to individual wastewater treatment works as described in the introduction to Table E8. The level of treatment at each works is recorded corporately, so the total population receiving a certain level of treatment is readily determined.

The small increase over last year's figure is due partly to the general increase in population, and partly to the more consistent method of determination. Overall population figures are expected to continue to increase at 0.6% per annum. In addition, the population receiving primary treatment or better will increase as preliminary treatment facilities and raw sea outfalls are upgraded to comply with UWWTR. The population receiving secondary treatment or better will increase at a slightly faster rate as some primary works will be upgraded to secondary.

The confidence grade is slightly lower than that for corresponding lines in Table E7. This is because the link between Drainage Operational Areas and Treatment Works is not yet incorporated in a corporate system.

A4.24 - The method for determining the non-domestic load at individual treatment works is described in the introduction to Table E8. As above, the level of treatment at each works is recorded corporately, so the total load receiving a secondary treatment is readily determined.

The reduction in the estimate of load is due mainly to the significant reduction in volume reported under lines A4.2-4.5 and A4.8-4.15. No significant change to this figure is expected in the next two years, since any increase in the general level of treatment is likely to be offset by a decrease in the level of commercial activity.

A4.25 - A4.26 - BOD and COD are taken measured from measured data. Unsettled values have been used to ensure that the figures reported here are consistent with Table E8.

The increase in load is due partly to the use of settled rather than unsettled loads and partly to an increase in the actual load received. Also the load at Meadowhead, Stevenston and Inverclyde applied for the full year, whereas in the previous year it applied for 6 months only. No significant change to these figures is expected in the next two years, since any increase in the general level of treatment is likely to be offset by a decrease in the level of industrial activity.

A4.27 - A4.30 - The method for determining these loads at individual treatment is described in the introduction to Table E8. The total receiving secondary treatment has been assessed from the category of treatment recorded in the corporate system.

A new reporting system has been put in place this year, so the figures for Lines A4.27 and 4.28 are more accurate. This is reflected in the change in confidence grade. A small increase is anticipated in future years in line with the general increase in population of 0.6%

The loading for Lines A4.29 and A4.30 has been assessed from average values taken from analyses where known. There has been an increase in imports from external company tankers, which explains the increase at line A4 .29. The COD figures are believed to be a more robust indicator of load than the BOD figures reported in A4.30. Although there has been an increase in the past year, this is not part of a sustained trend and it is not possible to predict the pattern of future movements in this total.

A4.31 - The corresponding figure in E8.18 is 150,400 tonnes. The small discrepancy is due to the fact that certain other loads, including some WWTW sludges are not tankered to the works, so are included in Table E8 but not in Line A4.30, which contributes to this total. They are, however included in the total reported in A4.34, which corresponds to the total in Table E8.

The increase since last year is partly due to the change of method of assessing loads described in the introduction to Table E8. It is also due to corrections made to the category of some works, resulting in a number of primary works being re-categorised as secondary.

The increasing trend is expected to continue, partly in line with the general increase in population of 0.6% per annum, and because some primary and preliminary works will be upgraded to secondary standard to comply with the UWWTR by December 2005.

A4.32 - The figure reported here is taken from Table E8, and is based on the estimated load received at the works. The decrease of approximately 1,500 tonnes is due almost entirely to the re-categorisation of a number of works as secondary, as noted above.

A further decrease in load receiving primary treatment only is expected in the short term, as further upgrading of works is carried out to comply with UWWTR.

A4.33 - The figure reported here is taken from Table E8, and includes the load receiving preliminary treatment but not screened discharges. Last year's figure included screened discharges: the figure for preliminary treatment only was 1568 tonnes. The reason for the increase is the re-assessment of loading described in the introduction to Table E8.

A significant decrease in load receiving preliminary treatment only is expected in the short term, as further upgrading of works is carried out to comply with UWWTR.

A4.34 - This figure is taken from E8.18 and is the estimated load received at treatment works and sea outfalls. It corresponds exactly to the totals reported in E8.18, but it should be noted that the Column defined as "Total" in E8.18 specifically excludes septic tanks, which has not been done here.

The increase in total load is due to the change in method reported in the introduction to Table E8. A continuing small increase is expected, in line with the general increase in population of 0.6% per annum.

A4.35 - The figure given is the settled COD figure used in the charging scheme. It is not expected to change in the short term.

A4.36 - The figure given is the pH-corrected suspended solids of "average sewage" used in the charging scheme. It is not expected to change in the short term.

A4.37 - The equivalent population served has been calculated from the total load received at the works (Line E8.18) assuming the average load to be 60g BOD/head/day. The component due to non-resident population had been omitted from this total.

The change since last year is due to the re-assessment of loads described in the introduction to Table E8. A small continuing increase is anticipated due to the general increase in population of 0.6% per annum.

A4.38 - This figure has been determined on the same basis as Line A4.37, but restricted to works where a known numerical consent is in place. The information on consent conditions is held in a corporate database.

The change since last year is due to the re-assessment of loads described in the introduction to Table E8. A small continuing increase is anticipated due to the general increase in population of 0.6% per annum.

A4.39 - This is the load received at PFI works that has been reported within the sum in Line A4.34.

The change since last year is due to the re-assessment of loads described in the introduction to Table E8. No major change is expected in the short term, as no new PFI works are planned at present, but a small continuing increase is anticipated due to the general increase in population of 0.6% per annum.

A4.40-45 Sewage – Facilities

A4.40 - This is the number of treatment works reported in Table E8. The figure includes septic tanks, but does not include preliminary works, which are included as sea outfalls in Line A4.41.

The reduction of 60 works since last year is due mainly to data improvements, but also to the fact that more works are decommissioned as new works come on stream. This is discussed more fully in the commentary on Lines E8.1-E8.8.

A small increase in the number of works is anticipated as sea outfalls are taken out of commission and replaced by treatment to comply with UWWTR.

A4.41 - This is the number of sea outfalls reported in Table E8, including preliminary treatment works.

The reduction in the number of outfalls is due mainly to data improvements, but partly to the fact that some have been replaced by full treatment.

A further reduction in the number of outfalls is anticipated with the construction of new coastal wastewater treatment works to comply with the UWWTR.

A4.42 - The available capacity has been taken as the design capacity of works, where known. Preliminary works and sea outfalls are not included in this total. For a number of smaller works, where the design capacity is not known, the available capacity has been taken to equal the load received at the works.

There is no significant change in capacity form last year, but the increase in the estimated load means that the headroom has decreased from approximately 7% over the load received to 1.3% and this is not expected to change significantly in the short term. A small increase in capacity is expected as new works are brought on line.

A4.43 - This is the figure reported against sea outfalls (including preliminary works) in Table E8, assuming a load of 60g BOD/head/day. The component of the load arising from non-resident population has been excluded from the total.

The increase from last year's figure is due to the re-assessment of load described in the introduction to Table E8, and also to the re-categorisation of a small number of primary treatment works as screened outfalls as part of a data improvement exercise. This population equivalent is expected to reduce significantly as the larger outfalls are replaced by full treatment to comply with UWWTR by December 2005.

A4.44 - Unsatisfactory outfalls are deemed to be those that are currently failing specific SEPA conditions, or that discharge to bathing waters or shellfish waters that are at risk. Discharges where an upgrade is required by 2005 under the Urban Wastewater Treatment Regulations are not considered unsatisfactory at the present time.

Three outfalls have been removed from the unsatisfactory list, as improvement works are now complete. A further five have been found not to impact directly on a bathing water, and will not require improvement until the UWWTR deadline of December 2005. These have also been removed from the list, reducing the total from 12 to 4. The remaining outfalls should be addressed by the end of 2005.

A4.45 - This figure has been derived from the load reported in Table E8 against those outfalls identified as unsatisfactory in Line A4.44, assuming a load of 60g BOD/head/day.

The reduction in population is small in comparison to the reduction in the number of outfalls. This is because re-assessment of loads has resulted in a significant increase in estimated load at the remaining outfalls. This figure will reduce to zero as the unsatisfactory outfalls are removed from the list.

A4.46-53 Sewage Sludge Disposal

The table below illustrates the base data from which the percentage sewage sludge disposal is calculated.

	TDS (as in E10.2)	%
A4.46 Percentage sewage sludge to farmland - raw.	0	**0.00**
A4.47 Percentage sewage sludge to farmland – conventional.	6,517	**5.79**
A4.48 Percentage sewage sludge to farmland - advanced.	14,079	**12.51**
A4.49 Percentage sewage sludge to incineration.	53,963	**47.96**
A4.50 Percentage sewage sludge to landfill.	258	**0.23**
A4.50a Percentage sewage sludge composted	2,253	**2.00**
A4.50b Percentage sewage sludge to land reclamation	34,913	**31.03**
A4.51 Percentage other sewage sludge disposal.	542	**0.48**
A4.52 Total sewage sludge disposed	112,525	100.00

A4.46 – A4.52 Figures reproduced from Scottish Water Sludge model and Scottish Water Sludge Management System "Gemini". The amount of sludge disposed to each disposal route was totalled and presented as a percentage of the total Scottish Water sludge production detailed in **A4.52**.

A4.48 - "Percentage of sewage sludge to farmland- advanced" has reduced as sludges from Perth and Brechin are now disposed of to land reclamation.

A4.50a, A4.50b and A4.53 - Are new lines for this years submission, Line A4.51 "Percentage other sewage sludge disposal" has reduced for this years submission with the tonnage now being allocated to the routes A4.50a. "Percentage of sludge composted" and A4.50b."Percentage of sludge to land reclamation".

A4.50 - "Percentage of sewage sludges to landfill" has reduced as sludges were diverted from Lochgilphead to Daldowie**.**

A4.50b -"Percentage sewage sludge to land reclamation" has increased due to the additional sludges from Perth and Brechin

A4.53 - Is reported as 0% as all Scottish Water sludges have met the criteria of the proposed recycling outlet.

Forecasts have been provided for A4.46 to A4.51. In 2004/05, there is a slight increase in Total sludge produced through the construction of a new wastewater treatment works to meet tightening consent standards.

There is likely to be a short reduction in disposal to composting due to sludge being disposed to another disposal route (for operational reasons). This is due to the removal of Duns as a composting route.

Sludges disposed to Landfill will increase due to the commission of a new works at Lochgilphead and the collection of sludge from surrounding wastewater treatment works.

A slight increase in the disposal of sludge to incineration is due to sludges from Stirling treatment works being treated at Daldowie, for operational reasons.

B Tables – Outputs to Customers

Table B1 Water Availability

General comments

The 2003/04 submission for Table B1 represents a slight change in methodology from previous Returns. Therefore the outputs from this year are not directly comparable to the outputs from past submissions. The change in methodology reflects water industry best practice outlined by the Environment Agency in the Water Resource Planning Guidelines 2003[2]. This approach establishes a methodology for estimating headroom across Scottish Water.

Over the past year, much work has been done to improve our understanding of our water resources and to properly identify areas of water resource surplus or deficit (headroom) across the business. The work was done to facilitate strategic asset planning decisions and is a fundamental part of area water strategies. There is also a specific investment driver in Quality and Standards III for headroom enhancements to ensure a minimum customer level of service. This requires a comprehensive understanding of headroom availability in all water resource areas across Scotland. To facilitate this, a water resource planning database was developed to store all data used for headroom calculations[3]. This tool was the basis for the table B1 submission.

The major changes to the 2003/04 B1 submission are:

- Improved definition of water resource area boundaries across the business;
- Improved yield estimates;
- The determination of deployable output (DO) and water available for use (WAFU) i.e. estimates of water treatment works loss and outage allowance;
- Inclusion of an allowance for target headroom.

Methodology

The estimation of headroom requires standard supply/demand balance calculations for each water resource area (WRA). The calculation for % headroom in each WRA, with % headroom defined by the WIC as:

% Headroom Definition: *The difference between water available for use and the annual average demand (distribution input (DI)) as a % of the annual average demand.*

Headroom is calculated as follows:

% Headroom per WRA = [WAFU – (DI)] / (DI)

The following steps were taken to determine % headroom in each WRA and are detailed below:

- Calculation of average annual distribution input (DI)
  DI data is the average daily volume of water supplied by each WTW into each WRA as reported in Line A2.38 and Table E4.
- Determination of the deployable output (DO)

[2] Environment Agency, Water Resources Planning Guideline (Version 3.3 December 2003)
[3] The Quality and Standards III database stores the following data for each Water Resource Area (WRA): WRA boundaries, WTW capacity, water resource yield, WTW loss, outage allowance, target headroom allowance, water order details.

DO is generally taken as the minimum of (a) the reliable source yield (once all water order requirements have been met) minus WTW loss or, (b) the Treatment Works output capacity, or (c) the raw water conveyance capacity.

- Calculation of WAFU
  DO adjusted for outage allowance
- Determination of target headroom
- Determination of headroom bands by population.

Identification of Water Resource Areas

The Water Resource Area (WRA) is the fundamental planning unit for water resource management and it is important that these are properly defined. Much effort has been taken to improve the understanding of discrete WRA in Scotland, and the areas were defined by aggregating water supply zones (WSZ) into the correct WRA.

Currently there are 278 water resource areas. This is a significant reduction from the 381 water resource areas reported in the 2002/03 submission. It is important to note that this reduction does not represent a major change to the way Scottish Water operates its assets, rather it reflects an improved methodology in defining a WRA.

Determination of the Deployable Output (DO)

Water Resource Yield

Reliable yield is the maximum continuous output that can be met from a water resource without failure, where failure is defined as the inability to meet the expected demand without the imposition of management restrictions outwith normal operational limits, at a stated frequency.

Recent yield assessments for all major water resource areas have been done using the methodology and software (AQUATOR-HYSIM) that was developed for Scottish Water under the SNIFFER Surface Water yield and Operational Reliability project[4].

The yields for minor catchments (predominantly in the North West) and for areas where there is not sufficient data to allow an AQUATOR-HYSIM model to be built, have been assessed using the Low Flow Studies methodology (LFS) developed by the Institute of Hydrology[5]. This is an empirical method and has lower confidence than the SNIFFER approach.

The water resource yield is net of any water order constraints or capacity constraints in the raw water assets and infrastructure, for example, capacity of raw water pump station.

Water Treatment Works Loss

An allowance for WTW loss is not mentioned in the WIC definitions. However, it is an important component of the supply demand balance and Scottish Water must ensure that it has sufficient water available to meet the full demand placed on its raw water resources i.e. DI + WTW loss.

There are two components to WTW loss[6]:

[4] **S**cotland and **N**orthern **I**reland **F**orum **F**or **E**nvironmental **R**esearch; Surface Water Yield Project (a joint venture including the three Scottish Water Authorities, SEPA and the Water Service in Northern Ireland); Water Resource Associates (WRA), report in press.

[5] now Centre for Ecology and Hydrology

[6] UKWIR/NRA (1995) Demand Forecasting Methodology - Main Report

- Structural water loss and both continuous and intermittent over flows
- Treatment process water - i.e. net loss that excludes water returned to source water

Where possible, WTW loss was evaluated using actual meter data i.e. difference between WTW inlet and outlet meters. However, for the majority of sites WTW loss was estimated based on operator knowledge and/or an assessment based on the type of treatment process used at each site. The estimates of WTW loss are held in the water resources database.

WTW Capacity

WTW capacity is the design capacity of the WTW and is taken from the corporate data set (Ellipse data).

Calculation of Water Available for Use (WAFU)

Outage Allowance.

Data for outage is based on regional assessments using the methodology recommended in the EA Water Resource Planning Guidelines, namely the approach set out in the "Operating methodology" of the UKWIR report "Outage allowances for water resource planning", published in March 1995 (Ref: 95/WR/01/3). Where data was not available or the methodology used was not comparable with procedures used in the rest of Scotland, default outage figures have been adopted. These default figures range from 5% for medium and larger water resource zones to 10% for small isolated zones.

Determination of target headroom allowance

The term headroom as used in Table B1 requires clarification because this term is also used in an UKWIR Report[7] which deals with the conversion of uncertainty into a target headroom allowance. Target headroom is defined as:

'the threshold of minimum acceptable headroom, which would trigger the need for total water management, options to increase water available for use or decrease demand'

The concept behind the UKWIR report is that there are clearly a number of uncertainties in the figures used to determine the supply / demand balance, and that a rational and prudent approach to this is to allow some additional headroom to cover these uncertainties. It is standard practice to include an allowance for target headroom when determining water resource availability in each WRA (refer to EA guidelines) and this is an essential component of the supply / demand calculations used by Scottish Water to prioritise investment in headroom. Therefore, for consistency with Water Industry best practice and to align the outputs with corporate datasets, namely the data used for developing the investment programme for Quality and Standards III, Scottish Water has included an allowance for target headroom in the table B1 submission.

A source by source estimate for target headroom allowance has been applied in the calculations for Table B1 and the following formula has been used:

% Headroom = [WAFU – (DI + target headroom allowance)] / (DI + target headroom allowance)

B1.1-4 Resource Areas

B1.1 - B1.4 -The change in methodology in calculating headroom from previous Returns, as detailed above, has resulted in the apparent increase in the population receiving headroom

[7] UKWIR A Practical Method for Converting Uncertainty into Headroom. Contract WR-13, 1998

in the lower bands. It must be stressed that the majority of the change is due to the regrouping of water supply zones to WRAs and to the new methodology adopted. Last year's calculation did not take into account WTW losses, outage allowance, target headroom or water order details. The re-grouping has resulted in a reduction of WRAs from 381 to 278. Refer to Identification of Water Resource Areas above for further commentary.

Confidence grades have remained the same as last year. It is anticipated that these WRAs will be adopted into a corporate data set and held on the Scottish Water GIS within the next report year. Confidence grades will then be reviewed together with the key components of the headroom calculation, including distribution input.

B1.5-8 Headroom

B1.5*:* The population figure is brought forward from Table A1.71

B1.6 to B1.8*:* In order to calculate the population count of a WRA, the water supply zones (WSZ) within each area were firstly identified using the hydraulic asset structure. An extract of population counts by WSZ was then taken from the corporate GIS.

All population totals are sourced directly from Table A1 and no further correlation is carried out as the result of the headroom calculation. Comments on the quality of the population and demand data are included in the commentary accompanying tables A1 and A2.

As discussed in previous submissions, the band sizes are rather narrow, thus for instance the mid-band of >2% and $\leq$ 5% has low counts and adds little information, whilst the lower and upper bands have high counts.

The table does not show that in a number of cases the supply to demand position has negative headroom as these are included in the $\leq$ 2% count.

The rational for specifying 2% and 5% as break-points for Table B1 is not clear as in the field of water resources these magnitudes are below reliably detectable thresholds for most of the variables, such as metered consumption. More meaningful information would be gained by altering the band sizes and including negative ranges. Scottish Water would welcome the opportunity to discuss these band widths and relating them to their application.

B1.9-11 Restrictions on Water Use

There have been no restrictions on water use during the Report Year.

Table B2 Pressure and Interruptions

General comments

Updated Information:

Data from last year's WIC return has been updated based on the following information:

- Calibrated all mains network models that have been completed within the report year.
- Information from Level 1 DMA reports.

Definition of the standard:

In accordance with the WIC guidance, Scottish Water reports against a standard of 15m in the adjacent main as a surrogate for the WIC standard. This will take into account the position of the water tank in the property. At present, no allowance has been made for properties on common or shared services, as these are currently being identified in our GIS.

Exclusions from the Standard:

Pressures below the standard **will** be acceptable in the following specified circumstances:

- Essential maintenance which has been pre-notified by a minimum of 24 hours;
- One-off incidents such as third party action / disturbance where these are not recurring incidents;
- Periods of less than one hour; and
- A period of abnormal peaks in demand, not more than 5 days per annum or 25 days in a rolling 5-year period. This exclusion will not be taken to cover daily, weekly or seasonal peaks, which could normally be expected.

Level of Service Register:

Currently there is no corporate Scottish Water Level of Service Register. Information is gathered from various sources across each of the operational areas. However, the methodology for recording low-pressure complaints is consistent across Scottish Water. It is proposed that a corporate low pressure register and associated procedures will be available by April 2005, as highlighted in WIC Action Plan 19. The corporate register will allow additions and removals of low pressure properties from throughout Scotland and will provide improved data to populate lines B2.1 to B2.10, including lines where no procedure currently exists.

The use of inferred pressures from level 1 DMA reports will lead to a less reliable estimate of the number of properties subject to low pressure, as the reduction in pressure due to head loss in the pipes cannot be taken into account. The actual minimum pressure of these properties in the field will vary dependent upon local headlosses, the layout of properties relative to critical monitoring points and the network layout. In some instances, estimates will be over stated, and in others under stated. The only reliable method of measuring the problem is to install continuous critical point monitoring.

Customer complaints about low pressure, received by telephone, e-mail and letter, are recorded and consideration will be given towards logging the zone or DMA appropriately if loggers are not already in place.

B2.1-10 Properties receiving pressure/flow below reference level

B2.1 – Refer to Line A1.69

B2.2 – Data are taken from the 2002-2003 WIC Return.

B2.3 – Properties have been added based on figures contained in Level 1 DMA reports April 2003 to April 2004. Some properties were added based on completed modeling reports.

Information was taken from the Level 1 DMA reports that inferred properties subject to low pressure from logged pressures at the highest point in the system. This would tend to over-estimate the number of properties subject to low pressure due to an over-estimation of the head losses in the system.

A C4 confidence grade is deemed to be more appropriate for the quality of data than the C3 returned last year.

B2.4 – At present no feedback loop/procedure exists following investigation of low pressure complaints to corporately document that asset deterioration of the network has caused the low pressure.

The development of the Low Pressure Register has been identified as a phase 2 Asset Data Improvement project. It is envisaged that the development phase of this project will begin in

September 2004 with an estimated completion date of December. Following the development phase and the establishment of appropriate procedures for populating the register, then data from the register could be used for completion of next year's WIC Annual Return.

B2.5 – At present no feedback loop/procedure exists following investigation of low pressure complaints to corporately document that operational changes to the network have caused the low pressure.

B2.6 – Properties removed: Based on figures generated from a review of available Level 1 DMA reports and from detailed logging carried out in a number of water supply zones within the South West operational zone area. However, the improvement to the data was not sufficient to warrant a better confidence grade.

B2.7 – At present no feedback loop/procedure exists to corporately document that asset improvement of the network has increased the pressure to properties.

B2.8 – At present no feedback loop/procedure exists to corporately document that operational improvements have increased the pressure to properties.

B2.9 – Calculated field. This has been given a confidence grade of C4.

B2.10 – At present no feedback loop/procedure exists to corporately document exclusions.

B2.11 and B2.13 - The following reasons explain the fall in planned interruptions –

The mains rehab investment has resulted in a reduction in work being generated.

Scottish Water repair mains under pressure. As per the definition, an interruption to supply is where the customer is without a continuous supply of water to their cold tap. Repairing under pressure, the customer does not lose the service.

Although the actual number of planned interruptions has fallen by 16% this does not correlate to a 16% reduction in the number of properties affected. As stated in the annual return commentary each interruption can affect differing numbers of properties e.g. a meter installation can affect one property whilst a valve replacement can affect 1,000 properties.

B2.17 – Scottish Water have introduced new scheduling systems and procedures which supports not only better planning and scheduling of work but also customer service, in that more customers are being warned and advised of an interruption to their supply.

B2.18 and B2.21 – The numbers reported in the annual return are taken from the Interruption to Supply database. As per comments from the Reporter, Scottish Water are altering their data capture record to ensure that interruptions due to third party are more clearly recorded.

B2.37, B2.39 and B2.40 – Failure to restore supply can occur for a number of reasons and if the event has affected a large number of properties, then the percentage of properties restored within time bands will fluctuate. Each interruption can affect a differing number of properties e.g. a meter installation can affect one property whilst a valve replacement can affect 1,000 properties.

Operational difficulties were experienced in North East area where 4,430 properties were affected by overruns between 1-4 hours and one where 322 properties were affected by an overrun of greater than 4 hours. Within the North West operational area 235 properties were affected by an overrun of greater than 4 hours.

B2.41-46 Unplanned interruptions – Restoration Time

The numerical data for supply interruptions was gathered in accordance with the Interruptions to water supply procedure.

Data for this section is similar to our WIC5 quarterly returns. However as data in our systems was updated after the submission of the quarterly returns, due to housekeeping of returned Interruption to Supply sheets, the data may differ slightly from the aggregate of WIC5 returns for 2003/04

Interruption to supply sheets are included in work packs prepared for and completed for each job where an interruption to supply occurs, as well as from data collected by contractors carrying out infrastructure renewal work. The data from the completed sheets is input to the Interruptions Database and EMPAC (a work management system). This facilitates the reporting requirements of the business, the quarterly (WIC 5) and annual returns.

The data entered in the 2003/04 annual return has been extracted from the Interruptions Database, Empac and information collated from our contractors.

It should be noted that an interruption to supply should only relate to actual interruptions from a customer's perspective i.e. if the main is repaired under pressure or if a back feed is put in place, there is no interruption to supply.

It should also be noted that each interruption can affect differing numbers of properties e.g. a meter installation can affect one property whilst a valve replacement can affect 1,000 properties. Failure to restore supply by the notified time can occur for a number of reasons and, if the event has affected a large number of properties, the number of properties reported will be high.

B2.42a - B2.46

The following figures are the breakdown of restoration times for unplanned interruptions affecting trunk and non-trunk mains

	Non Trunk	Trunk
Total number of properties restored in >6 hours	35,939	8,624
Total number of properties restored in >12 hours	3,647	12,441
Total number of properties restored in >24 hours	2,264	2
Total number of properties restored in >48 hours	291	391

B2.46 The increase in the number of properties restored greater than 48 hours for both trunk and non-trunk mains was mainly due to incidents in the North West operational area. On the 18 April 2003 a trunk main burst resulting in 360 properties being affected for more than 48 hours. The following non-trunk main interruptions occurred. On the 3 July an interruption occurred in Bridgend, Islay and on the 1 January 2004, 3 non trunk mains burst which affected Peddiston in the Black Isle which resulted in a total of 196 properties affected.

As per the annual return commentary failure to restore supply by the notified time can occur for a number of reasons and, if the event has affected a large number of properties, the number of reported will be high.

The following unplanned interruptions affected a high number of properties:

Fife area	1,540 properties affected
Blantyre area	250 properties affected
Elgin area	1,100 properties affected
Shetland area	750 properties affected

Therefore, 4 interruptions resulting in 3,640 properties affected have inflated the total number compared to previous years.

The confidence grading of the data submitted in the 2003/04 annual return is regarded as B3.

Table B3 Sewage Flooding

General Comments

Four sections of sewage flooding are required to be reported on in Table B3. These are Annual Flooding due to Overloaded Sewers, Annual Flooding due to Other Causes, Clean Up Response Times and Properties on the "At Risk" Register. The information used to report on these sections is collated by two main sources: these are the Sewer Flooding Incident Database (SFID) and the Flooding "At Risk" Register (referred to as the Flooding Register).

Flooding Register

In 2002 Scottish Water compiled a Flooding Register as part of its asset management process.
This Flooding Register was populated by merging existing sewer flooding records from the West of Scotland Water Authority (WoSWA) and East of Scotland Water (EoSW) and through a first pass data collection exercise covering the former North of Scotland Water Authority (NoSWA). On completion, this exercise provided initial knowledge of flooding due to overloaded sewers across the whole of Scotland. The Register excludes flooding relating to causes other than sewer overloading.

Flooding Register Change Management

In the year 2003/04 updates to the Flooding Register were managed and reported monthly as a business Key Performance Indicator (KPI). The information which resulted in updates to the Register was sourced from operations, the Capital Investment Team and Strategy & Planning. Operations maintain the Sewer Flooding Incident Database (SFID), which records sewer flooding events across Scotland and through the use of a standard form (which is completed by the squad in attendance at the incident) the cause of flooding and the activities undertaken are recorded. The Capital Investment Team monitor the flooding projects and report beneficial use date and the final delivery costs. Strategy & Planning who manage the Flooding Register are responsible for the movement of properties on to and out of the Register. This is achieved by analysis and validation of information provided by Operations and the Capital Investment Team and through investigation of incidents affecting flooding locations (flooding clusters) often using Drainage Area Study information where available. In addition Met office rainfall data is used to identify severe weather events. Continuous liaison with Operations and Customer Service staff ensure that the Flooding Register is maintained up to date at all times.

Flooding Register Improvements

The Flooding Register has been further developed this Report year to include data management rules and processes and to permit more efficient reporting for both Business KPIs and Annual Return information.

Further improvements to the Flooding Register are planned for this year including the introduction of quality assurance for properties being removed or added.

Flooding Register Predictions

Through work on the current Quality & Standards (Q&S) III project, using Drainage Area Studies (including the Glasgow Strategic Drainage Plan) and tracking changes to the Flooding Register over the last year the number of properties at risk of flooding is predicted to increase as more properties are identified and recorded.

Sewer Flooding Incident Database (SFID)

The Sewer Flooding Incident Database captures all wastewater flooding events across Scotland and records location, properties affected and how (internal/external), cause, attendance times and measures taken. Sewer Flooding Incident Records are completed by the Scottish Water staff in attendance on site and these records are used to populate the SFID. Where appropriate these records are followed up by investigations to confirm event details. As this database records all sewer flooding incidents it is then used to support both the records in the Flooding Register and in providing information on sewer flooding due to causes other than overloaded sewers (e.g. chokes, collapses, plant failure).

Future recording of all flooding incidents and their causes will be recorded in the newly developed corporate Works & Asset Management System which will record incidents, causes and costs. This will further increase the confidence of the Annual Return figures and business reporting as the system is integrated with customer contact data, which will allow analysis on contacts and causes.

Sewer Flooding At Risk Properties Performance

At the end of the report year the Flooding Register recorded the following unresolved flooding (a property is only recorded in one category) :

Register Status (Nr. of Properties)	**03 / 04**
At Risk 2 in 10 years	620
At Risk 1 in 10 years	485
Garden	1731
Highway	466
Other Flooded Areas	57

A comparison with the Scottish Water figure for this Return and the England & Wales figures for last year's Returns places Scottish Water below the median. It should be noted that confidence in the Flooding Register data is average (B4). The following table demonstrates Scottish Water's position.

DG5 – Sewer Flooding, Overloaded Sewers

Water Company* 2002 / 2003	**Nr. of Properties Per 100,000****
Yorkshire	18
Northumbrian	19
Dwr Cymru	30
Southern	31
South West	38
Severn Trent	41
United Utilities	46
Scottish Water (2004)	**46**
Anglian	49
Wessex	105
Thames	146

* (2003 Return except Scottish Water)

** (the increase in connected properties has been reflected in the SW figures)

B3.1-6 Annual Flooding – Overloaded Sewers

The submission is based on figures sourced from the Flooding Incident Database.

The number of properties flooded and the number of flooding incidents reported this year, show significant reductions due to a number of factors.

Analysis of rainfall data for two sample locations (Dundee and Aberdeen) concluded that the number of high intensity rainfall events experienced this year was significantly less than the previous year and may be a reason for the reduced flooding occurrences. Reduced flooding occurrence cannot be entirely associated with a reduction in the number of high intensity rainfall events as the precise geographic location of these events is also a major factor in flooding experienced.

It is due to the random combination of rainfall intensity and location that neither last year's nor this year's reported flooding figures can be assumed to be typical. A typical year for flooding figures is assumed by Scottish Water to be in the order of 200 affected properties.

Significantly the 30 July 2002 event in the Glasgow East End area accounted for a large proportion of the figure last year but no similar scale event occurred this year. This year one event was confirmed by the Met office as severe. This was in Wishaw on the 30 May 2003 and was assessed as a 1 in 76 return period event.

The significant changes in the number of garden and highway flooding highlights a change in the system used to report flooding from 02/03 to 03/04. In 02/03 figures were reported from customer contact databases, with the assumptions that all non internal flooding was garden flooding, leading to possible over reporting of garden flooding. Highway flooding is reported as zero indicating the short comings in reporting in this area for this year's return. The switch over from legacy reporting systems to new Scottish Water corporate systems has been a factor in the reported number for flooding incidents this year. An apparent shortfall in the recording of flooding incidents can be seen in the data during this period.

Scottish Water recognises that improvement in the quality of data being recorded for all flooding is required and new corporate systems including Promise and WAMS are proposed to link customer contact information to cause analysis information from site, using one set of data hence allowing more robust reporting which will become evident in next years return.

Reporting of sewer flooding will always be under-reported as Scottish Water relies on customers advising us of a problem. It is recognised across the industry that there are occasions and circumstances where customers do not (inadvertently or intentionally) report a sewer flooding incidents.

The figure reported for Line B3.5 is much lower than that reported for the year 02/03. However the reported figure for the year 01/02 is zero with an M, (missing) Confidence Grade.

The low figure for this year is due to two reasons:
1. A change in assumptions made regarding those flooding events which were non internal.
2. The change from the legacy recording systems to the new recording systems which appears to have led to an under recording of events.

Non internal, non garden flooding is in part recorded under the lines concerning highway flooding, but there is no provision for reporting other flooded areas such as public open space, wasteground or agricultural land. This figure has been reported as zero and missing due to lack of consistent data during the transition to the new corporate systems.

The number of highway flooding incidents is reported as zero with a “missing” Confidence Grade. This is due to the lack of consistency through the transition from the legacy reporting systems to the new corporate systems.

The new system is able to record highway flooding incidents.

B3.7-13 Annual Flooding – Other Causes

The information for lines B3.7 to B3.13 is reported from the same source as B3.1 – B3.6 and the commentary is as the previous section.

B3.14-22 Clean Up Response Times

The information for lines B3.14 to B3.22 is mainly provided by the Sewer Flooding Incident Database by way of the Flooding Incident Record Sheets, populated by Sewer Maintenance Squads.

An increased effort in responding to and recording internal flooding incidents has resulted in the improvement reported. This has resulted in significant variance in the numbers reported in this section since 2002/03. Further improvements are expected next year as KPIs on data collection / quality and the new Promise system are introduced.

The new system will record automatically the time that the Sewer Maintenance Squads are sent out to the sewer flooding incident and the time of completion of clean up which will be entered by the Sewer Maintenance Squad on their field laptop system.

B3.23-36 Properties on the "At Risk" Register

B3.23-26 “At Risk” Summary

The number of properties reported in the 2003/04 Annual Return is based on those properties which have been reported and confirmed using historical information and investigated as part of the continuous data improvement of the Flooding Register.

Future additions to the Flooding Register are anticipated through properties yet to be identified and future newly recorded properties. Examples of this growth are, newly recorded flooding in Campbelltown, 22 properties added to the Register and Whifflet Street,

Coatbridge where, after investigation the number of properties in the cluster increased from 25 to 45.

Line B3.25 total at risk was reported incorrectly in the 2002/03 return. This was an arithmetical error. The value of 1014 should have been 981, a difference of 33 properties. Line B3.29 “removed by authority action” was reported correctly

The increase in numbers of properties on the Register is mainly due to newly recorded properties and investigations described previously as part of the continuous data improvement programme. In particular, improved records of incident dates and Drainage Area Studies have resulted in an increase of properties with a risk of suffering internal flooding twice in 10 years.

No information was available last year for B3.26 however historical information, and confirmation by Operations has allowed properties to be removed from the Register through not having flooded in the last 10 years.

An error in the reporting of properties added to the ‘At Risk’ Register was reported in the 2003 Return. The error resulted in the over recording of 33 new properties on the flooding register. These properties should not have been reported until the 2004 Return. The correct figures for AR03 are as follows:

Line B3.23 – 2 in 10 years	Remains unchanged at 499
Line B3.24 – 1 in 10 years	Has been reduced by 33 to 482
Line B3.25 – Total at Risk	Has been reduced by 33 to 981

B3.27-28 Problem status of properties on register

Scottish Water has continued to address the number of internally flooded properties by introducing temporary improvement solutions and flood contingency plans. These interim solutions prevent or reduce the risk of occurrence of internal flooding of property by installing, for example, periscope vents, flood guards and sandbags. Work is ongoing to deliver temporary solutions where possible and in the past year 58 properties have received such protection. Investigations are ongoing for other flooding problems that will result in further properties receiving interim improvement solutions and contingency plans. It should be noted that these measures do not affect the need nor priority of a permanent solution to the flooding problem but are targeting at improving customer service where possible to do so.

Not all problems can be helped by such measures, physically and / or within reasonable cost.

Temporary solutions show an increase in activity resulting from Scottish Water’s more proactive approach to flooding. Line B3.28 was reported incorrectly last year and did not reflect the total register status to be solved. Properties reflecting the Glasgow East End flooding event of the 30 July 2002 were omitted from these figures. The actual line B3.28 To Be Solved figure for the 2002/03 Return should have been 981.

B3.29-32 Annual changes to register

Line B3.29 reports 167 properties have been removed through Scottish Water action. Significant efforts will be required to prioritise flooding solutions to remove properties efficiently from the Register in the future in order to align Scottish Water with the performance of water companies in England and Wales.

The figures reported for Lines B3.30 and B3.31 are mainly due to newly recorded properties from investigations into flooding clusters as part of continuous data improvement.

No properties have been added due to increased demand. Current processes and a wider availability of Drainage Area Studies makes the introduction of new properties due to increased demand increasingly unlikely.

B3.33-36 Problem solving costs

The figure for line B3.33 this year is supplied using the total cost of all the capital projects completed during 2003/04 obtained from Scottish Water's Capital Investment Management System (CIMS) and information relating to the number of properties removed from the Flooding Register for each project.

Nine investment projects were completed last year, resulting in the removal of 138 properties from the register at an average cost per property of £41.272k. These projects were solved using straightforward solutions that presented no engineering complexity and/or difficulties. However the future projects, which are currently being assessed, are more problematic and complex and are likely to lead to higher costs per property. A further nine projects where the main project driver was not sewer flooding have removed an additional 29 properties from the Flooding Register.

The average temporary problem solving cost (capex) (Line B3.35) was derived from the total cost of temporary solutions divided by the number of properties with a temporary solution (Line B3.27) which produced the average cost of £978.54 per property.

The interpretation of the costs to be reported for permanent solutions opex costs (Line B3.34) is those costs which are the operating costs of permanent capital investment solutions (e.g. pump running costs). Currently there are no opex costs associated with permanent flooding solutions investment. This is due to the simplicity of the solutions constructed, for example, pipe upsizing rather than offline storage with a pump return. There are no opex costs incurred by temporary solutions.

Table B4 Customer Care – enquiries

General comments

The numerical data for enquiries was gathered in accordance with the ‘Billing Enquiries’, ‘Change of Payment Method Request’, ‘Water Meters – Applications and Installations’ and ‘Customer Contacts Categorising and Logging’ procedures.

Scottish Water phased in a new corporate billing system known as "HiAffinty" between September and March of this report year. Customer information contained within the three previous Water Authorities' billing systems (Custima and Rapid) were transferred to the new corporate billing system during a planned migration of data project.

In addition Customer Service relocated their Billing operations during the year to a Customer Service management centre located at Fairmilehead

B4.1-13 Billing/Charging/Metering enquiries

The increase in the number of billing contacts received can be attributed to the Scheme of Charges implementation and to the centralisation of Customer Services which facilitated the accurate recording of all contacts.

It should be noted that the contacts responded to within 2 working days increased from 72.73% in 2002/03 to 77.99% in 2003/04. Contacts responded to within 5 working days increased from 79.02% in 2002/03 to 80.75% in 2003/04.

It should be noted that data entry errors identified in WIC 5 submissions returns have been corrected within the Annual Return submission where 5,314 contacts were included within the total number of Billing enquiries incorrectly.

The drop in performance can be attributed to:

The number of contacts received during this year to previous years increased by over 60,000.

Scottish Water centralising 3 billing centres located in Glasgow, Edinburgh and Dundee to their Management Centre located within our Fairmilehead office. During this project, performance fell due to procedural and system changes, recruitment and training of personnel.

Customer information contained within the three previous Water Authorities billing systems was transferred to our new corporate billing system HiAffinity during a planned migration of data project.

B4.14-26 Change of Payment Method Enquiries

The increase in the number of customer contacts relating to Change of Payment Method (COPM) can be attributed to Scottish Water's new policy of including COPM forms within all bills issued.

B4.27-39 Other Enquiries

B4.27 Scottish Water's method for calculating this line is:

Number of calls answered on customer contact lines – (number of telephone complaints + number of all billing, charging and metering contacts including change of payment) + other written enquiries.

Time banded information was taken from the WIC 5 returns with the difference deemed to be dealt with at source and allocated to 0-2 days.

It should be noted that contacts responded to within 2 working days has increased from 95.23% in 2002/03 to 99.46% in current reporting year.

B4.40-52 New Customer Set up

Although the total number of new customer set ups is available the breakdown of timebands is unavailable for the report year. It was envisaged that with the implementation of the new corporate system the breakdown figures would have been available. However as from the second quarter of 2004/05 a time-banded report shall be available.

Table B5 Customer Care – Complaints

General comments

Data for this section is similar to our WIC 5 quarterly returns. However as data in our systems was updated after the quarterly returns were submitted, the data may differ slightly from the aggregate of WIC 5 returns for 2003/04.

The numerical data for Complaints is gathered in accordance with the “Complaints” and “Customer Contacts Categorising and Logging” procedures.

During the report year Scottish Water introduced a new corporate Customer Management System known as "Promise".

All customer contacts categorised as complaints have been captured on Promise.

All written complaints and telephone complaints requiring a written response are directed to a centralised complaint handling team for investigation and response.

The data entered in the 2003/04 Annual Return has been extracted from Promise.

The confidence grade allocated remains as the previous year due to a new corporate system introduced to Scottish Water, along with the merger of three contact centres into a single Customer Management Centre. The use of the Promise system has steadily improved throughout this year and this will be reflected in an improved confidence grade in next year's Annual Return.

B5.1-13 New Written Complaints

B5.1 The increase in the number of written complaints reported can be attributed to the centralisation of Customer Service. This has facilitated the accurate recording of a written complaint and the implementation of a complaint handling team.

It should be noted that contacts responded to within 2 working days has increased from 32.92% to 61.71%. Contacts responded to within 5 working days has increased from 58.88% to 73.43% and contacts responded to within 10 working days have increased from 97.82% to 99.81%.

B5.1a, b It was envisaged that with the implementation of the new corporate system the figures to populate line B5.1a would have been available. However, the data was not available until November 2003.

The data included within this line covers the period November 2003 - March 2004 with no extrapolation of data. This is reflected in the lower confidence grade assigned.

The improvement in response can be attributed to the centralisation of a customer complaint/ recovery team. This team now has immediate access and visibility to customer complaints. The centralisation of this team supports Scottish Water in identifying and supporting quicker responses to our customers either by phone or by face to face contact.

B5.14-26 New Telephone Complaints

B5.14 The reduction in the number of telephone complaints requiring a written response can be attributed to the implementation of technical specialists within the operational contact centre along with the centralisation of customer complaint handling. This allows a member of the complaint handling team to deal with, take ownership of and respond to the customer complaint at point of contact. This therefore reduced the need for a written response.

B5.14a,b It was envisaged that with the implementation of the new corporate system the figures to populate line B5.14a would have been available. However, the data was not available until November 2003.

The data included within this line covers the period November 2003 - March 2004 with no extrapolation of data.

B5.27-38 Complaints by Category

At the implementation of Promise, Scottish Water took the opportunity to realign its 2nd level categories. Differences in complaint numbers recorded against WIC categories between 2002/03 and 2003/04 can be accounted for by the change in process implemented by Scottish Water. For example in 2002/03 the numbers recorded for Water Supply was 53,534 whereas in 2003/04 the numbers recorded for Water Supply was 72,487. This difference was a result of the changes to second level categorisation. For example, water rising which was previously included within Water Infrastructure is now included within Water Supply.

Table B6 Customer Care – Other

B6.1-9 Telephone Contacts

The statistics were taken from telephony data supplied from the British Telecom Service View, the Kingston Telephone Management System, Callscan and the ACD switch Meridian Max, and were based on the complete year's telephone activity.

The telephony management systems have been developed and established during the year to support the centralization of Customer Services within Fairmilehead. From quarter 4 of 2003/04 all traffic is now routed through a single telephony system in Fairmilehead.

This environment has facilitated more accurate, robust data capture and categorisation of customer contacts received by Scottish Water.

The implementation of a new contact system and the merger of our three contact centres into a single Customer Management Centre had an impact on Scottish Water's performance. Variations across the year can be linked to the roll out of the new water and wastewater charges and disruption caused whilst implementing our new corporate system 'Promise'.

B6.2 The information contained is for data covering the period 1 June 2003 - 31 March 2004 inclusive with two months of extrapolated data. This is reflected in the lower confidence grade.

B6.8 'All lines busy', has a zero return. This is due to the introduction of the British Telecom Service View (Message Link) resulting in every customer call receiving either an agent response or a pre-recorded message specific to an event occurring in the customer's STD area code.

The confidence grading of data submitted is regarded as A1, as data is based on factual information with infrequent system down time.

B6.10-20 Private Septic Tank Emptying

Data is entered / captured within the septic tank management system Gemini.

This facilitates the reporting requirements of the business, the WIC 5 Quarterly and Annual Returns.

The data entered in the 2003/04 Annual Return has been extracted from Scottish Water corporate system Gemini..

B6.21-29 Keeping Appointments

Scottish water introduced a new corporate customer management system 'Promise' to facilitate the capture of and to update the appointment record. As explained in the WIC5 returns this process for the period 2003/04 was not available. The information included within

the WIC5 submissions and the Annual Return is from a manual record kept by the Customer Recovery Team. This is reflected in the low confidence grade.

As from quarter 2 of 2004/05 all appointments reported shall be system generated.

Table B7 Customer Care – GMS Performance

B7.1-8 Planned Interruptions

B7.1-4 - the data entered in the 2003/04 Annual Return was extracted from the Interruption to Supply Database, Empac and our contractor submissions.

B7.5 - Under the Guaranteed Standard Payment criteria Scottish Water does not currently make automatic payments for interruption failures. However, on certain occasions, in the interest of customer service, automatic payments have been processed.

B7.6 and B7.8 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.9-17 Unplanned Interruptions

B7.9-13 - the data entered in the 2003/04 Annual Return was extracted from the Interruption to Supply Database, Empac and our contractor submissions.

The increase in the number of claimed payments processed can be attributed to the incidents reported in the North West operational area (see B2.46).

B7.15-17 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.18-22 Sewer Flooding

'Actual payments made' data was extracted from Scottish Water Financial Systems.

Update on Automatic Payments re Billing Enquiries

As reported last year in the Annual Return Scottish Water do not have a facility for making automated payments. In the current year Scottish Water, through our Transformation initiatives, have rationalised the three legacy billing systems into one. Between September and March 2003 the data was moved in a phased way and the legacy systems switched off. Hi-Affinity will be in post implementation support until the end of June 04. Second phase development will begin in July and the ability to process automatic payments or refunds will be implemented during this period.

B7.23-27 Request to change method of payment enquiries

The data entered in the 2003/04 Annual Return was extracted from WIC5 returns.

B7.24-27 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.28-32 Other Billing/Charging/Metering enquiries

The data entered in the 2003/04 Annual Return has been extracted from WIC5 returns.

B7.29-32 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.33-37 Written Complaints

All customer contacts (written) categorised as complaints have been captured on the corporate customer contact system 'Promise'. The data entered in the 2003/04 Annual Return was extracted from 'Promise'.

B7.34-37 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.38-42 Telephone Complaints where written response is requested

All customer contacts (telephone complaint - written response requested by the customer) categorised as complaints have been captured on the corporate customer contact system, 'Promise'. The data entered in the 2003/04 Annual Return was extracted from WIC5 returns

B7.39-42 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.43-50 Keeping Appointments

The data entered in the 2003/04 Annual Return was extracted from WIC 5 returns.

B7.47-50 – 'Actual payments made' data was extracted from Scottish Water Financial Systems.

It should be noted that, although there are less 'Keeping Appointment' failures reported as against the number of payments made reported in this return, payments have been made to customers where an appointment had been made verbally but not recorded and not attended..

B7.51-52 Ex Gratia Payments Made

'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.53-57 Water Ingress to Gas Mains

No instances of failure to provide information within the time period occurred in the reporting year 2003/04.

B7.58-62 Meter Applications

'Actual payments made' data was extracted from Scottish Water Financial Systems.

B7.63-72 Pressure

B7.63-67 (A) - Failure to inform customer of result of investigation within 5 working days

It should be noted that the above standard was not implemented in 2003/04 as the new Code of Practice was not yet in-force

B7.68-72 (B) - Instance of Low Pressure

It should be noted that the above standard was not implemented in 2003/04 as the new Code of Practice was not yet in-force

B7.73-82 Major Incidents

B7.73-77 (A) - Failure to provide information

No instances of failure to provide information within the time period occurred in the reporting year 2003/04

B7.78-82 (B) - Failure to provide alternative supplies

No instances of failure to provide alternative supply within the time period occurred in the reporting year 2003/04

B83-87 GMS Payment

B7.83-87 (A) - Failure to make payment within 10 working days

‘Actual payments made’ data was extracted from Scottish Water Financial Systems.

C Tables – Quality

Table C1 Water Quality Outputs – Compliance

General Comments

- All data in this table is for the calendar year 2003.
- Data in lines C1.1 to C1.19 and C1.22 to C1.23 is taken from the Laboratory Information Management System.
- The zones in lines C1.3 to C1.15 are regulation water supply zones as defined in The Water Supply (Water Quality)(Scotland) Regulations 1990 i.e. an area designated for the purpose of the Regulations with a population of not more than 50,000 and in which all the premises are supplied for domestic purposes from the same water source or combination of water sources.
- The confidence grade is given as A1 as data is extracted from LIMS

C1.1-4 Summary

C1.1 – These are the determinants which have a limit specified in The Water Supply (Water Quality)(Scotland) Regulations 1990. Free and total chlorines and colony counts, for example, are not included. There are 18,261 fewer determinants than in 2002. An audit of the sampling schedule has shown that there was approximately a 17% shortfall in regulation distribution sampling during 2003. This has been attributed to difficulties with the introduction of a new sampling scheduler.

C1.2 – These are determinants that exceed the limits specified in The Water Supply (Water Quality)(Scotland) Regulations 1990. No allowance is made for Temporary Relaxations allowed under these Regulations.

C1.3 - See definition above of supply zone. These zones are reviewed at the end of each year and where works closes zones are merged. Hence the number of zones will decrease.

C1.4 - This is the number of zones that have a determinant that exceeds the limits specified in The Water Supply (Water Quality)(Scotland) Regulations 1990. Some zones fail for more than one determinant.

C1.5-15 Specific parameters Within Water Supply Zones

C1.5-14 – These are the zones that exceed the limits specified in The Water Supply (Water Quality)(Scotland) Regulations 1990 for the determinant shown.

C1.15 - Some of these zones will have failed for more than one determinant.

C1.16-19 Samples Taken for Water Leaving the WTWs

C1.16 - The number of samples taken for coliforms has decreased since a number of treatment works were closed during 2003.

C1.17 - The number of samples with coliform failures has fallen when compared with 2002 due to the result of policies to improve water quality.

C1.18 - The number of samples with faecal coliform failures has fallen when compared with 2002 due to the result of policies to improve water quality.

C1.19 – These are the works where any cryptosporidium failure in the final water has been recorded.

C1.20-23 WTWs/Service Reservoirs

C1.20 - The number of untreated supplies is the number of individual properties that are supplied either from a connection to a raw water main before a treatment works or directly to the raw water reservoir that feeds a treatment works. Scottish Water has no supply zones supplied with raw untreated water.

Data for this year's Return is based on last year's submission and comprises data from the legacy East and West authorities only. The North area previously reported no untreated supplies to properties.

The 165 properties comprise:

- Unoccupied
- In process of disposal from legacy authority housing stock
- Derelict / abandoned
- Agricultural use only (outbuildings etc.)
- Multiple units counted as one e.g. single supply to large estate.

Properties supplied from burns or springs were not included in this figure.

The task of identifying all similar supplies in the north area has not yet been carried out. The total is expected to rise considerably upon completion of this exercise. As a result the confidence grade remains at C4. A register of all untreated supplies will be created which will be of additional use in the response to imminent Private Water Supplies legislation with expected ongoing debate and consultation.

C1.21 - Relaxations granted by Scottish Ministers no longer exist under the Water Supply (Water Quality) (Scotland) Regulations 2001. These Regulations came into full effect on 25 December 2003.

C1.22 - The number here includes all service reservoirs in use for all or part of 2003. Service reservoirs can be taken out of use temporarily for repair or refurbishment. When in use they must be monitored under the Regulations. The number of service reservoirs in use can also increase. When a treatment works is closed due to the completion of a mains extension it is often converted into a service reservoir.

C1.23 - There is an ongoing program to refurbish service reservoirs, and this is reflected in the improvement in coliform failures when compared with 2002.

Table C2 Water Quality Outputs – Asset Performance

General Comments

- All data is for the financial year 1 April 2003 to 31 March 2004
- All data was taken from the Laboratory Information Management System.
- Compliance value is taken to be the permitted concentration or value in The Water Supply (Water Quality)(Scotland) Regulations 1990. Note that apart from coliforms these limits apply at customer taps not treatment works.
- There is no regulation requirement to sample for the parameters in lines C2.5 to C2.24 at treatment works.
- The number of treatment works is those works that were in use for all or part of the period 1 April 2003 to 31 March 2004. Some works closed during this period but have been sampled and so are included in the figures.

Table C3 New Obligations – Water

General Comments

- Water supply zones in lines *C3.1, C3.4, C3.7, C3.10, C3.13, C3.16, 3.18 and 3.20* are water supply zones as defined in The Water Supply (Water Quality) (Scotland) Regulations 1990, i.e. an area designated for the purpose of the Regulations with a population of not more than 50,000 and in which all the premises are supplied for domestic purposes from the same water source or combination of water sources.
- Undertakings in lines *C3.1, C3.4, C3.7, C3.10, and C3.13* are taken to be Undertakings relative to section 76E of the Water (Scotland) Act 1980. These are agreed with the Scottish Executive when a treatment works/water supply zone fails to meet a standard. Scottish Water then gives an undertaking that the treatment works will be upgraded or improved by a certain date.
- Undertakings in lines 3.16, 3.18, 3.20 are based upon risk assessments carried out in accordance with The Cryptosporidium (New Water and Sewerage Authorities) Direction 2002. It should be noted that the Cryptosporidium Directions (Scottish Water) 2003 were issued on 19 December 2003. This revised Direction places new obligations on Scottish Water and changes the risk assessment procedure. Future returns will need to be amended to take account of this and will not be comparable to previous years' returns.
- Lines C3.1 to C3.15 are reported for the financial year since the Undertakings are linked to project delivery. Lines C3.16 to C3.21 are reported for the calendar year as with other water quality outputs.

C3.1-3 Drinking Water Directive (98/83 EC)- A) Lead pcv = 25 µg/l

C3.1 - The number has decreased from 149 to 53 as a result of the installation of orthophosphate dosing at water treatment works, rezoning to deliver water from another supply, and lead communication pipe replacement. This reflects progress of the capital programme.

C3.4-6 Lead pcv = 10 µg/l

C3.4 - There are currently no undertakings to meet the 10 ug/l standard. This may change in future years when there is more clarity on the requirements to meet the 10 ug/l standard by 2013.

C3.7-9 Trihalomethanes pcv = interim

C3.7 - There is no interim THM standard in the Water Supply (Water Quality) (Scotland) Regulations 2001.

C3.10-12 Trihalomethanes pcv = final

C3.10 - The number has decreased from 150 to 125 as a result of the completion of a number of new works and mains extensions.

C3.13-15 Other parameters

C3.13 - The number has decreased from 42 to 32 due to completion of a number of new works and mains extensions.

C3.16-21 The Cryptosporidium (New Water and Sewage Directive) Direction 2000

C3.16 – Scottish Water has no Water Supply Zones with a risk assessment score >100.

C3.18 – The figure has decreased from 31 to 24 due to completion of a number of new works and mains extensions.

C3.20 –The number has decreased from 48 to 37 due to completion of a number of new works and mains extensions.

C3.31-33 The Abstraction Directive

The Abstraction Directive does not currently apply to any Scottish Water assets. This may change with the introduction of the Water Environment and Water Services Act. Any implications will be reported in future years.

C3.34-36 The Birds Directive, The Habitats Directive

Nil return is submitted for these lines as Scottish Water has not been requested by SNH or SEPA to carry out works associated with these directives. Again the Water Environment and Water Services Act may introduce new obligations which will be reported in future years.

Table C4 Wastewater Quality Outputs – Asset Performance

The base asset list used for reporting this table is the database of wastewater treatment works maintained by the Strategy & Planning Section, which is referred to in the introduction to Table E8. This database records works consent type and whether or not it is sampled. Not all works are as yet consented, and work is continuing with SEPA to confirm the full list on consented sampled discharges.

Wastewater treatment works compliance is reported by SEPA on a monthly basis. Strategy & Planning Section compile an internal report on a monthly basis. This report identifies those works that have been agreed with SEPA as failing, as well as the reason for failure. This information has been transferred to the treatment works database to enable this table to be completed.

This table is reported for the calendar year 2003. This is a change from last year as the data was reported by financial year 2002-03. The change in reporting period is to bring the table in line with the WIC definitions and with SEPA reporting. It should be noted that this is a significant factor in the apparent worsening of the compliance results. In line with the pattern of previous years, there has been an improvement in performance in the first three months of 2004, but this not reported in the table C4 as the reporting period ends December 2003.

C4.1-3 All discharges

This refers to both numeric and non-numeric consents, so the numbers of consented and sampled works are the totals of two-tier, single-tier, non-sanitary and non-numeric consents reported below. The number of compliant works is the number of consented works less the number of confirmed failing works reported in Line C4.19.

The changes in the numbers of consented and sampled works are partly a result of changing to a different internal database this year, and partly due to continuing work with SEPA to confirm the sampling regime at works. Confidence grade for discharges sampled in the year has improved from C3 to B2. This is due to the fact a documented process is now in place. Data received from SEPA is stored in a single source database.

Total discharges sampled in the year, line C4.2, is reported as 794. This figure includes works with non-numeric consents, line C4.17. These works are not actually sampled by SEPA but are visited for inspection.

C4.4-9 Look-up Table Lower Tier Consents and Upper Tier Consents

These two sets of results refer to the same set of consented and sampled works, so Lines C4.4 and C4.7 are identical, as are lines C4.5 and C4.8. The figure reported in line C4.6 is simply works that have not failed the lower tier standard: it does not necessarily mean that they are compliant with the upper tier standard. The same rule applies vice versa to line C4.9

C4.13-15 Absolute non Sanitary Consents

This section reports works that have only non-sanitary parameters in their consent. Consents that contain both sanitary and non-sanitary parameters are included in either two-tier or single-tier as appropriate.

C4.19-21 Discharges confirmed as failing

C4.19 - This is the confirmed number of failing works at the end of the calendar year 2003. As discussed in the introduction to this Table, the main reason for the increase in this figure compared to last year is the change in reporting from financial year to calendar year. Improvement in compliance during the period January 2004 to March 2004 is not picked up in this reporting period of C4.

C4.20, C4.21 - The list of failing works has been recorded in the Strategy & Planning database used to report loads in Table E8. The figures reported here are thus consistent with Table E8, and are considered to be more robust than those reported last year. The confidence grade, however, has fallen from B2 to B3. B3 is considered to be a realistic grade for this data and is in line with similar data provided in E8.

C4.22-24 Pollution Incidents

The reporting of pollution incidents is the responsibility of Scottish Water's emergency planning department. Incidents are reported for information only to the Scottish Executive and are not categorised as category 1, 2 or 3. For this reason zero and non-applicable has been entered for these lines.

Table C5 Wastewater Quality Outputs – Asset Performance.

Scottish Water does not sample all wastewater treatment works on a monthly basis. Sampling of wastewater treatment works is either done on an audit basis or in response to failing or near miss SEPA sample results. As a result of this, and as agreed with WIC's office that the cells in this table will be populated as '0' with confidence grades of 'N' for not applicable. This reflects the fact that the audit samples taken by Scottish Water cannot be used as a year to year comparison.

Table C6 Wastewater Quality Outputs – New Obligations

This Table reports commissioned projects in the Report Year which delivered against the nine key investment drivers relating to new quality obligations. Some works have multiple drivers and therefore the population equivalent will appear more than once in the table. The population equivalent is calculated from the Asset Inventory records.

C6.1-6 Driver WQ1: Control of Pollution Act 1974 S34

Improvements were undertaken at 11 WWTPs or discharges including Bonnybridge, Balfron, Ellon, Watten and sea outfalls at Pettycur and East Wemyss.

C6.7-16 Driver WQ2: Improvements to poor or seriously polluted waters

Improvements were undertaken at 8 WWTPs including Selkirk, Cruden Bay and Haddington. A single works was completed to replace 3 works at Gillock. One CSO at Tarbolton Water of Fail was upgraded – this CSO also had an EC1/1 driver and is also reported under UWWTD. Five villages, or parts of communities, received first time sewerage – South Seilibost, Fife Elie The Toft, Port of Dundee, Findochty and Inverurie.

C6.17-22 Driver WQ3: Protection of Risk

Improvement works were undertaken at 9 discharges including Powmill, Balmedie, Carradale and Inveraray. Phosphorous control was undertaken at 6 sites including Aberlour and Blair Atholl.

C6.23-34 Driver EC1: UWWTD Directive

Improvement works were undertaken at 20 CSOs including Brechin, Blair Atholl, Bridge of Earn, Banff, Buckie, and Lossiemouth. These removed 16 from the Q&S II agreed uCSO list.

Improvement works were undertaken at 22 WWTPs or discharges including Aberlour, Wolfhill, Wick, and Newton Stewart.

C6.35-38 Driver EC2: Bathing Waters Directive

Improvement works were undertaken at 13 CSOs at Peterhead, Dornoch and Cruden Bay. These removed 8 from the Q&S 2 agreed uCSO list. Improvement works were completed at 5 WWTPs including Dores and Balmedie and flows were transferred from Ganavan to Oban.

C6.39-42 Driver EC3: Shellfish Waters

Improvement works were undertaken at Inveraray and Kames and Tighnabruiach. There were no CSOs upgraded in the Report Year.

C6.43-46 Driver EC4: Freshwater Fish Directive

Improvement works were undertaken at Aberchirder and Haddington WWTPs. There were no CSOs upgraded in the Report Year.

C6.47-49 Driver EC6: Sludge (Use in Agriculture) Directive

There were no improvement works completed in the Report Year. The installation of V5 loggers at a number of sites was completed but did not enhance sludge treatment.

C6.49a-c Driver EC8: Habitats Directive

8 sites have been identified requiring action but none were programmed for completion in the Report Year.

C6.50 Driver EC9: Dangerous Substances Directive

There were no improvement works completed in the Report Year.

Table C7 Water Mains Activities

C7.1-9 Water Mains Rehabilitation Under Agreed Programme of Works

This is the length of main that has been rehabilitated during the report year, as part of the overall Q&S 2 mains rehabilitation programme. All mains rehabilitation during 2003-2004 has been mains renewal, with no relining carried out during this period.

The total number of water quality zones (WQZs) within Scottish Water's area has reduced due to the ongoing process of redesigning boundaries. The figure reported is the number of zones in GIS at report year end. The number of WQZs reported as being subject to mains rehabilitation has increased from that in the previous return, due to the decision to include all zones programmed as part of the Q&S 2 mains rehabilitation programme. This includes zones where work is carried out on a hotspot basis as some zones only require localised rehabilitation to resolve the issues for the entire zone. The rehabilitation carried out for hotspot schemes contributes to the total length of mains in the agreed programme of work.

It should also be noted that mains rehabilitation is actually programmed and managed on the basis of water supply zones (WSZs) rather than WQZs. Where possible WSZs have been assigned to WQZs but this has not been fully completed due to the ongoing redesigning of boundaries. An estimated number of WQZs have been added to the known WQZs and the confidence grade reflects this inaccuracy.

The length of mains subject to pre-appraisal surveys is 2022km in this reporting period. The length of mains is identified from GIS and INMS datasets.

The data for work undertaken in the report year has been provided by Scottish Water Solutions from the project monitoring developed by the programme delivery team and from the data used to populate Table G – Capital Expenditure.

C7.10-14 Water Resource Planning

This is the number of established Scottish Water district metered areas (DMAs) as obtained from the DMA reporting tool, Perform Classic. Scottish Water is introducing a revised reporting tool, Perform Spatial Plus, over the next 6 months. More accurate reporting figures will be produced when Perform Spatial Plus has been established across Scottish Water.

The figure returned for the number of updated DMAs denotes the number of additional DMAs, which were established during 2003-04. The figure returned for the number of DMAs currently being updated represents the finalised programme for the next phase of DMA construction, which will be completed during 2004-05. The actual number of DMAs established will vary slightly during construction.

Property coverage and length of mains covered by established DMAs were obtained from the DMA reporting tool, Perform Classic. Again, more accurate figures will be produced when Perform Spatial Plus has been established across SW.

Table C8 Sewer Activities

C8.1-9 Sewer Rehabilitation Programme

C8.1 The number of sewage drainage areas has been interpreted as responding to the number of Drainage Area Study (DAS) Zones across Scotland. These zones represent the boundaries within which a Drainage Area Study would be undertaken to produce a Drainage Area Plan. A high confidence grade is associated with this figure reflecting the relatively static nature of these boundaries. It is anticipated that only minor alterations to these boundaries would ever be required.

C8.2 The number of sewage drainage areas subject to a programme of work has been assumed to be the number of Drainage Area Study (DAS) Zones which contain a sewer rehabilitation (or replacement) scheme whether completed, ongoing or to be promoted as part of the current sewer rehabilitation target for Quality & Standards (Q&S) II investment period.

This figure has been collated from a database of sewer rehabilitation needs across Scotland which has been populated from Drainage Area Studies and maintained to reflect schemes as they reach beneficial use.

The figure does not include those sewer replacements carried out as part of flooding alleviation or overflow improvement projects.

General Statement

The following two lines relate to the length of sewers which have or are to be rehabilitated or replaced. At present the length of sewers which have been rehabilitated cannot be distinguished from that which have been replaced. Likewise the sewers which are yet to be rehabilitated cannot be distinguished as either rehabilitated or replaced as the method of improvement has not been confirmed to date. As it is expected that the majority of the sewer improvement will be via sewer rehabilitation then all of the lengths are reported against line C8.4 with C8.3 reported as missing. The same reporting method has been applied to lines C8.6 and C8.7.

C8.3 This line has been assumed to be the length of sewer identified for replacement or which has been replaced in the current (Q&S II) target for sewer rehabilitation. The figure reported however is zero with a M (Missing) confidence grade due to the reasons identified above.

C8.4 This line has been assumed to be the length of sewer identified for rehabilitation or which has been rehabilitated in the current (Q&S II) target for sewer rehabilitation. The figure reported here is the total figure for line C8.3 and C8.4 for the reasons described above. The confidence grade assigned is C4 reflecting the lack of a corporate database.

The length of sewer rehabilitated to date is 90km, the length of sewer promoted to be delivered to date is 173 km and the length of sewer to be promoted to meet the Q&S II target is 147km.

C8.5 This line is assumed to be the length of sewers which have been assessed by CCTV survey in the report year which totals 189km. The length of sewers which have been surveyed immediately prior to a sewer rehab project is not currently collected but will be no more than that reported as being rehabilitated or replaced this year.

C8.6 & C8.7 The length of sewers replaced or rehabilitated during the report year is reported against the single line C8.7 as the division between which length has been replaced as opposed to rehabilitated cannot be made. Line C8.6 is therefore reported as zero with a “missing” confidence grade. The confidence grade on line C8.7 is assigned as C4 as a result of the uncertainty in the reporting of projects carried out during the report year.

The amount of sewerage improvements promoted to date shows a step increase in the length of rehabilitation to be carried out and therefore the reported figure next year should show marked progress towards meeting the Q&S II Target.

C8.8 The amount of completed and acceptable post-surveys is reported as zero as there is no data collected for any of the sewer rehabilitation that has been undertaken this year. The confidence grade is therefore reported as M, Missing.

C8.9 The number of DAS Zones which have had a sewer rehabilitation project completed within its bounds has been reported in this line. The data has been collected from completed projects.

C8.10-12 Critical Sewers

C8.10 & C8.11 The length of critical sewers replaced or rehabilitated during the report year is reported against the single line C8.10 as the division between which length has been replaced as opposed to rehabilitated cannot be made. Line C8.11 is therefore reported as zero with a "missing" confidence grade. The confidence grade on line C8.10 is assigned as C4 as a result of the uncertainty in the reporting of projects carried out during the report year.

C8.12 No critical sewers were abandoned this report year. A change in the method by which the length of critical sewers was calculated resulted in a reduction in the overall length. This change is reported in this line and is consistent with line D6.16. The confidence grade assigned is also consistent with line D6.16 at C3.

C8.13-16 Drainage Area Plans

General Statement

At present in Scottish Water there is an ongoing programme for the production of Drainage Area Plans (DAPs). The figures relating to this programme of work are reported in Table D6. This programme covers the first time creation of DAPs but does not currently provide for the maintenance of these plans once created. The figures reported for the following lines therefore reflect the absence of DAP maintenance to date.

Periodic maintenance is seen as essential to prolong the useful life of the DAPs and therefore get full benefit of the initial cost of their creation (currently projected at approximately £40m). Currently there are proposals for the cost of the maintenance of DAPs to be included in the next Investment period as they are considered to be essential, valuable assets for gaining a full understanding and for the management of the sewerage network and how it interacts with both customers and the environment, and for the planning of future development of the network and in assisting with its efficient operational running.

The Quality & Standards (Q&S) II investment period priority was, and is, for the first time production of Drainage Area Plans. The Q&S III investment period will have DAP maintenance as a priority together with the extended DAP coverage for the unsatisfactory intermittent discharge environmental and flooding due to overloaded sewers enhancement programmes.

C8.13, C8.14, C8.15 and C8.16 These lines are all reported as zero reflecting the absence of DAP maintenance provided for in the current investment period. The confidence grade for these figures is correspondingly recorded as missing. Table D6, lines D6.21 to D6.25 Activities – Studies report the current status of Drainage Studies.

D Tables – Asset Information

Tables D1 to D3 are populated automatically from Tables G5 and G6 and individual confidence grades and commentaries are included where appropriate.

Table D1 Workload Commissioned Assets – Water Service

Table D1 records replaced/refurbished, new and enhanced assets commissioned in the Report Year 2003-04. This is based on Scottish Water's approved investment programme to meet the requirements of legislative driven quality improvements and on-going capital maintenance to ensure that the necessary level of service is maintained.

Commissioned assets have been analysed and allocated to either replaced/refurbishes or new/enhanced as appropriate. The financial information on project capital expenditure has been reconciled with the corporate financial management system. Whilst Scottish Water has made progress in developing a procedure for reporting commissioned assets on completion, further development is required to enable these assets to be recorded in the Capital Investment Monitoring System by requiring an asset data appendix to be submitted with Capex 5 forms. The Financial Capital Analysis Form will also submitted at Capex 5 to ensure that the Financial Fixed Asset Register and the Asset Inventory are both updated on projects achieving beneficial use. The asset information has been obtained from available record information and analysis of projects completed.

Rolling programmes have been shown as commissioned in 2003-04 to ensure that the completed assets are included. However the lower confidence grade reflects concern that not all assets refurbished through minor works have been recorded in Table G.

Where there were more than 5 asset types included within a single project, these have been rolled up to enable the reporting to be as representative as possible of the investment incurred.

D1.1-2 Asset Replacement

D1.1 Work required under the Reservoirs Act is included in this line.

D1.12-13 Water Storage

D1.12 - Security work under the Code of Practice for The Security of Service Reservoirs is included in these lines.

D1.42-43 Water Storage

D1.42 - Security work under the Code of Practice for The Security of Service Reservoirs is included in these lines.

D1.47-51 Water Mains

D1.47 - The new and enhanced potable water mains figure includes the lengths of main resulting from new developments and represents the assets adopted. As Scottish Water only makes payments to developers up to the reasonable cost limits for new developments, the investment reported does not reflect the actual costs to developers.

Investment on Water Zonal Plans is not recorded in Table D1 as there is no asset code to report against.

Table D2 Workload Commissioned Assets – Wastewater Service

Table D2 records replaced/refurbished and new/enhanced assets commissioned in the Report Year 2003-04. This is based on Scottish Water's approved investment programme to meet the quality requirements of UWWTD, Bathing Waters Directive and the Control of Pollution Act, together with capital maintenance and infrastructure renewals to ensure that the necessary level of service is maintained.

Commissioned assets have been analysed and allocated to either replaced/refurbishes or new/enhanced as appropriate. The financial information on project capital expenditure has been reconciled with the corporate financial management system. Whilst Scottish Water has made progress in developing a procedure for reporting commissioned assets on completion, further development is required to enable these assets to be recorded in the Capital Investment Monitoring System by requiring an asset data appendix to be submitted with Capex 5 forms. The Financial Capital Analysis Form will also submitted at Capex 5 to ensure that the Financial Fixed Asset Register and the Asset Inventory are both updated on projects achieving beneficial use. The asset information has been obtained from available record information and analysis of projects completed.

Rolling programmes have been shown as commissioned in 2003-04 to ensure that the completed assets are included. However the lower confidence grade reflects concern that not all assets refurbished through minor works have been recorded in Table G.

Where there were more than 5 asset types included within a single project, these have been rolled up to enable the reporting to be as representative as possible of the investment incurred.

D2.31-33 Sewers

D2.31 and D2.32 The new and enhanced critical and non-critical sewers resulting from new developments are included in the commissioned assets and represent the assets adopted. As Scottish Water only makes payments to developers up to the reasonable cost limits for new developments, the investment reported does not reflect the actual costs to developers.

D2.45-50 Sludge Treatment Facilities

D2.46 The investment reported relates to the installation of V5 loggers at a number of sludge treatment facilities as required by the Sludge Use in Agriculture Directive.

Investment in Drainage Area Plans/Strategies is not recorded in Table D2 as there is no appropriate asset code to report against.

Table D3 Workload Commissioned Assets – Support Services

Table D3 records the new or enhanced and refurbished or replaced support services commissioned assets.

All projects relating to offices have been reported as refurbishment/replacement although Henderson Drive was a new build to replace the original office and to accommodate staff from other offices within Inverness.

D3.23-24 Depots and Workshops

D3.23 - The enhancements reported relate to upgrades to the depots undertaken to meet Waste Management Licensing requirements. Similar upgrades at 2 WWTPs are reported in D2.

D3.30-32 Information Systems

D3.31 and D3.32 - The enhancements reported relate to new servers and mainframes which support the centralisation of the IT infrastructure.

D3.33-36 Other Non-Operational Assets

D3.13 and D3.33 - These lines report investment on laboratory equipment, hand-held monitoring equipment and other equipment

Table D4 Asset Changes – Water, Wastewater and Support Services

The data presented in Table D4 shows the difference in the asset stock due to the following:

- Unified approach to asset classification using WAMS and GIS.
- Improved understanding of the asset types and banding factors.
- Investment in year 2003/04.
- Improved costing information.

The EARC values are set to zero because of the significant changes to asset stock during the year, would make this table meaningless.

Table D5 Asset Performance and Activities – Water Service

D5.1-6 Asset performance indicators

D5.1 - Burst Incidence Rate
The burst incidence rate is based on the number of burst repairs reported in E6.11 divided by the length of potable pipe reported in E6.8. The confidence grade allocated to the number of burst repairs is described in the E6.11 commentary and carries through into the confidence grade of B3 for this indicator.

The current figure of 182 bursts per 1000km of mains is lower than reported in the 2002/03 year (194 per 1000km). This is principally due to the 5% reduction in the reported burst repairs, together with a 1.5% increase in the length of potable pipe. The derivation of the number of bursts is based on the number of repairs to mains, which in turn, is as much a feature of the leakage management strategy and associated maintenance tactics, as it is of asset condition.

Any comparisons with the burst incidence figures for the rest of the UK should take note that OFWAT operates strict leakage loss targets that has determined a different operating climate to that experienced in Scotland. Consequently the figure for burst incidents should be read in conjunction with the estimated leakage losses, which offers insight into water pipe condition as leak management programmes begin.

D5.7-11 Activities

D5.7 to D5.11 - The total number of distribution zones identified for study (D5.7) is the total number of all the current Water Supply Zones within Scottish Water and were identified from GIS. The number of zones has increased due to the ongoing process of redesigning boundaries. This year Scottish Water has developed a common format for studies, which are delivered in conjunction with the ongoing mains rehabilitation programme. The number of completed studies (D5.9) refers to the total number of studies completed using this common format.

The percentage of detailed distribution zone studies completed (D5.10) and the percentage of properties covered by these studies (D5.11) have fallen from last year due to the exclusion of former study types that were previously included. The ongoing DZSs, which should be delivered by the end of the next report year, cover an estimated additional 431,294 properties.

Table D6 Asset Performance and Activities – Wastewater Service

D6.1-9 Asset Performance Indicators

D6.1 The sewer collapse figure per 1000km of sewerage is reported consistently with the data collection exercise used for the performance and condition assessment done for Table H4. The table H4 commentary therefore covers in detail this figure. The data capture of collapse information remains an issue for this year's Return although new corporate systems will see improvement in the future. The Confidence Grade assigned therefore remains low at C5.

General Statement

In 2002 Scottish Water compiled a Combined Sewer Overflow Database as part of its asset management process. The database was created through the merging of the overflow records of the three previous Authorities. The database initially contained the records of unsatisfactory overflows from the three predecessor Authorities but now contains records on all overflow types across Scotland. The database is now referred to as the Intermittent Discharge Register, aligning the terminology with the Water Companies in England and Wales. An Unsatisfactory Combined Sewer Overflow would now fall under the description of unsatisfactory Intermittent Discharge (uID).

Data improvement on the Register is being addressed through continual liaison with Operations staff and through Drainage Area Studies, a programme of which has been ongoing throughout Quality and Standards (Q&S) II and which is continuing to provide clarification of the overflow asset inventory and characteristics on performance in terms of hydraulics (flooding) and environmental (pollution sources). The Register is also being updated with improved assets reaching the beneficial use stage through investment projects.

D6.2 Number of Unsatisfactory CSOs.
The number of uIDs which have been removed from the uID Register totals 115, with 12 removed through better information via Drainage Area Studies, 77 corrections to the Register in the form uIDs included in last years return which shouldn't have been, duplicate records and overflows already abandoned, 4 overflows abandoned as found not to spill and 22 where capital investment resolved failing parameters. These figures are summarised in the Table D6.2 below. An exercise to classify intermittent discharges has been undertaken for the planning of the Q&S III investment period which has led to additional uIDs being identified. 756 uIDs have been added this year. The overall increase in uCSOs is 643.

				Removed – SW Action				
D6.2	Opening Balance	Removed Better Info	Removed Inaccuracy correction from 02/03	Removed SW Action	Capital Projects (hydraulic solution)	Capital Projects (screening solution)	Q&S III Additions	uID Outstanding Balance
2003/04	549	12	77	4	22	0	756	1190
					Removed SW Action Total	26		

Table D6.2 - uID Balance Annual Return 2004

D6.3 Number of CSOs.
Improvement in the number of Scottish Water's IDs has progressed this year through the updating of the Register with information from Drainage Studies which have been completed prior to the Report Year and through the Drainage Studies which have been completed throughout the Report Year. The backlog of ID information in completed Drainage Studies is now complete. A net increase of 849 IDs have been added to the Register from last year.

D6.4 Percentage of uCSOs.
The percentage of all IDs which are classed as unsatisfactory has risen from last year (18% to 30%). This increase is mainly due to the large increase in the number of uIDs (841 added this year) which have been classified due to the planning exercise for Q&S III.

D6.10-20 Activities - Critical Sewer Investigations

D6.10 The opening balance for this year's Return has been produced from a newly created database containing all CCTV survey data produced from the Drainage Area Study (DAS) programmes and from other CCTV surveys carried out in the predecessor Authorities. The data dates back to April 1995 to the present. As the procedures for Drainage Area Studies require CCTV surveys to be carried out on only critical sewers the vast majority of the database relates to Scotland's critical network. A small number of non-critical sewer surveys will be present from survey work executed outwith the DAS Programme.

The opening balance for this year's return has been calculated by querying the data for surveys undertaken prior to 1st April 2003. This is considered more accurate to the previous Return's closing balance and therefore has been assigned a higher confidence grade. The previous two Returns gave a confidence grades for D6.10 as B3, this year the Line is assigned B2.

It is recognised however that a number of surveys carried out prior to the Report Year are not present in the database and therefore a minor adjustment has been made to account for this. Once sourced the data for these surveys will be included and a re-assessment of the Opening Balance in subsequent years will account for this.

D6.11 The estimation of a sewer condition grade for those sewers which have not been subject to a CCTV survey is not a process which is followed by Scottish Water at present. The figure reported this year, as with last year, is therefore zero. The confidence grade assigned is M, missing.

D6.12 The closing balance for the 2003 Return has been used as the opening balance for the 2004 Return. The last two years submissions give a confidence grade for Line D6.12 as C3, this remains unchanged.

D6.13 The figure for the length of new critical sewers has been taken from capital investment programme outputs and from Developer Services information for the Report Year. There is no current corporate process to collect and report the information required from these sources and therefore there is a degree of cursory inspection of the investment project outputs to derive the Return figure. An assessment of whether the length of sewer reported is critical or non-critical is not made, the assumption is that the full length is all critical. The assessment of the resulting confidence grade is therefore low at D6.

D6.14 The 2004 Return submission has been produced from the newly created CCTV database with a query run to assess the length of sewer surveyed during the Report Year. As Scottish Water's current (DAS driven) CCTV survey programme is now near completion, less CCTV survey work was carried out over the last year than previous years. A confidence grade of B2 reflecting the use of a Scotland wide database using a reliable query to establish the required length. There is some scope for CCTV surveys which were carried out during the year not to have been entered into the database but this is estimated to be low due to the extensive compilation of data which was undertaken.

In future years the database will be queried on a date such that the lag in time between a CCTV survey being completed on site and the same data appearing in the database will be accounted for. The effect of this for the opening balance this year is likely to be insignificant. The effect of lag on the data this year is assessed as being minor due to the tailing off of CCTV survey work in the months leading up to the end of the Report Year.

D6.15 Scottish Water currently does not follow a procedure to estimate sewer condition grade on sewers which have not been subject to a CCTV (or other types of) inspection. The figure therefore reported this year is zero.

D6.16 The length of critical sewers reclassified this Report year reflects the improved sample set used to calculate the length of critical sewers. The sample set (which covers approximately 60% of the sewerage network) has, this year, been augmented by a larger number of Drainage Area Studies which has produced a critical sewer length less than that reported last year. This line therefore reflects the alteration due to improved sample data.

D6.17 No critical sewers have been abandoned this year.

D6.18 The length of sewers assessed by CCTV inspection has increased again this year to 12% of the sewerage network (excluding laterals in calculation). This reflects the continuing improvement of asset data and asset condition information.

D6.19 Assessed by estimating has returned 0 values last year and this year. CG is also M for both this year and last year.

D6.20 The length of critical sewer closing balance is down from last years Return. This line has been affected by the reclassification of critical sewers (in D6.16). This reflects the use of an improved sample set for the extrapolation to the entire network and not an actual reduction in the number of critical sewers in the network.

D6.21-25 Activities – studies

D6.21 A prioritisation exercise in October 2003 resulted in 45 DAS Zones being identified for study as they had a number of current drivers (QSII) present. It is the intention to undertake a study of every DAS Zone by the end of QSIII (2014) and therefore the remaining DAS Zones will be prioritised according to QSIII drivers and addressed throughout the QSIII period. The figure reported in this year's submission includes those which are currently ongoing or complete and those which have been identified as having current QSII drivers, ie 109 ongoing, 72 completed and 45 prioritised studies.

D6.22 The number of studies ongoing relates to the number of DAS Zones which are subject to an ongoing study (or studies) within them. This has resulted in the number increasing from last year which reported only those unique DAS Zones where a study was ongoing. The difference from last year's Return is in part due to clarification of DAS Zone boundaries and clarification and improvement in the status of a number of Studies previously reported as Complete.

D6.23 The number of studies completed relates to the number of DAS Zones which are subject to a completed study (or studies) within them. The difference from last year's Return is in part due to clarification of DAS Zone boundaries and clarification and improvement in the status of a number of Studies previously reported as ongoing.

D6.24 The percentage of studies completed has increased from last year's Return due to a change in the total number of studies identified for study, Line D6.21 (an increase in those ongoing or complete against a reduction in those planned to be undertaken).

D6.25 The percentage of properties covered by completed studies has increased from last year due to two factors :

- more studies have reached the completed stage, and
- those studies which have had their status clarified from AR03 as completed added more properties than those clarified as ongoing. The net result is additional coverage of

properties by completed studies. The properties data used in this calculation are consistent with the properties used elsewhere in the wastewater section of the Return.

E Tables – Operating Costs and Efficiency

General Comments

The Activity Based Costing Tables E1 and E2 were prepared using reports from the corporate finance system in a format consistent with WIC reporting requirements.

Scottish Water's Activity Based Management (ABM) software, Metify, has been used to allocate costs to WIC activities. This has resulted in an improvement in confidence grades for tables E1b and E2b.

As the ABM software allocates costs to activities and not to individual assets, some extrapolation was required in order to allocate costs to individual large works or banded small works and, in the case of wastewater, some further analysis was required to allocate costs to treatment stages.

With the introduction of ABM, the methodology for allocating costs has changed significantly from that used in 2002/03. As a result, a greater proportion of functional expenditure (excl. PFI) was allocated to Water in 2003/04 as demonstrated in the table below: -

	2003/04 £m	2003/04 %	2002/03 £m	2002/03 %
E1.12 Water	101.269	55.8	105.935	50.9
E2.12 Wastewater (excl. PFI)	80.303	44.2	102.104	49.1
	181.572	100.0	208.039	100.0

This change in methodology makes it difficult to make meaningful year on year comparisons of costs at activity level. In order to facilitate comparison, we have applied the ABM cost allocations derived in 2003/04 to the 2002/03 E1 and E2 tables and used this as the basis for our detailed commentary. This information is reproduced at Appendix 1.

With the exception of accruals for potential contract claims with regard to PFI schemes, there are no atypical costs included in the 2003/04 return.

Total Operating Performance in 2003/04 v 2002/03

- Total operating expenditure (lines E1.26+E2.26–E1.23-E2.23-E2.24-E1.25-E2.25) excluding PFI running costs, third party (non core) costs, exceptional items and after absorbing an additional £3.0m of costs associated with new opex, reduced by £27.6m or 8.7% from 2002/03.

	2003/04 £m	2002/03 £m
Core operating costs per management accounts	288.1	310.4
Less bad debt charged to non core	-0.7	-
SW operating costs associated with PFI	1.5	6.1
	288.9	**316.5**

- Core operating costs reduced by £22.3m or 7.2%, after absorbing an additional £3.0m of costs associated with new opex.
- Third party (non core) costs consist of :-

	2003/04 £m	2002/03 £m	Variance £m
Non statutory services	12.5	18.7	6.2
New trading activities	7.2	1.7	(5.5)
Bad debt charge associated with non core activities	0.6	0.0	(0.6)
	20.3	**20.4**	**0.1**

Non Statutory Services

Costs associated with those non-core services that were traditionally provided by the former Water Authorities declined by 33.2% to £12.5m. This reduction is matched by a reduction in turnover resulting from Scottish Water's primary focus on core business activities.

New Non-Core Trading Activities

Scottish Water's new trading activities relate primarily to the sale of contracting services to Scottish Water Solutions and the provision of water-related services to major business customers. Costs associated with these activities increased from £1.7m in 2002/03 to £7.2m in 2003/04. £4.0m of this increase relates to mains rehabilitation and other capital investment activities carried out on a commercial basis by Scottish Water's contracting division for Scottish Water Solutions Limited. Prior to this, the costs for such activities were charged directly to the capital investment programme.

- Total functional expenditure (lines E1.12 & E2.12) excluding PFI and after absorbing an additional £3.0m of costs associated with new opex reduced by £26.5m (12.7%) from 2002/03
- Total employment costs (E1.1, E1.10, E2.1 & E2.10) reduced by £14.6m (14.7%) from 2002/03 due to effective use of the voluntary severance scheme. The average number of employees during the year reduced by 491 or 10% to 4,516. Compared with the average level employed by the former water authorities in 2001/02 this equates to a reduction of 1,132 employees or 20% in the first two years of Scottish Water.
- Other functional costs reduced by £11.9m or 10.9% (excluding PFI costs) from 2002/03 even after absorbing £3.0m of costs associated with new opex, due to general efficiency savings across all areas of cost.

Total business activities spend (E1.16 & E2.16) reduced by £2.1m or 4.5% from 2002/03. Within 'other business activities' general opex savings resulted in a £1.5m reduction in costs in the year. Within Customer Service, increased costs of collection of £2.4m were offset by £2.5m of opex savings in other cost areas. Within Scientific Services costs reduced by £0.5m or 3.8%, this was after absorbing additional opex costs associated with the new cryptosporidium directive (£0.3m).

- Doubtful debts increased by £1.3m from 2002/03. The domestic charge reduced as a result of improved collection and the non-domestic charge was £3.8m higher than in 2002/03 reflecting the increase in aged debt at 31 March 2004.
- Exceptional costs increased by £28.2m and related to restructuring and transformation costs undertaken as part of the £200m spend to save programme.
- Capital maintenance costs increased by £16.3m reflecting the increased investment in infrastructure and non-infrastructure assets.

Cost Allocation

In 2003/04 the capture of costs within Scottish Water's general ledger was not sufficiently developed to allow reporting directly from the corporate financial system. In particular, sludge treatment and disposal costs were not fully identified and general and support costs were not fully charged to activities and services. In 2004/05, Scottish Water is aiming to

move towards capturing 80% of asset management costs directly at individual asset level within the general ledger, which should greatly improve the quality of data in the 2004/05 return.

Activity Based Costing was introduced during 2003/04 to develop and maintain a better understanding of cost behaviour throughout Scottish Water . As part of this exercise, costs were allocated to WIC activities enabling more accurate identification of costs, highlighting areas of costing inconsistency, and improving the basis of allocation across the company. Further improvements within the corporate financial system and the interfaced Works Management System in 2004/05, should help to further align internal reporting with WIC reporting requirements.

ABM groups the costs of water and wastewater activities into high level categories e.g. total small works and total large works, with no allocation of costs to individual assets or size bands. Consequently for 2003/04 further allocation is required to distribute costs down to this level. In order to achieve this, the aggregated ABM costs have been allocated down to assets/size bands/treatment types etc. in proportion to the direct costs captured at asset level in the general ledger. It is recognised that there are weaknesses inherent in this approach and we have reduced the confidence grades in tables E4, E5, and E8-10 accordingly. Work is ongoing to establish a more robust methodology for determining costs to this level. These tables will be re-submitted once this work is complete.

Table E1 Activity Based Costing - Water Service

Table 1a

During preparation of this year's return, an error was identified in the allocation of general and support costs between operational areas in 2002/03. This has been corrected and the amended data re-submitted at Appendix 2. Details of the change are as follows: -

Water Resources & Treatment E1.11 (2002/03)

	NW £m	NE £m	SE £m	SW £m	Total £m
Per original return	3.333	1.177	1.047	3.697	9.254
Adjustment required	-	1.553	-	-1.553	-
Per revised submission	3.333	2.730	1.047	2.144	9.254

Water Distribution E1.11 (2002/03)

	NW £m	NE £m	SE £m	SW £m	Total £m
Per original return	1.977	1.030	1.907	3.867	8.781
Adjustment required	-	1.374	-	-1.374	-
Per revised submission	1.977	2.404	1.907	2.493	8.781

Table 1b (explanations based on variances from Appendix 1 are detailed below)

A consistent approach was applied across Scottish Water to direct costing and the allocation of costs to services using ABM software. Total functional expenditure reduced by £13.7m or 12.0%, from 2002/03.

E1.0-12 Service Analysis - Water: Direct Costs

Confidence Grades
Unless otherwise indicated, the introduction of activity based costing has improved the basis of allocation of costs. The accuracy banding – 2, remains unchanged recognising that ABM is being used for the first time in producing this return.

E1.1 & E1.10 – Overall, employment costs reduced by £8.6m or 14.8% as a result of the substantial headcount reduction in the year.

E1.2 to E1.8 & E1.11 – Total functional expenditure excluding employment costs decreased by £5.2m or 9.1%. This was due to a substantial reduction in the use of hired and contracted services coupled with general efficiency savings in other opex.

E1.13-26 Operating Expenditure

E1.13 - The allocation of Customer Service costs between water and wastewater was driven by ABM activities. Within ABM, costs were allocated using a number of resource drivers including number of water and wastewater contacts from SW's Promise system and the number of bills issued. Customer service costs allocated to water remained unchanged from 2002/03, with efficiency savings of £1.2m, offset by a £1.2m increase in collection costs, predominantly from Local Authorities.

E1.14 – The allocation of Scientific Services costs to water and wastewater was driven by ABM activities. Within ABM costs were allocated using a number of resources drivers including the number of samples taken in the year. There was a £0.4m reduction in costs from 2002/03 as a result of opex efficiency savings, predominantly headcount related.

E1.15 – The distribution of the total costs of 'other business services' to water or wastewater was driven by ABM allocations based on resource drivers. WIC fees were split 50/50 between water and wastewater. Costs decreased by £0.7m from 2002/03 due to opex efficiency savings.

E1.17 – Local Authority rates for operational assets were captured directly at asset level. Rates for offices and depots were allocated to water and wastewater using ABM.

E1.18 – Doubtful debts were allocated to water and wastewater in proportion to aged debt by service.

E1.19 – There were no start up costs in 2003/04.

E1.20- E1.21 – Exceptional costs total £52.9m and relate to restructuring and transformation costs undertaken as part of the £200m Spend to Save programme. These exceptional costs incurred during the year include staff severance costs of £34.1m and £18.7m of other costs, predominantly IT related, associated with the fundamental restructuring and transformation of the business. These costs have been allocated 60% to water and 40% to wastewater in proportion to total operating expenditure excluding doubtful debts, rates and PFI (E1.26 + E2.26 – E1.17 – E2.17 – E1.18 – E2.18 – E2.4)).

E1.29-36 Capital Maintenance

E1.29-E1.33 The analysis of depreciation between water and waste water is consistent with that provided in table L10 of the p12 RAB return. Amortisation of grants has increased by £0.7m, £0.3m of this represents the amortisation of grant for Cairngorm House which was sold in 2003/04. The Business Activities depreciation charge was classed as immaterial in 2002/03, but £1.5m was identified in 2003/04 due to a) an improved understanding of costs from ABM and b) increased capital spend in the year.

Rows E1.29 & E1.30 which require data entry, have been cell protected preventing data input on these lines. E1 has been submitted without this data in accordance with WIC instructions. The correct version of this table is attached at Appendix 3.

E1.35 – ABM activity analysis identified a small element of capital maintenance charge, which relates to third party (non core) work. In 2002/03, it was assumed that there were little or no assets used exclusively for third party activities and that this charge was therefore immaterial.

E1.37-39 PPP Costs

Table E1c The 2004/05 budget and forecast tables have been populated using the 2004/05 budget approved by the Board in April 2004. The 2005/06 data is based on the latest version of the Strategic Business Plan. Costs by element have been pro-rated to service and activity using the 2003/04 E1b data.

Table E2 Activity Based Costing - Wastewater Service

Table 2a

During preparation of this year's return, an error was identified in the allocation of general and support costs between operational areas in 2002/03. This has been corrected and the amended data re-submitted at Appendix 2. Details of the change are as follows:-

Sewerage E2.11 (2002/03)

	NW £m	NE £m	SE £m	SW £m	Total £m
Per original return	1.298	0.662	1.111	3.085	6.156
Adjustment required	-	1.152	-	-1.152	-
Per revised submission	1.298	1.814	1.111	1.933	6.156

Table 2b (explanations based on variances from Appendix 1 are detailed below)

A consistent approach was applied across Scottish Water to direct costing and the allocation of costs to services using ABM software. Total functional expenditure reduced by £12.7m or 13.7% from 2003/04 (excluding PFI running costs).

E2.0-12 Service analysis - wastewater: direct costs

Confidence Grades

Unless otherwise indicated, the introduction of activity based costing has improved the basis of allocation of costs. The accuracy banding - 2, remains unchanged recognising that ABM is being used for the first time in producing this return.

E2.1 & E2.10 – Total employment costs decreased by £6.0m or 14.7%, as a result of the substantial headcount reduction in the year.

E2.2 to E2.8 & E2.11 – Total direct costs excluding employment costs and PFI decreased by £6.7m or 12.9% from 2002/03. This was largely due to a substantial reduction in hired and contracted costs. Further efficiency savings offset a £0.2m increase in SEPA costs.

E2.4 – The 'estimated' costs of running PFI schemes increased by £6.4m due to the full year impact on costs of schemes commissioned during 2002/03 (Daldowie, MSI, Levenmouth and Moray).

E2.13-26 Operating Expenditure

E2.13 - The allocation of Customer Service costs between water and wastewater was driven by ABM activities. Within ABM, costs were allocated using a number of resource drivers including number of water and wastewater contacts from SW's Promise system and the number of bills issued. Customer service costs allocated to water remained unchanged from 2002/03. Efficiency savings of £1.2m were offset by a £1.2m increase in collection costs, predominantly from Local Authorities.

E2.14 – The allocation of Scientific Services costs to water and wastewater was driven by ABM activities. Within ABM, costs were allocated using a number of resource drivers including number of samples taken.

E2.15 – The distribution of total costs of 'other business services' to water or wastewater was driven by ABM allocations based on resource drivers. In 2003/04, WIC fees were split 50/50 between water and wastewater. Costs decreased by £0.7m from 2002/03 due to savings from headcount reductions and an increase in costs allocated to capital for capital related projects such as Q&S III.

E2.17 – Local Authority rates for operational assets were captured directly at asset level. Rates for offices and depots were allocated to water and wastewater using ABM.

E2.18 – Doubtful debts were allocated to water and wastewater in proportion to aged debt by service.

E2.19 – There were no start up costs in 2003/04.

E2.20- E2.21 – Exceptional costs total £52.9m and relate to restructuring and transformation costs undertaken as part of the £200m Spend to Save programme. These exceptional costs incurred during the year include staff severance costs of £34.1m and £18.7m of other costs, predominantly IT related, associated with the fundamental restructuring and transformation of the business. These costs have been allocated 60% to water and 40% to wastewater in proportion to total operating expenditure excluding doubtful debts, rates and PFI (E1.26 + E2.26 – E1.17 – E2.17 – E1.18 – E2.18 – E2.4).

E2.29-36 Capital Maintenance

E2.29-E2.33 The analysis of depreciation between water and wastewater is consistent with that provided in table L10 of the p12 RAB return. Amortisation of grants has increased by £0.3m representing the amortisation of grant for Cairngorm House which was sold in 2003/04. Business Activities depreciation charge was classed as immaterial in 2002/03, but £1.5m was identified in 2003/04 due to a) a better understanding of costs from ABM and b) increased capital spend in the year.

Rows E2.29 & E2.30 which require data entry, have been cell protected preventing data input on these lines. E1 has been submitted without this data in accordance with WIC instructions. The correct version of this table is attached at Appendix 3.

E2.35 – ABM activity analysis identified a small element of the depreciation charge that relates to third party work. In 2002/03 it was assumed that there were little or no assets used exclusively for third party activities.

E2.37-39 PPP Costs

Table E2c The 2004/05 budget and forecast tables have been populated using the 2004/05 budget approved by the Board in April 2004. The 2005/06 data is based on the latest version

of the Strategic Business Plan. Costs by element have been pro-rated to service and activity using the 2003/04 E1b data.

For a detailed analysis of PFI costs by project please refer to the F table commentary provided at F1.3. The following table reconciles total spend on PFI to the analysis provided in E2. The estimated annual operating costs for PFI projects provided at E2.4 is derived from the PFI companies financial models and is a purely indicative figure based on their historic estimates of operating costs at each site. E2.38 takes the total PFI contract costs and deducts this notional estimate of operating costs.

	£'000		**£'000**
Total PFI costs per Statutory Accounts	113,008	PFI contract costs per E.237	111,508
		PFI operating costs incurred within SW included in E2.26	1.500
	113,008		113,008

Table E3 PFI Project Analysis

Table Overview

Table E3 provides details of the 21 PFI wastewater treatment works that are managed under 9 separate PFI Concession agreements. The 9 projects and 21 works are as follows:

PFI Project	**PFI Works**
Highlands	Fort William & Inverness
Tay	Hatton
Aberdeen	Nigg, Persley, Peterhead & Fraserburgh
Moray Coast	Lossiemouth, Buckie & Banff/Macduff
AVSE	Seafield, Newbridge, East Calder, Blackburn & Whitburn
Levenmouth	Levenmouth
Dalmuir	Dalmuir
Daldowie	Daldowie
MSI	Meadowhead, Stevenston & Inverclyde

E3.0-6 Project Data

E3.1-2 The determination of resident and non-resident populations is the same as that described in the introduction to Table E8, and also used in E9.1 and E9.2

The population figures have been taken from those used to complete lines E7.1 and E7.2, which were allocated to individual drainage operational areas (DOAs). The population served by each works was taken to be the sum of all the DOAs served by the works.

Although there have been some significant changes to individual works, the overall increase in population has been about 4%. This year the estimates for individual works have been deduced from current population data, and are considered to be more robust than the previous historical data.

The decrease in non-resident population is mainly a result of the different methodology used in assessing this parameter. Again the figures for individual works have been assessed on a common basis from corporate data, and the results are more accurate than last year's submission.

E3.3 The figures stated here are unsettled COD taken from records in a database held by the Trade Effluent section. Unsettled COD has been used for consistency with load data, in which unsettled BOD has been used as being more representative of the load arriving at the works.

Overall there has been a reduction of about 10% in the figures compared with last year. This is due mainly to the change in approach in that unsettled COD has been taken directly from measured data rather than estimated as a multiple of settled COD.

E3.4 This is the amount of sludge received from other sources including waterworks and wastewater works sludges. Calculation of daily load was from yearly totals/365 and using 95.26 kg/COD/m3 for wastewater works sludge and 48.70 kg/COD/m3 for water works sludge. The annual quantities were derived from the Gemini Sludge Management System

The very large increase reported this year is a result of more consistent data capture in the recording system.

E3.5 The population equivalent has been assessed from the load received on the basis of 60g BOD/head/day. The method of determining load is fully described in the introduction to Table E8.

There is an increase of about 9% compared with last year: this is a result of the different approach to the assessment of loads, which is discussed in the introduction to Table E8.

E3.6 Based on project status at 31 March 2004. Commissioning of Levenmouth WwTW (sludge dryer system), Daldowie and the MSI project have yet to be completed.

E3.7-11 Scope of works

E3.7 The AVSE project includes the Esk Valley Sewer, which is served by a number of storm water works and sewage pumping stations. The Levenmouth project includes a contributing sewage pumping station and rising mains in Leven, Buckhaven and Methil.

Hatton and the Moray Coast project include extensive pumping mains and pumping stations. Inverness includes a major pumping station and associated pumping mains.

E3.8 The MSI works each comprise a sewage treatment facility with a common sludge treatment centre at Meadowhead.

E3.9 Daldowie is exclusively a sludge treatment centre.

E3.12-16 Sewage Treatment – Treatability

These items were populated from data collected at each of the works. Total Organic Carbon (TOC) is not measured at any of the works. NH_3 is measured at Persley, the AVSE works, Dalmuir and the MSI works.

At Hatton SEPA does not measure incoming NH_3 as the works does not have to comply with a percentage reduction value.

The works at Peterhead and Fraserburgh have highly variable influent due to seasonal loads from fish processors.

E3.17-22 Sewage Treatment - Effluent Consent Standard

E3.17-21 Data was obtained from consents held as part of the PFI contract documentation and verified with the appropriate PFI Company.

E3.21 Phosphate consent at Newbridge, East Calder, Blackburn and Whitburn is defined as the mean concentration of total phosphorus in any series of samples in any period of 12 months.

E3.22 Data was obtained from monitoring of SEPA compliance reports.

E3.23-24 Sewage Treatment Flow

E3.23 At the Highlands, Tay, Aberdeen and Moray Coast projects the data was based on qualifying dry days as defined in Scottish Water's agreements. Namely the mean dry weather flow on all days when there is zero rainfall, following a day when there is less than 0.25mm of rainfall.

At Levenmouth and the AVSE works dry weather flow was estimated by calculating the average daily flow during a dry period from 1st to 4th September 2003 inclusive.

At Dalmuir and the MSI works dry weather flow figures were derived from SCADA records of flows during a dry period of 7 days to the week ending 18th July 2003.

E3.24 At the Highlands, Tay, Aberdeen and Moray Coast projects the PFI companies provided minimum and maximum hourly flows for all qualifying dry days based on flow meter readings. At present not enough data is available to determine the ratio of maximum to minimum flow at Banff MacDuff.

At Levenmouth and the AVSE works (with the exception of Seafield), maximum to minimum flow figures were estimated from SCADA records from 1st to 4th September 2003. The Seafield ratio was calculated from flow meter readings.

At Dalmuir maximum to minimum flow figures were derived from SCADA records of flows during a dry period of 7 days to the week ending 18th July 2003.

At the MSI project a ratio of maximum to minimum flows could not be calculated due to it being a pumped scheme. This results in periods of zero flow being recorded.

E3.25-31 Treatment Works Category

Information contained in these lines was extracted from the project agreements and is given a confidence grade of A1.

E3.25 Levenmouth primary stage does not include primary sedimentation.

E3.28 The treatment at East Calder and Whitburn is nitrifying filters and sand filters.

E3.29 The treatment at Inverness, Persley, Fraserburgh, Banff MacDuff, Seafield and Levenmouth is ultraviolet. The treatment at Newbridge, East Calder and Whitburn is rapid gravity sand filters.

E3.31 The treatment at Blackburn is rapid gravity sand filters. The treatment at Meadowhead is a Biofors tertiary filter.

E3.32-37 Miscellaneous Data

Information contained in these lines was extracted from the project agreements and is given a confidence grade of A1.

E3.33 A number of works include inlet pumping stations. Seafield includes an intermediate lift pumping.

E3.34-35 The following works do not treat sludge from other facilities – Persley, Fraserburgh, Buckie, Banff Macduff, Stevenson and Inverclyde.

E3.36 Newbridge sludge treatment facilities receive imported sludge from East Calder, Blackburn and Whitburn.

Inverness receives imported sludge from Fort William; Nigg from Persley; Peterhead from Fraserburgh; Lossiemouth from Buckie and Banff MacDuff.

Meadowhead receives imported sludge from Stevenston and Inverclyde.

E3.37 Levenmouth sludge treatment facilities are currently under commission.

E3.38-41 Total Cost Analysis

E3.38 The total annual charge includes Service Fees for the year, contingencies and rates (including rebates).

E3.39 The capital equivalent values were derived from the base model incorporated in a report to the Transport and Environment Committee on 21 June 2001 adjusted for inflation. At Daldowie the PFI cost was used in the absence of a Public Sector Capital Equivalent value. Similarly for Levenmouth and the AVSE project the values have been taken from the 2001/2002 WIC return adjusted for inflation.

E3.40 Estimated annual direct operating costs were based on the Concessionaire's financial model adjusted for actual inflation.

N.B. As actual costs are not known and can vary considerably from the financial model a confidence grade of B3 has been used.

E3.41 The period quoted is the Contract Period as defined in the Contract, not the period remaining.

E3.42-46 Associated Authority Costs

E3.42 With the exception of Dalmuir and the MSI project, all standard SEPA charges are met by the Concessionaire and are included in the tariff rates. At Nigg Scottish Water meet the additional SEPA charges associated with 2 parameters as detailed in the contract.

E3.43 This includes the costs of Advisors and Legal, etc and the cost of the Scottish Water PFI department that deals with PFI schemes which have been allocated to projects based on opex.

E3.44 At Meadowhead and Stevenston Scottish Water operate a downstream terminal pumping station, however these costs are not directly captured. At all other schemes the terminal pumping station costs are met by the Concessionaire and are included in the tariff rates. Accordingly, there is no data.

E3.45 Apart from Inverness and Fort William, sludge disposal costs are the responsibility of the Concessionaire. For Inverness and Fort William, costs were based on the volume of wastewater treated. Costs were apportioned between the two projects based on this volume, on a ratio of 4 (Inverness) to 1 (Fort William). Sludge is disposed of to land.

E3.46 All other Scottish Water costs associated with PFI projects are included in this line such as power, rents and insurance.

Table E4 Water Explanatory Factors - Resources and Treatment

General Comments

There has been an improvement in the understanding of Scottish Water's non-infrastructure assets during the past year. The creation of a single asset inventory held within the Works and Asset Management System (WAMS) together with data improvement programmes has allowed most data to be sourced from the corporate data set. This allows consistency between Table E and Table H. Where data improvement has taken place for this year's Return, it is intended to uplift these changes back into WAMS.

Although data has improved, it is recognised that there are still data gaps which have required estimates to be made for the submission. These are detailed further within the relevant sections of the commentary below (and within Table H commentary). Therefore the confidence grades of this information have remained the same.

E4.0-12 Source Types

E4.0 – E4.5*:* Overall there has been an increase of 13% in the number of sources from last year, (from 588 to 663). This is particularly apparent in the South West operational area where there has been an increase of 62 sources. This is due to a continued and consistent methodology that was adopted for last year's Return which 'unbundles' all sources supplying yield to a reservoir or an aqueduct. All spring sources at the same site have been identified separately. This is also a result of on-going data maintenance by the Water Resource and Reservoir Team within the Assets Strategy & Planning Section who have standardised a single asset structure across the business. Over the past year, much work has been carried out to improve the understanding of water sources. A resource planning database was developed to store this data. This is referred to in the commentary for Table B1 Water Availability.

The WIC has introduced a change to the grouping of source types which results in a change in the proportion of water supplied by each raw water source type. The single category of lochs, burns & springs has been split between three categories; lochs (E4.2), river and burn abstractions (E4.3), and boreholes & springs (E4.4). The impounding reservoirs category (E4.1) remains unchanged. As a result of these changes, E4.3 (the number of river and burn abstractions) has increased from 22 to 272 and the average daily output has increased from 334Ml/d to 485.6Ml/d.

Where a WTW is served by more than one source type, the output has been allocated to the major source and the minor source output reported as zero. This is due to the fact that the raw water is generally not metered. Confidence grades for this section of the table remain at B4.

In the section 'Own Source Outputs' the distribution input has been used to calculate the average daily output derived from each source type. This does not take into consideration losses as a result of raw water transmission and during water treatment processes.

Where a WTW was operational for only part of the year, the annual output that was put into supply is included, and the WTW is included in the count of number of works. Since the frequency with which flow meters are read varies (by telemetry or manually - daily, weekly or monthly) the average daily supply has been calculated as the sum of the annual outputs in megalitres divided by 366.

Distribution Input is virtually unchanged from last year.

E4.6 to E4.7: Scottish Water does not have any raw water exports and correspondingly an A1 confidence grade has been entered for this line.

E4.8 to E4.12*:* Scottish Water welcomes WICS changes in the classification of sources in this year's Annual Return. This has allowed burns to be classed with river abstractions, therefore increasing the percentage of water supplied by this category from 14% to 20%. Refer to E4.0-E4.5 for further commentary.

E4.13-16 Peak Demand and Pumping Head

E4.13: The peak demand to average ratio was calculated using works output data. There was limited historical data available in some areas therefore, for reasons of consistency, the peak demand to average ratio was calculated using only the previous two years' data. The confidence grade has been lowered to C4 from a B4 to reflect the current distribution input confidence grade as in line A2.38.

E4.14 and E6.14-E6.16 Pumping Head - General Comments

The formula below was used to calculate pumping head:

$$Average\ pumping\ head = \frac{\sum \left(l_i * wp_i \right)}{d}$$

Where:
i = each site at which pumping occurs
l_i = annual mean lift at site *i* (m)
wp_i = volume of water pumped at site *i*
d = distribution input

Methodology

The existing data available for lines E4.14 and E6.14-E6.16 is of widely varying levels of quality and coverage across Scottish Water's operational areas. Previously, this data had been obtained from a number of sources to which varying methodologies had been used.

By adopting a consistent methodology for these lines across all areas in this year's calculation, there has been an overall increase in the pumping head values. A number of methods were used in determining the average pumping head, depending upon the data available. These are listed below in order of accuracy:

1) Continuously recorded flow and pressure data
2) Calculated from limited pressure and flow.
3) Use of historical 2003 data
4) Estimations on lift and flow based on the average of other similar pumps. Where borehole lift data was unavailable the following assumptions were used to estimate the mean lift across all borehole pumps:

   Borehole lift = 25m estimated Borehole depth
   10m estimated headloss
   15m target level of service
   10m estimated difference in elevation
   = 60m

The table below summarises the methodology used to calculate the average pumping head for distribution and resources & treatment:

Methodology Table: Number of pumps & % of pumping head by method

	Number of pumps				% of pumping head total
Methodology	**NW**	**NE**	**SE**	**SW**	
1	0	13	7	42	73
2	0	0	7	6	1
3	174	112	70	69	18
4	67	52	15	40	8
Total	**241**	**177**	**99**	**157**	**100**

Additional Pumps

An additional 125 pumps have been used in this year's calculation (See Additional Pumps Tables in sections E4.14 and E6.16 below). A single asset list of pumping stations was sourced from the WAMS and is consistent with those reported in Table H.

E4.14: Resource and Treatment Average Water Pumping Head

The resource and treatment average pumping head figure has increased from 13.88m to 20.95m due to the identification of 84 additional pumps and as a result of the consistent methodology applied to all pumps to calculate the average pumping head. This includes the category of groundwater source (GWS) pumps which were not included in the calculation of pumping head for last year's Return. The following table details the Resources & Treatment pumping head calculated for 2003 and 2004.

We stated that the pumping head for Scottish Water had increased by 6m. This was an error, the pumping head for North East operational area increased by 6m, but the overall pumping head for Scottish Water increased by approximately 1.5m as a result of the drought.

As previously stated, there was increased pumping from the River Earn to the Glenfarg complex this moved the Scottish Water total pumping head by 1m. The drought also caused Balmore line to have to pump more water to the East and this resulted in a change of approximately 0.5m. There was increased pumping at some boreholes, although the change to pumping head was negligible. In addition there were several temporary pumping schemes, these were not included in the pumping head figures in the Annual Return but did contribute to the overall power bill, for example the Fife transfer scheme which was implemented to reduce the demand on the Glendevon complex.

The drought cost Scottish Water approximately £1m as detailed in table 1. These costs were not just as a result of increased pumping, and are detailed below:

- Pumping (Glendevon £161k; Balmore line £80k; Fife boreholes £14k; Fife Transfer £27k inc hire of pumps and generators)
- Start up costs for temporary pumping schemes
- Letter drops informing customers of the situation in the problem areas
- Increased networks costs as a result of fixing bursts as they occurred rather than optimizing work in a particular area.
- Increased chemical usage due to additional demands placed on works (Glenfarg – additional sludge removal costs; additional PAC treatment at Mannofield due to taste and odour complaints)
- Increased transport costs as water was supplied by tanker to some areas.

Table 1

Drought Costs 2003/04

Cost type	Amount £
Employee costs	3,595
Supplies & Services	126,238
Chemicals & Materials	102,449
R&M	274,293
Power	315,638
Transport	36,828
Property	8,500
Administration	96,400
Internal Recharges	47,880
Total	1,011,821

Resources & Treatment Pumping Head Table

	Units	NW	NE	SE	SW
Resources & Treatment					
E4.14: Av. Pumping Head - **2004**	m	24.24	31.85	13.123	19.36
E4.14: Av. Pumping Head - **2003**	m	19.30	20.17	9.82	12.35

Additional Pumps
The number of additional pumps used in this year's calculation is shown in the table below.

Additional Resources & Treatment Pumps Table

	Units	NW	NE	SE	SW
Additional GWS Pumping Head	m	5.52	5.90	1.98	0.10
Additional GWS Pumps	nr	39	25	7	4
Additional RWP Pumping Head	m	0.47	0.98	0.00	0.30
Additional RWP Pumps	nr	4	2	0	3

Summary of Other Changes

The North East pumping head increase is also due to the following:

- Where a number of pumps were reported last year with blanks/zeros, a different approach has been taken by applying data to these pumps, based on the average lift and flow of other similar pumps (see Methodology Table).
- The pumping volume of the River Earn Abstraction Pump (which has an average mean lift of 200m) increased significantly from 6,442 Ml/year to 11,358 Ml/year. This has added an additional 6.5m. Due to dry weather conditions during the report year, there has been a large increase in pumping from the River Earn to Glenfarg WTW using an additional number of pumps. This is not considered to be "average" conditions and therefore may change in following years. (It must be noted that the apparent overall increase in the pumping head between 2002/03 and 2003/04 cannot be attributed to the same dry weather conditions but instead to the uncertainty of the components of the pumping head calculation, change in methodology and additional GWS pumps.)

The South West pumping head increase is also due to the following:

In previous years, the methodology adopted for the South West area was based on the power equation which involved many assumptions. An improvement this year has been the use of a consistent methodology across Scottish Water (see methodology section). This has resulted in a reported increase in pumping head in this operational area.

E4.17-23 Water Treatment Works by Process Type

The works process type is defined in WAMS. Manual checking of the information accuracy was carried out by the new Area Asset Planning Teams for last year's Return. Slight changes have been made to reflect changes as detailed below.

The total number of works remains at 371. Although nine works have been closed, there are an additional nine entries due to their operational status being reviewed and updated. The changes are summarised below:

Operational Area	Sites Added 2004	Comments	Sites Removed	Comments
NW	Calder	Included with Hoy last year	Achnandarroch	Works closed
	New Onich	Not included last year	Cunningsburgh	Works closed
	New Uig (Suainaval)	Not included last year, had Uig Wester Isles as abandoned	Rosehall	Works closed
	Taynuilt	Not included last year	Sandwick	Works closed
	Ardvourlie	Work in progress last year	Islivig	Works closed
	North Erradale	Included with Melvaig last year		
NE	Balmalcolm	Down as mothballed last year, actually emergency.	Gartly	Works closed
			Bomakelloch	Works closed
			Drummuir	Works closed
			Strathdon	Works closed
SE	Flex Farm Chlorinator	Included in Acreknowe last year		
SW	Dunside	Incorrectly down as decommissioned last year		

Distribution input produced by process type has changed slightly reflecting the minor changes to WTW detailed above.

E4.24-E4.29: The proportional breakdown of distribution input between the process types has not changed significantly as a result of the changes in asset stock.

E4.30-40 Water Treatment Works by Size Band

The peak hydraulic capacity that was used to place each works in the size bands was determined by the maximum output recorded in WAMS. The maximum output is determined by the actual maximum hydraulic throughput by the individual works over the last two years. The proportional breakdown of distribution input by works size band is almost identical to last year.

The following changes in water treatment works by size band have occurred since last year's return due to the change in WTW asset stock (addition and removal of nine works) and continual data improvement.

The smallest band <=1 Ml/d has reduced by 8 to 232
Number of works >1 to <= 2.5 Ml/d has increased by 5 to 30
>2.5 to <=5 Ml/d has decreased by 1 to 34
>5 to <=10 Ml/d has increased by 3 to 21

>10 to <=25 Ml/d has increased by one due to the correct allocation of operational status
The number of WTW in size bands over 25 Ml/d remains unchanged

E4.41-46 Bulk Import and Exports

E4.41-E4.42 - Both zero as there are no bulk imports or exports to or from other agencies.

E4.43-E4.44 - Exports are entered as positive to ensure that the net change in volume (E4.45) is equal to be zero.

E4.47-58 Costs

ABM groups the costs of water treatment into two categories: - small and large works, with no allocation of costs to individual assets or size bands. Consequently, further allocation is required to distribute costs down to this level. The aggregated ABM costs have been distributed to individual large works and to small asset bands, in an equi-proportional basis to direct costs captured in the financial ledger. The costs of water sources and water sludge have been allocated to treatment works based on treatment costs by sizeband. (The costs of treating and disposing of water sludge are contained within water resources and treatment.)

Confidence grades are lower than those in E1b to reflect the levels of allocation that were required. From 2004/05, Scottish Water is aiming to move towards capturing 80% of asset management costs directly at individual asset level within the general ledger, which should greatly improve the quality of data in the 2004/05 return.

The total water resources and treatment costs in Table E4 have been aligned with operational size band data provided by Scottish Water's Asset Operations team.

Table E5 Large Water Treatment Works Information Database

General Comments

- Table E5 contains the same 26 large WTWs >25 Ml/d throughput as last year's return. They are listed in alphabetical order within operational area order. Works 1 and 2 are in NW; works 3 to 9 are in NE; works 10 to 15 are in SE; works 16 to 26 are in SW.
- Information provided in this section of the table has been taken from existing data within the Works and Asset Management System (WAMS) and various Water Treatment and Water Quality data-sets.
- All data are for the financial year 1st April 2003 to 31st March 2004.

E5.0-4 Works size

E5.1 - The average daily flow reported here is consistent with distribution input figures reported in Table E4.

E5.2 – This figure is based on daily average of the peak seven day period as per the definition in line E4.13.

E5.4 – Headroom in this table is arrived at via a simple calculated field.

Variance in confidence grades in this section reflect the different levels of data currently held on each of the works, in particular, the varying the accuracy of bulk flow measurement devices

E5.5-20 Raw Water Source and Compliance and Performance

All data included in these lines were taken from the Laboratory Information Management System (LIMS).

E 5.10-11 - Parameter 'a' is iron. This is considered a problem at some works. It is not clear from guidance whether different parameters can be chosen for different works. Also iron will contribute to turbidity and colour in lines E5.6 to E5.9. Algae is considered a problem at some works but this parameter is not measured in mg/l.

E 5.12-13 - Parameter 'b' is manganese. This is considered a problem at some works. It is not clear from guidance whether different parameters can be chosen for different works. Also manganese will contribute to turbidity and colour in lines E5.6 to E5.9.

E5.14 – This is the overall works risk score derived according to the procedures laid down in The Cryptosporidium (New Water and Sewerage Authorities) Direction 2000. Factors which depend on the treatment process as well as catchment and raw water are included in this score. High risk is a risk assessment score of greater than 75, medium risk a score of 50 to 75, and low risk a score of less than 50

E5.15-20 - The compliance value in line E5.15 is the PCV of 0 coliforms/ 100ml. The threshold value in lines E5.16 to E 5.20 is the PCV for that parameter. Failures at works are due to individual circumstances. The raw data is based on very few operational samples taken at most of the works.

E5.21-25 Processes

This information is extracted from the dataset used to populate Table E4.

E5.26-30 Miscellaneous Data

There has been no major investment at any of the water treatment works with a capacity of greater than 25ML/d. As a result the information contained in the miscellaneous data section of the table has not altered from last year with the exception detailed below:

Turret WTW was reported as having treated water pumping on site and no sludge on site treatment. This has been corrected this year to read no treated pumping but there is on site sludge treatment facilities.

E5.31-42 Works Cost

E5.31-39 As explained in section E4, costs have been allocated from ABM grouped large works to individual works in proportion to the direct costs captured by asset within the financial ledger. Confidence grades are lower than those in E1b to reflect the levels of allocation that were required.

E5.40 – Operational data has identified 7 works that incur raw water pumping costs. Estimates of these costs are not available at this time. This table will be re-submitted once this information is complete

E5.41 – The cost of treated water pumping is included within water distribution.

E5.42 – The cost of treating and transporting water sludge have been derived from ABM activity costings.

Table E6 Water Explanatory Factors – Distribution

E6.0-7 Area data

E6.0 - Scottish Water is split into four operational areas (North West, North East, South East and South West).

The North West operational area has a very low population density due in part to the number of sparsely populated islands it serves it is also completely rural in nature. The South West has the highest population density of the four operational areas and is urban in nature. The South East and North East are predominantly rural in regards the area served by both.

E6.1 - The operational area split of population connected to the water distribution system is built up from population figures provided by the unitary authorities and projected GRO population estimates. Three unitary authority areas (Argyll & Bute, Falkirk and Moray) overlap Scottish Water operational area boundaries. For these areas OS address points were overlaid across the unitary authority boundaries and operational area boundaries to assign address points to an operational area. Populations were then assigned to operational areas based on the split of address points.

E6.2 - The total number of connected properties matches that provided in A1.69. The number of non-domestic measured and unmeasured properties has been sourced from Scottish Water's billing system. The confidence grade reported by operational area is lower than that reported at the Scottish Water level due to some extrapolation required between the 4 operational areas. See comments against E6.4 for further details.

E6.3 - Volume of water delivered to households is the product of the following components:

Unmeasured household supply pipe losses
Unmeasured household internal plumbing losses
Unmeasured household customer use
Measured households

The values for this line have been calculated using the same methodology as in lines A2.1 & A2.5 and this methodology is detailed in the commentary for Table A2.

The confidence grade at the operational area level is lower than that reported at the Scottish Water level as an element of extrapolation was necessary. In particular the per capita consumption figure used is an all-Scotland figure, taken from the Domestic Water Consumption Study 1999. Therefore the confidence grade has been adjusted to a lower reliability and accuracy of C4 compared to B3 last year. Further commentary is provided in Table A2.1 Water Volumes.

E6.4 - All measured and unmeasured non-domestic data have been sourced from Scottish Water's billing system. District codes were mapped to Scottish Water's four operational areas using information sourced from GIS. This enabled derivation of the number and associated water volumes delivered to non-domestic properties. Adjustments to the final volumes were carried out for both supply pipe leakage and for water delivered to the four operational areas in order to match volumes reported at the Scottish Water level in Table A2. The latter adjustment of 5% for unmetered non domestic was based on property counts for unmeasured customers from A1.66. An adjustment of 11% was made to measured non-domestic properties using extrapolation techniques.

The 2003/04 volumes for unmeasured non-domestic customers were based on 37.5 m3 per £1000 of water rateable value. These figures exclude supply pipe leakage of 56.8 l/prop/day for unmeasured customers and 59.7 l/prop/day for unmeasured void customers which have since been added. A confidence grade of B2 was allocated to the information held in the customer billing systems. However, reliance on the assumption of 37.5 m3 per £1000 of water rateable value and then allocating these properties to the 4 operational areas has resulted in a less accurate confidence grading.

E6.5 - This is the total geographical area within each of Scottish Water's four operational areas, as calculated by the corporate GIS. These boundaries are unchanged since the previous submission.

E6.7 - The new drinking water regulations (The Water Supply (Water Quality) (Scotland) Regulations 2001) came into force at the end of 2003. These allow an area designated for the purpose of the Regulations to cover a maximum population of 100,000 (formerly 50,000). Scottish Water consolidated the Water Quality Regulation Zones in January 2004 from 489 zones (as reported in 2002/03) down to 394 zones and have incorporated supply changes and mains extensions made during the recent years, predominantly in the north east and south east operational areas.

This data was extracted from Scottish Water's GIS and INMS systems. Regulation zones in this table represent those in existence as at 31st March 2004.

E6.8-13 Water Mains Data

E6.8 & E6.10 - The total length of mains and the length of mains > 300mm both show an increase on last year's submission. This is partly due to capital investment in new asset stock, such as new housing sites, and partly due to the ongoing consolidation of data within Scottish Water's GIS system. The changes in lengths for the operational areas of South West and South East from last year are predominantly due to the correction of figures that were inadvertently transposed in the 2003 return.

E6.9 - This is the total length of unlined ferrous main (cast, spun and ductile) as recorded on the corporate GIS. The figure reported has increased slightly on last year's return due to the consolidation of data within the Scottish Water's new single GIS. The changes in lengths for the operational areas of South West and South East from last year are predominantly due to the correction of figures that were inadvertently transposed in the 2003 return.

E6.11 - The number of bursts on water mains is inferred from the number of repairs of bursts undertaken, which are estimated at 8,466 for this report year.

The derivation of the number of repairs on water mains has in the past been based on the reported job completions from the work management systems of the legacy organisations. For the current report year, the data available from these legacy systems has been less reliable than in previous years. This is due to the present transition period between the decommissioning of legacy systems and the bringing online of new Scotland-wide systems.

The availability of burst repair information for the South West and South East operational areas has been particularly affected during this transition period, and hence data for this area has been supplemented with data on applications for road openings made through the MolesEye system.

Great care has been exercised to ensure the figures for burst repairs take account of job cancellations and deferrals. It is also clear that MolesEye data can under-report numbers where repairs do not involve road openings or utility search procedures. The allocated confidence grade of B3 reflects this uncertainty.

Repairs to burst water mains from April 2004 are being recorded Scotland-wide on the new unified works management system, which will provide a much more consistent source of data for future returns.

E6.12 - At present Scottish Water does not have a sufficient number of DMAs set up in the distribution system to allow estimates of total leakage to be made from night flow measurements, as specified in the WICS reporting requirements. As such, this line has been calculated as described in Table A2.

E6.13 - Data reported in this line originates in the calculations behind Table B2. Data from last year's return has been updated based on the following information:

- Calibrated all mains network models that have been completed within the report year.
- Information from Level 1 DMA reports.
- Detailed pressure logging carried out in a number of water supply zones within the South West Operational Zone.

E6.14-16 Pumping Stations

The number of pumping stations and service reservoirs has been sourced from the WAMS. See E4.14 and E6.14-E6.16 - General Comments above.

E6.14 - The confidence grade of this line has improved from a C4 to B4 due to the pumps now being held within a corporate dataset. The South East and South West areas have a higher accuracy band of 3 due to a better understanding of the asset stock. This is a reflection of data improvements carried out over the last two years.

E6.15 - The total pumping capacity has been calculated for the operational pumping stations.

The methods used in determining the distribution pumping capacity are listed below in order of accuracy:

1. Data from the Works and Asset Management System
2. Use of historical 2003 data
3. Estimations based on average of similar pumps

E6.15a - Data from the Works and Asset Management System (WAMS) and previous annual returns have been used to provide total KW capacity for pumping stations. Refer to Table H commentary for further methodology.

The methodology for the extrapolation was to group the sites by their WIC grade (Grade 13, booster pumping stations), then group the sites by Region and categories it into the WIC size band based on the known Kilowatt rating. This data is then converted into a percentage in each of the above areas, which gives the basis for the extrapolation across the whole asset stock. The extrapolation for the booster pumping stations was based on 64% of known sites.

E6.16 - The methodology used to calculate the average distribution pumping head is detailed under E4.14 and E6.14-16 Pumping Head - General Comments section as a global approach has been applied to all pumps.

The distribution average pumping head has increased from 22.00m to 29.63m (see Distribution Pumping Head Results Table below). This is due to the identification of 41 additional pumps that were not included in previous WIC calculations and as a result of the consistent methodology applied to all pumps to calculate the average pumping head.

Distribution Pumping Head Results

	Units	NW	NE	SE	SW
Distribution					
E6.16: Av. Pumping Head – **2004**	m	14.24	35.05	2.99	37.29
E6.16: Av. Pumping Head – **2003**	m	15.00	21.00	7.20	28.00

The South West area has significant pumping within the distribution system.

Within the Milngavie water operational area, there is pumping at Buchley (all of C5), Castlemilk (C2), Drumchapel (M5) and Thornliebank (C1). Additionally there are a number of booster pumps downstream of Buchley supplying different areas of the C5 trunk main system.

The full output from Balmore WTW is pumped to within the Forth Valley and Glasgow distribution networks. The supply to Forth Valley is subsequently boosted at Glenhove to West Lothian and to Dalmacoulter, Lanarkshire. This volume makes up 14% of the overall distribution input for the SW area. As the Loch Katrine scheme develops, and the supply from Milngavie WTW to Glasgow is reduced, there will again be increased pumping from Balmore WTW into the Glasgow distribution system.

Towards the end of the 03/04 year Balmore water began to be supplied into the C5 system. To achieve this additional pumps were installed at Balmore, upstream of the Buchley pumps. This Balmore link main into the Milngavie supply increases the output from Balmore by 40%. The Balmore output now contributes closer to 20% of the South West distribution input figure.

Additional Pumps

The number of additional pumps used in this year's calculation is shown in the table below. A single asset list of pumping stations was sourced from the WAMS and is consistent with those reported in Table H.

Additional Distribution Pumps Tables

	Units	NW	NE	SE	SW
Additional TWP Pumping Head	m	0.21	1.25	0.22	2.11
Additional TWP Pumps	nr	6	23	8	4

Summary of Other Changes

South East Area:
Reduction in total pumping head is mostly as a result of the Gowanbank Pumping Station being removed from the South East area calculation and included within the South West area calculation.

South West:
Increase in total pumping head as a result of the Gowanbank Pumping Station being included in the South West area calculation and removed from the South East area calculation.

Confidence Grades

Confidence grades remain at C4 with the exception of the South West Area. The higher accuracy of band 3 has been awarded to this area due to better information used from continuously logged flow and pressure data for priority pumps.

E6.17-20 Service Reservoirs and Water Towers

The number of service reservoirs has increased from 1550 to 1692 (including 16 water towers) with a corresponding increase in total capacity from 3711Ml to 4150Ml.

An improvement for this year's Return has been to collect legacy corporate data and off-line asset lists into a single Scottish Water asset inventory of Treated Water Storage (TWS) assets to be held within the new Works Asset Management System (WAMS). Examples of off-line databases were:

- Tank cleaning programmes
- Service reservoir security contracts and
- Last year's Annual Return submission.

Two related projects, detailed below, undertaken within the last financial year, have improved the understanding of the number and operational status of these assets.

Related Projects 2003-04

1. WAMS *Ellipse* and Finance System *PeopleSoft* Launch
Work was undertaken to support the launch of WAMS Ellipse and the Finance System, PeopleSoft.

An extract of TWS assets was taken from the three legacy works asset management systems and audited by a combination of local knowledge made up from local and external consultant staff. Gaps were identified in the legacy systems i.e. Clear Water Tanks.

These assets were geo-referenced to water supply zones using grid references, where possible, or local knowledge. Some auditing of operational status was carried out at this stage.

2. Creation of Scottish Water Hydraulic Asset Structure
A hydraulic water asset structure has also been created. This involved a review of water supply zones, service reservoirs and naming conventions.

Output

These two items of work helped to form this year's TWS asset list. Additional assets found from previous work, as detailed above, are now part of the asset inventory. The list of TWS assets now forms part of the WIC *Asset Database AR04.* This database holds the information required to populate Table E6 and Table H. Relevant corporate information will be uplifted into WAMS.

Where capacities were not known, estimates have been used based on extrapolation of existing data within each of the 4 Scottish Water operational areas. Data that have been estimated will not be uplifted into WAMS.

The confidence grades for the number of service reservoirs have improved to a B3. This is a reflection of some data improvement undertaken over the last two years and is part of the on-going data improvement process.

The confidence grade of E6.20 (Total capacity of water towers) is a C4. However a comment cannot be inserted in the comments worksheet adjacent to the table since this cell is protected. The comment would be: “Extrapolation exercise to fill data gaps. All capacities not yet held within corporate data set.”

Table E7 Wastewater Explanatory Factors – Sewerage

General Comments

In Table E7, “Comments” worksheet, there is a note under “Issues with data” section to state that E7.1 should equal A3.83. In E7.1, the number is 4,688.01 (000) (2 d.p.), where as the figure in A3.83, the number is 4,688.010 (000) (3 d.p.). This appears to be a problem with the formatting of the tables, as E7.1 is the same as A3.83.

E7.0-7 Area Data

E7.0 This line is pre-set by WIC to name the Operational Areas. Scottish Water is split into four operational areas (North West, North East, South East and South West).

The North West operational area has a very low population density due in part to the number of sparsely populated islands it serves it is also completely rural in nature. The South West has the highest population density of the four operational areas and is urban in nature. The South East and North East are predominantly rural in regards the area served by both.

E7.1 The distribution of the resident connected population has been made to be consistent with the overall population figures reported in other tables of the Annual Return. The distribution involved allocating population figures to the address point file which allowed accurate distribution of properties and population to the wastewater boundaries. The population has decreased by 43,327 partly due to a decrease in the overall population figure and partly due a change in the methodology for calculating this figure. This year, the resident population does not include those in caravan parks or the homeless.

E7.2 The distribution of the tourist population has been made using the Yellow Point Business directory, a geo-coded directory covering Scotland. The classification of business types was filtered to those which would attract the tourist population and this sample set used to distribute the population based upon average bedspaces and occupancy. The confidence in these figures reflects the absence of a Scottish Water corporate dataset for tourism, the figures being based on information from Visit Scotland. The method of distribution of the overall tourist figures to the sewerage networks is improved on last year as it utilises a managed, albeit, external database.

Comparison between the E7.2 figure and the difference between winter and summer populations reported in Table A indicates a low connection rate of tourist accommodation types across Scotland. This as a result of a more accurate methodology applied, this year, in determining the non-resident connected population, which entails allocating the population to sewered areas, then to operational areas. One issue relating to the use of sewered area boundaries in establishing whether a property is connected or otherwise is that the sewered areas require to be regularly updated so that all properties within each sewered area are captured. The lower confidence grade (this year), compared with 2002/03 reflects any under-reporting of properties as a result sewered areas not being completely up-to-date and also the fact that not all properties will be connected to the sewer network (for example, some properties could be served by private septic tanks).

E7.3 The volume of sewage collected has been calculated as the flow which arrives in a Scottish Water sewer (of any type) from any source e.g. rainfall, infiltration, domestic use, industrial use, tidal flows, connected watercourses. The approach used has been applied consistently across Scotland and uses data sets for rainfall, connected properties and sewered areas consistent with the wastewater element of the Annual Return.

The flow has been calculated in two parts, the dry weather flow and the storm flow.

Dry Weather Flow : A factor has been established which relates the number of connected properties to the amount of sewer flow in periods of no rainfall. To establish this figure a number of actual recordings of flows were analysed with a known connected property count to establish a range of flow per connected property factors. These factors were averaged and applied to all sewered areas to establish a total dry weather flow contribution per sewered area.

Storm Flow : The storm flow element was calculated by using existing sewer models to establish a relationship between rainfall depth, area of the sewered area and the amount of run-off generated. A selection of models were used and an average value of run-off per mm rainfall per hectare of sewered area was established. This was then applied to each sewered area to establish a total storm flow contribution per sewered area.

The total sewage collected was calculated (dry weather plus storm flows) for each sewered area and a total for each operational area calculated.

This figure includes all flows which are collected by the wastewater network but does not necessarily relate to the flows which arrive at treatment sites as some flows will be lost to overflows and other flows collected by storm sewers will be discharged without treatment.

E7.4 The total connected properties have been assessed using a consistent database used throughout the Annual Return. The assessment of connected properties has been made by assigning the properties from the Ordnance Survey Address Point database as connected if they fall within a sewered area boundary. This summary of the numbers within each operational area is made by summing the connected properties in each sewered area according to which operational area they are within. This method relies on the sewered areas to determine connectivity. These boundaries require to be updated to reflect new development on the periphery of the networks and in some areas are missing. The degree to which this undercounts the connected properties is off-set to some extent by the fact that not all properties within a sewered area will be connected to the sewerage network (served by private septic tanks for example). The net result of this is an undercount of the connected properties but the extent of this is small and is therefore reflected in the assigned confidence grade.

E7.5 The figures remain unchanged from last year as no alteration of the operational area boundaries has taken place.

The figures reported in Table E6 for SE and SW Operational Areas have been transposed. The figures in Table E7 are correct.

E7.6 The figures remain unchanged from last year as no changes in the definition of the sewered area boundaries has been undertaken. However, this will be required to improve the assessment of connected properties and to reflect the addition of developments on the periphery of the sewerage networks. It will also address sewered areas which are currently missing from a number of small networks.

The numbers for the SE and SW are transposed.

E7.7 As with last year's Return this year's figures for annual precipitation have been sourced from the Centre for Ecology and Hydrology (CEH) in their publication, Hydrological Summary for the United Kingdom. The data was transferred from the CEH reporting boundaries to Scottish Water's sewered areas and averaged across each operational area. The CEH data is based upon raingauge data collected by the Met Office. The Confidence Grade assigned this year reflects the lack of a Scottish Water corporate data source and the method by which the external data was applied to the individual sewered areas in each operational area. Comparison with actual, detailed recordings of rainfall is a possible future improvement in this data. The reduction in the confidence grade from last year is appropriate as the grade applied last year was an over optimistic assessment.

E7.8-14 Sewerage Data

General Statement

The length of sewers reported in the following lines has the same base source of data, which was the asset database used for the production of Table H4. This data has been compiled from an extract of sewerage network from the corporate GIS system augmented by information from completed Drainage Area Studies which have not yet been updated in GIS. A number of queries on the data set were run to remove sewer lengths such as “abandoned”, “isolated”, “planned”, “proposed” and “unknown status”. Sewer lengths associated with Private Finance Initiative projects were also removed. An estimate has been included for the inclusion of new housing and industrial developments which as yet have not been included in GIS and therefore not counted in the total sewer length. The backlog extends prior to the current report year.

E7.8 The total length of sewer has been obtained from the same asset database as that used for the production of Table H Asset Inventory and described above. The total sewer

length has increased this year as a result of an update to the estimated number of lateral sewers and an additional estimate of the length of sewers in developments which have not yet been entered into the corporate GIS system. These are therefore not part of the sewer length extracted to form the main data for the sewer assets.

E7.9 A current project is underway which is looking at gathering information on the lateral sewers across Scotland. This project includes surveying the length, condition and configuration of a sample of lateral sewers. Preliminary results of the project, based on a sample of only 100 lateral sewers, have been used in this year's Return which raises last year's estimate of 10,000km to 13,200km. This figure will improve in confidence as more laterals are surveyed and the sample size increases.

E7.10 The length of combined sewers has been obtained from the same asset database as that used for the production of Table H Asset Inventory and described above. It should be noted that last year's Return had the figures for the South East and South West operational areas transposed in error.

E7.11 The length of separate storm sewers has been obtained from the same asset database as that used for the production of Table H Asset Inventory and described above. It should be noted that last year's Return had the figures for the South East and South West operational areas transposed in error.

E7.12 Length of sewer > 1000mm diameter has been obtained from the same asset database as that used for the production of Table H Asset Inventory and described above.

E7.13 The critical sewer length has been assessed using the detailed assessments of sewer criticality carried out as part of Drainage Area Studies. The percentage of critical sewer length within the total sewer network length (excluding sewer laterals) for each study area was calculated and an average across all studies established. This average was applied across the entire sewer network (excluding laterals) to provide a length of critical sewer. Although this reduced the length of critical sewer the confidence in this figure is an improvement on last year as a larger sample set (approximately 60% of all sewerage excluding laterals) of study information has been used.

The proportion has been assessed using the average across the catchments where a detailed assessment has been made of sewer criticality, ie those where a Drainage Area Study has been undertaken.

The number of catchments used in the assessment of the proportion has increased this year and has resulted in a lower proportion than last year.

This year's figure has been produced using a larger set of data and has also been subject to a more thorough analysis of the figures.

E7.14 The total number of sewer collapses across Scotland has increased (by 8.4%) this report year indicating that the condition of the sewerage network is similar to or poorer than that reported on last year. A confidence grade of C4 has been assigned to these figures which reflects the ongoing issue with the collection of sound records for collapses due to the withdrawal of legacy systems and the launch of the new corporate system. The full introduction of the new corporate system will see the situation improve next year. Further detail behind the assessment of this year's Return figures is contained in the commentary for Table H4.

E7.15-23 Pumping Stations

General Statement

The information gathered for wastewater pumping stations for the 2003-04 Annual Return has been based upon Scottish Water's Works and Asset Management System (WAMS) Asset Inventory which contains the corporately managed list of all pumping station installations. The list of pumping stations has been augmented with further fields of data on capacity, head, power, designation and function from a number of sources. These sources include databases, spreadsheets, paper information, drop test data, Drainage Area Studies and other reports from all areas of Scottish Water.

The figures used for these lines are consistent with the corporate asset inventory with the exception of PFI pumping stations which are included for Table E7, however it has been discovered that the asset inventory has a number of inconsistencies in the pumping station data it holds. A number of duplicates are present in the inventory and require to be clarified and removed. On inspection of the Inventory it is clear that a number of pumping stations which are operated by PFI concessionaires are present. However not all PFI pumping stations are present. A number of pumping stations which are due to be transferred to PFI remain in the Inventory.

It is the intention to retain this information, improve it and to augment the data with new information through further data collection exercises and actual site testing. Currently a strategy for managing Scottish Water's wastewater pumping station assets is being developed which will include how these data issues and the reporting will be addressed.

E7.15 - The figure for the overall total number of wastewater pumping stations has increased from last year's Return. The data has been assigned to one of the four operational areas and includes all pumping stations, including those which are operated by PFI concessionaires. The overall figure may be low as a number minor of pumping stations constructed and adopted as part of new developments may not yet be present in the inventory. This uncounted number is considered to be low and will be included when improvements to GIS and inventory data are undertaken.

Breakdown for line E7.15:

(i) Sewage Pumping Stations Not PFI: 1821
(ii) Sewage Pumping Stations due to be transferred: 0
(iii) Sewage Pumping Stations PFI: 77

E7.16 - The 2003/04 return value for "Total capacity of pumping stations (m^3/d)" was produced using pump information collated from several sources. Scottish Water's WAMS data was utilised as the base pumping station information and the capacity fields were populated with data from databases, spreadsheets, paper information, drop test data, Drainage Area Studies and other Scottish Water reports. On collating this information 20% of pumping stations were found to have a known capacity value and the remaining 80% have been extrapolated using an average value generated from the sample, for the individual types of pumping station. There is a large amount of uncertainty in the values gathered in the data collection exercise as it is expected that many of the figures provided will be the individual pump capacity rather than the required total capacity of the installation. This has led to a significant increase in capacity since last year. Many of the figures supplied may also be the design capacity and will not reflect the actual performance which may be less due to impeller wear and performance drop-off.

E7.16a - The 2003/04 return value for "Total capacity of pumping stations (kW)" was produced using pump information obtained from Scottish Water's WAMS Database and additional values collated from several other sources. Power rating fields not complete in the

WAMS Database were populated with data from existing local spreadsheets, paper information from Scottish Water sources and other Scottish Water held reports. 68% of pumping stations have a known capacity value and the remaining 32% have been extrapolated using an average value generated from the sample, for the individual types of pumping station.

E7.17 - The 2003/04 return value for "average pumping head" was produced using historical pump information collated from several sources including Drainage Area Studies, sewerage models, paper records of pumping installations and operational knowledge. The WAMS Database (asset inventory) was utilised as the base pumping station directory and the components of pumping head (annual pumped volume (m^3/d) and annual mean lift (m)) were populated. 13% of pumping stations have a known head value but this varies considerably across the four Operational Areas (NE – 25%, NW – 2%, SE – 22% and SW – 1%). The confidence level in the pumping head figure is low to reflect the absence of quality data and the small sample of available data across the wastewater network. The sample figures that have been obtained will not reflect the installation pumping head but are more likely the individual pump head figures. The source data for these sample figures was not gathered for the reason of the WIC Return and therefore are collected on a different basis.

A high percentage (58%) of the WWPS have been found to be within 500m of the coastline or a watercourse. This may indicate that a high number of the pumping stations are used as interceptors to historical raw outfalls or are used to transfer flow along a coastline both of which would require only a small delivery head to pass the flow on as the geography of these areas would be relatively flat.

In comparison with last year's figure the average pumping head has dropped significantly. The reason for this is considered to be due to an overestimate of last year's figure. This year's figure is thought to be a more realistic figure although the size of the sample set and uncertainties over what the sample contains results in a low confidence grade.

E7.18 - The 2003/04 return values for "Total number of combined pumping stations" was produced using pump information type collated from several sources. Scottish Water's WAMS Database was utilised as the base pumping station directory and the type fields were populated with data from existing local spreadsheets, paper information from Scottish Water sources, drop test data and other Scottish Water held reports. 92% of pumping station types are known, with the remaining 8% extrapolated using the sample data. 62% of the sample pumping stations SW wide are combined and this is mirrored when separated into the four operational areas.

E7.19 - The 2003/04 return values for "Total capacity of combined pumping stations" was produced using pump information type collated from several sources. Scottish Water's WAMS Database was utilised as the base pumping station directory. The capacity fields were populated with data from existing local spreadsheets, paper information from Scottish Water sources, drop test data and other Scottish Water held reports. 20% of pumping station capacity are known, with the remaining 80% extrapolated using the sample data. Greater accuracy concerning pumping station type has given a higher confidence in the value generated.

E7.20 - The 2003/04 return values for "Total number of stormwater pumping stations" was produced using pump information type collated from several sources. Scottish Water's WAMS Database was utilised as the base pumping station directory. The type fields were populated with data from existing local spreadsheets, paper information from Scottish Water sources, drop test data and other Scottish Water held reports. 92% of pumping station types are known, with the remaining 8% extrapolated using the sample data. 3% of the sample pumping stations Scottish Water wide are stormwater and this is mirrored in the final numbers, although not through the four operational areas.

E7.21 - The 2003/04 return values for “Total capacity of stormwater pumping stations” was produced using pump information capacity collated from several sources. Scottish Water’s WAMS Database was utilised as the base pumping station directory. The capacity fields were populated with data from existing local spreadsheets, paper information from Scottish Water sources, drop test data and other Scottish Water held reports. 20% of pumping station capacity are known, with the remaining 80% extrapolated using the sample data. Greater accuracy concerning pumping station type has given a higher confidence in the value generated.

E7.22 - The number of overflows has increased this year through a data improvement exercise undertaken on the Intermittent Discharge (ID) Register. Drainage Areas Studies were used to provide information for previously unrecorded overflows.

The 3948 CSOs reported in table E are only operational assets. The 4210 reported in Table H are the operational works in addition to the redundant and decommissioned assets.

The increase from JR03 is as a result of additional CSOs being identified during surveys as part of the Asset Data Improvement Project and further work on Drainage Area Studies.

E7.23 - The number of overflows which are equipped with a screen has increased marginally over last year’s figure through the information gathered from Drainage Area Studies.

Table E8 Wastewater Explanatory Factors - Sewage Treatment Works

General Comments

The loadings reported in the June 2003 Annual Return were based on historical data inherited from legacy data systems. As these were of variable quality, a completely new approach has been adopted for the assessment of individual treatment works loads. A theoretical figure has been derived, being the sum of the following components:

Domestic resident
Domestic non-resident
Non-domestic
Trade effluent
Public septic tank load
Private septic tank load
Other tankered load (including other WWTW and WTW sludges)

The difference in total load between the two approaches is less than 6%, giving confidence that in global terms the dataset is reliable. However, there have been significant changes in load at individual works and this has resulted in a large number of movements between size bands, both up and down.

The asset list on which the information in this table is based is held in a database maintained by the Strategy and Planning section. This database is updated continuously by the Asset Planners responsible for the works, and is reconciled at intervals with the corporate Ellipse system. It is intended in due course to transfer the functionality of this database into the corporate system.

The list of operational works and outfalls has been checked extensively and this has resulted in a net reduction of 81 assets in total, mainly small septic tanks and outfalls, due to incorrect inclusions last year. Further changes are due to new works being commissioned and old works being taken out of service.

In a few cases, one effluent stream can be treated by two independent operational works (e.g. an inlet works and a secondary treatment works). In these cases, only the works providing the higher treatment level is included in the number of works to avoid double counting of the effluent stream.

The list is based on those sites that were operational at the end of the reporting year, and includes both PFI and non-PFI sites. Where treatment works have been decommissioned and replaced during the year, only the new works have been reported, again to avoid double counting of the load.

The components of load have been determined as follows:

Resident and non-resident domestic
The population figures have been taken from those used to complete lines E7.1 and E7.2, which were allocated to individual drainage operational areas (DOAs). The population served by each works was taken to be the sum of all the DOAs served by the works. The load was assessed on the basis of 60gBOD/head/day.

Non-domestic
The number of non-domestic establishments in each DOA was determined by identifying commercial enterprises in the corporate address point database. The total non-domestic load was estimated from the total volume (Lines A4.2 – 4.5 and A4.8 – 4.15) and assuming a mean concentration of 300mgBOD/litre, based on typical sample results. The total load was

allocated to individual works pro rata to the number of non-domestic properties in all the DOAs served by the works.

Trade effluent
Measured BOD from sample results collected for charging purposes were used. These are recorded in a database held by the Trade Effluent section. Unsettled BOD has been used, as this is more representative of the actual load on the works.

Public and private septic tanks
The number of septic tank emptyings is recorded by operational area, and the corresponding volumes have been assessed by assuming
Private domestic tanks – $3m^3$
Public tanks – $25m^3$
The load has been assessed on the assumption of a concentration of 6g/litre, based on typical sample results.

Other tankered load
In the case of commercial tankered loads, the assessment has been made on the basis of corporate records of sampled tanker loads. Imported wastewater and water treatment sludge loads have been assessed from recorded volumes, assuming concentrations of 6g/litre and 0.1g/litre respectively.

E8.1-10 Numbers

There is an increase in the confidence grade from C5 and B3 (JR03) to A2 and A1, for small works bandings and larger works bandings respectively. This is due to works information now being held in the Strategy & Planning Wastewater Information database resulting in a greater reliability and higher accuracy of data.

E8.1-E8.8 - The number of works in each category has been determined from the loads determined by the method defined above, excluding the load from non-resident population. One works reported in Band 5, Girvan, would have been classed as a Band 6 works if the load from non-resident population had been included.

The total number of treatment works (excluding outfalls) has decreased by 60 to 1836. The main reason, as noted above, is data improvement, but in addition 19 works, mainly septic tanks and primary works, have been decommissioned, while 8 new works, mainly secondary and tertiary, have been brought into service.

The number of outfalls has decreased from 229 to 208. Again the main reason for the decrease is data improvement, although one preliminary works has been taken out of service this year. Last year 145 outfalls were of unknown type, and were divided between the screened and unscreened categories. About 50 of these have been removed from the list as they serve either treatment works or CSOs. These have been assumed to come from the screened category. The remaining 20 that were grouped with the screened category have been transferred to unscreened, as there is no evidence that they are screened. About 40 unscreened discharges have been added to the list that were omitted in error from last years submission. The net effect of these changes is a large movement in numbers from the screened to the unscreened category.

The list of outfalls has been extensively scrutinised, and this is reflected in the improvement in confidence grade. However, the list of untreated outfalls reported in this table is not yet held in a corporate system, and so the grade differs from the other categories listed here.

E8.9, E8.10 - The ammonia consent conditions are known and have been attached to the appropriate treatment works as held in the Asset Inventory, thus enabling them to be categorised as shown here.

There has been no net change in the number of works with these ammonia consent conditions.

The 'comments' worksheet states that E8.18 should equal A4.34*(1000/365) and requests that either E8.18 or A4.34 should be amended so that the numbers reconcile. This appears to be an error in the tables, because E8.18 excludes septic tanks, which are included in the total load entering the sewerage system.

As the total load received (for each treatment category in E8.18) is 438,619 kg/BOD/day, (which includes septic tanks, this correctly reconciles with A4.34 Total load entering sewerage system (BOD/yr) of 160,096.080.

E8.11-20 Loading (average daily load)

E8.11-E8.18[8] **-** The method of determining loads has been fully described in the introduction to this section

The total load (excluding septic tanks) has increased from 409,000 kg BOD/day to 431,000 kg BOD/day. This is mainly a result of the revised method of calculating the loads, which is believed to be more robust. Although the overall change is small, there are quite significant changes at many individual works. Coupled with the improvements to the allocation of works to the correct treatment category, this has resulted in significant changes to the loads in some categories and size bands.

The most significant changes that have occurred are to the totals in the primary and screened outfall categories. A number of works were wrongly included in the primary category last year, and this has now been corrected. Three works in particular, Ironmill Bay, Penicuik and Valleyfield have affected the total: these are all in categories 6, 5 and 4 respectively and are all secondary works. Although the number of screened outfalls have decreased significantly this has been from the smaller size bands. The loads on the remaining outfalls have generally increased as a result of re-estimating, and five primary Band 4 works have been re-designated as screened, which has also affected the total significantly.

E8.19, E8.20 The figures reported here have been determined from the loadings on the works subject to ammonia consent standards specified. The changes in total loading for each consent category reflect the changes in numbers and loads noted above.

E8.21-30 Compliance

E8.21-28 - Percentage compliance has been calculated on the basis of SEPA results. In the case of two-tier consents, only upper tier failures have been counted. Works that are not sampled are not included in the averaging process for individual treatment categories and size bands.

The percentage compliance figures in general are slighter lower than last year, which reflects the results reported in Table C4. This is largely due to the fact that there has been a change in reporting on fiscal year to calendar year. Normally there is an improvement in performance between December and March, and this pattern has in fact been repeated in 2004. Compliance in this return is reported calendar year therefore cannot be directly compared with the last annual return. SEPA report compliance to Scottish Water on a monthly basis

[8] Footnote to E8.18 The total load reported in E18 excludes septic tanks. If the septic tank load is added to this figure it will be found to match the total reported in A4.34.

E8.29-30 - The compliance figures for works with ammonia consent conditions reflect the general slight decline in standards noted above. It should be noted that the number of works in these categories is very small, so the percentage compliance figures are sensitive to very slight changes in the base data.

E8.31-42 Costs

As ABM groups the costs of wastewater assets into small and large work categories and then by grouped treatment types, a further allocation is required to distribute costs to assets by sizeband and by treatment process. The aggregated ABM costs have been distributed to individual large assets and small asset bands based on the direct costs captured in the financial ledger on an equi-proportional cost basis. Where the financial ledger captured costs for a grouping of works, a further allocation was made to distribute the costs to asset level using the actual load of each works.

Confidence grades are lower than those in E2b to reflect the levels of allocation that were required. From 2004/05, Scottish Water is aiming to move towards capturing 80% of asset management costs directly at asset level within the general ledger, which should greatly improve the quality of data in the 2004/05 return.

The estimated operational costs of PFI are generated from the PFI financial model. As the PFI companies do not supply a breakdown of cost by cost type, power and SEPA costs have been provided for non-PFI assets only.

The costs of treating and disposing of sludge are contained within Table E10 Sludge Treatment and Disposal.

Costs in Table 8 have been aligned with operational size band data provided by Scottish Water's Asset Operations team.

Table E9 Large Sewage Treatment Works Information Database

E9.0-5 Works Size

E9.0 - There are 37 large works, which is the same number as last year. However, two works have been added to the list as a result of re-estimating the loads:

Galashiels
Ironmill Bay

Both of these works were at the upper end of Category 5 last year. Two works have been removed:

Auchengeich (decommissioned March 2003)
Linwood (estimated load revised downwards to Category 5)

E9.1, 9.2 - The determination of resident and non-resident populations has been described in the introduction to Table E8.

In general the figures are similar to those reported last year. The most significant change is at Seafield, the increased population here representing additional catchments that are now pumped to the works.

E9.3 - COD is a gross figure, taken from recorded measurements. It is the COD load entering the WWTW.

Loads are based on available analytical data and flows. Overall, there is a slight reduction in the total load treated at these works: this is due partly to the that the trade effluent load at the works added to the list is substantially less than that at the works removed. However, the

main reason for this reduction is due to changes in load at some of the works already on the list. The gross COD has been measured directly, rather than estimated as a multiple of the settled COD

E9.4 - This is the amount of sludge received from other sources including waterworks and wastewater works sludges. Calculation of daily load was from yearly totals/365 and using 95.26 kg/COD/m3 for wastewater works sludge and 48.70 kg/COD/m3 for water works sludge. The annual quantities were derived from the Gemini Sludge Management System

The very large increase reported this year is a result of more consistent data capture in the recording system. However, a higher confidence grade has not been allocated here, because of difficulties experienced in migrating data to the new system. The confidence grade reported last year was probably inappropriate.

E9.5 - The population equivalent has been assessed from the load received on the basis of 60g BOD/head/day. The method of determining load is fully described in the introduction to Table E8.

The confidence grade for this row is the same as for the load data in Table E8. The higher confidence grade reported last year was incorrect.

E9.6-10 Treatability

These figures are the averages for each parameter for the report year. The results are from Scottish Water's own sampling programme and the information is retrieved from LIMS.

Influent samples are not normally analysed for Total Organic Carbon (TOC), and this has been indicated by applying a confidence grade N. At a number of PFI works, influent samples are not analysed for ammoniacal nitrogen as this is not included in the tariff structure.

E9.11-16 Compliance

E9.11-16 - Figures are the lower consent values taken directly from the discharge consent document as issued by SEPA. Where a parameter is not included in the discharge consent, this is indicated by a confidence grading of N.

Comparison with last year shows that there has been a tightening of the BOD consent standard at 3 of the 37 works and a new COD consent has been imposed at 4 works. This is a reflection of the general pattern of tighter consents.

The percentage compliance has been calculated on the same basis as the figures in lines E8.21 –E8.30: that is, SEPA compliance data using the number of sanitary determinands (BOD, COD, SS and Ammonia) analysed for and counting gross (upper tier) failures only. Compliance is reported as calendar year. SEPA report compliance on a monthly basis.

Overall, the results are similar to last year. The exception to this is Perth, where the situation has been complicated by the addition of a UWWTD standard. The works is compliant with the COPA standard, but a number of samples fail against the UWWTD standard.

E9.17-18 Flow

The record of flows is held in LIMS, and this has been updated where known. Some variations from last year's figures have been noted, but there are no significant changes.

E9.19-25 Treatment Works Category

This information is held in the Ellipse corporate database. A few minor corrections have been made, but there are no significant changes.

E9.26-32 Miscellaneous Data

E9.28 The presence or otherwise of a terminal pumping station is recorded in the Asset Inventory.

E9.30 & E9.32– All sludge costs have been included in E10.

E9.33-43 Works cost

As explained in section E8, costs have been allocated from ABM grouped large works by treatment category to individual works and treatment processes based on the direct costs captured by asset within the financial ledger. Confidence grades are lower than those in E1b to reflect the levels of allocation that were required.

E9.42 – The cost of terminal pumping stations is based on 2002/03 estimates.

E9.43 – All sludge costs have been included in E10.

Table E10 Wastewater Explanatory Factors - Sludge Treatment and Disposal

E10.1-2 Sludge Volumes

E10.2 – This information was based on information from several sources:

- Scottish Water "Gemini" Sludge Management data base of sludge movements
- Scottish Water Sludge Model
- Databases maintained by a recycling company of the sludge taken to agricultural land.

All figures were based on tonne dry solids (tds), from either calculated sludge quantities or actual tds which are derived from the wet weight information held on the above data bases and sludge solids analysis carried out both on site and in the laboratory.

The accuracy of the data shall improved as Scottish Water are currently upgrading data input to the Scottish Water's sludge management system "Gemini" through direct input from site monitors, monitoring volume and solid content.

E10.3-11 Sludge Treatment and Disposal Costs

The capture of sludge costs within the financial ledger is incomplete due to the delay in implementing the new works management systems. In 2003/04, as in 2002/03, sludge costs were included in wastewater treatment costs in the general ledger.

ABM was used to allocate all sludge costs from wastewater treatment to sludge treatment by disposal route – landfill; land reclamation; agriculture and power generation. Some off-line extrapolation was required to

a) align ABM data to WIC reporting requirements
b) to meet additional WIC requirements which were received after the financial year-end and
c) to align transport and handling costs from wastewater treatment works and sludge conditioning centres to final disposal routes.

Confidence grades are lower than those in E2b to reflect the levels of allocation that were required.

All costs associated with sludge handling, treatment and transportation are included within this table.

E10.12-19 Sludge Treatment Type

The numbers and treatment categories are consistent with those reported in E8. Please refer to the commentary for lines E8.1 to E8.7 for further information regarding any changes in banding of works since 2002/03 return.

Table E11 Management and General

In 2003/04, employee numbers have been aligned to the costs appearing in tables E1b and E2b. This entails the removal of staff numbers associated with capital work and third party work. The following reconciles E11 staff numbers to the annual accounts:

	FTE's
Staff numbers per E11.1	2,963
Staff involved in capital & transformation projects	1,009
Statutory waste and wastewater services	3,972
Non statutory water and wastewater services	233
Other trading activities	91
Staff seconded to Scottish Water Solutions	220
Total staff per the Annual Report	4,516

E11.1-4 Employee Numbers

E11.5-20 Management and General Assets

E11.5 – E 11.14 Data has been sourced from existing records. However, it should be noted that the majority of premises have not been measured or valued in the past year. Where this is the case, the information has been sourced from historical records, or has been estimated.

The majority of our sites have integrated functions. For example, control rooms are primarily for water production but also have some wastewater control functionality. For this reason areas of water and wastewater have been obtained by applying a percentage split (53% water, 47% wastewater) to the majority of office and depot sites. In a limited number of cases the functionality of the premises is clear and in these cases the correct areas were used.

Scottish Water does not have any single workshop sites but some depots have limited workshop facilities.

Scottish Water has four main control rooms. This figure excludes minor control rooms that exist on many single production sites.

E11.15 This data has been sourced from the H tables and due to vehicles being used on an operational, rather than functional basis, the allocation to water and wastewater has been done using the same percentage split as for employee numbers.

E11.16 The percentage coverage of telemetry systems has been sourced from the H tables and has been apportioned 45% water and 55% wastewater.

E11.17 The number of telemetry outstations has been taken from an out of date data set. The current source is unavailable due to the failure of an IT server. The allocation between water and wastewater has been apportioned on the basis of 45% water and 55% wastewater.

E11.18 The number of personal computers has been sourced from the H tables. The allocation to water and wastewater has been done using the same percentage split as for employee numbers.

E11.19 The number of workstations has been sourced from the H tables. The allocation to water and wastewater has been done using the same percentage split as for employee numbers.

E11.20 The number of mainframes has been sourced from the H tables. The figure has been double counted on the basis that no mainframes are used exclusively for one service.

F Tables Statutory Accounts

General comments

The F tables for 2003/04 have been prepared from the Statutory Accounts in accordance with WIC definitions.

With the exception of accruals for potential contractual claims with regard to PFI schemes, there are no atypical costs included in the return for 2003/04.

Table F1 Income and Expenditure Account

F1.1 Total Income

The following table summarises the year on year movement of the main components of income:-

	2003/04 £m	2002/03 £m	Variance £m
Household	580.3	538.7	41.6
Commercial	326.6	309.8	16.8
Trade effluent	28.5	26.0	2.5
Non statutory services	15.5	19.7	-4.2
New non core trading activities	7.4	1.1	6.3
	958.3	**895.3**	**63.0**

Statutory Services
Total turnover for the year increased by 7% to £958.3m. Turnover from core water and wastewater services supplied to household customers increased by 7.7% to £580.3m while turnover from services supplied to business customers increased by 5.7% to £355.1m. The increase in core business turnover arose principally from the increase in regulated tariffs introduced in April 2003.

Non Statutory Services
Turnover from the provision of those non-core services that were traditionally provided by the former Water Authorities declined by 21.3% to £15.5m. This reduction in turnover results from Scottish Water's primary focus on core business activities.

		2003/04 £m	2002/03 £m	Variance £m
F10.37	Water for electricity	0.210	0.227	-0.017
F10.39	Pipe connections and mains diversions	8.148	8.630	-0.482
F10.40	Farming, forestry, fishing and recreation	1.235	1.561	-0.326
F10.41	Other rents	0.481	0.423	0.058
F10.42	Laboratory services	1.394	1.975	-0.581
F10.43	Corporate consultancies	0.077	1.186	-1.109
F10.44	Property clearance certificates etc	0.379	0.371	0.008
F10.46	Other income	0.766	0.561	0.205
F10.48	Private septic tank emptying – domestic	1.187	1.450	-0.263
F10.49	Private septic tank emptying –non domestic	0.332	0.572	-0.240
F10.50	Other sewerage	0.719	0.251	0.468
F10.51	Pipe connections and diversions	0.518	2.577	-2.059
		15.446	**19.784**	**-4.338**

New Non-Core Trading Activities

Scottish Water's new trading activities relate primarily to the sale of contracting services to Scottish Water Solutions and the provision of water-related services to major business customers. Turnover from those activities increased from £1.1m in 2002/03 to £7.4m in 2003/04. £4.0m of this increase relates to mains rehabilitation and other capital investment activities carried out on a commercial basis by Scottish Water's contracting division for Scottish Water Solutions Limited. Prior to this, the costs for such activities were charged directly to the capital investment programme. Scottish Water Solutions Limited has been accounted for under FRS9 *Associates and Joint Ventures* as a JANE (Joint Arrangement Non Entity) and not as a subsidiary. Consequently, this trading income for sales to Scottish Water Solutions Limited is included in turnover and associated costs within cost of sales.

An analysis of income by activity is detailed below :-

	2003/04 £m	2002/03 £m	2001/02 £m
Business Development activities	3.4	1.1	0.7
Contracting Services – Scottish Water Solutions	4.0	0.0	0.0
	7.4	**1.1**	**0.7**

The table below presents this same information by WIC annual return category :-

		2003/04 £m	2002/03 £m	Variance £m
F10.46	Other income	6.267	0.753	5.514
F10.50	Other sewerage	-	0.326	-0.326
F10.52	Other wastewater related income	1.215	-	1.215
		7.482	**1.079**	**6.403**

Reconciliation of total non statutory income to F10

The table below reconciles the income from non statutory services and new non-core trading activities to that set out in table F10 :-

		2003/04 Old/ Inherited Non Core £m	2003/04 New Trading Activities £m	2003/04 Total £m	2002/03 Total £m
F10.37	Water for electricity	0.210	-	**0.210**	0.227
F10.39	Pipe connections and mains diversions	8.148	-	**8.148**	8.630
F10.40	Farming, forestry, fishing and recreation	1.235	-	**1.235**	1.561
F10.41	Other rents	0.481	-	**0.481**	0.423
F10.42	Laboratory services	1.394	-	**1.394**	1.975
F10.43	Corporate consultancies	0.077	-	**0.077**	1.186
F10.44	Property clearance certificates etc	0.379	-	**0.379**	0.371
F10.46	Other income	0.766	6.267	**7.033**	1.314
F10.48	Private septic tank emptying – domestic	1.187	-	**1.187**	1.450
F10.49	Private septic tank emptying –non domestic	0.332	-	**0.332**	0.572
F10.50	Other sewerage	0.719	-	**0.719**	0.577
F10.51	Pipe connections and diversions	0.518	-	**0.518**	2.577
F10.52	Other wastewater related income	0.000	1.215	**1.215**	-
	Total non core income	**15.446**	**7.482**	**22.928**	**20.863**

See F10 comments for further detailed comments.

F1.2 Employment Costs

By effective use of the employee voluntary severance scheme, the average number of employees during the year reduced by 491 or 10% to 4,516[1]. Net employment costs reduced by £22.5m or 14.9% from 2002/03.

Compared with the average level employed by the former water authorities in 2001/02 this equates to a reduction of 1,132 employees or 20% in the first two years of Scottish Water.

[1]The average headcount includes 220 staff seconded to Scottish Water Solutions, costs associated with these staff are not included in F1.2.

F1.3 PPP operating costs

All 9 PFI schemes covering 21 sites were operational for the full year. The cost of PFI schemes in the year was £113m. The full year impact of operations, partially offset by favourable weather conditions, increased costs by £7.6m from 2002/03.

Included within the £113.0m of costs for the year is an amount of £3.1m for outstanding contractual claims.

Expenditure by project is analysed below: -

	2003/04 £m	2002/03 £m	Variance £m
Dalmuir	7.0	7.5	0.5
Daldowie	14.0	11.2	-2.8
Meadowhead, Stevenston, Inverclyde	12.1	8.6	-3.5
Inverness and Fort William	7.0	7.1	0.1
Tay	18.7	20.1	1.4
Aberdeen	13.3	20.1	6.8
Moray	10.8	6.1	-4.7
Almond Valley/Seafield	20.7	20.1	-0.6
Levenmouth	8.7	2.8	-5.9
Other costs	0.7	1.8	1.1
Total costs	**113.0**	**105.4**	**-7.6**

F1.4 Other operating costs

Other operating costs reduced by £6.3m or 3.4% from 2002/03, even after absorbing new opex costs (associated with newly commissioned plant) of £3.0m.

A year on year analysis of other operating costs is detailed in the following table: -

	2003/04 £m	2002/03 £m	Variance £m
Travel & expenses	5.7	6.2	0.5
Training	1.5	1.8	0.3
Supplies and Services	19.4	20.3	0.9
Repairs and Maintenance	20.1	21.2	1.1
Chemicals and Materials	15.3	15.6	0.3
Power	17.8	17.8	0.0
Transport	18.8	19.0	0.2
Property	32.4	34.7	2.3
Insurance	7.4	7.9	0.5
Cost of Collection	14.9	12.5	-2.4
General and Administration	12.7	13.4	0.7
Telecoms and IT	10.9	12.8	1.9
	176.9	**183.2**	**6.3**

Travel & training – compared to 2002/03 travel costs were 8.1% lower and training costs were 16.7% lower, reflecting the reduction in employee numbers and general efficiency savings.

Supplies & services – costs reduced by 4.4% despite the impact of new opex associated with capital investment.

Repairs – costs incurred were £1.1m or 5.2% lower than in 2002/03 as a result of reduced contract rates and improved arrangements with contractors.

Chemicals – chemical costs were 1.9% lower than in 2002/03 despite the impact of new opex.

Power – there was no nominal reduction in costs from 2002/03 due primarily to the impact of new opex.

Transport – despite transport costs being higher than budget in the year, costs were still 1.1% lower than in 2002/03 as a result of savings arising from the re-negotiation of the vehicle and plant maintenance contract and the general reduction in the size of the fleet.

Property – costs this year were £2.3m or 6.6% lower than in 2002/03 due to property rationalisation and a reduction in the cost of building repairs and maintenance.

Insurance – costs were £0.5m lower than in 2002/03 as a result of a reduction in the property insurance premium and the move to manage more risk in house e.g. the move to third party cover for vehicles.

Cost of collection – collection costs were £2.4m higher than in 2002/03 primarily as a result of increased charges from Local Authorities prior to the implementation of the revised SLA's and an increase in the use of external collection agents to collect non domestic debt.

General & administration - costs were £0.7m lower than in 2002/03 due to general efficiency savings.

Telecoms & IT – rationalisation of hardware, software and consumables resulted in savings of £1.9m or 14.8% from 2002/03.

F1.5 Bad debts

	2003/04 Charge	2002/03 Charge	Variance
Domestic	27.5	30.0	2.5
Non-domestic	11.1	7.0	-4.1
	38.6	37.0	-1.6

The bad debt charge for the year was £1.6m higher than for 2002/03. The domestic charge reduced as a result of improved collection. The non-domestic charge was £4.1m higher than in 2002/03 reflecting the increase in aged debt at 31 March 2004 (see **F4.2** commentary for details).

F1.7 Own work capitalised

£35.9m of costs were recharged to capital in 2003/04. As can be seen from the table below 67.4% of this recharge is for costs, which are directly charged to capital projects. A further 24.5% of expenditure was incurred on planning and programme management costs

associated with the delivery of the capital programme, and the remaining £2.9m (8.1%) relates to the incremental capital overhead costs, which were allocated across all capital projects.

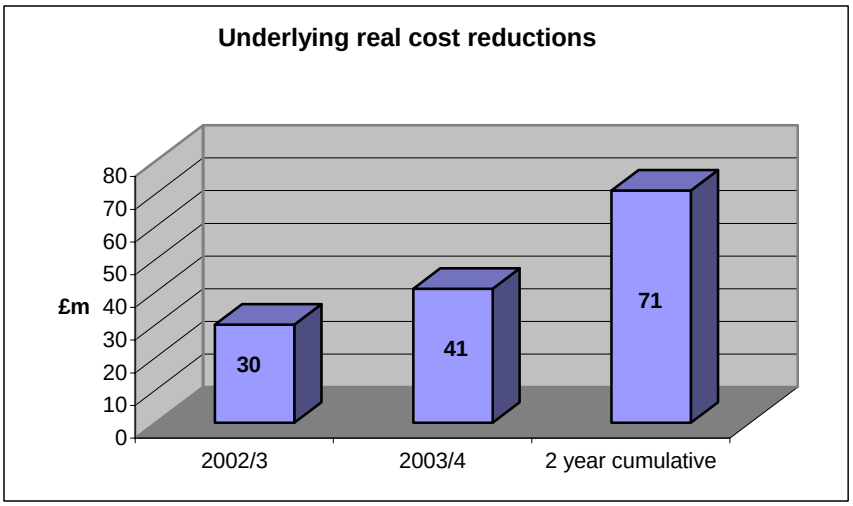
	£m	% of total
Direct capitalisation - project delivery	24.2	67.4
Indirect capitalisation – project design	8.8	24.5
Capitalised overheads	2.9	8.1
	35.9	100.0

The recharge to capital is £4.4m lower than 2002/03 and reflects the volume of work now done by Scottish Water Solutions.

F1.9 Total Costs

Nominal operating costs (i.e. excluding depreciation, PFI charges and costs associated with new trading activities) reduced by £28.5m to £300.6m (£288.1m for core services and £12.5m for traditional non-core services) compared to £329.1m in 2002/03. Continued focus on improving operating efficiency through the major business transformation programme has driven this reduction in nominal operating costs.

Real underlying operating costs, when compared to the similar costs of the three former water authorities in 2001/02 (i.e. excluding new operating costs associated with newly commissioned plant), have reduced by £71 million or 20% since the creation of Scottish Water - £30 million in 2002/03 and £41 million in 2003/04, as depicted in the following graph.



F1.12 & F13 Asset & Infrastructure Depreciation

Depreciation, including infrastructure maintenance charges, increased by £16.9m to £262.0m (excluding amortisation of PFI assets) reflecting the increased investment in infrastructure and non-infrastructure assets. These costs will continue to rise in the future as a consequence of Scottish Water's significant capital investment programme to improve the quality, reliability and efficiency of service provision.

F1.16 & F17 Interest received and paid

At 31 March 2004 the weighted average interest cost of the £2,192.8m outstanding debt was 6.34% (2003- 6.45%). Net interest payable during the year was £136.7m, £0.9m lower than 2002/03. Interest cover, based on operating cashflow before capital expenditure increased from 2.2 to 2.5 in 2003/04.

F1.20 Taxation

Tax has been charged at 31% recognising deferred taxation, but no corporation tax is payable.

F1.22 Exceptional items

Exceptional costs charged in the year totalled £52.8m and related to restructuring and transformation costs undertaken as part of the £200m 'Spend to Save' programme.

An analysis of the total cumulative "spend to save" expenditure over 2002/03 and 2003/04 is set out in the table below.

	2003/04 £m	**2002/03 £m**	**Cumulative to 2003/04 £m**
Transformation Programme :-			
People	3.2	1.5	4.7
Customer Service Enhancements	3.6	2.9	6.5
Financial Control	0.4	0.5	0.9
Integrated Support Services	2.0	1.7	3.7
System Rationalisation	13.3	5.5	18.8
Data Quality Improvements	2.7	2.1	4.8
Improved Asset Performance	4.5	3.5	8.0
Total Transformation Project	29.7	17.7	47.4
Non Q&S Capital Investment	4.9	12.9	17.8
Severance	34.8	9.3	44.1
Other/Excess Staff Costs	2.7	1.6	4.3
	72.1	41.5	113.6
Less Capitalised	-19.3	-16.9	-36.2
Total Profit & Loss Charge	**52.8**	**24.6**	**77.4**

WIC Control Checks

F1.9-F1.3 = E1.26+E2.26

Operating costs per F tables		**Operating costs per E tables**	
Total costs F1.9	420,929	Total water costs E1.26	209,738
Less PFI costs per Statutory Accounts F1.3	-113,008	Total waste water costs E2.26	194,180
	307,921		
Add exceptional costs F1.22	52,697		
Add PFI estimated running costs E2.4	41,800		
Add PFI operating costs incurred within SW included in E2.26	1,500		
	403,918		

F1.3 = E1.37+E2.37

PFI operating costs per F tables		PFI annual charge per E tables	
Total costs per Statutory Accounts F1.3	113,008	Total costs per E2.37	111,508
		Add PFI operating costs incurred within SW included in E2.26	1,500
	113,008		113,008

F1.9-(E1.38+E1.37) = E1.39+E2.39

Total operating costs per F tables		Total operating costs per E tables	
Total costs per F1.9	420,929	Total costs per E1.39	377,734
Asset depreciation F1.12	119,591	Total costs per E2.39	358,483
Infrastructure depreciation F1.13	143,000		
Exceptional items F1.22	52,697		736,217
	736,217		

E1.29 and E2.29 = F9.8

Infrastructure depn. per F tables		Infrastructure depn. per E tables	
Depn – Water	102,960	Total costs per E1.29	103,012
Depn – Wastewater	40,040	Total costs per E2.29	39,836
		Allocated to third party	152
	143,000		143,000

F3.15 = F2.19

F2.19 Government & other loans	-2,138.516	**F3.15** Total borrowings	-2,192.837
F3.6 Non government loans < 1 year	-12.727		
F3.13 Non government loans > 1 year	-41.594		
	-2,192.837		**-2,192.837**

Table F2 Balance Sheet

F2.1-3 Fixed Assets

F2.1 - Capital expenditure in the year was £408.6m. £389.3m was invested in the delivery of the Quality and Standards regulatory capital programme and £19.3m relating to capital expenditure incurred as part of the "spend-to-save" programme. Of the £389.3m regulatory capital investment programme, £71.3m was delivered through the programme allocated to Scottish Water Solutions Limited.

F2.4-8 Current Assets

F2.5 - See detailed comments for F4.

F2.6 - During the year net debt increased by £33.1m to £2,182.2m. The increase was driven by £102.4m of new long-term loans at a weighted average interest cost of 4.26% and a £40.0m net increase in short-term loans, partially offset by £100.4m repayment of long-term loans and a £8.9m increase in cash balances.

F2.9-12 Creditors: Amounts Falling Due Within one Year

F2.10 - See detailed comments for F4.

F2.13-18 Creditors: Amounts Falling Due After More than One Year

F2.14- See detailed comments for F4.

F2.16 - The table below summarises the movement in provisions from March 2003. *Information excised relating to the value of VS payments*. The utilisation includes payments made for employees who left under voluntary severance this year, payments to the pension funds for VS leavers and rental payments for redundant assets.

	At 31/03/03	Charge in the year	Utilisation in the year	At 31/03/04
Reorganisation – severance	65.0	34.8	-36.8	63.0
Deferred tax	21.5	27.2	-	48.7
Others (incl. redundant assets and restructuring)	1.9	1.5	-0.2	3.2
	88.4	**63.5**	**-37.0**	**114.9**

F2.19-21 Capital and Reserves

F2.19 - During the year net debt increased by £33.1m to £2,182.2m. The increase was driven by £102.4m of new long-term loans at a weighted average interest cost of 4.26% and a £40.0m net increase in short-term loans, partially offset by £100.4m repayment of long-term loans and a £8.9m increase in cash balances.

Table F3 Analysis of Borrowing

Government loans, both short and long term are disclosed in the balance sheet under Capital and Reserves in accordance with the Accounts Direction. Other debt is recorded under short and long term creditors in accordance with the Companies Act.

The data submitted in the F tables for 2002/03 has been restated to allow comparison on a like for like basis. The table below shows the year on year comparison of this disclosure:-

	2003/04 £m	2002/03 £m
Government debt	2,138.516	2,071.017
Creditors < 1 year (F3.6)	12.727	25.613
Creditors > 1 year (F3.14)	41.594	54.215
	2,192.837	**2,150.845**

Table F3a Analysis of Borrowing by interest rate and date of maturity

All new short-term borrowings and repayments are netted off, i.e. short-term loans taken out and then repaid during the year are shown as zero.

Table F4 Analysis of Debtors and Creditors

F4.2 Trade debtors

	31-Mar Household £m	31-Mar Commercial £m	31-Mar Total £m	01-Apr Household £m	01-Apr Commercial £m	01-Apr Total £m
Earned debt	207.5	94.1	301.6	184.4	96.9	281.3
Unearned debt	0.0	0.0	0.0	0.0	0.0	0.0
Gross Trade Debtors	207.5	94.1	301.6	184.4	96.9	281.3
Provisions	170.9	40.0	210.9	142.6	38.7	181.3
Net Trade Debtors	36.6	54.1	90.7	41.8	58.2	100.0

The commercial customer aged debt analysis is: -

	Actual 31 Mar £m	Opening 1 April £m
Overdue – over 1 year	**28.2**	**21.2**
Overdue – 3-12 months	**23.7**	**18.0**
Overdue – less than 3 months	**17.3**	**17.8**
Aged debt	**69.2**	**57.0**
Current	**24.9**	**39.9**
Gross debt	**94.1**	**96.9**
Credit note provision	**-6.6**	**-6.3**
Bad debt provision	**-33.4**	**-32.4**
Total net commercial debt	54.1	58.2

The above figures highlight a reduction in gross commercial debt of £2.8m during the year, but this is after processing £11.1m of write-offs during the year.

Aged debt as a percentage of turnover has increased from 16.0% at 31 March 2003 to 18.7% at 31 March 2004. This is as a result of the following factors: -

- the impact on billing and debt collection activity which resulted from the migration of data on to a single Scottish Water billing system, which required the individual billing systems to be closed down for a period of time to enable a controlled migration to take place
- the impact on collection activity of the delay in implementing the new credit management partnership, which will commence in April 2004 rather than the originally intended date of January 2004. This has resulted in customers not going through the full collection cycle during the year. This will be mitigated by additional activity during 2004/05.
- during migration of Glasgow based billing to the new single billing system, it was established that there was a change in reporting methodology between the two systems, with the Glasgow system ageing debt based on different principles from the new system. Following a presentation to the audit committee in February, the debt was

re-stated in line with the new methodology, resulting in a re-profiling of debt with a consequent adverse movement in aged debt.

- and the possible delays in customer payment practice which may have resulted from changes made to the business charging structure

Completion of the introduction of a new billing system and consolidation of billing and collection activities from 3 sites to 1 was achieved during March. This will allow improvements to be made during 04/05.

Household income cash collection was 0.94% better than budget, which equates to an additional £5.5m of cash collected.

F4.3 - Other debtors were £5.2m higher than at March 03 , this was due to the closing VAT debtor at March 04 being £5.7m higher than at March 03.

F4.4 - A backlog in billing arose while the billing systems were shut down in mid March in order to migrate data from the Glasgow billing system onto the new Scottish Water billing system. This resulted in accrued income being £7.5m higher at March 04 than at March 03.

F4.7-14 Creditors due within one year

F4.8 - The number of outstanding purchase orders on the legacy Accounts Payable systems were reduced prior to migration, to facilitate the transfer of data onto the single SW-wide Accounts Payable system which came into operation in April 2004. As a result closing trade creditors were £10.2m lower at March 04 than at March 03.

F4.9 - Capital creditors were £27.3m higher than at March 03. This was due in part to an increase in the value of work done accruals in 2004 due to the phasing of capital spend (£12.8m), and the recognition of long term liabilities,. including contractual claims and site servicing accruals, in the year to March 2004 (£14.5m).

F4.12 - Other creditors were £16.5m lower than at March 03. This was largely as a result of a £12.9m reduction in the non government debt repayable in less than a year.

F4.13 - Closing accruals were £3.6m higher than at March 03. This was principally due to an increase in accruals for potential claims associated with land acquisition and compensation claims.

F4.15-21 Bad Debt Provisions remaining, netted against Debtors

The table below outlines the aged profile of household debt at 31 March 2004

	96/97 to 99/00 £'000	**00/01 £'000**	**01/02 £'000**	**02/03 £'000**	**03/04 £'000**	**Total £'000**
Gross debt	52,346	26,054	31,097	37,838	60,196	207,531
Credit note provision	(94)	(292)	(491)	(1,061)	(2,895)	(4,833)
Bad debt provision	(52,252)	(23,546)	(28,166)	(29,595)	(32,538)	(166,097)
Net debt	**-**	**2,216**	**2,440**	**7,182**	**24,763**	**36,601**

F4.17 – F4.20 The non domestic bad debt provision was calculated using the same methodology applied in 2002/03 i.e. provided for 100% of all debt > 1 year old **(A)** and 50% of all debt >3 months but < 1 year old **(B)**.

	£m
Opening BDP at 01/04/04	32.921
Less debt written off	-10.684
Plus top up to provision required in year	11.131
Total provision required at 31/03/03 **= A+B**	**33.368**

The provision is calculated for total debt rather than for debt by service, as a result we have used extrapolation to populate rows F4.17 to F4.20, hence the confidence grades of B2.

Table F5 Cash Flow Parameters

F5.1-4 Debt and Credit Periods

F5.1 Figure calculated as in 2002/03, by adding trade debtors (F4.2) plus bad debt provision (F10.61) divided by turnover (F1.1) times 365 days.

F5.2 and F5.4 The creditors ledgers report total purchases and trade creditors by supplier, but they do not differentiate between capital and revenue expenditure. A degree of judgement has therefore been used to split creditors between trade and capital in this table.

Table F6 Working Capital

See commentary for F4.

Table F7 Cash Flow Statement

This has been prepared on a cash basis and is consistent with the Statutory Accounts. Comment on all material cashflow items is included above.

Table F8 Reconciliation of Operating Surplus (Deficit) to Net Cash Flow from Operating Activities

This has been prepared on a cash basis and is consistent with the Statutory Accounts. Comment on all material cashflow items is included above.

Table F9 Analysis of fixed assets by asset type (for report year)

See F2.1 for commentary.

Table F10 Analysis of income

Total turnover increased by 7.0% from 2002/03 to £958.3m, with additional revenue from tariff increases offsetting customer base erosion and the impact of tariff harmonisation.

Confidence grades have improved from 2002/03 with the introduction of the single SW wide billing system, however as the billing system only came into operation part way though the year, confidence grades have been assessed at A2 rather than A1.

F10.1-16 Primary Income - Water

Primary Income – Water

F10.1 – Domestic unmeasured income has increased by 4.9%, in line with expectations from tariff increases and information on customer base movement, derived from the councils.

F10.5 to F10.8 – Non-domestic measured volume income reduced by £8.6m or 8.6%, as a result of the following :-

- tariff increases for customers in the former East and West areas being offset by tariff reductions for customers in the North; and
- the introduction of LUVA's which had a sizeable downward pressure on the revenue from volumes > 100Ml.

F10.7b - Please note this is income from LUVA customers not standard tariff customers which are covered at F10.6.

F10.7 & F10.8 Income from customers on non standard tariffs reduced by £20.2m in the year, as customers on special deals in 2002/03 were transferred to LUVA agreements in 2003/04.

F10.11 - Non-domestic measured fixed water income has grown by £4.6m or 17.4%, as a result of the substantial tariff increases for customers in the former North and West areas.

F10.12 - The variable element of non-domestic unmeasured water income reduced by £11.5m or 52.4% as a result of the restructuring of the charge between fixed and variable elements. The variable charge reduced to 2.5p from 5.08p in the former East & West and 9.61p in the former North.

F10.13 - Non-domestic unmeasured water fixed income increased by £7.2m as a result of the introduction of a new charge developed in the 2003/04 Scheme of Charges.

The overall reduction in unmeasured water income is £4.6m or 21%, as a result of the above tariff restructuring. The unmetered charges were altered to reflect the low water use of these customers. This had the effect of affording abatement to all unmetered customers at 50% (abatement for qualifying customers was previously 30% in the West area).

F10.17-34 Wastewater

F10.17 - Domestic unmeasured income has increased by 10.4%, in line with expectations from tariff increases and information on customer base movement, derived from the councils.

F10.23 - Non-domestic measured fixed wastewater income has grown by £4.9m or 42.9%, as a result of the introduction of a fixed charge in the former North area and substantial price increases for customers in the former West area.

F10.24 - Non-domestic measured volume wastewater income has grown by £1.5m or 3.2%. Tariffs increased by approximately 10% in this area, but this was offset by an overall reduction in volumes treated of about 1 million m^3.

F10.25 - Non-domestic measured surface water drainage has increased by £15.6m or 26.7%. This is as a result of substantial price increases for SWD charges in the former East (192%) and West (16.7%) areas.

F10.26 - Non-domestic measured highway drainage is included in line **F10.25** for both 2002/03 and 2003/04, this reflects the existing tariff structure.

F10.28 to F10.29 - Non-domestic unmeasured wastewater income is now split between fixed and RV income. Total income has increased by £7.0m or 21.0%. Unmeasured wastewater income in 2002/03 was artificially understated by £9.5m, being the amount debited to income to create the income uncertainty accrual for meter rightsizing and data cleansing. The underlying movement in income was therefore a £2.5m reduction from 2002/03, which was largely as a result of the granting of abatement to all unmetered waste customers at 50%. This was not previously granted in either the former West or North areas.

2003/04 saw the introduction of fixed charges which were not in place in 2002/03, these changes affected customers from the former North and West areas with low RV's. Additionally the abatement received by customers in 2002/03 was rolled into the 2003/04 tariff and reflected in the increase year on year.

F10.33 - Trade Effluent income has remained fairly constant at £28.5m.

F10.35-47 Secondary Income – Water Related

F10.46 - Other income includes £7.4m of income from new trading activities, relating primarily to the sale of contracting services to Scottish Water Solutions, and the provision of water related services to major business customers.

F10.55-61 Bad Debt Provision in Year

F10.55 to F10.61 -See comments at F4.15 to F4.20.

G Tables Investment Plan (Actuals and Forecasts)

Table G presents Scottish Water's capital expenditure programme showing the actual expenditure in the Report Year and forecasts for future years. The outturn expenditure reported for 2003-04 was £388M against the £450M budget based on the level of funding agreed with the Scottish Executive. The target of £450M was reduced to £400m by the Scottish Water Board in January 2004.

There were a number of significant changes to the Investment Plan and delivery of the Capital Programme in 2003-04. The first was the agreement of the WIC 18 Baseline Programme with the Water Industry Commissioner and the decision to monitor the programme against the WIC 18 Baseline which resulted in the reconstitution of the programme and allocation of new project numbers to all projects. As Table G requires the reporting of all projects with expenditure in the price control period, expenditure on identified new obligations or other projects outwith the baseline programme are included. A number of these projects are awaiting confirmation of substitution funding.

Scottish Water Solutions as the delivery vehicle for a substantial proportion of the Q&SII programme came into being in September 2003. The capital programme is now divided into three areas for delivery purposes:

1. SWS – Allocated Programme
2. SWS – Managed Programme
3. SW Programme – Katrine Water Supply, Minor Capital Works and Support Services

Scottish Water Solutions had not completed the establishment of a baseline programme for phased expenditure by 31 March 2004. Individual projects and the total forecast expenditure for 2004-05 and 2005-06 may be subject to revision once their baseline programme has been finalised.

Scottish Water is entering into a Framework Agreement for the delivery of the Minor Capital Works Programme but this had not been finalised by 31 March 2004. A baseline programme for future phased spend will be established. The revised forecasts will be reported in the 2004-05 Quarter 1 Capital Investment Return.

The main focus for investment in the Report Year has continued to be legislatively driven quality improvements. As can be seen in the summary tables, compliance with Water Quality Undertakings in the Water Service sector and with Urban Wastewater Treatment Regulations in the Wastewater Service sector accounted for the most significant proportion of investment. However, considerable investment was also made on Infrastructure Renewals, accounting for approximately 24% of the 2003/04 programme.

Quality improvements continue to dominate the capital programme in future years although the level of capital maintenance is expected to increase to maintain compliance at existing sites. Expenditure on mains and sewer renewals will also be ramped up during 2004-06.

PPP and Spend to Save projects totalling £20.6M have not been included in the Return.

Strengths of submission

The financial information provided in G5 and G6 of the submission has been reconciled with Scottish Water's corporate finance system. The transfer of the three legacy financial systems to Peoplesoft 8.4 in 2003-04 enabled capital expenditure to be reported from a single financial system. The Life to Date expenditure has been fully reconciled between the Financial System and the Capital Investment Monitoring System (CIMS). The current year project information in G5 and G6, from which information in other tables is derived, represents the end-of-year position as reported in the fourth quarter capital investment return to the Commissioner, and as stated in the Statutory Accounts.

There have been considerable changes to the Capital Investment Monitoring System (CIMS) in the course of 2003-04. Access was extended across Scotland to enable all Project Managers to update their projects directly into the monitoring system rather than uploading spreadsheets from the former North and West areas on a monthly basis. An upgrade of CIMS to CIMS2 has been rolled out over a number of phases. This enables updating from Peoplesoft 8.4 on a daily basis and all Scottish Water projects to be updated directly by Project Managers. An interface has been built to enable monitoring of Scottish Water Solution projects to be input on a monthly basis from Primavera (P3e), the project management tool utilised by SWS. Improved reporting from the corporate system will be achieved by the end of Quarter 1, 2004-05.

Weaknesses of submission

The WIC 18 Baseline Programme reported agreed outputs to be delivered in the Q&SII period but these do not match the Regulatory Purpose and Output Measures. No percentage split was allocated to the output drivers in the WIC 18 Baseline Programme. The methodology to convert outputs to the Regulatory drivers where there were multiple outputs was as follows:

The output measures were considered first and the a percentage split allocated on the basis of the number of outputs. The purpose measures were then attached to the outputs measures and the purpose reflects the total of the outputs associated giving for example:

- Project with 4 quality outputs will have 25% to each output and purpose measure will be 100% quality.
- Project with 4 maintenance outputs and 1 quality output will have 20% to each output and 80% to capital maintenance and 20% to quality purpose codes.
- Project with one quality, one growth and one capital maintenance output will have 34/33/33 allocation to both purpose and output measures.

Applying this methodology may have resulted in the investment reported on quality, capital maintenance and growth being un-representative of the final output of the project or the total programme forecast being wrongly weighted. As the outputs percentage has been equally distributed, the expenditure on a particular driver in the summary tables may also have been wrongly weighted. The opex impact by driver is based on the percentage allocation to each output and therefore any inaccuracies in allocation will distort the opex impact reported in the Summary Tables.

Currently the Regulatory purpose and output measures and percentage splits are not included in Capex 3 submissions. However, this will be addressed and, once the Capex forms are created within the CIMS2, the appropriate % splits and any changes to purpose or output will be updated as approvals are sought.

Data

The confidence grading associated with actual financial information in G5 and G6 would be A1 / A2 as it is based on sound records and procedures. However, the overall confidence grade has been reduced to B3 due to inherent limitations in apportioning costs to purpose and output codes and incremental opex costs.

Section G Variance Analysis

The 2003/04 return reflects the efficiency targets set out in WIC 23 and the expenditure in 2002/04 reflects the actual expenditure incurred in each project. The future forecasts are the latest best estimate and therefore are deemed to be inclusive of an element for inflation. Indexation of the programme above the 1.5% allowed in the efficiency targets set is based on

COPI. The assumed indexation totals £97M over the 4 year period. The COPI index value used in 2003-04 was 136. This results in 1.157% over 2002-03 value.

Projects Cost Variance

As a project advances through the development stages of feasibility and options appraisal to reach an agreed target cost, the cost information and certainty improves. On obtaining an agreed target cost, any variance above the thresholds contained in the Capital Investment Approval Process requires a Capex 4 to be produced to explain the change in forecast and to seek approval to an amended scope and/or budget.

Project Variance from 2003 Return

Since the submission of the 2003 Return, the WIC 18 Baseline Programme has been agreed but Table G contains projects with actual and forecast expenditure which have been identified as New Obligations and require agreement on substitution funding. There are a number of projects which have incurred expenditure in the control period but do not form part of the Regulated Programme. Work is ongoing to confirm whether these projects will continue or be stopped or deferred to Q&SIII. Funding for those that will continue requires to be identified. A number of projects have been disaggregated from single lines in the 2003 Return.

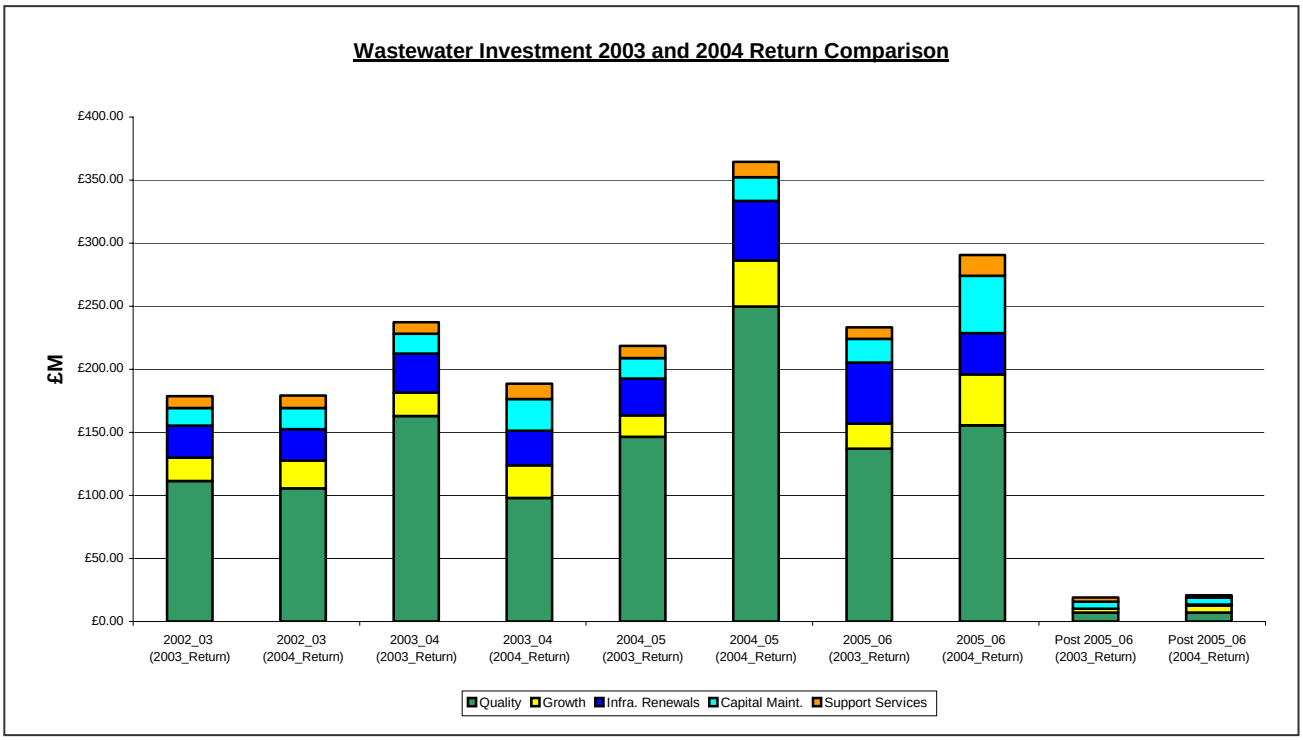
Comparison of Profiles

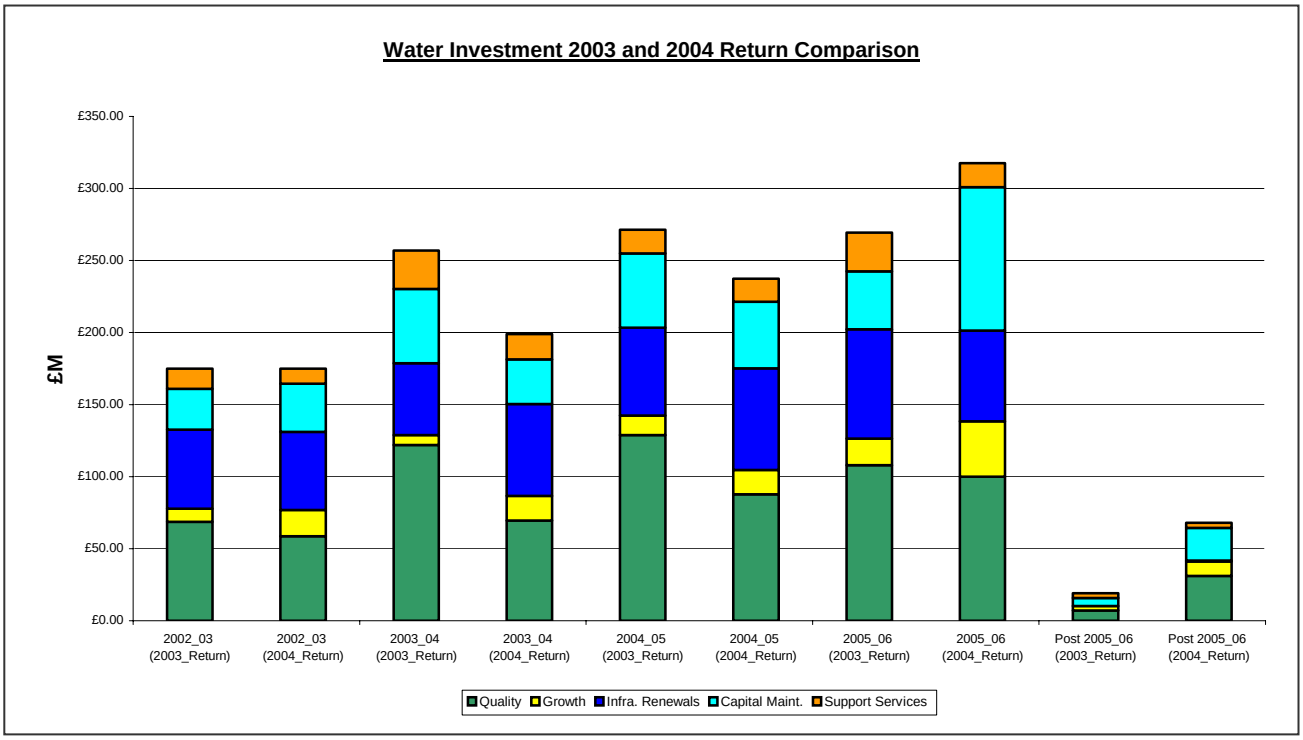
The table below compares the investment profiles of Section G, WIC 23 and the profile shown in the 2003-04 return. Scottish Water acknowledges the considerable difference; this is due to a revised funding profile agreed with the Scottish Executive.

	2002/03	2003/04	2004/05	2005/06
WIC23	£435M	£411M	£500M	£463M
2002/06 Funding Profile agreed with Scottish Executive	£350M	£450M	£480M	£520M
2003/04 June Return	£354M	£388M	£619M	£625M

Scottish Water Board has established a budget of £505M for 2004-05 although Table G indicates a higher value. Whilst this is partly due to a degree of over-provision to compensate for any unforeseen problems, e.g. planning approvals, which could delay any of the projects included in the programme, there are further factors affecting the 2004-06 values. These are based on March 2004 monitoring and include projects which may be identified for removal to fund projects awaiting funding substitution which are also reporting their forecast out-turn costs. The 2004-05 forecast will be subject to amendment with the finalisation of the Scottish Water Solutions baseline programme and the creation of a baseline for the Minor Capital Works.

Comparison of 2002-03 and 2003-04 Table G





The change in methodology to allocate purpose and output measures accounts for the variance in splits reported for 2002-03. The total investment in 2002-03 is reporting at £354M, rather than £353M previously reported. This was due to 2 projects previously identified in the Capital Investment Returns being wrongly classified as PFI in 2002-03 and the transfer of a number of IT projects from Spend to Save to the General Programme.

Investment Profile beyond 2006

Some carryover investment beyond 2006 is identified in the table, the principal project being Loch Katrine Water Supply. However a number of Water Quality Undertakings to be delivered to meet the 2008 deadline and Wastewater Quality projects, particularly related to EC6 Sludge (Use in Agriculture) Directive are also projecting expenditure beyond March 2006. Other projects have growth and capital maintenance drivers. No projections of the Q&SIII programme under development have been included.

Outputs Achieved 2003-04

The following Table indicates the WIC 18 Baseline Programme outputs delivered in 2003-04:

Output	Number Achieved 2003-04
1st time provision – water	55
Remove poor pressure risk	116
WQ Drivers	68
Mains Rehabilitated	592
Discharge Compliance	26
Remove Flooding risk	167*
1st time provision – sewerage	63
Sewers rehabilitated	48
UCSOs upgraded	65*

* See appendices 1 and 2 for outputs claimed not specifically identified against projects in Table G

Projects with No Asset Outputs

These projects fall into three categories:

- Projects that provide improved information and understanding of the existing assets, collection and distribution systems: This is achieved through development of Drainage Area Plans, Water Zonal Plans, PPRAs and establishment of DMAs. Area or Functional Strategies have also been progressed to consider the overall requirements of Scottish Water to meet quality standards and maintain appropriate levels of service. These enable prioritisation of investment and development of appropriate solutions to deliver the Quality and Standards outputs and identification of the lengths of mains and sewers which require rehabilitation in Q&SII and into the Q&SIII period. Investment of £19M has been incurred in 2003-04 and a further £6M is forecast over the next two years.
- Quality and Capital Maintenance Projects removed from Programme. Quality projects which have been identified as potential for substitution funding are reported with their actual expenditure on feasibility and, although indicating S10 in 2003-04, no asset outputs are attached. Capital maintenance projects with feasibility expenditure are also reported but their previous forecasts have been removed and rolled up into two Small Value Capital Projects funding lines to address priority needs for capital maintenance to ensure an appropriate level of service is maintained to customers.
- IT projects to deliver new or enhanced corporate systems e.g. CIMS and WAMS.

Confidence Grades G1-G4

As previously stated, the financial information on each project is reconciled with Scottish Water's corporate finance system and has a high confidence grade. However, the analysis applied to establish driver apportionment leads to a reduction in accuracy to +/- 5%.

Throughout the G tables there are slight rounding errors as the tables only allow Scottish Water to report to an accuracy of £1000.

Table G1 Summary - Water Service

Where no line comment is given, the information is a summary derived from Table G5.

G1.1-6 Base Service Provision

G1.1 – Base operating expenditure is calculated from total operating expenditure (E1b.26). Data is shown for the period up to 2006 data beyond the period is subject to the next review period.

G1.5 – This figure represents total Infrastructure Maintenance investment including renewals in the Report Year.

G1.7-10 Backlog

As projects have been disaggregated into the WIC 18 Baseline Programme, all WIC 18 projects have been reported as base service provision. The only projects reported as including backlog are a number of Minor Capital Works projects where backlog was identified as a driver.

Different approaches had been taken by predecessor Authorities in the allocation of base and backlog and it is considered inappropriate to continue to reflect this inconsistency.

G1.13-17 Growth

G1.17 – Additional operating expenditure is calculated through analysis of the proportion of capital spend allocated to the Output codes on each individual project and applying the same split to the operating costs.

G1.18-22 Grants and Capital Contributions

G1.18 – No grants for infrastructure assets were received in the report year.

G1.19 – Grants totalling £567.2k for non-infrastructure assets were received in the report year. These all related to EKP security upgrades.

G1.20 – No contributions are reported in the Report Year.Any contributions received from Roads Authorities, relating to New Roads and Streetworks Act projects, are not credited to the individual projects. These are reported net, as the assets created are not depreciable.

G1.21 – One contribution of £750k was received towards one quality non-infrastructure project was received in the report year.

G1.22 – No assets adopted or acquired at nil cost were included in the MEA value in Table D3.

G1.23-27 Expenditure Totals

G1.27 – The report year figure should match that in E1b.26, however due to rounding errors within the G tables there is a slight difference between these values.

Table G2 Summary - Wastewater Service

Where no line comment is given, the information is a summary derived from Table G6.

G2.1-6 Base Service Provision

G2.1 – Base operating expenditure is calculated from total operating expenditure (E2b.26). Data is shown for the period up to 2006 data beyond the period is subject to the next review period.

G2.5 – This figure represents total Infrastructure Maintenance investment including renewals in the Report Year.

G2.7-10 Backlog

As projects have been disaggregated into the WIC 18 Baseline Programme, all WIC 18 projects have been reported as base service provision. The only projects reported as including backlog are a number of Minor Capital Works projects where backlog was identified as a driver.

Different approaches had been taken by predecessor Authorities in the allocation of base and backlog and it is considered inappropriate to continue to reflect this inconsistency.

G2.13-17 Growth

G2.17 – Additional operating expenditure is calculated through analysis of the proportion of capital spend allocated to the Purpose Category codes on each individual project and applying the same split to the operating costs.

G2.18-22 Grants and capital contributions

G2.18 – No Grants for infrastructure assets were received in the Report Year in respect to wastewater assets.

G2.19 – No grants for non-infrastructure assets were received in the Report Year.

G2.20 – No contributions towards infrastructure projects were received.

G2.21 – One contribution from other parties of £5.4k was received in the Report Year.

G2.22 – No assets adopted or acquired at nil cost were included in the MEA value in Table D3.

G2.23-27 Expenditure Totals

G2.27 – The report year figure matches that in E2b.26. In future years, due to this line being a calculated field, the data appearing in this line reports the change in opex resulting from the compliance and growth programmes.

Table G3 Quality - Wastewater Service

Where no line comment is given, the information is a summary derived from Table G5.

G3.1-8 Drinking water directive

G3.2, G3.4, and G3.6 – the increase in opex costs shown in the Report Year reflects the incremental increase following completion of projects within 2002-03 and 2003-04. Changes have been identified for future years. Due to the application of the equal percentage allocation to all output measures, the opex calculation by driver may be distorted. No data is collected on the opex costs by driver as part of the Capex approval process. Unless a specific process can be attributable to a single output driver, an appropriate split by driver cannot be established. Any opex changes resulting from capital maintenance on non-infrastructure assets has been shown against DW3. Any opex changes resulting from capital maintenance on infrastructure assets has been shown against DW5.

G3.9-10 The Cryptosporidium Direction 2000

G3.10 – the increase in opex costs shown in the Report Year reflects the incremental increase incurred following completion of projects within 2002-03 and 2003-04. Changes have been identified for future years. As with Drinking Water Directive, it is not possible to split the opex impact against individual outputs unless a specific process can be wholly attributed to this driver.

G3.11-12 Water Mains Rehabilitation

Investment in Mains Rehabilitation is driven by the criteria of condition and serviceability.

G3.13-14 The Abstraction Directive

No investment has been identified against this Directive.

G3.15-16 The Birds Directive, The Habitats Directive

No investment has been identified against this Directive.

Table G4 Quality - Wastewater Service

Where no line comment is given, the information is a summary derived from Table G6.

G4.1-4 Driver WQ1: Control of Pollution Act 1974 Section 34

G4.2 – Opex savings identified against base and backlog non-infrastructure capital maintenance projects have incorporated into WQ1/1.

G4.15-26 Driver EC1: UWWTD Directive

EC1 continues to be the principal driver for quality investment in the Report Year with coastal waters accounting for the majority of spend. The opex increase resulting from upgraded levels of wastewater treatment in the Report Year and future years is primarily driven by UWWTD requirements. As the opex impact is calculated at project level, the split between drivers has been apportioned on the basis of the output measures percentage split.

G4.27-30 Driver EC2: Bathing Waters Directive

Although the Scottish Executive wished all projects with a Bathing Water driver to be completed in advance of the 2003 Bathing Water season, it has not been possible to

advance all projects to meet the change in deadline and investment will continue in future years. A number of projects delivered temporary solutions with the permanent solution to be completed at a later date. The opex implications are reported in appropriate years.

G4.31-34 Driver EC3: Shellfish Waters

The majority of expenditure to meet Shellfish Waters requirements is within 2004-06.

G4.35-38 Driver EC4: Freshwater Fish Directive

Minimal investment was made against this driver in the Report Year and the major spend will be incurred in 2004-06.

G4.39-40 Driver EC6: Sludge Directive

Expenditure in the Report Year relates principally to work on projects where sludge treatment facilities have been identified in association with wastewater treatment projects. The majority of expenditure forecast beyond 2005-06 is against EC6.

G4.41-42 Driver EC9: Dangerous Substances Directive

The majority of expenditure in the Report Year was incurred on the Linwood and Johnstone STWs Rationalisation Project with preliminary work on additional projects

Table G5-6 Project analysis – water and wastewater services

Commentary on these tables is on a column by column basis.

Authorities Investment Code (Column 1)

This is the unique number which identifies the project within the capital investment programme and CIMS2. There are a number of exceptions where projects required to be split to enable reporting of the water and wastewater asset outputs in G5 and G6. These are principally Support Services projects but Code 7703 has been split into 5 projects to report Minor Capital Works in the South West operational area. The codes reported include the CIMS2 code to enable these to be tied back to their original code.

Due to the number of lines available for reporting in G5 and G6, a number of programme groups have been aggregated and reported against a single code. These include WZPs, DAPs, PPRA, DAS projects and are reporting the total actual and forecast expenditure for the programme against a single project. As there have been Global Capex 1 approvals in respect of a significant proportion of the Sewer Rehabilitation Programme, these are reported against their allocated codes.

Two sets of mains renewal projects have been rolled together to report in G5 but the majority of mains renewal projects are reported against their CIMS2 project code.

To reduce the wastewater projects to fit G6, it has been necessary to roll-up a number of pump stations refurbishment projects to a single code and two sets of CSOs have been similarly rolled up. These have been given dummy codes and an audit trail of the projects rolled up is available. Projects with expenditure of less than +/- £100 in Q&SII period have been rolled up to single projects in G5 and G6.

Project Title (Column 2)

This is the title defined by Scottish Water and is taken directly from the capital investment programme and CIMS2. The only exceptions are the projects which have been rolled to a single code to reduce the number of projects in G6.

Status Code (Column 5)

The project status code is taken from the pre-determined set of codes, which reflect the current stage of the project. Progress on projects is updated monthly through CIMS2 and status codes are adjusted to indicate the milestones which have been achieved. The S8 construction code has been used for all rolling programmes where there are asset outputs to be reported in 2003-04 although some elements of the project may be at any stage from identification of investment need through to project hand-over.

Design Code (Column 6)

The appropriate codes have been allocated to projects to reflect the design route being progressed. Projects that have not progressed to feasibility stage are largely being reported as D0. All projects identified for delivery by Scottish Water Solutions are shown as D6.

Procurement Code (Column 7)

The procurement code reflects the principal procurement route for each project, although a number may employ more than one procurement route. All projects identified for delivery by Scottish Water Solutions are shown as P6.

Expenditure Profile (Columns 7.1-16)

The sums entered are total capital expenditure including design and supervision costs. The total expenditure column, which sums up the individual years, is formatted in £millions. The Report Year financial information held in CIMS2 has been reconciled with the corporate finance system. A consistent approach to accruals has been adopted across Scottish Water which will ensure that the corporate finance system and CIMS2 reflect the value of work done and are reconciled.

Total Change in Operating Costs (Column 17)

The information on changes in operating costs has been derived from a number of sources. These include opex costs of existing assets, operational experience and use of manufacturers' data where Scottish Water has limited or no experience of operating certain treatment processes. The effects of new investment take account of changes in staffing levels, rent and rates, power costs, chemicals and other consumables, monitoring and sampling costs. The WIC 18 baseline opex value has been used for projects which are pre-Capex 3 and the approved Capex 3 opex value has been used for projects at Capex 3 or beyond. Any amended change in forecast opex resulting from an approved Capex 4 application or Capex 5 approval will be updated.

Year of Commissioning (Column 18)

This is the planned year of commissioning and is entered in financial year format. The information entered is taken from CIMS2 for the majority of projects. However, to enable the commissioned asset information to feed into Tables D1 – D3, rolling programmes are being reported with a year of commissioning of 2003-04 but only the elements completed in 2003-04 are shown in the asset columns. This is in accordance with reporting practice for previous years.

Total Contributions (Columns 19-20)

Total contributions refer to the values of grants or contributions from third parties received in the Report Year and the totals shown in the summary tables represent payments received against these projects. These include security grants and contributions from individuals or organisations to quality upgrades or capital maintenance. No infrastructure grants or contributions towards New Roads and Streetworks Act work (NRSWA) from Roads Authorities are shown as these are not credited to projects which are reported at net expenditure as the assets cannot be depreciated.

No grants or contributions have been shown in future years.

Capital Expenditure Analysis (Columns 21-23)

This is split into the three areas of contract costs, design and supervision costs, and other direct costs. These are expressed as a percentage of the total project costs. Information has been extracted from CIMS2 for completed projects. Projects which have received Capex 3 approval and an agreed target cost reflect the expenditure split identified on the Capex form. Future projects have been extrapolated on the basis of the likely design and procurement routes.

For design and build contracts, there may be misallocation between design and contract costs.

Purpose Analysis by Investment Category (Columns 24-33)

Purpose analysis by investment category has been undertaken on a project by project basis. As the WIC 18 Baseline Programme did not allocate percentage splits to projects with a combination of quality, capital maintenance and growth drivers, the methodology outlined in the General section has been applied. As the current Capex 3 does not update the Purpose and Output analysis, these have not been updated when the project has received approval for a defined scope and target cost. However, this will be addressed as part of the CIMS2 upgrade where Capex forms will be created and stored within the monitoring system. Minor Capital Works reflect the purposes identified through the Capex approval process. Purpose codes have been matched to output measures.

Output Measures (Columns 34-43.5)

For quality purpose codes, there has been a straight mapping to quality output measures. Multiple output measures have been allocated the appropriate percentage split based on methodology outlined above. Quantities are reported as follows:

DW1 – DW5 – number included in WIC 18 Baseline Programme. This does not reflect the number of Water Quality Undertakings that will be delivered by the project which may cover more than one water quality zone.

EC1/1, EC1/3, EC1/5, EC2/1, EC3/1, EC4/1, EC2/1, EC3/1, EC4/1, WQ2/2 – the number relates to the number of uCSOs on the agreed list. Where there are multiple outputs against the same CSO, the quantity is reported against the first EC output.

EC1/2, EC1/4, EC1/6, EC2/2, EC3/2, EC4/2, EC8, WQ1/1, WQ2/1, WQ3 – the number relates to the number of continuous discharges in the WIC 18 baseline addressed by the project. Where there are multiple outputs, the quantity is reported against EC or the WQ1.

For non-quality purpose codes the quantities indicated for output measures are as follows:

- Wa1 – it is currently not possible to evaluate the impact on the weighted water quality index resulting from an individual project. These have all been shown as 0.

- Wa2 and Wa4 – as there are no WIC 18 Baseline programme outputs, the value has been left as 0.
- Wa3 – the number of properties which will be removed from the Poor Pressure Register have been shown. Projects with no specified number of properties have been shown as 0 where pressure has been identified as a driver.
- Wa5 – where a project showed a length of main to be rehabilitated in the WIC 18 baseline, this value has been shown. For projects with no length, or non mains renewal capital maintenance, the value has been left as 0.
- Wa6 – as there are no WIC 18 Baseline Programme outputs, the value has been left as 0.
- Ww1 – the number of properties removed from the Internal Flooding Register is indicated by projects reported as complete in the Report Year and rolling programmes reporting only the asset outputs delivered in 2003-04. For future years, the quantities reported may be subject to change as the projects are developed.
- Ww2 and Ww3 – as there are no WIC 18 Baseline Programme outputs, the value has been left as 0.
- Cs1 – this output measure has not been used.
- Cs2 – as this output measure is included against Capital Maintenance where the purpose measure is picked up in the Summary Tables, there is a duplication of expenditure calculated in Tables G5 and G6. However, the values feeding through to the Summary Tables is correct as Cs2 does not contribute to the G1 or G2 values. A list of the projects with Cs2 outputs and the benefits to customers are shown in Appendix 3.

Where purpose codes of WM3 or SM3 have been used for Support Services, these codes have also been entered as output measures.

A list of projects delivering requirements of the Security and Emergency Measures Directive and the Code of Practice for Security of Service Reservoirs are shown in Appendix 4.

Asset Replacement or Refurbishment (Columns 44-93)

Report year assets have been coded on the basis of actual assets replaced or refurbished using asset codes and size banding from Table H definitions. Where there were more than five asset types included within a single project, these have been rolled up to enable the reporting to be as representative as possible of the investment incurred. Costs have been allocated on the basis of the total project expenditure given in column 16. The expected assets to be replaced or refurbished through future projects have been similarly entered. For projects commissioned in the Report Year, prior and post condition, performance and risk grades were provided from the 2002-03 Asset Inventory and from the 2003-04 Table H Existing Asset Inventory. The performance, condition and risk grades prior to investment for future years are derived from the 2003-04 Table H Existing Asset Inventory. The performance, condition and risk grades post investment are derived from the 2003-04 Table H Future Asset Inventory as the anticipated changes to assets have been modelled. For rolling programmes, the codes, quantities and costs reflect the assets commissioned in 2003-04 and therefore the future asset outputs and costs do not feed through to the appropriate rows in Table H.

Due to rolling programmes on mains renewals and sewer rehabilitation, Table G does not reflect the lengths and investment on infrastructure renewals fully in the asset tables. It is anticipated that the lengths replaced or rehabilitated will achieve the values established in the WIC 18 Baseline programme by 2005-06.

New and Enhanced Assets (Columns 94-108)

Report year assets have been coded on the basis of actual assets created or enhanced using asset codes and size banding from Table H definitions. Where there were more than

five asset types included within a single project, these have been rolled up to enable the reporting to be as representative as possible of the investment incurred. Costs have been allocated on the basis of the total project expenditure given in column 16. Future assets types and size bands have been estimated on the basis of the likely solutions to be delivered. For projects beyond Capex 3 the assets reported reflect the expected assets to be commissioned. For rolling programmes, the codes, quantities and costs reflect the assets commissioned in 2003-04 and therefore the future asset outputs and costs do not feed through to the appropriate rows in Table H.

It should be noted that the investment recorded against asset outputs may give a misleading impression of the costs of removing CSOs from the unsatisfactory CSO list. Where the solution requires the laying or upsizing of significant lengths of sewer to enable the elimination or improvement of individual CSOs, the civil costs reported against CSOs may form a relatively minor part of the project. Similarly, the removal of a CSO from the Unsatisfactory list may be achieved through upgrades of Wastewater Treatment Plants or pump stations.

Depreciation (Columns 109-115)

For completed projects and projects under construction, depreciation types have been allocated on the basis of the WIC definitions and the asset life classification being utilised in the Scottish Water Fixed Asset Register. Data has been extracted from Capex 5 forms and Completed Asset Data forms. Depreciation for future projects has been projected on the basis of the anticipated asset types resulting from the likely solutions to be delivered.

Appendix 1

Flooding Outputs not claimed in 2002-03

Carluke – Crossford, Lanark Road	5
Kilbarchan Sewer Flooding Relief – Low Barholm / Tandlehill	4
Coatbridge – Haddington Way – Sewer Augmentation	7
Glasgow – Avonspark Street	2
Edinburgh – Haddington – Church Street	2
Edinburgh – Greenbank Road	2
Kinross Sewerage Scheme – Smith Street	4
Stranraer, Mayfield Avenue	1
Alloa West Sewers	2
	Total 29

Appendix 2

UCSOs – Outputs identified as delivered without need for asset creation or enhancement:

41 CSOs on the list of 439 CSOs in the WIC 18 baseline programme are no longer classed as unsatisfactory

Appendix 3

Cs2 Projects

The attached table details the projects with Cs2 as one of their output measures and the benefits resulting for customers.

Project Code	Project Title	Benefit to Customer
4065	ALNESS MR	Reduction in pressure problems, interruptions and improved water quality
4066	BADACHRO - SIDHEAN NAH AIRDE BRANCH MR	Reduction in pressure problems, interruptions and improved water quality
4067	BARBARAVILLE MR	Reduction in pressure problems, interruptions and improved water quality
4068	BONAR BRIDGE MR	Reduction in pressure problems, interruptions and improved water quality
4069	BROOMHILL MR	Reduction in pressure problems, interruptions and improved water quality
4070	BRORA MR	Reduction in pressure problems, interruptions and improved water quality
4071	DULNAIN BRIDGE MR	Reduction in pressure problems, interruptions and improved water quality
4072	EDDERTON MR	Reduction in pressure problems, interruptions and improved water quality
4073	EMBO MR	Reduction in pressure problems, interruptions and improved water quality
4074	KILMUIR BRANCH MR	Reduction in pressure problems, interruptions and improved water quality
4075	MARYBURGH MR	Reduction in pressure problems, interruptions and improved water quality
4076	MILTON MR	Reduction in pressure problems, interruptions and improved water quality
4077	MULCHAICH PRV DMA MR	Reduction in pressure problems, interruptions and improved water quality
4078	MUIR OF ORD MR	Reduction in pressure problems, interruptions and improved water quality
4079	POOLEWE MR	Reduction in pressure problems, interruptions and improved water quality
4080	PORT NIS MR	Reduction in pressure problems, interruptions and improved water quality
4081	TORE MR	Reduction in pressure problems, interruptions and improved water quality
4082	THURSO ORMLIE DMA MR	Reduction in pressure problems, interruptions and improved water quality
4083	ULLAPOOL MR	Reduction in pressure problems, interruptions and improved water quality
4084	ABERDEEN WATER SUPPLY - WELLINGTON RD	Reduction in pressure problems, interruptions and improved water quality
4085	BALNAGOWAN MAINS RENEWAL (SHANDWICK MAINS)	Reduction in pressure problems, interruptions and improved water quality
4087	A92 DUNDEE TO ARBROATH TRUNK ROAD - ALTERATIONS TO WM	Reduction in pressure problems, interruptions and improved water quality
4089	GAIRLOCH MAINS RENEWAL (DESIGN)	Reduction in pressure problems, interruptions and improved water quality
4090	INVERASDALE MAINS RENEWAL (DESIGN)	Reduction in pressure problems, interruptions and improved water quality
4091	MULBUIE (BLACK ISLE) MAINS RENEWAL (DESIGN)	Reduction in pressure problems, interruptions and improved water quality
4092	KILCHOAN MAINS RENEWAL	Reduction in pressure problems, interruptions and improved water quality
4093	BONAR BRIDGE ZONAL MAINS RENEWAL	Reduction in pressure problems, interruptions and improved water quality
4094	WATER MAINS RENEWALS 2002 - 2003 - TAYSIDE WEST AREA	Reduction in pressure problems, interruptions and improved water quality
4095	WATER MAINS RENEWALS 2002 - 2003 – TAYSIDE EAST AREA	Reduction in pressure problems, interruptions and improved water quality
4096	WATER MAINS RENEWALS 2002 - 2003 - GRAMPIAN	Reduction in pressure problems, interruptions and improved water quality
4097	WATER MAINS RENEWALS 2002 - 2003 - FINDOCHTY	Reduction in pressure problems, interruptions and improved water quality
4098	WATER MAINS RENEWALS 2002 - 2003 - FRASERBURGH PHASE 2	Reduction in pressure problems, interruptions and improved water quality
4099	MULCHAICH PHASE 2 MR (CONSTRUCTION)	Reduction in pressure problems, interruptions and improved water quality
4100	STRATHPEFFER (UPPER) MR DESIGN	Reduction in pressure problems, interruptions and improved water quality
4101	TULLICH MR DESIGN	Reduction in pressure problems, interruptions and improved water quality
4102	SOUTH HOY AND FLOTTA WMR	Reduction in pressure problems, interruptions and improved water quality
4103	MARYBURGH MR (DESIGN)	Reduction in pressure problems, interruptions and improved water quality
4104	KILTARLITY MAINS RENEWAL	Reduction in pressure problems, interruptions and improved water quality
4105	GOLSPIE MAINS REPLACEMENT	Reduction in pressure problems, interruptions and improved water quality
4106	CLAYSIDE (BRORA) WATER MAINS RENEWALS	Reduction in pressure problems, interruptions and improved water quality
4264	DUNDEE - CLATTO TO JEANFIELD AUGMENTATION	Reduction in pressure problems, interruptions and improved water quality
5473	INVERNESS WATERMAINS REPLACEMENT	Reduction in pressure problems, interruptions and improved water quality
5662	GILBERTSON ROAD, LERWICK MR	Reduction in pressure problems, interruptions and improved water quality
5664	LOCHINVER MR - DESIGN	Reduction in pressure problems, interruptions and improved water quality

5665	BALAGUNLOUNE MR - CONSTRUCTION	Reduction in pressure problems, interruptions and improved water quality
7616	INVERURIE WWTP-ODOUR SURVEY	Identify cause of apparent odour problem
8299	UNALLOCATED NORTH MAINS RENEWALS	Reduction in pressure problems, interruptions and improved water quality
8329	N - Garmouth Septic Tank Outfall	Remove outfall from popular fishing pool
8478	Nairn WWTP Peracetic Acid Dosing and Odours	Address odour problem
8515	Killen Pump Upgrade	Improve and maintain steady water pressure and avoid interruptions
8518	Kilcoy Redcastle MR	Reduction in pressure problems, interruptions and improved water quality
8519	Elgin Kellas River Crossing Repairs	Risk assessment - not progressed
8554	Culloden Castle Stuart MR	Reduction in pressure problems, interruptions and improved water quality
8628	Troqueer WWTW - Odour Control Equipment	Identify cause and address odour problem
8745	ELECTROCHLORINATION & CHLORAMINATION AT SANDY LOCH WTW & EELA WTW	Address odour and taste complaints
9016	Pitcalzean Pump Upgrade	Improve and maintain steady water pressure and avoid interruptions
9127	KEISTLE PUMP UPGRADE	Improved water quality
9528	TAIN WWTP - ODOUR AND COMPLIANCE	Reduce odours in vicinity
9679	LAGGAN ST - SOAKAWAY	Address concerns about soakaway
9694	LOCH DUNTELCHAICH - MR FOOTE	Address any problem of SW affecting private water supply
9695	BALNAIN INLET IMPROVEMENTS	Ensure adequate raw water supply to WTW
9704	Acharacle Damaged Field Drainage	Improve field flooding following previous MR project
9708	Uig Earlish Pressure Sustaining Control	To maintain pressure during peak flow

Appendix 4 – Security Projects

Projects addressing security measures as part of the Security and Emergency Measures Directive or Code of Practice for Security of Service Reservoirs are reported with a number of different purpose and output measures as shown below. In some instances this reflects the original codes allocated when projects commenced.

Project Code	Project Title	Purpose Code(s)	Output Code(s)
54	ALNWICKHILL/FAIRMILEHEAD WTW SECURITY	WM2, WM1	Wa6, Wa5
1217	SECURITY	SM3, WM3	SM3, WM3
1218	SERVICE RESERVOIR SECURITY	WM2	Wa6
1842	TREATMENT WORKS SECURITY	SM2	Ww3
3121	PENINVER CWT - SECURITY COVER REPLACEMENT	WM2	Wa6
3122	KILCHATTAN CWT - SECURITY COVER REPLACEMENT	WM2	Wa1
3123	TIGHNABRUAICH CWT - SECURITY COVER REPLACEMENT	WM2	Wa1
3124	COLINTRAIVE CWT - SECURITY COVER REPLACEMENT	WM2	Wa1
3125	CARRICK CASTLE CWT - SECURITY COVER REPLACEMENT	WM2	Wa1
3126	CAIRNDOW CWT - SECURITY COVER REPLACEMENT	WM2	Wa1
3646	SERVICE RESERVOIR WATER QUALITY & SECURITY IMPROVEMENTS	QW1	DW3
3978	UNALLOCATED ESW WIDE SECURITY WTW	WM2	Wa6
4232	ROSS PRIORY/ GLENHOVE SECURITY	QW1, WM1	DW3, Wa5
4387	SR SECURITY - COVER REPLACEMENT	WM2	Wa6
5079	MILLHALL SR INTERNAL & PERIMETER SECURITY	WM2	Wa6
5454	SECURITY (WASTEWATER)	SM3	SM3
6684	ALNWICKHILL/FMH WTW SECURITY - HIGH LEVEL SECURITY	WM2	Wa6
6685	ALNWICKHILL/FMH WTW SECURITY - NON-VP ELECTRONIC & PHYSICAL SECURITY	WM2	Wa6
6686	ALNWICKHILL/FMH WTW SECURITY - SECURITY FENCING	WM2	Wa6
7031	CASTLE KENNEDY WWTW - REPLACEMENT SECURITY FENCE	SM2	Ww3
7508	CLATTO/BLACKWATER SECURITY PH1	WM3	WM3
7509	SECURITY SCHEME FOR CLATTO DEP	WM3	WM3
7514	INVERCANNIE/BULLION SECURITY	WM3	WM3
7518	CP SECURITY OF SERVICE RES.	WM3	WM3
7519	SR SECURITY- COVER REPLACEMENT	WM2	Wa6
7728	AIRDRIE - DALMACOULTER SERVICE RESERVOIR - EKP SECURITY WORKS	WM2	Wa1
7729	SECURITY OF SRS - RETENTION	WM2	Wa1
7730	SENSITIVE SITES SECURITY	WM2	Wa1
7731	SERVICE RESERVOIR - PHYSICAL SECURITY - PHASE 1 ENHANCED SITES	WM2	Wa1
7732	BRADAN WTW - EKP SECURITY WORK	WM2	Wa1
7733	GLASGOW MILNGAVIE WTW - EKP SECURITY WORK	WM2	Wa1
7755	TREATMENT WORKS - PHYSICAL SECURITY UNALLOCATED	WM2	Wa6
8014	UDSTON SERVICE RESERVOIR , HAMILTON - SECURITY COVER REPLACEMENT	WM2	Wa1
8318	UNALLOCATED SERVICE RESEVOIR SECURITY MEASURE	WM2	Wa6
8342	Inverurie WWTW Security	SM2	Ww3
8487	NW Area SR Security Upgrade	WM2	Wa1
8490	North Strategic WWT Works-Security System Enhancement	SM2	Ww3
9651	GLASGOW RAW RESERVOIRS SECURITY	WM2	Wa6

H Tables – Asset Inventory and System Performance

Methodology, Data sources and Assumptions

- The Current Asset Inventory is produced using the WIC definitions and created in the SW Asset Management System.
- A structured approach has been adopted, grouping the Asset Data into the key components and analysing each of these areas for gaps in X factors, condition / performance grades and EARC calculations.
- The Gaps in X factors have been populated using simple extrapolations based on the data present. The commentary in each sub section defines in detail the methodologies for these extrapolations.
- The gaps within Condition and Performance have been dealt with in a similar methodology. In each WIC grade (Non Infrastructure only), an analysis was carried out to obtain the percentages of population in each grade at the sub asset level. This is the basis for the main extrapolation. To allocate the missing grades a methodology was then applied by using table G outputs for base maintenance by project, by site, to prioritise the allocation of missing condition and performance grades to sub assets within these projects.
- Data sources for the Asset Inventory are Ellipse for non-infrastructure and INMS for infrastructure.
- EARCs are imported from the Table J cost base.

Asset Information Improvement Strategy

Asset information improvements are being delivered primarily through two Transformation improvement programmes: IT Rationalisation and Asset Data Improvement, and functional strategy delivery. The former two programmes of activity contain various projects focussing on data improvement, system development, and process delivery.

As part of the development of a Work & Asset Management System (WAMS) for Scottish Water, a new single asset inventory was completed at the end of March 2003, consolidating data from the legacy authorities' systems. This was used for the 2002/03 return and has been updated during 2003/04 to become more robust, as part of the overall development of WAMS for implementation in April 2004.

The Asset Data Improvement Project, which is programmed up to March 2006, is addressing data completeness and accuracy shortfalls from the predecessor authorities.

As a result of the above initiatives, the data in this year's return is more robust than the 2002/03 submission.

Asset Information Improvement Strategy

The following items have improved the quality of this year's return.

- Site survey of 330 treatment works and pumping station sites.
- An independent external audit of the condition and performance of asset stock and related extrapolation models.
- Desk top and survey assessments of 1,000 pumping stations.
- Power, efficiency and pumping head surveys and assessments on 20% of Scottish Water's pumping station assets, accounting for 80% of total power used for pumping.
- Creation of a single standard asset hierarchy/structure and coding system allowing improved asset costing.
- Re-classification of all water mains and sewers in terms of grassland, urban or rural.
- Delivery of the new Work and Asset Management System 6 months ahead of programme.
- Delivery of the new Geographical Information System, providing the first ever consolidated view of infrastructure inventory data across Scotland.

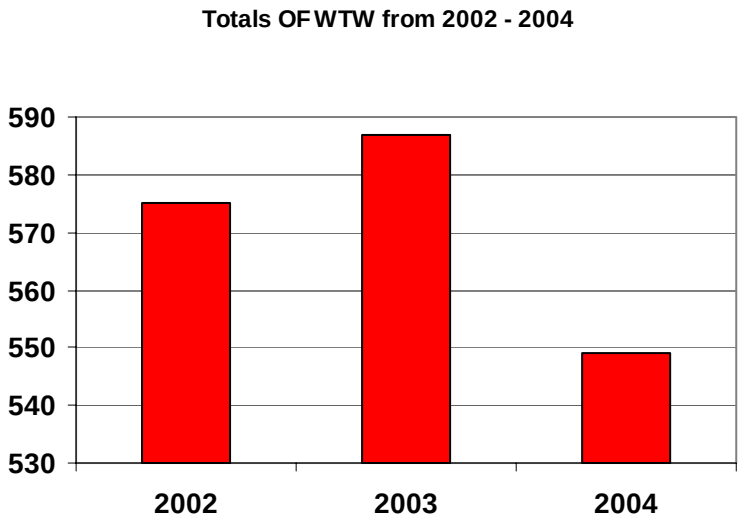
- Establishment of an Asset Information Help Line, Mailbox and Intranet Page, which have received over 200 contacts in their first three months of operation, 25% of which have led to data improvement and the others to better dissemination of information and increased use of corporate, as opposed to local, information sources.
- Delivery of preliminary information management processes and Data Management Plans.

Table H1-H6 Asset inventory

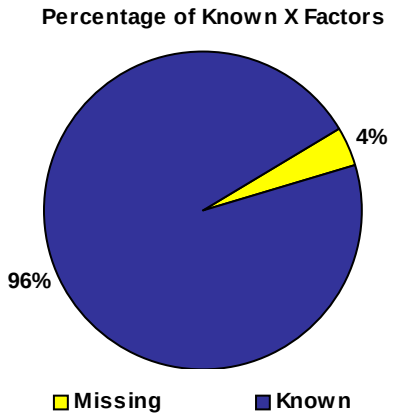
Table H2 Water Non-Infrastructure

H2.1-8 Water Treatment Works

Asset Stock

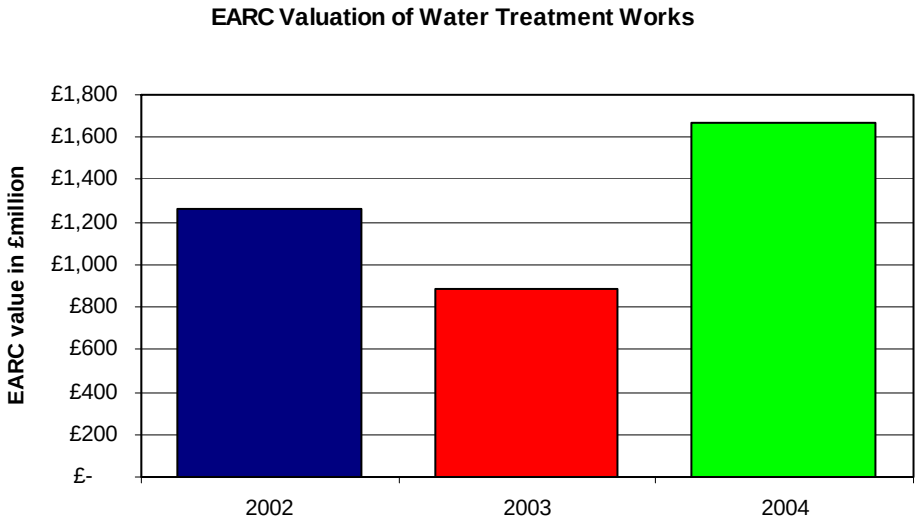


The total number of works has decreased 587 in 2003 to a total of 549 in 2004, a difference of 38 sites. This is mainly due to a desktop exercise carried out to validate the existence of all sites, their operational status and their design capacity.



The above pie chart shows a high percentage of known X factors (design capacity) for Water Treatment works. The small percentages of missing works are redundant works and are assumed to be in the lowest size banding for works.

Asset Valuation



The Asset valuation for 2004 has increased by 87% on last year, from £890 million in 2003 to £1.667 billion in 2004. This is mainly due to the methodology for valuing Water Treatment Works has been vastly improved compared with previous years.

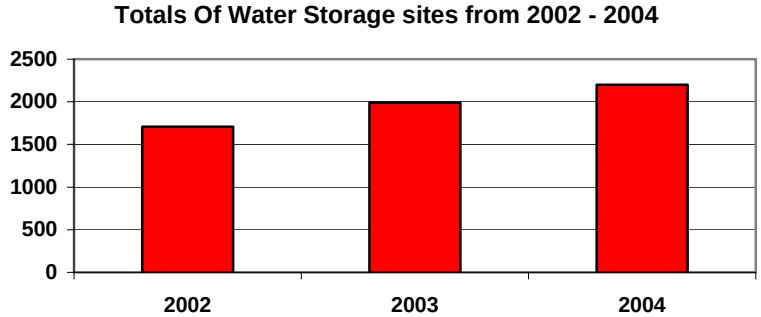
A high level cost equation has been produced for each type of water treatment works (WIC Grades 1 – 8). The graph used is size (Ml/d) against cost. The data points have been obtained by building up cost estimates for existing "live" water treatment works using the sub assets and SW's cost equations to develop a total "site" cost. These cost equations are then used to price the full asset inventory at asset level with the costs allocated to the sub assets by a pre determined weighted basis. (Power curves were generated for each WIC Grade and for both Civils and M&E).

The previous years valuation of the EARC's was based around an assumed level of number of sub assets required for each treatment category based on a simplified understanding of the processes required to comply with the WIC definitions. The cost equations were then converted from their normal descriptor (m3, kW etc) to match the descriptor for Table H, ie Ml/d.

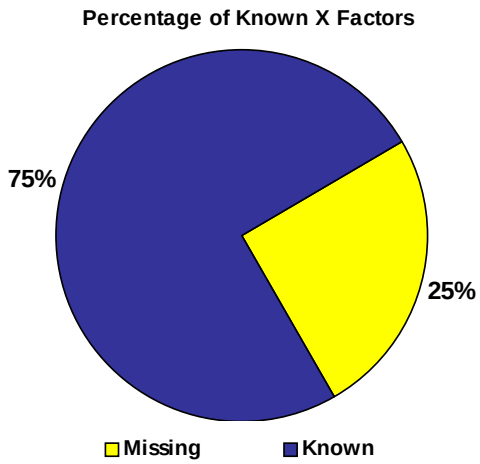
As this years methodology is based around real assets and sub assets with estimates built up from the sub assets tank size, power rating for pumps etc, to produce a series of data points for each WIC Grade, the EARC values for water treatment works is being more robust than the value produced by the previous years approach.

H2.9-10 Water storage

Asset Stock

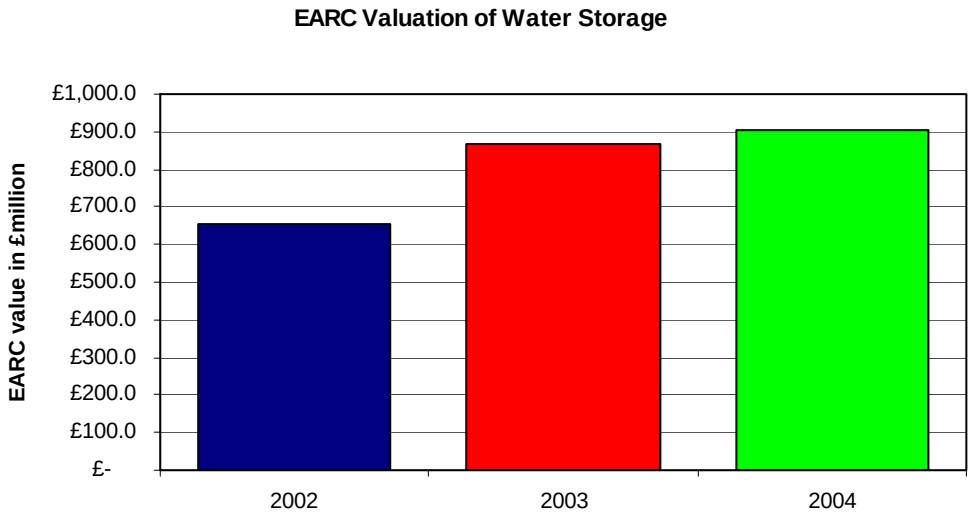


The total number of Water Storage sites has increased from 1989 in 2003 to a total of 2199 in 2004, a difference of 210 sites. This is mainly due to a desktop exercise carried out to validate the existence of sites, their operational status and their design capacity.



The above chart shows that the asset valuation was based on having X factors for 75% of Water storage sites. The Missing 25% was based on an extrapolation of the 75% known water storage sites. The methodology for the extrapolation was to group the sites by Area. type (Break Pressure Tank, Clean water tank, service reservoir and Water tower) and categorise it into the WIC s size band based on the known design capacity. This data is then converted into a percentage in each of the above areas, which gives the basis for the extrapolation across the whole asset stock.

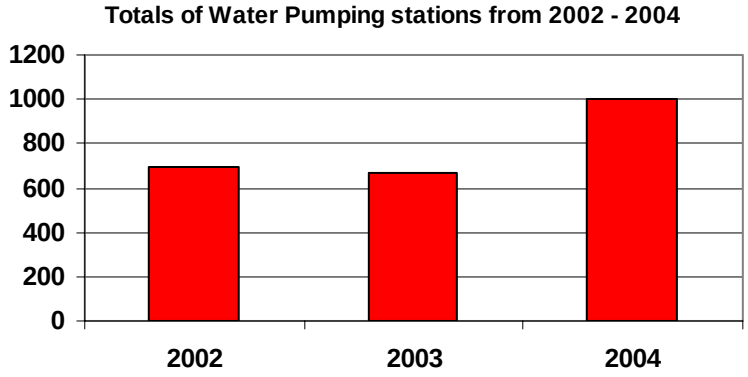
Asset Valuation



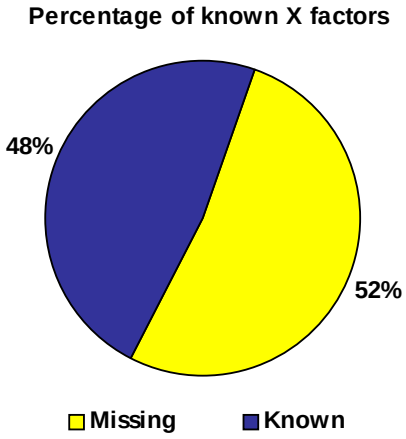
The asset valuation for 2004 has increased by 4% on last year, from £867.3 million in 2003 to £906.2 million in 2004. This is mainly due to the identification of more Water storage sites, which had not been identified in previous other returns.

H2.11-13 Water pumping stations

Asset Stock

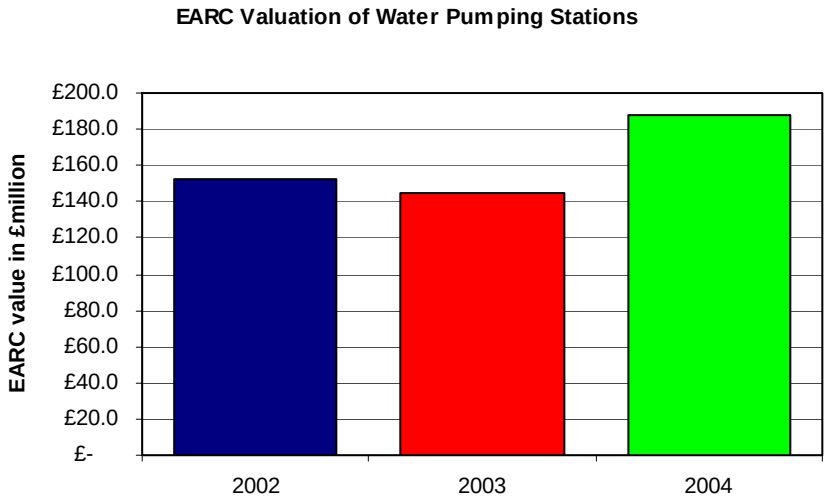


The total number of Water pumping stations has increased from 672 in 2003 to a total of 1005 in 2004, an increase of 333 sites. This is mainly due to a desktop exercise carried out to validate the existence of all sites, their operational status and their Kilowatt rating.



The above chart shows that the asset valuation was based on having X factors for 48% of Water Pumping Stations. The Missing 52% was based on an extrapolation of the 48% known Water Pumping stations. The methodology for the extrapolation was to group the sites by their WIC grade, then grouped by Area and categorise it into the WIC s size band based on the known Kilowatt rating. This data is then converted into a percentage in each of the above areas, which gives the basis for the extrapolation across the whole asset stock

Asset Valuation

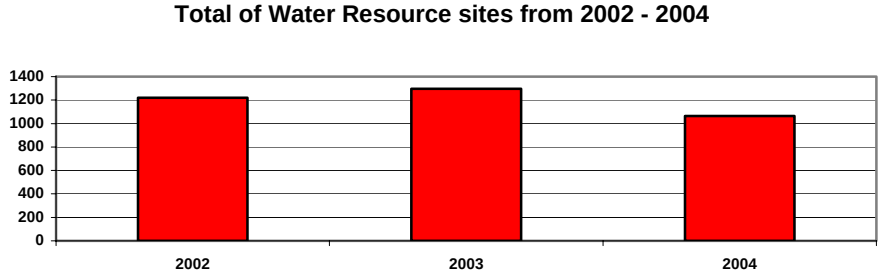


The asset valuation for 2004 has increased by 30% on last year, from £144.5 million in 2003 to £188.3 million in 2004. This is mainly due to the identification of more Water Pumping stations, which had not been identified in previous other returns. The Total kW rating overall has risen from 52,065kW to 81,149kW in 2004.

Table H3 Water Infrastructure

H3.1-3 Water Resources

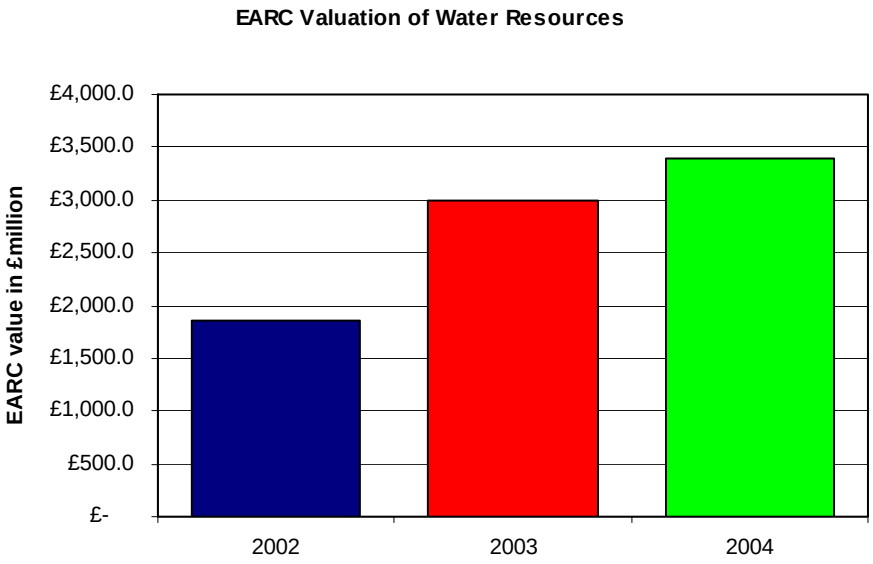
Asset Stock



The total number of Water resources has decreased from 1296 in 2003 to a total of 1065 in 2004, a decrease of 231 sites. This is mainly due to a desktop exercise carried out to validate the existence of all sites and their operational status.

The above chart shows that the asset valuation was based on having X factors for 46% of Water resources. The Missing 54% was based on an extrapolation of the 46% known Water Resources. The methodology for the extrapolation was to group the sites by their WIC grade, then group by Area and categorise it into the WIC s size band based on the known flow rating. This data is then converted into a percentage in each of the above areas, which gives the basis for the extrapolation across the whole asset stock

Asset Valuation



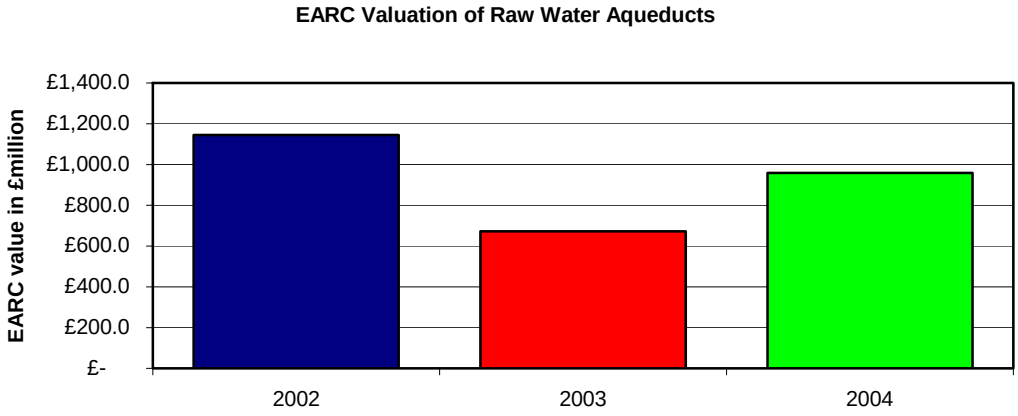
The asset valuation for 2004 has increased by 14% on last year, from £2991.5 million in 2003 to £3397.3 million in 2004. This is due to a change in the cost equation. The cost equations have been up dated with additional data points captured from projects analysed.

H3.3 Raw Water Aqueducts

Asset Data

The total Length of Raw Water Aqueducts has decreased from 2393.1 km in 2003 to a total of 1876.4 in 2004, a decrease of 516.7 km. This is partly due to the decommissioning of a number of smaller treatment plants and their associated raw water main infrastructure and partly due to better information.

Asset Valuation



The asset valuation for 2004 has increased by 43% on last year, from £672.2 million in 2003 to £959.4 million in 2004. This is due to an improvement of the methodology for valuation.
The asset inventory was supplied in two separate parts and EARC'ed using the following two methods.
16A - WIC Grade 16A is underground pipelines and has been valued as per Water Mains (WIC Grades 17 & 18). Gross EARC value £505m. Last year only one cost equation was used. This year there is three separate cost equations, one each for grassland, rural/suburban & urban.

16B - WIC Grade 16B is pipelines above ground on supports. This has been valued using the 2004 water mains grassland cost equation, uplifted by 20% for a location factor and 15% for a live working percentage (in line with Q&S3).

Methodology

The base data on raw water mains and aqueducts has been taken from the corporate GIS. The condition and performance grading of raw water mains has followed the principles developed for the potable water main asset stock. The condition and performance of aqueducts has been derived from sample field surveys.

Strengths of submission

The raw water main asset stock has been extracted from the new unified corporate GIS, which is an improvement on the previous return where data was extracted from 3 legacy systems which recorded these assets in separate formats.

Issues with data

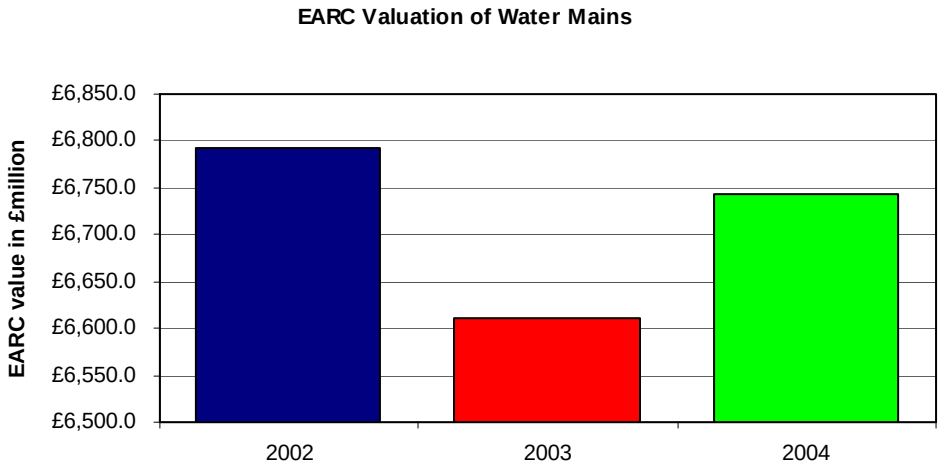
Historically data cleansing of GIS records for raw water main assets has not achieved the same level of investment as that for potable mains. This is due to the lesser use being made of the GIS on a day to day basis for operating this asset stock. Attribute data for raw water mains is therefore still relatively poor.

Comparisons with Previous Return

The length of asset stock is reduced on the previous return. This is partly due to the decommissioning of a number of smaller treatment plants and their associated raw water main infrastructure and partly due to better information.

H3.4-3.8 Water Mains Overview

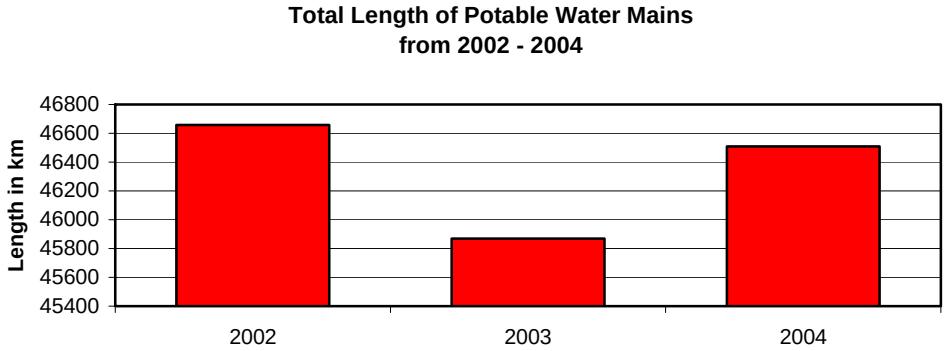
Asset Valuation



The asset valuation for 2004 has increased by 2% on last year, from £6,611.5 million in 2003 to £6,743.3 million in 2004. This is due to data improvement.

H3.4 Potable Water Mains

Asset Data



The total Length of Potable Mains has increased from 45869 km in 2003 to a total of 46508 in 2004, an increase of 639 km.

Methodology

The base data on water mains is held on the GIS, with the further analysis required to assign condition and performance grades carried out through the application of fully documented INMS methodologies.

The condition of the mains has been analysed using the INMS condition grading methodology, which is documented in Procedure P0956_02. The performance of the mains has been analysed using the INMS performance grading methodology, which is documented in Procedure P0956_01.

Strengths of Submission

The condition grading model has been updated on the previous submission to incorporate the latest findings and independent audits on pipe deterioration modelling.

For the performance grading, the data available on customer complaints and water quality failures is much improved on the previous return. This is due to the implementation of two new corporate systems - Promise and Labware.

Issues with data

Whilst the data on water quality samples and customer contacts has improved, the availability of data on burst repairs has deteriorated significantly. This is due to the new WAMS system going live only from 1 April 2004. During the preceding financial year legacy works management systems have been run on a reduced functionality, which has not provided the level of detailed required. The implementation of WAMS, which has already now gone live will rectify this issue for the next return.

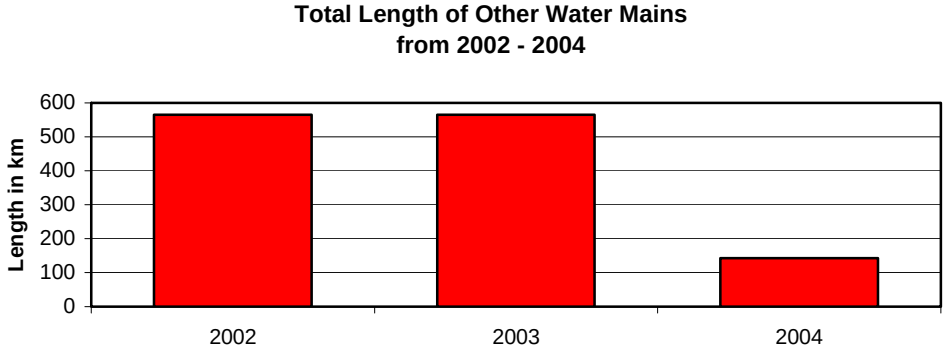
Comparisons with Previous Return

The percentage of mains reported as being in condition grades 4 & 5, at 35%, is a significant reduction on the previous return. This is primarily due to changes in the predicted deterioration rates for ferrous mains, which are now considered to be less severe in the later stages of these assets life in soil types of low to medium aggresivity.

The percentage of mains in performance grades 4 & 5, has however increased to 34%. The main reason for this is better information, with Scotland wide coverage of customer complaints and water quality failures now available. This data was largely unavailable for the previous return, with the result that an artificially optimistic assessment was produced after applying INMS methodologies, which require detailed and comprehensive data for each sub-asset.

H3.5 Other Water Mains

Asset Data



The total Length of Other Mains has decreased from 564.7 km in 2003 to a total of 142.7 km in 2004, an decrease of 422 km.

Methodology

For the previous submission a new assessment of this asset stock was not undertaken, with the results being those carried forward from the previous return. This year an independent assessment of this asset was carried out, with the base data being extracted from the corporate GIS and then subject to analysis following the principles applied to the potable mains.

Strengths of Submission

A detailed effort was made to identify those assets which are believed to be included in this category.

Issues with data

Although all water mains are recorded on the GIS, some mains falling within the 'other mains' definition, such as raw water mains supplying industrial customers, are not currently classed as a separate type on the GIS from other raw water mains. Their identification and extraction cannot therefore currently be automated.

Comparisons with Previous Return

The total length of asset reported in this category is less than in the previous return. This is however due to the new assessment of the asset category being made as described above, rather than a change in the asset stock itself.

H3.6 & H3.7 Communication Pipes (Lead and Other)

Methodology

Information on communication pipes has historically not been recorded on the corporate GIS and the INMS Communication Pipe Database has therefore been used, as in previous returns, to provide an assessment of communication pipe numbers, material type and location.

This database has a record of all the properties within the area of supply and has an inferred connection to the nearest main, as recorded on the GIS. The age of the communication pipe is then assumed to be the same as the age as the water main/property to which it is connected. As different material types were used in distinct time periods, the material of the communication pipe can then be derived from its age. It has been assumed for these purposes that lead was used for communication pipes up to 1963.

Strengths of submission

The INMS Communication Pipe Database has now been in use for a number of years and is believed to provide the best estimate on communication pipes numbers and material types from the information available.

Issues with data

Where information exists in the authority's works management systems, or other historical records, that lead replacements have occurred, these are also incorporated into the communication pipe database. However information on older historical lead replacements is limited and more will have occurred than have been incorporated.

Comparisons with Previous Return

The total reported number of communication pipes (lead and other) has increased on the previous submission by approximately 90,000. This is partly due to updated corporate property information and partly due to the ongoing connection of new properties to the network during the report year.

The number of communication pipes estimated as being lead has however been reduced to 970,658, from just over 1m. in the previous return. This is to be expected as a result of both

opportunistic lead communication pipe replacements during mains rehabilitation work and individual lead replacements under the lead strategy project. Additional information on historic replacements including statistical analysis of lead communication pipe numbers by the DWQR supports this level of reduction. The number of non-lead communication pipes has correspondingly increased.

H3.8 Water Meters

Methodology

The base data on meters has been taken from the customer billing system. Condition grades have then been allocated based upon the service life of the meter and the age of installation. Service lives are assumed to be for meters below 40mm 15 years, for those from 40 to 125mm 10 years, and for those above 150mm, 6 to 10 years. Meter accuracy is considered to be synchronous with condition.

Strengths of submission

Meter details are now held on one system for the whole of Scotland for the first time. This gives higher confidence to the overall asset stock assessment as well as allowing the development of a consistent basis for assessing condition.

Issues with data

Although meter details are now held on one system, the information on installation date relies on the data migrated from the legacy systems, with the older meters likely to have the lowest confidence.

Further investigation of the assessment of meter age with respect to performance on reliability and volume accuracy is required.

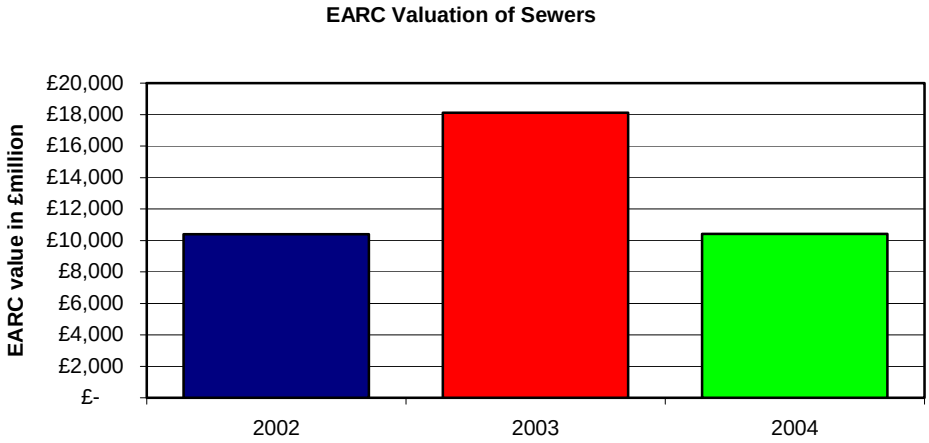
Comparisons with Previous Return

Although there has been a large number of new meters installed during the report year, a significant number of meter records have also been removed from the billing system. These are meters which are no longer being used as revenue meters, for example transfer meters between the former authorities. As a consequence of these two adjustments, the overall total of meters has remained broadly consistent with the previous submission.

Table H4 Wastewater Infrastructure

H4.1-3 Sewers

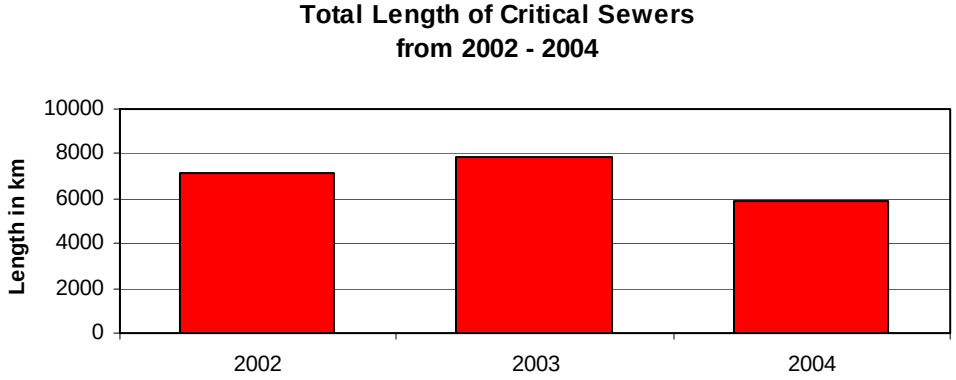
Asset Valuation



The asset valuation for 2004 has decreased by 42% on last year, from £18,109.4 million in 2003 to £10,424.9 million in 2004. This is due to an improvement of the cost equations. See Appendix 1 for full explanation.

H4.1 & H4.2 Critical & Non-Critical Sewers

Asset Data



The total Length of Critical Sewers has decreased from 7888.15 km in 2003 to a total of 5869.84 km in 2004, a decrease of 2018.31 km. This is due to the revised method of determining the proportion of sewers that are critical.

Methodology

The base data on sewers has been extracted from the corporate GIS. This has then been supplemented with sub-asset level data from completed Drainage Area Studies where these have been carried out. This has been required to compensate for the current backlog in the updating of the GIS with information from these studies. An estimate has also been made for the length of sewer relating to housing sites not yet on the GIS. Data in-fill has then been used where the GIS does not have records for attributes of size or depth, using the rule set developed under the Q&S3 project.

In addition, as for the previous submission, an estimate for the length of laterals, which historically have not been recorded on the GIS, has also been made. A field survey commissioned to refine the previous estimate has now reached its mid-point, with the results showing that the average length of lateral is above the 5 metres previously assumed. The estimate for the length of lateral has therefore been increased in the light of these results, from 10,000km to a total of 13,200km.

The proportion of sewers classified as critical has been based upon the criticality assessments made during the Drainage Area Studies. The proportion of sewers of each size and depth band categorised as critical during these studies has then been applied to sewers of the same depth and size band in the asset inventory as a whole.

Condition grade is based on the CCTV survey data sampled from the whole of Scotland, graded using the Sewer Rehabilitation Manual method. This sample is assumed for this purpose to be unbiased with respect to condition, since sewers to be surveyed are generally selected on the basis of criticality, which is unrelated to condition. The previous five years of CCTV data analysis has been used (2,958 km), giving a coverage of about 49% of critical sewers.

Performance grades 4 and 5 have been based on the number of recorded chokes, blockages and flooding recorded over the previous 5-year period. Sewers recording more than one event over the 5-year period have been allocated to grade 5 and those with one event are allocated to Grade 4. Performance grades 1 to 3 have been based upon silt depths as recorded in the CCTV sample dataset.

The distributions of condition and performance from these samples are then extrapolated to the entire network, removing bias where necessary, yet following trends of size or depth in the 25 bands where good correlation exists.

The estimate of sewer length added to the dataset for new housing sites has assumed to be in condition ad performance grades 1.

Strengths of submission

The two main improvements over the previous submission are the revised method for determining the proportion of critical sewers and the improved estimate for the length of laterals.

For the previous submission the proportion of sewers classified as critical was based upon using the information held on the GIS as the sample dataset from which to extrapolate. This dataset was felt however to be potentially biased, with more sewers that are actually critical having this attribute recorded. The sample dataset based on the Drainage Area Studies is felt to be more representative.

Issues with data

There is still a considerable backlog in updating the GIS with information from completed Drainage Area Studies, which results in poor coverage in the GIS on key fields of criticality, size and depth.

The Promise CRM system, which was rolled-out in April 2003, has improved the capture of performance data, but the implementation of the system is only in its first phase. The association of work directly with the sewer asset concerned has yet to be achieved. This is particularly important to identify the influence on the performance of laterals in the inventory. The existence of a 5-year period of good blockage data linked to the individual asset is still 5 years away.

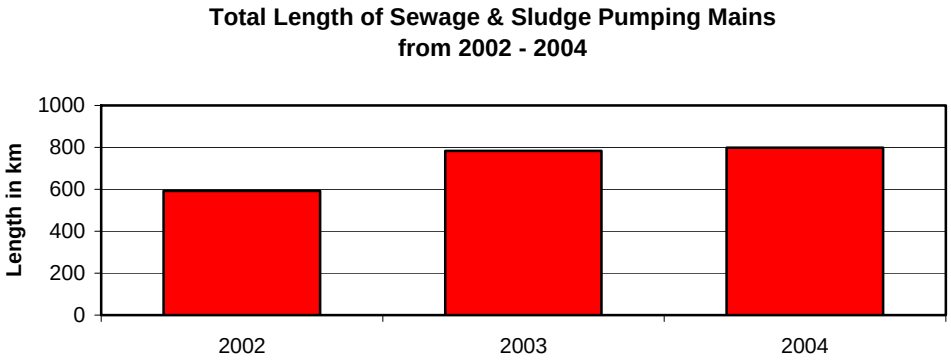
Comparisons with Previous Return

The length of critical sewers has been reduced on the previous return due to the revised method of determining the proportion sewers that are critical. The length of non-critical sewers has increased primarily due to the increase in the estimate for the length of laterals and the inclusion of an estimate of the new development backlog. In total the length of sewer is greater than that reported in the previous submission.

There has been some movement in the percentage of assets reported as being in condition and performance grades 4 & 5. This is however primarily due to the effect of using a rolling 5 year band of CCTV and performance data and is not considered to be statistically significant.

H4.3 Sewage & Sludge Pumping Mains

Asset Data



The total Length of Sewage & Sludge pumping Mains has increased from 783.8 km in 2003 to a total of 798.41 km in 2004, an increase of 14.61 km. This is due to data improvement.

Methodology

The base data on rising mains has been extracted directly from the corporate GIS. The condition of these assets has then been assessed on the basis of their age and material, with the performance assessment similarly derived. Those assigned to grades 4 & 5 through this methodology are primarily ferrous, asbestos cement and uPVC mains laid before 1950.

Strengths of submission

Assessment of condition and performance in the previous return was based solely on asset age. This has been improved this year to provide a more refined method which also takes into account material type, using knowledge gained from the extensive work on pipe condition and performance carried out of the clean water network.

Issues with data

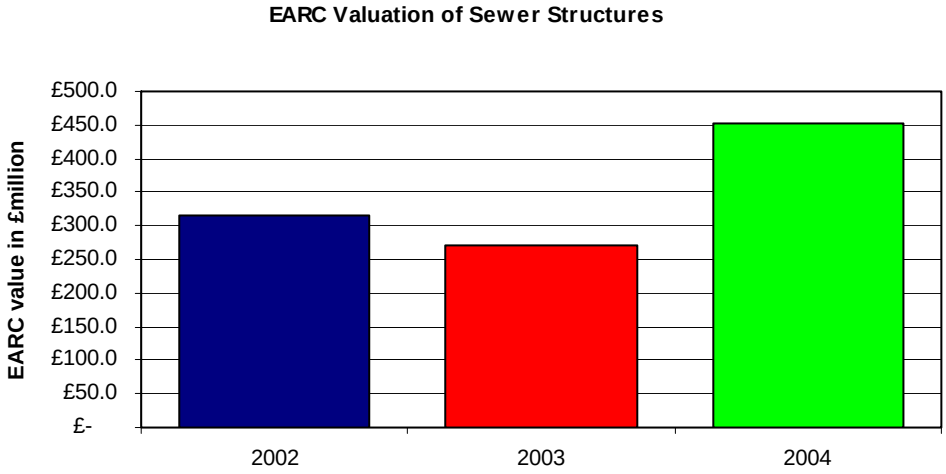
Historically there has been little systematic assessment of the condition and performance of rising mains due to the small proportion in the sewer network that they comprise. While the method of assessment based on age and material improves on the previous return, this has been primarily derived from work carried out on the potable water network. A more specific assessment of the parameters affecting rising mains and in particular their unique corrosion environment would help to improve the condition assessment. In addition the base data on material type and age recorded on the GIS for this asset is currently poor in comparison with other datasets.

Comparisons with Previous Return

There has been a reduction in the percentage of this asset recorded as being in condition and performance grades 4 & 5. This is however due to the change in methodology, which now takes account of material as well as age, rather than a change in the asset stock. As this methodology is still under development and the base data on the asset is poor, interpretation of the significance of these results should await more detailed assessments.

H4.4-5 Sewer structures

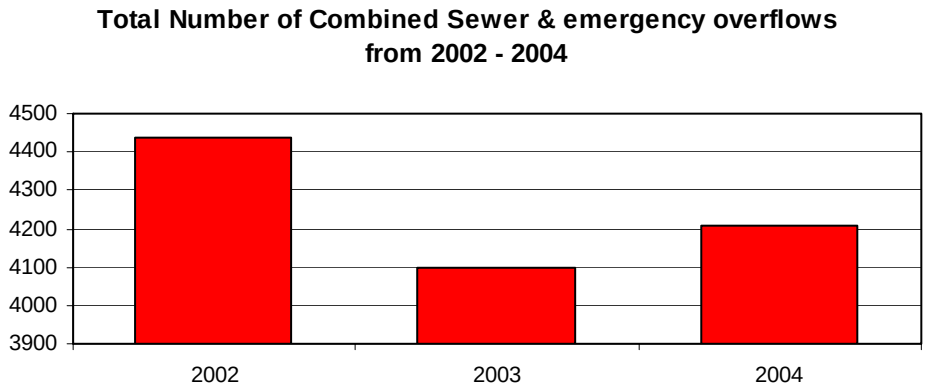
Asset Valuation



The asset valuation for 2004 has increased by 66% on last year, from £271.3million in 2003 to £450.9 million in 2004.

H4.4 Combined Sewer & Emergency Overflows

Asset Data



The total number of Combined Sewer & emergency overflows has increased from 4096 in 2003 to a total of 4210 in 2004, an increase of 114. This is due to the improvement of data.

Methodology

The Combined Sewer Overflow database maintained by Strategy & Planning has been used as the source for the data on overflows. This database has been compiled over the Report year from the database of unsatisfactory (u)CSO's used to programme investment for Q&S2, and a more comprehensive database of all CSO's compiled for the Q&S3 project. This set currently includes Emergency Overflows(EO's) and CSO's at Wastewater Treatment Works.

Condition grades have been derived from the results obtained from overflows which have been surveyed. Those classified as adequate have been assigned to condition grade 4, with those classified as poor or bad, assigned to condition grade 5. Overflows not surveyed have been allocated grades through extrapolation from the sampled dataset.

Performance data has been based on the SEPA grades collated as part of the Drainage Area Study programme, where available (for about 54% of CSOs). Unsatisfactory CSOs have been allocated to grade 4 if modelling estimates less than 1000m^3 overflow per year and grade 5 if more than 1000 m^3 per year. CSOs with no DAS performance data (constituting 46%) have been allocated grades in a fixed ratio profile that takes into account that unsatisfactory CSO's are more likely to have been included in surveys than satisfactory ones, and that the ratio of CSOs in grades 4 & 5 in the non-surveyed set will be less than in the surveyed set.

Strengths of submission

The asset stock listing is believed to be more accurate. Performance data is available for 54% of CSOs this year.

Issues with data

The information on these assets has been taken from the Scotland wide database of CSO's developed over the past year by Strategy & Planning. Transfer of this data into the corporate GIS data would improve spatial awareness and access to this data.

The coverage of condition and performance data for currently non-surveyed overflows should however continue to improve through the ongoing programme of Drainage Area Studies.

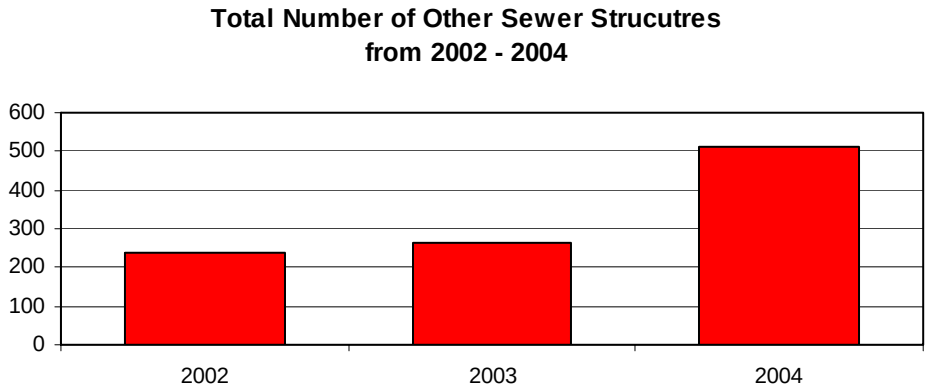
Comparisons with Previous Return

The overall dataset for combined sewer overflow condition and performance has been significantly improved since last year. The revised data set improves confidence on inventory numbers and provides a clear basis for asset grading across the regions.

The proportion of overflows in condition grades 4 & 5 has remained stable, while the proportion in performance grades 4 & 5 has increased due to the improvement in data and methodology.

H4.5 Other Sewer Structures

Asset Data



The total number of Sewer Structures has increased from 262 in 2003 to a total of 511 in 2004, an increase of 249. This is due to the further investigation that took place for this return. This is however still an estimate, with further work required to make the data more robust.

Methodology

The data required for this report line has been interpreted as referring only to storage tanks. Data on this asset is currently very limited, with robust data only available for the former East of Scotland Water area. The total number of tanks for the whole of the authority has therefore been estimated based upon the frequency of tanks in the former East area, extrapolated to cover the remainder of Scotland based upon the extent of the sewer network in the other regions.

There is currently no condition and performance data available for these structures, and for this return the asset was therefore divided equally between the five condition and performance grades. For the previous return the condition and performance profile was taken from that of the CSO's, but after review this year, it has been felt to not be sufficiently correlated.

Strengths of submission

The best estimate of the number of tanks has been made given the information available.

Issues with data

Asset data is still very poor. Condition and performance data currently unavailable.

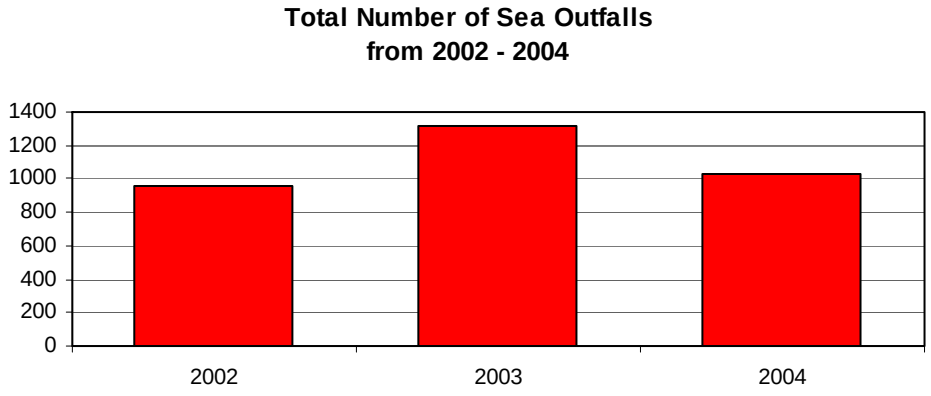
Comparisons with Previous Return

The total reported number of tanks has increased on the previous submission due to the further investigation into this asset that took place for this return. This is however still an estimate, with further work required to make the data on this asset more robust.

Although the condition and performance grade profile has shown a significant change on the previous submission, this is due to the change in methodology, rather than a change in the asset stock.

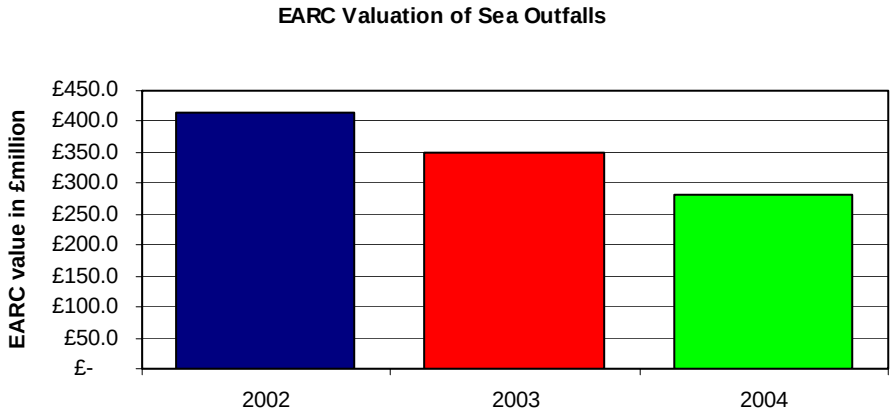
H4.6 & H4.7 Short & Long Sea Outfalls

Asset Data



The total number of Sea outfalls has decreased from 1319 in 2003 to a total of 1028 in 2004, a decrease of 291. This is due to improvement of data.

Asset Valuation



The asset valuation for 2004 has decreased by 19% on last year, from £349.4 million in 2003 to £282.6 million in 2004. This is due to data improvement.

Methodology

The asset stock listing has been improved since the previous return, with a revision of the total number of outfalls to 1028. The condition assessment has been based on asset age. PVC outfalls have been assigned grades 1 to 4, concrete outfalls grades 1 to 3, brick outfalls

grades 3 to 5 and vitrified clay outfalls grades 1 to 5. Performance grading has followed the same methodology as the condition grading.

Strengths of submission

The overall dataset for this asset has been improved. A condition and performance assessment methodology has been developed based on recorded age. This compares to the previous return, where the condition profile of the sewer network was used in the absence of a separate assessment methodology.

Issues with data

The base data held on the new corporate GIS, while being a better data source than the separate datasets available for the previous return, still requires further improvement. The current age based condition grading methodology, while being a step forward on the previous return, requires to be calibrated with data from actual field surveys.

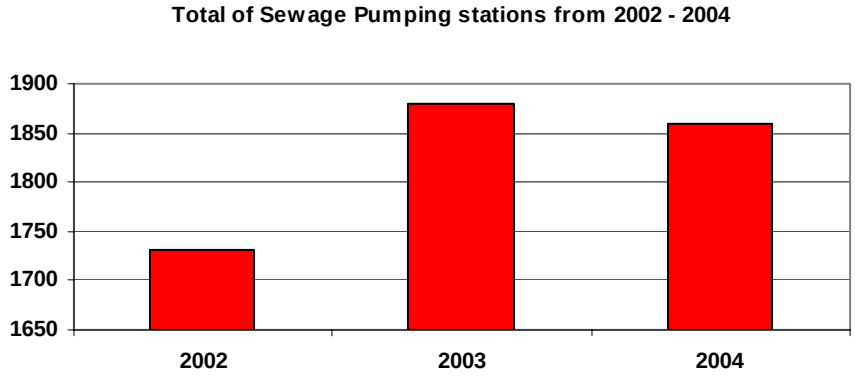
Comparisons with Previous Return

Due to better information, the reported number of short sea outfalls has been reduced, and the number of long sea outfalls increased. The profile of condition and performance grades has changed due to the revision in methodology.

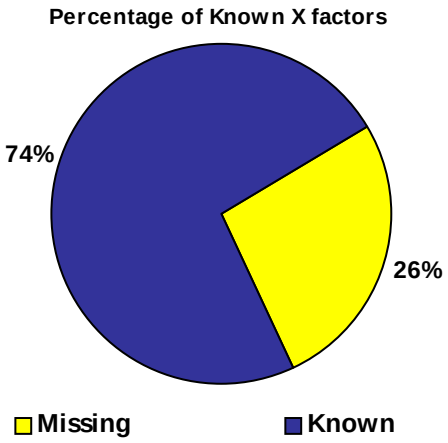
Table H5 Wastewater Non-Infrastructure

H5.1-2 Sewage Pumping Stations

Asset Stock

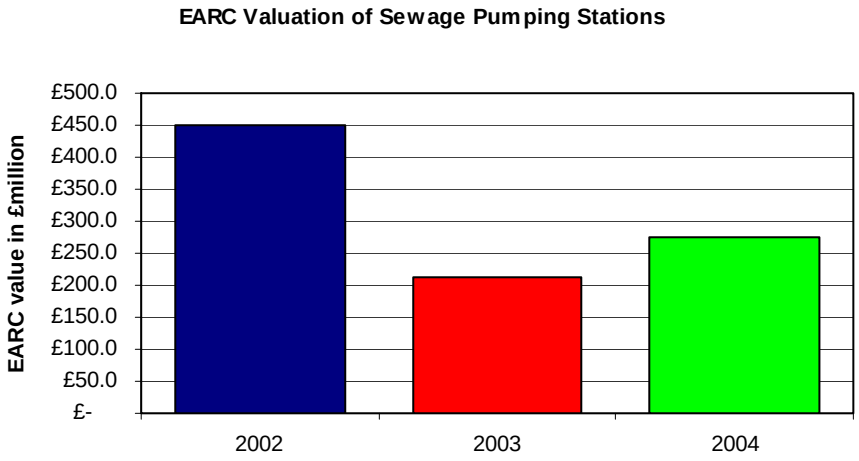


The total number of Water pumping stations has decreased from 1879 in 2003 to a total of 1860 in 2004, a decrease of 19 sites. This is mainly due to a desktop exercise carried out to validate the existence of all sites, their operational status and their Kilowatt rating



The above chart shows that the asset valuation was based on having X factors for 74% of Sewage Pumping Stations. The Missing 26% was based on an extrapolation of the 74% known Sewage Pumping stations. The methodology for the extrapolation was to group the sites by their WIC grade, then group by the sites Region and categorise it into the WIC s size band based on the known Kilowatt rating. This data is then converted into a percentage in each of the above areas, which gives the basis for the extrapolation across the whole asset stock.

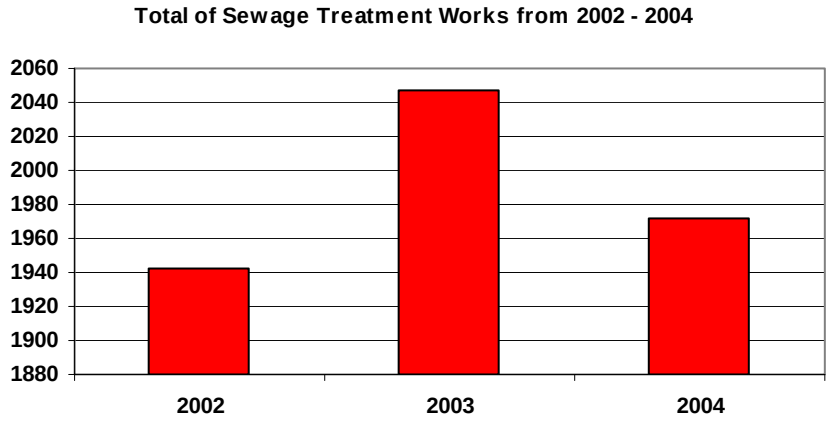
Asset Valuation



The asset valuation for 2004 has increased by 30% on last year, from £213.2 million in 2003 to £276.3 million in 2004. The reason for this increase is due to more data being captured on the kW rating of sewage pumping stations, the total kW rating overall has risen from 50,000kW to 90,000kW in 2004.

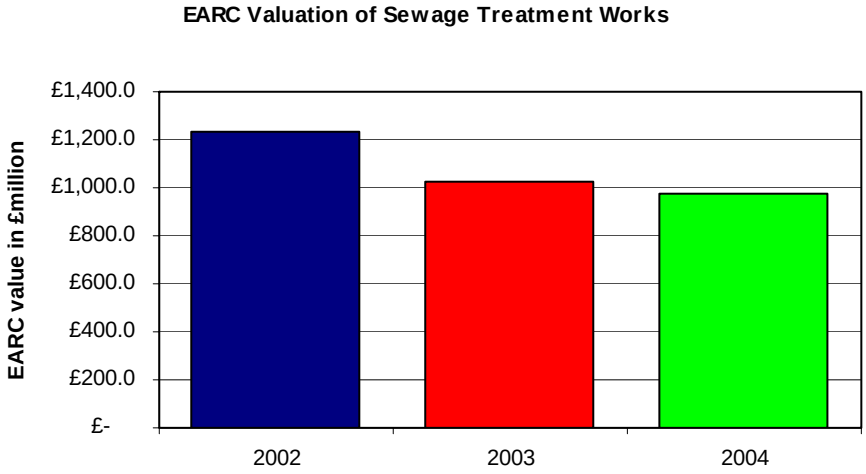
H5.3-7 Sewage Treatment Works

Asset Stock



The total number of Sewage Treatment Works has decreased from 2047 in 2003 to a total of 1972 in 2004, a decrease of 75 sites. This is mainly due to an extensive desktop exercise being carried out to validate the existence of all the sites, their operational status and their Population Equivalent, which is then converted into the pollution Load.

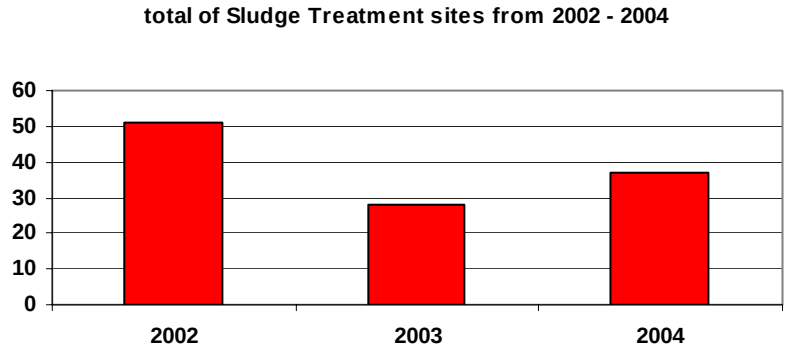
Asset Valuation



The asset valuation for 2004 has decreased by 5% on last year, from £1026.4 million in 2003 to £977.9 million in 2004. This is mainly due to the drop in quantity of Sewage Treatment works.

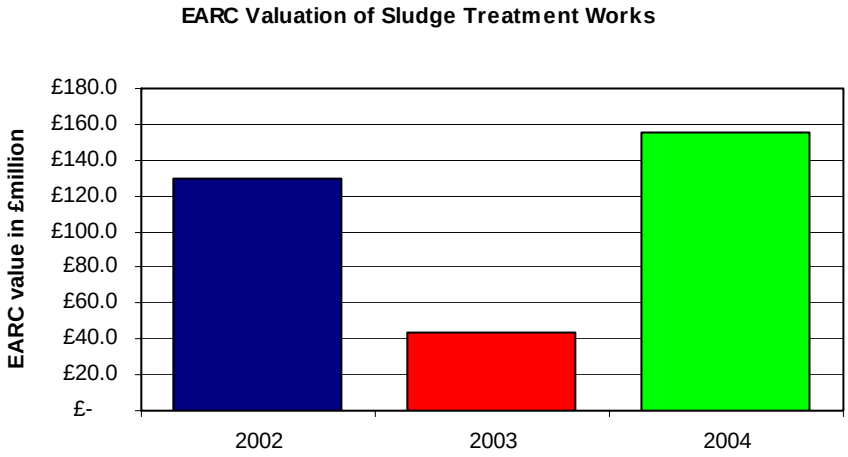
H5.8-13 Sludge Treatment Facilities by Disposal Type

Asset Stock



The total number of Sewage Treatment Works has increased from 28 in 2003 to a total of 37 in 2004, an increase of 9 sites. This is mainly due to a desktop exercise being carried out to validate the existence of all the sites and their operational status.

Asset Valuation



The asset valuation for 2004 has increased by 255% on last year, from £43.8 million in 2003 to £155.7 million in 2004. The dramatic increase in value is due to the improvement to the costing methodology.

The 2004 methodology has been enhanced from the previous years methodology. Several existing live sludge treatment works were valued using the known sub assets sizes to produce an estimated site cost equation. This cost equation was then used to value all other sludge treatment works on the asset inventory.

In contrast, the methodology for last years return was to price the works using only one cost equation (dewatering plant) and making an allowance for a building cost. The building costs were unit costs applied to various work size bands. This method greatly under estimated the number of assets required on a sludge treatment site (ie sludge pump station, holding tanks, inlet screens etc).

Table H6 Support services

Methodology

Scottish Water is inspecting all offices and depots to determine function, suitability, condition and performance. For offices and depots, this inspection will be complete by the end of the year. There is a need to identify and establish the consequences of a number of regulatory issues - in particular there are the Asbestos at Work Regulations and the Disability Discrimination Act. It should be expected that significant changes will occur to building valuations, maintenance regimes and in some cases the use of buildings. The costs of surveys and required works is estimated at £11m over a 5 year period. Additional to this will be cases where the disposal of the building is more advantageous than essential remedial works.

We have a mixture of offices, depots with offices, depots, yards and office depot facilities at works. The office & depot inspection will identify these types and future reports may need to clarify where there is no option to reduce numbers because the facility is part of an operating asset.

Laboratory equipment on the whole is quite aged and Scottish Water have a programme to replace this equipment (£400k per annum over the next 3 years). Also, pending laboratory rationalisation, we will be in a better position to assess our equipment needs.

Strengths of submission

The base data on all Laboratory equipment is held on an Asset Register which lists all the relevant information concerning each piece of equipment including age, initial cost, maintenance costs and current status.

This information was collected from operational staff who offered technical advice on the state of each piece of equipment.

Issues with data

Current and future restructuring may result in changes in strategy and therefore investment. The figures are compiled from available existing information and therefore have a low quality level. Only one of the 3 predecessor authorities performed an asset revaluation exercise and this was done by limited type sampling.

H6.3 Control Centres

None

H6.4 Vehicles and Plant

None

H6.5 Telemetry Systems

Methodology

A Scottish Water Telemetry Strategy is at the planning stage and the expansion of telemetry outstation assets will be prioritised according to Legislative Requirements, Efficiency/Performance and Spend-to-Save based on risk assessment.
The top-end telemetry system currently being used in the former East area will be rolled out to the former North and West areas over the next two years.

There are up to 330 outstations that may be replaced during 2004 to 2006 as part of the roll-out of the new Scottish Water telemetry system. These outstations may not be compatible with the system. They have not been identified in the return.

There are approximately 140 sites in the former Highland area which have multiple outstations. This was a technical method used to provide for larger input/output counts at particular sites. The maximum number at any one site is 5 outstations. The figures used have counted these sites with multiple outstations as one outstation site. If the sites were upgraded, they would certainly have the multiple outstations replaced with a single (larger) outstation.

A financial impact analysis was undertaken, which formed the basis of a single Equivalent Asset Replacement Cost (EARC) of £5K to replace any outstation. In practice this would increase significantly for larger sites. The figures also do not take into account costs for instrumentation upgrading and allowing for increased i/o to take into account new telemetry i/o standards.

The figures input for asset life appear to be pessimistically low. Line H6.5 shows it to be in the 'short' range. Without putting accurate numbers into Life this figure will not reflect the true nature of the replacement needs

No indication is given for outstations listed/not listed in the return which are installed on site but not yet commissioned.

Strengths of submission

This submission has taken information from the existing eight legacy systems and collated the outstation base into the four geographical areas of the business. This information has been data-based so that it will assist in future asset planning. It is intended to cleanse and add a structure to this data so that it is more accurate and valuable.

Issues with data

There is data missing from outstation sites in Scottish Water's North West and North East areas. It is hoped to rectify this before next year's submission.

This is the first year that the submission has separate outstations in terms of the new geographical areas.

Comparisons with Previous Return

Much of the information used for this return is the same as last year's but with new outstations added. No attempt has been made to cleanse historical data.

H6.6 Information Systems

Methodology

Scottish Water IT has a centralised Asset Database for all IT Assets. The required information was extracted from this database and an estimate of the replacement value was calculated.

The condition of PCs within Scottish Water is poor, with half of the stock now over 3 years old. This is due to previous regional replacement programmes being put on hold during the transition to Scottish Water. However, these have now been replaced by several Scottish Water IT Infrastructure Rationalisation Projects being run within the framework of the overall IT Rationalisation Programme. These projects, being implemented over the next 2 years,

cover Server Environment Development, Desktop Environment Development, Network Services Development and Security & Systems Management Development.

Strengths of submission

The current hardware inventory has been gathered in a methodical manner and is held on a centralised database. The replacement programme is based on an industry standard lifecycle policy.

Issues with data

For the WIC Report, it is difficult to class equipment under the categories PCs, Workstations, and Mainframes. For future, it would be more meaningful to be able to use Desktops, Laptops & Servers.

H6.7 Other Non-Operational Assets, Land and Forestry

Methodology

It has been assumed that the number of assets will remain similar in the foreseeable future, though they could be affected by a future strategy. Capital investment for Land and Forestry will be limited to maintaining existing assets and amounts to less than £100,000 over the investment period. Scottish Water is reducing the number of surplus houses the authority owned resulting in the disposal of significant numbers of houses through tenants 'right to buy' legislation and open market sales. Expenditure on Tenanted Farms will be limited to maintenance costs as required under the terms of the relevant leases, as the numbers of such farms are falling as the reasoning for owning them to protect the catchment area is now less important with improved water treatment facilities.

Strengths of submission

Scottish Water has a relatively high level of knowledge of the asset inventory and these details are held on a number of corporate databases.

Weaknesses of submission

Any future investment cannot be determined until Scottish Water develops or implements a new strategy for Other Non-Operational assets.

Table H11 Summary

Future Asset Inventory

The principal aim for the future "Asset Inventory" tables is to see a reduction in the value of "red" risk sub-assets. However, much of the capital investment programme is aligned to quality and growth, and therefore the reduction in red 'risk' assets is reduced.

Methodology

The source for non-infrastructure data originates from Ellipse and has one consistent terminology set, has one consistent asset hierarchy structure, and works on the single level of granularity required by the WIC's guidelines.

Issues with data

It is difficult to align future projects to specific sub-assets since detailed project study work has not yet been undertaken at that level. This is particularly problematic when the project is Quality, rather than asset maintenance driven.

General

The future Table H11-16 are directly related to Table G. This involved obtaining the projects and total costs from Table G and applying the costs in Table H11-16 to either new assets or by modifying existing assets.

On completion of the future data-entry the following differences were identified between Table H11 and Table G.

- Rolling Budgets in Table G are entered in the Asset Inventory section on Table G as years 2003-04 only, to allow compliance with Table D1-3, whereas Table H11-16 includes totals from 04/05 onwards.

- Recreational Fisheries were not included in the Tables H11-16, as there is not an asset to assign this cost to.

In the cases where there are named projects which have detailed design or feasibility reports, the future data entered in to Tables H11-16 is generally accurate. However, in rolling projects and future strategies where the design has not been completed, the change to the future asset stock can only be estimated. Therefore, it is not anticipated that the actual future asset stock will reflect what has been predicted in Table H11-16.

The confidence grades were generally reduced to a reliability grade B, with the exception of water pumping stations, water mains, sewers and sewer structures which are reliability grade C.

Table H12 Water Non-Infrastructure

H12.1-8 Water Treatment Works

The number of WWTWs is expected to increase from its current figure of 549, to a total of 545 treatment works, reported in H12. The largest increase in type of TWs is SW2, in which there is an additional 44, while SW0 and SW1 have reduced, indicating that more works are being upgraded during this period. The majority of assets have moved from Red to Green or amber status.

H12.9-10 Water Storage

The total number of water storage units will increase in the future from 2199 to 2230. The majority of this increase will be in Service reservoirs, where there will be an increase of 31.

The investment in water storage appears to only convert 50% of the red assets. The service reservoir projects in the investment programme are mostly in rolling budget or future strategies. Therefore, it is possible that the actual investment in the future for new and base may differ slightly and that the red assets may reduce.

H12.11-13 Water Pumping Stations

The total number of water pumping stations will increase in the future from 1005 to 1037. There will be 32 new booster pumping stations.

Table H13 Water Infrastructure

H13.1-3 Water Resources

Assets in this banding in the future will increase from 1296 to 1315, (specifically for DIRs and Raw Water Intakes (Lochs and Burns)

H13.4-8 Water Mains

In the future, the investment in mains potable (H3.4) has increased the length of mains by 1244km. The future base investment for water mains has been applied to only red assets. This may not actually occur and some of the amber assets may be replaced or rehabilitated.

Table H14 Wastewater Infrastructure

H14.1–3 Sewers

The total length of sewers will increase to 40593km (from the current figure of 39346km). The proportion of assets allocated to risk grade Green will also increase. There will be a significant increase in the number of Sewer structures, (particularly in the number of CSOs), from 4358 to 5112. Base expenditure is not included here, as it does not increase the value of the assets stock, it only improves the condition performance, or lowers the risk gradings.

H14.4–5 Sewer Structures

The Sewer Structures future data includes 65 new assets.

H14.6–7 Sea Outfalls

The sea outfall future data includes 65 new assets.

Table H15 Sewage Non-Infrastructure

H15.1–2 Sewage Pumping Stations

In the future asset inventory, the number of sewage pumping stations will increase from 1860 to 1969.

H15.3–7 Sewage Treatment Works

The number of Sewage Treatment Works will increase from 1972 to 2045 and the majority of red assets have been converted to either amber or green.

In general the future data for the wastewater treatment works is fairly accurate as detailed feasibility studies were used to modify and create new assets or sub assets.

H15.8–13 Sludge Treatment Facilities

The number of sludge disposal facilities will increase from 37 to 38.

In general the future data for the sludge disposal facilities is fairly accurate as detailed feasibility studies were used to modify and create new assets or sub assets.

Table H16 Support Services

In the future asset inventory, the most significant investment is shown to be in telemetry and information systems, indicating capital expenditure of £20.8m and £11.19m respectively. The risk red status of assets has not changed significantly, although more assets have moved to risk status green.

General

The capital investment section, which is brought forward from Table G into Table H 11-16, indicates a different investment profile to the investment profile in the Risk, Condition/Performance and Financial Impact section. This is because the need for investment may be different from actual timing of the investment, i.e. as asset may require investment in H1-6 in Period 0 (1-2yrs), however, the investment may not be available until Period 1 (3-5yrs) if there is a limited budget. Not all sub assets will require investment at the same time but it is more cost effective to upgrade a works in one contract.

Appendix 1

Review of Sewer EARC's

The following report explains the variation in the value of EARCs for sewers between AR2003 and AR2004.

Table H – EARC's

Review of Sewer EARC's
WIC Grade 22 Critical Sewers and WIC Grade 23 Non Critical Sewer
(Lines H4.1 – H4.2)

Methodology 2003

Team

The following individuals were involved in the process in 2003.

- **Data Capture and Analysis**
  External Cost Consultants – Faithful & Gould and Franklin & Andrews
- **Producing of Table J Unit Costs**
  External Cost Consultants – Faithful & Gould and Franklin & Andrews
- **Producing of Table H Cost Equations**
  John Faulke

Table J Unit Costs

The methodology for establishing the unit costs was as previous years submission.

The rates from named projects tender documentation and term contracts were analysed only for pipelines relating to the WIC definitions. Ie WIC definitions relate to sewers at 2.0m depth to crown of pipeline, so the rates for each pipe diameter at depth band 2.0 to 2.5m depths were used in the analysis. All other relevant costs as per the definitions were added to the pipeline rate (eg fencing, reinstatement costs, traffic management (not grassland), manholes, and junctions).

This was undertaken for several projects, were information could be obtained, and the rates for each pipe diameter were averaged (weightings were used to balance up rates obtained from term contracts and rates from named projects). The average rates then had further percentages added for SW internal costs and a Tender to Outturn factor.

These were the units rates submitted in the Table J Return for 2003.

Table H Unit Costs

As required by WIC, the derivation of the costs for the purpose of calculating the gross Equivalent Asset Replacement Cost shall be the same as those used by the Authority to estimate the standard costs required in Information Requirement J: The Cost Base.

- Table J £ cost/linear metre rates were derived for grassland, rural/suburban roads and urban streets for 6 diameters of sewer at the WIC spec depth of 2m to crown of pipe.
- A composite uplift for site specifics was added – a straight average of the values for North, East and West regions – to each Table J unit cost.
- As the asset valuation covers assets at other than WIC sizes, graphs were constructed and a line of best fit drawn through the data points for grassland, rural/suburban roads and urban streets. The line of best fit was determined to be a polynomial expression as the exponential expression yielded too high values when extrapolated to large diameters.
- Because the GIS was unable to return the terrain overlying the pipes, a judgement was made on the mix of assets in each terrain type (grassland, rural/suburban roads and urban streets) at each size and the weighted average was called the 'combined' rate. This was done separately for non-critical and critical sewers as there was considered to be a different mix of sizes and terrain types for each.
- Our sewers are not all laid at WIC spec depth of 2m to crown of pipe. Therefore it is necessary to apply a depth factor.

  The depth multiplier was itself a composite of the multiplication factors for grassland, rural/suburban roads and urban streets terrains, as determined from analysis of contracts.

  The depth multipliers were applied to the combined (WIC spec depth) rates for non-critical and critical sewers.

  The multiplier factors were:

Up to WIC spec depth of 2m to crown of pipe	1.0
2 to 4 m depth	1.7
4 to 6 m depth	2.46
Greater than 6 m depth	3.22

- The asset inventory was received from Strategy & Planning as a data set of sewer lengths, by size band, by condition and performance grade ((which doesn't affect cost), by depth band. It included 10,000 km of laterals added since the previous WIC return. The cost equations as derived above were applied to the asset stock received to produce the total EARC value for WIC Grades 22 and 23 of £10,425m.

Methodology 2004

Team

The following individuals were involved in the process in 2003.

- **Data Capture and Analysis**
  External Cost Consultants – Faithful & Gould and Franklin & Andrews
- **Producing of Table J Unit Costs**
  External Cost Consultants – Faithful & Gould and Franklin & Andrews
- **Producing of Table H Cost Equations**
  External Cost Consultants – Faithful & Gould and Franklin & Andrews &
  External statistician – ESSL

Table J Unit Costs

The methodology for data capture and analysis was similar to previous years submission. As per last year, the only depth range analysed was 2 – 3m. All relevant costs as per the WIC definitions

were included to the pipeline rates (eg fencing, reinstatement costs, traffic management (not grassland), manholes, and junctions).

To widen the data capture and analysis for this years submission, the analysis was extended to establish more data points for sewers.

- where possible more pipe diameters were analysed, not just WIC Table J sized diameters (150mm, 225mm, 300mm, 450mm, 600mm and 900mm)

A substantial number of data points were established. Each data points consisted of a cost, for a pipe diameter all within the depth range 2 – 3m deep. All of the data points costs had additional percentages added to them for SW internal costs and a Tender to Outturn factor.

These data points were then passed to an independent statistician to generate cost equations which would then produce the Table J unit costs. (This statistician has been used for the previous three June Returns for producing cost equations relating to Non Infrastructure process components). Three separate cost equations were produced; one for grassland, one for rural/suburban, and one for urban sewers.

The unit rates established using these cost equations for 2004, are of the same magnitude as last years Table J Return for sewers. There is a 4.6% efficiency saving been identified for this years Returned compared to 2003.

Table H Costs Equations

As required by WIC, the derivation of the costs for the purpose of calculating the gross Equivalent Asset Replacement Cost shall be the same as those used by the Authority to estimate the standard costs required in Information Requirement J: The Cost Base.

As such, the methodology for establishing Table H cost equations was enhanced from the approach taken last year. In addition to the data capture undertaken to establish Table J unit costs, (analysis of pipe diameters within depth band 2 – 3m), the amount of data capture was extended:

- where possible a greater range of data was gathered at varying depths bands, not just the WIC specified depth (2.0m to crown of pipe).
- for every data point analysed, a corresponding data point was established to include for site specifics, ie the data points for establishing the Table H cost equations for sewers.

Again, a substantial number of data points were established. Each data points consisted of a cost, for a pipe diameter for depth ranges 0 – 2m, 2 – 3m, 3 – 4m, etc. All of the data points costs had additional percentages added to them for SW internal costs and a Tender to Outturn factor.

These data points were then passed to an independent statistician to generate cost equations which would value the asset inventory (Table J). The statistician then produced cost equations, which tied in with the depth bands to match the asset inventory, ie 0 – 2m, 2 – 4m, 4 – 6m & 6 – 9m. Twelve separate cost equations were produced; four for grassland (at each depth band 0 – 2m, 2 – 4m, 4 – 6m & 6 – 9m), four for rural/suburban, and four for urban sewers.

These twelve cost equations were then used to price the asset inventory, for both critical and non-critical sewers. This valued WIC Grade 22 and WIC Grade 23 at £10,424m for 2004 compared with £18,109m for 2003.

Comparison of 2003 & 2004 Table J Unit Costs

The unit costs produced for this years Return have been tabulated to compare with last years June Return unit costs (all costs to 3Q 2003).

The difference between the units rates from the two returns show that there is, in general, an increase in SW's capital efficiencies as the 2004 unit rates are slightly lower than last year. This equates to 4.6% across the whole sewer laying category.

Description		2004 £/m	2003 £/m	Percentage Difference
Sewer laying - Grassland				
J3.1a	Diameter 150mm	119.6	131.2	-8.8%
J3.2a	Diameter 225mm	145.4	158.7	-8.4%
J3.3a	Diameter 300mm	171.3	172.2	-0.5%
J3.4a	Diameter 450mm	222.9	211.8	5.2%
J3.5a	Diameter 600mm	274.5	260.7	5.3%
J3.6a	Diameter 900mm	377.8	417.6	-9.5%
Sewer laying - Rural/Suburban				
J3.1b	Diameter 150mm	196.8	197.9	-0.5%
J3.2b	Diameter 225mm	235.7	239.0	-1.4%
J3.3b	Diameter 300mm	274.6	285.0	-3.6%
J3.4b	Diameter 450mm	352.4	338.6	4.1%
J3.5b	Diameter 600mm	430.2	406.0	6.0%
J3.6b	Diameter 900mm	585.8	660.5	-11.3%
Sewer laying - Urban				
J3.1c	Diameter 150mm	218.9	247.9	-11.7%
J3.2c	Diameter 225mm	259.3	287.9	-9.9%
J3.3c	Diameter 300mm	299.7	323.6	-7.4%
J3.4c	Diameter 450mm	380.6	401.8	-5.3%
J3.5c	Diameter 600mm	461.5	490.5	-5.9%
J3.6c	Diameter 900mm	623.2	765.7	-18.6%

The methodology for producing the Table J cost equations is consistent between the 2003 and 2004 Returns.

Comparison of 2003 & 2004 Table H Cost Equations

As stated previously, 12 cost equations were produced to price the 2004 asset inventory compared with only the four used last year.

To allow a comparison to be made with last years four equations (one for each depth band), the grassland, rural & urban 2004 cost equations were aligned at each depth band to produce 4no composite 2004 cost equations. The weightings between the ground categories used to allow alignment was the same as assumed in 2003.

It can be clearly seen from each of the graphs (1-4) that cost curves from 2003 is always higher than the 2004.

Also it is worth noting that the 2004 cost curves are linear compared (except for depth band 6 – 9m) with the 2003 cost curves which are polynomials. The polynomial curves tend to produce much higher EARC costs for sewers of diameters in excess of 900mm. Approximately 10% of the asset stock has a diameter greater than 900mm.

Another comparison is shown in Graph 5, which compares the 2004 composite cost equation for depth 0 – 2m with the 2003 cost equation for depth 2 – 4m. This shows that there is a very close correlation between these two cost equations within the diameter range 0 – 900mm.

In examining the methodology for producing Table H cost equations for 2003, it can be seen that the base cost equation produced from Table J (ie for depth to crown of sewer of 2.0m – data analysed from BOQ's depth range 2 – 3m to invert) has been set as the cost equation for 0 – 2m rather than the cost equation for the 2 – 4m depth band.

This error has occurred due to the incorrect assumption last year that the depths bands supplied in last years asset inventory were to crown of pipe rather than to invert level. (ie depth band A which is 0 – 2m to invert level was assumed to be 2m to crown of pipe).

Comparison of the Higher Diameter Pipeline Rates

An assessment was also made as to which of the cost equations (either the 2003 polynomial or 2004 linear cost equations) are reflective of "real life costs". Scottish Water Solutions were approached to provide such estimates for 1200mm, 1500mm and 1800mm diameter pipelines in grassland and in roads. These costs have been tabulated for comparison purposes.

Diameter (mm)	Depth to Invert (m)	Ground Type	SWS Estimate Total	2004 EARCs	% Diff cf SWS Rate	2003 EARCs	% Diff cf SWS Rate
1200	2 - 4	Grass	£ 565	£ 551	-2.5%	£ 1,135	100.8%
	2 - 4	Road	£ 1,023	£ 861	-15.8%	£ 1,968	92.4%
	4 - 6	Grass	£ 668	£ 672	0.7%	£ 1,643	146.1%
	4 - 6	Road	£ 1,458	£ 1,317	-9.7%	£ 2,848	95.3%
1500	2 - 4	Grass	£ 789	£ 664	-15.8%	£ 1,590	101.6%
	2 - 4	Road	£ 1,281	£ 1,015	-20.8%	£ 2,757	115.2%
	4 - 6	Grass	£ 894	£ 873	-2.3%	£ 2,301	157.5%
	4 - 6	Road	£ 1,769	£ 1,563	-11.7%	£ 3,989	125.4%
1800	2 - 4	Grass	£ 944	£ 777	-17.7%	£ 2,136	126.2%
	2 - 4	Road	£ 1,450	£ 1,170	-19.3%	£ 3,699	155.1%
	4 - 6	Grass	£ 1,035	£ 1,095	5.8%	£ 3,091	198.7%
	4 - 6	Road	£ 1,972	£ 1,809	-8.3%	£ 5,352	171.4%

From the above table it can be clearly seen that the unit rates produced from the 2004 cost equations are more representative of the estimates provided by SWS. The unit rates established from the 2004 equations are with +ve/-ve 20%, where as the unit rates from the 2003 equations are greater than 90% of the SWS estimate.

Risks to changes in next years asset stock valuation

The methodology for producing cost equations as developed for this years Return is considered as being a sound approach.

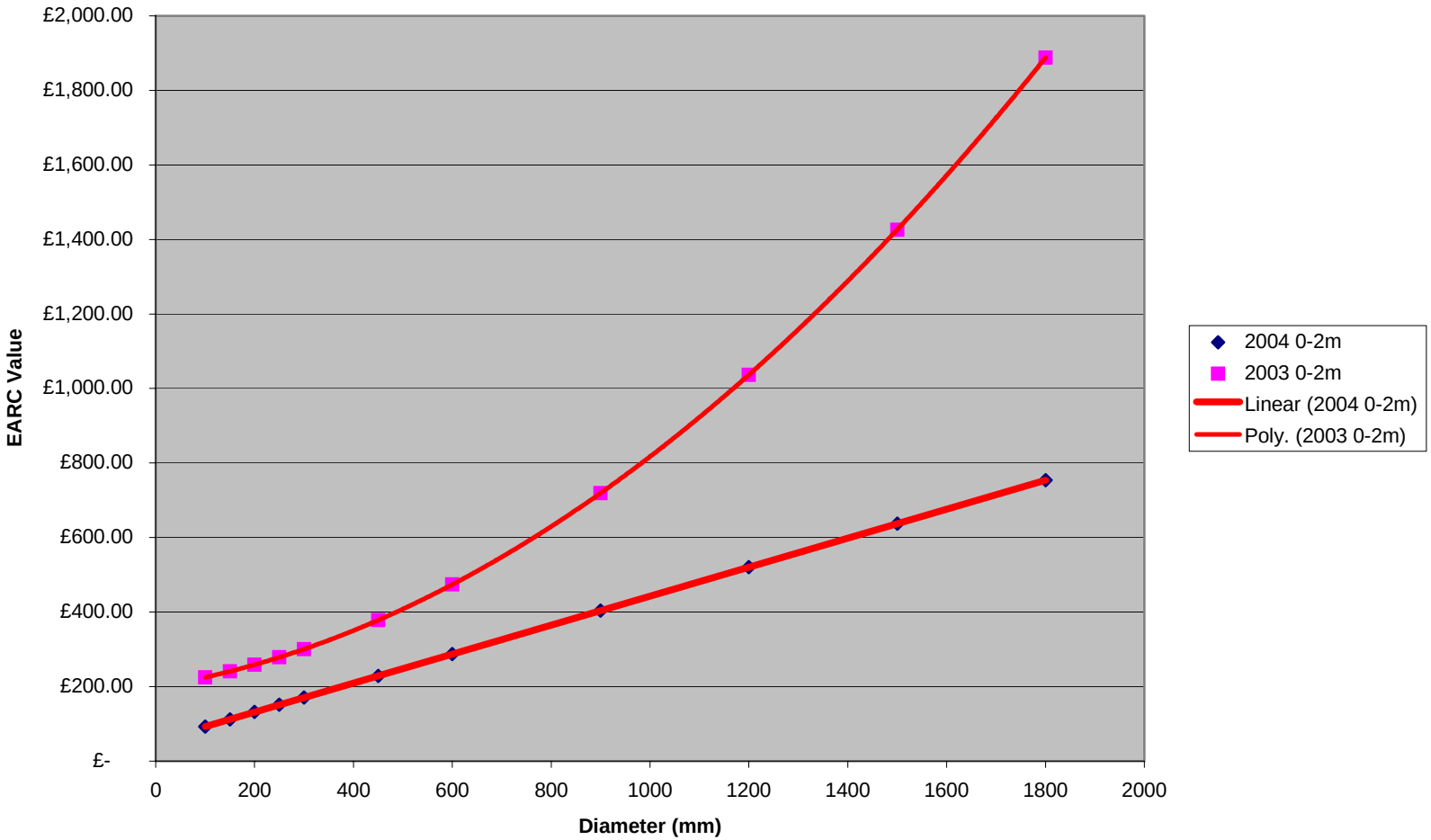
- However it should be noted that as in previous years only a limited amount of data is captured and analysed. For next years Return even more data needs to be collected and analysed to ensure that the cost equations can become more robust, ie the more data points to be produced for the 12no. cost equations the more statistically robust the equations will become. Also additional effort should be focused on capturing data for larger pipe diameters as this will provide a greater degree of confidence as to the correct shape of the cost curves (ie linear or polynomial).
- Another improvement that could be implemented to the valuation of the asset stock would be to produce cost equations which were representative of the actual frequency of fittings in the ground, rather than using the WIC specified frequencies. (ie the cost equations established have assumed that manhole spacing is one every 50m. If the actual average manhole spacing

could be established from the asset inventory, then the “real” manhole frequency costs could be used to establish more accurate cost equations).

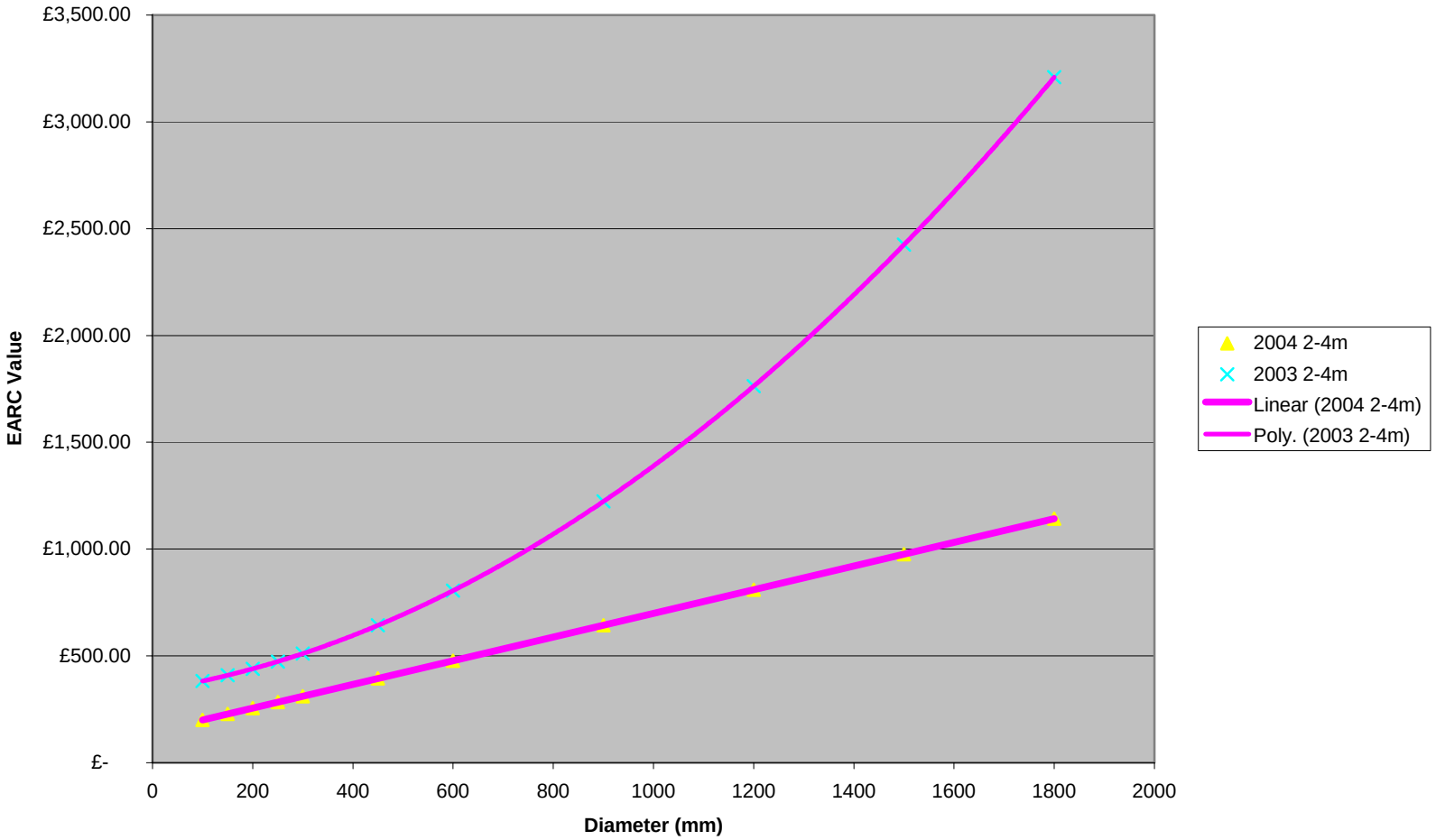
Conclusion

- The misinterpretation of the depth banding in the pricing of the 2003 asset inventory in the main cause of the EARC value for sewers being too high last year.
- The EARC value for the sewers for this years Return is of the correct magnitude.
- The methodology for establishing cost equations to EARC the sewers asset inventory is a step change for the better.
- Next years data capture for sewers should ensure that larger diameter pipelines are analysed to produce more robust cost curves for the higher diameter ranges.

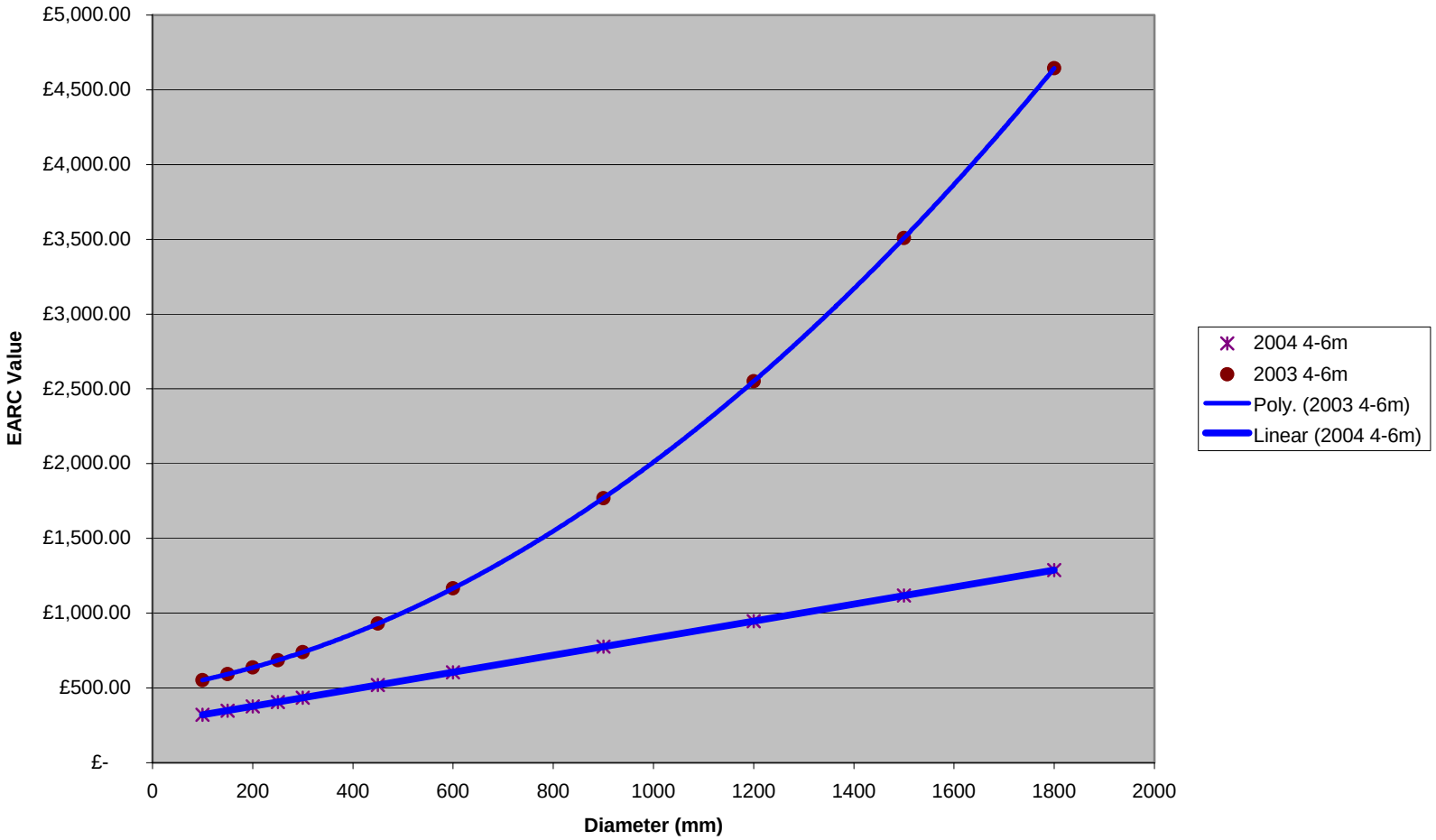
Graph 1
WIC Grade 22
2003 Compared to 2004 Combined Equations
Depth 0 - 2m



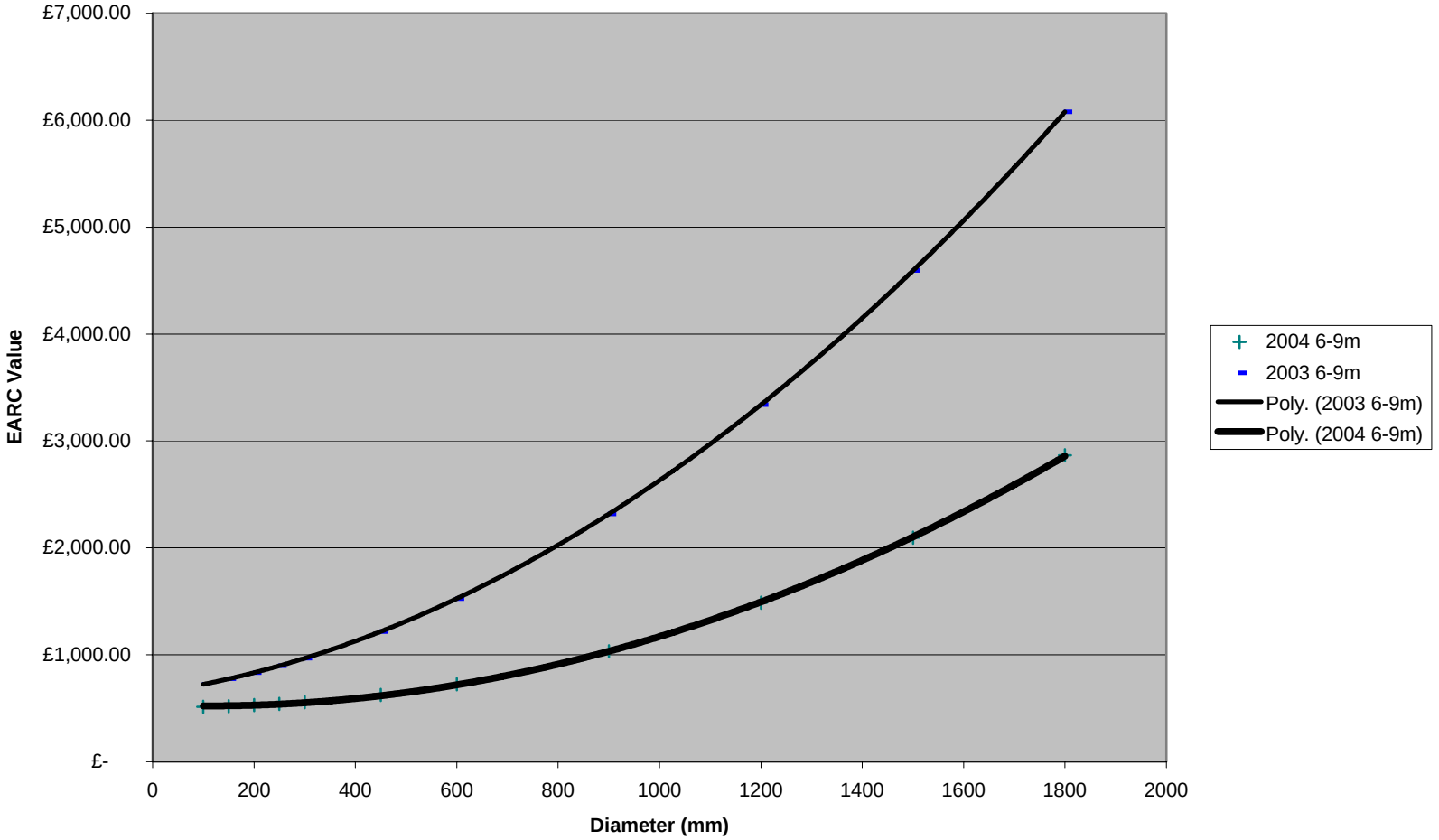
Graph 2
WIC Grade 22
2003 Compared to 2004 Combined Equations
Depth 2 - 4m



Graph 3
WIC Grade 22
2003 Compared to 2004 Combined Equations
Depth 4 - 6m



Graph 4
WIC Grade 22
2003 Compared to 2004 Combined Equations
Depth 6 - 9m



Appendix 2

Assumptions

Water Infrastructure Consequences

Cons ID	Consequence Description	Consequence
1	Mains Potable <600mm	Maj
2	Mains Potable >300<600mm	Maj
3	Mains Potable >150<300mm	Maj
4	Aqueducts	Maj
5	Mains Potable >75<150mm	Con
6	Mains Potable <=75mm	Con
7	Mains (Other) >600mm	Con
8	Mains (Other) >300<600mm	Con
9	Mains (Other) >150<300mm	Con
10	Mains (Other) >75<150mm	Con
11	Mains (Other) <=75mm	Con
12	Ancillaries - customers (lead comm pipes)	Low
13	Ancillaries - customers (Galv Iron comm pipes)	Low
14	Ancillaries - customers (other comm pipes)	Low
15	Ancillaries - customer (meters) Non Household	Low
16	Ancillaries - customer (meters) Household meters	Low

Waste Water Infrastructure Consequences

Cons ID	Consequence Description	Consequence
1	Critical Sewer <900mm	Maj
2	Sewage Pumping Mains <900mm	Maj
3	Critical Sewer >600<900mm	Maj
4	Sewage Pumping Mains >600<900mm	Maj
5	CSO & EO's	Con
6	Critical Sewer >300<600mm	Con
7	Sewage Pumping Mains >300<600mm	Con
8	Critical Sewer >150<300mm	Con
9	Sewage Pumping Mains >150<300mm	Con
10	Other sewer structures	Con
11	Critical Sewer <=150mm	Con
12	Sewage Pumping Mains <=150mm	Con
13	Sewage Outfall	Con
14	Non Critical Sewer >300<600mm	Low
15	Non Critical Sewer >150<300mm	Low
16	Non Critical Sewer <=150mm	Low

Water Treatment Consequences

Cons ID	Consequence Description	Consequence
1	grit removal plant, general	Maj
2	inlet works	Maj
3	loch area general	Maj
4	hydro power generation	Maj
5	power generation plant	Maj
6	power supply	Maj
7	emergency generating unit, general	Maj
8	chlorination, pre-contact/treatment	Maj
9	chlorination, residual/marginal	Maj
10	chlorine dosing, general	Maj
11	hypochlorite dosing pre-contact/treatment	Maj
12	hypochlorite dosing residual/marginal	Maj
13	on site electrolytic chlorine generation	Maj
14	ultra-violet disinfection, general	Maj
15	chemical dosing, chlorammination	Maj
16	chemical dosing, coagulants	Maj
17	chemical dosing, flocculants	Maj
18	chemical dosing, general	Maj
19	chemical dosing, phosphates	Maj
20	gac contactor, general	Maj
21	gac contactor, rectangular	Maj
22	gac contactor, vessel or shell	Maj
23	soda plant	Maj
24	pac dosing	Maj
25	polerite filter	Maj
26	sulphur dioxide de-clorination plant	Maj
27	fluoridation plant, general	Maj
28	rapid gravity filter, general	Con
29	membrane filtration plant	Con
30	pressure filter, general	Con
31	non surveyed asset	Con
32	sedimentation tank, auto desludg	Con
33	sedimentation tank,manual desludge	Con
34	septic tank, general	Con
35	package plant	Con
36	screening, general	Con
37	screening, micro-strainer	Con
38	slow sand filter, general	Con
39	water pump station, general	Con
40	water pump station, in-line pumps	Con
41	water pump station, submersible	Con
42	water pump station, vertical shaft drive	Con
43	covered storage tank, general	Con
44	raw water tank, remote storage	Con
45	tertiary treatment area general	Con
46	balancing tank, general	Con
47	lagoon, general	Con
48	lagoon, sludge	Con
49	wash water tank, supply	Con

Cons ID	Consequence Description	Consequence
50	wash/waste water tank, general	Con
51	washwater systems	Con
52	scour	Con
53	chemical dosing, ph adjustment +ve	Con
54	adsorbtion clarifier	Con
55	chemical dosing, ph adjustment -ve	Con
56	ozone dosing plant, general	Con
57	control and monitoring	Con
58	major works control system	Con
59	plant monitoring and control	Con
60	telemetry outstation, general	Con
61	telemetry outstation, private wire	Con
62	telemetry outstation, pstn	Con
63	telemetry outstation, satellite	Con
64	telemetry outstation, uhf radio	Con
65	telemetry peripheral, general	Con
66	telemetry peripheral, uhf radio	Con
67	waste water tank, chemical	Con
68	sludge blanket clarifier, flat bottom	Con
69	sludge blanket clarifier, general	Con
70	sludge blanket clarifier, hopper bottom	Con
71	sludge blanket clarifier, pulsator	Con
72	contact tank, general	Con
73	flocculation zone, general	Con
74	dissolved air flotation tank, general	Con
75	dissolved air production, general	Con
76	flash mixer, general	Low
77	waste water tank, recovery	Low
78	bagging room	Low
79	sedimentation tank, general	Low
80	cess pit area, general	Low
81	filtration area	Low
82	sludge cake store	Low
83	sludge drying bed, general	Low
84	sludge holding tank, batch thickener	Low
85	sludge holding tank, general	Low
86	sludge holding tank, with picket fence thickener	Low
87	sludge mechanical thickening, general	Low
88	sludge plant	Low
89	sludge pressing, general	Low
90	sludge pressing, plate press	Low
91	sludge pumping, +ve displacement	Low
92	flow meter, intrusive	Low
93	flow meter, non-intrusive	Low
94	water sampling	Low
95	building services	Low
96	building, admin/control/mess	Low
97	building, garage	Low
98	building, general	Low
99	building, laboratory	Low
100	building, non-operational	Low
101	building, process	Low

Cons ID	Consequence Description	Consequence
102	building, store	Low
103	building, workshop	Low
104	fuel oil tank	Low
105	other facilities, general	Low
106	valve house	Low
107	landscaping + planting	Low
108	off site access, general	Low
109	raw water reservoir area general	Low
110	road bridge	Low
111	site roads + paving	Low
112	fencing + gates	Low
113	site security measures	Low

Water Storage Consequences

Cons ID	Consequence Description	Consequence
1	de - chlorination plant	Maj
2	power generation plant	Maj
3	emergency generating unit, general	Maj
4	spillway	Maj
5	chlorination, residual/marginal	Maj
6	chlorine dosing, general	Maj
7	power supply	Maj
8	non surveyed asset	Con
9	telemetry peripheral, general	Con
10	telemetry outstation, pstn	Con
11	telemetry outstation, general	Con
12	washwater systems	Con
13	water pump station, general	Con
14	control and monitoring	Con
15	telemetry peripheral, uhf radio	Con
16	covered storage tank, single	Con
17	pipe bridge	Con
18	covered storage tank, general	Con
19	telemetry outstation, satellite	Con
20	telemetry outstation, uhf radio	Con
21	tertiary treatment area general	Con
22	inlet works	Con
23	jackhead	Con
24	screening, general	Con
25	telemetry outstation, private wire	Con
26	off site access, general	Low
27	building, admin/control/mess	Low
28	landscaping + planting	Low
29	flow meter, non - intrusive	Low
30	flow meter, intrusive	Low
31	filtration area	Low
32	water tower	Low
33	other facilities, general	Low
34	building services	Low
35	building, general	Low

Cons ID	Consequence Description	Consequence
36	building, workshop	Low
37	building, store	Low
38	building, process	Low
39	building, laboratory	Low
40	building, garage	Low
41	fencing + gates	Low
42	site security measures	Low
43	site roads + paving	Low
44	telemetry peripheral, satellite	Low
45	telemetry peripheral, pstn	Low
46	telemetry peripheral, private wire	Low
47	valve house	Low
48	septic tank, general	Low
49	water sampling	Low
50	telemetry outstation, owned cable	Low

Water Resources Consequences

Cons ID	Consequence Description	Consequence
1	dam,concrete	Maj
2	spillway	Maj
3	dam, earth fill	Maj
4	dam, masonry	Maj
5	dam, general	Maj
6	impounding reservoir, general	Maj
7	compensation structure	Maj
8	water pump station, borehole pumps	Maj
9	inlet works	Maj
10	power supply	Maj
11	draw - off tunnel	Maj
12	loch area general	Maj
13	draw - off pipework	Maj
14	draw - off tower bridge	Maj
15	gravity intake	Maj
16	hydro power generation	Maj
17	emergency generating unit, general	Maj
18	draw - off tower	Maj
19	pitching (upstream)	Maj
20	non surveyed asset	Con
21	control and monitoring	Con
22	covered storage tank, general	Con
23	balancing tank, general	Con
24	fish pass and compensation water	Con
25	raw water tank, remote storage	Con
26	screening, pipeline strainer	Con
27	water pump station, general	Con
28	water pump station, submersible	Con
29	weir	Con
30	wave wall	Con
31	telemetry outstation, general	Con
32	telemetry outstation, satellite	Con

Cons ID	Consequence Description	Consequence
33	inter - process pipework + channels	Con
34	screening, general	Con
35	balancing tank, bankside storage	Con
36	screening, medium (9 - 25 mm)	Con
37	screening, fine (< 9mm)	Con
38	screening, coarse (>25 mm)	Con
39	scour	Con
40	pipe bridge	Con
41	lagoon, bankside storage	Con
42	telemetry outstation, uhf radio	Con
43	building, general	Low
44	fencing + gates	Low
45	filtration area	Low
46	flow meter, intrusive	Low
47	flow meter, non – intrusive	Low
48	building, admin/control/mess	Low
49	building, non – operational	Low
50	valve house	Low
51	building, process	Low
52	site roads + paving	Low
53	landscaping + planting	Low
54	manhole	Low
55	off site access, general	Low
56	other facilities, general	Low
57	road bridge	Low
58	raw water reservoir area general	Low
59	water sampling	Low
60	building, store	Low

Water Pumping Stations Consequences

Cons ID	Consequence Description	Consequence
1	water pump station, borehole pumps	Maj
2	water pump station, hydropneumatic	Maj
3	water pump station, in - line pumps	Maj
4	water pump station, submersible	Maj
5	w/pump station,vertical shaft drive	Maj
6	water pump station, general	Maj
7	power supply	Maj
8	emergency generating unit, general	Maj
9	spillway	Maj
10	inlet works	Maj
11	chlorine dosing, general	Maj
12	chlorination, residual/marginal	Maj
13	power generation plant	Maj
14	non surveyed asset	Con
15	draw - off tunnel	Con
16	dam, general	Con
17	covered storage tank, general	Con
18	telemetry peripheral, uhf radio	Con
19	telemetry peripheral, satellite	Con
20	chemical dosing, ph adjustment - ve	Con

Cons ID	Consequence Description	Consequence
21	telemetry peripheral, pstn	Con
22	telemetry outstation, pstn	Con
23	telemetry peripheral, private wire	Con
24	weir	Con
25	dry well	Con
26	wet well	Con
27	balancing tank, general	Con
28	raw water tank, remote storage	Con
29	control and monitoring	Con
30	surge suppression	Con
31	screening, fine (< 9mm)	Con
32	screening, pipeline strainer	Con
33	balancing tank, bankside storage	Con
34	plant monitoring and control	Con
35	screening, micro – strainer	Con
36	telemetry outstation, general	Con
37	loch area general	Con
38	telemetry outstation, private wire	Con
39	telemetry outstation, owned cable	Con
40	inter - process pipework + channels	Con
41	impounding reservoir, general	Con
42	telemetry outstation, uhf radio	Con
43	telemetry outstation, satellite	Con
44	screening, coarse (>25 mm)	Con
45	screening, general	Con
46	off site access, general	Low
47	landscaping + planting	Low
48	road bridge	Low
49	raw water reservoir area general	Low
50	other facilities, general	Low
51	flow measurement, temporary	Low
52	flow meter, non – intrusive	Low
53	water sampling	Low
54	fencing + gates	Low
55	building, general	Low
56	building, store	Low
57	building, process	Low
58	building, garage	Low
59	building, admin/control/mess	Low
60	flow meter, intrusive	Low
61	site security measures	Low
62	site roads + paving	Low

Sewage Treatment Works Consequences

Cons ID	Consequence Description	Consequence
1	power generation plant	Maj
2	power supply	Maj
3	emergency generating unit, general	Maj
4	gas holder, integral	Maj
5	gas holder, separate	Maj
6	gas powered generation plant, general	Maj

Cons ID	Consequence Description	Consequence
7	dry well	Maj
8	dry well	Maj
9	wet well	Maj
10	wet well	Maj
11	reed bed, tertiary	Maj
12	sewage pump station, +ve displacement	Maj
13	sewage pump station, auto priming	Maj
14	sewage pump station, ejector	Maj
15	sewage pump station, general	Maj
16	sewage pump station, in-line pumps	Maj
17	sewage pump station, screw	Maj
18	sewage pump station, submersible	Maj
19	sewage pump station, vertical shaft drive	Maj
20	baf filter	Maj
21	baf plant	Maj
22	bio-filter, alternating double	Maj
23	bio-filter, general	Maj
24	bio-filter, high rate	Maj
25	bio-filter, nitrifying	Maj
26	bio-filter, recirculating	Maj
27	bio-filter, single filtration	Maj
28	surge supression	Maj
29	major works control system	Maj
30	plant monitoring and control	Maj
31	control and monitoring	Maj
32	sludge mechanical thickening, belt press	Maj
33	sludge plant	Maj
34	sludge pressing, belt press to cake	Maj
35	sludge pressing, centrifuge to cake	Maj
36	sludge pressing, general	Maj
37	sludge pressing, plate press	Maj
38	sludge pressing, vacuum filter to cake	Maj
39	sludge pumping, +ve displacement	Maj
40	sludge pumping, general	Maj
41	sludge reception system	Maj
42	sludge screening, general	Maj
43	package plant	Maj
44	soda plant	Maj
45	sludge digestion plant	Maj
46	sludge digestion tank	Maj
47	chemical dosing, coagulants	Maj
48	chemical dosing, flocculants	Maj
49	chemical dosing, general	Maj
50	h/chlor.dosing precontact/treatment	Maj
51	chemical dosing, ph adjustment +ve	Maj
52	flare stack	Maj
53	chemical dosing, ph adjustment - ve	Maj
54	effluent discharge	Con
55	effluent discharge, > 300 nb <= 450 nb	Con
56	effluent discharge, <= 150 nb	Con
57	effluent discharge,>225 nb<=300nb	Con
58	storm overflow	Con

Cons ID	Consequence Description	Consequence
59	bagging room	Con
60	thermal drying and pelletising plant	Con
61	secondary treatment area	Con
62	sedimentation tank, auto desludge	Con
63	sedimentation tank, manual desludge	Con
64	balancing tank, general	Con
65	wash water tank, supply	Con
66	wash/waste water tank, general	Con
67	washwater systems	Con
68	waste water tank, chemical	Con
69	waste water tank, recovery	Con
70	sludge cake store	Con
71	fuel oil tank	Con
72	gravity sand filter, general	Con
73	modular sand filtration, general	Con
74	slow sand filter, general	Con
75	grass plot, tertiary	Con
76	reed bed, general	Con
77	tertiary clarifier, general	Con
78	tertiary treatment area general	Con
79	ultra-violet disinfection, dirty water	Con
80	inter-process pipework + channels	Con
81	sludge holding tank, batch thickener	Con
82	sludge holding tank, with picket fence thickener	Con
83	sludge mechanical thickening, centrifuge	Con
84	sludge pressing, drum filter	Con
85	jackhead	Con
86	pipe bridge	Con
87	grit removal plant, cv channels	Con
88	grit removal plant, detritor (dorr type)	Con
89	grit removal plant, general	Con
90	grit removal plant, trap (pista type)	Con
91	inlet works	Con
92	screening, coarse (>25 mm)	Con
93	screening, fine (< 9mm)	Con
94	screening, general	Con
95	screening, medium (9 - 25 mm	Con
96	screening, micro-strainer	Con
97	screening, pipeline strainer	Con
98	screenings handling, bypass maceration	Con
99	manual grit removal	Con
100	storm water screens, coarse (>25 mm)	Con
101	storm water screens, fine (< 9mm)	Con
102	storm water screens, general	Con
103	storm water screens, medium (9 - 25 mm)	Con
104	storm water separator, general	Con
105	flow measurement, temporary	Con
106	flow meter, intrusive	Con
107	flow meter, non-intrusive	Con
108	sludge holding tank, general	Con
109	sludge holding tank, pathogen kill	Con
110	storm water tank, general	Con

Cons ID	Consequence Description	Consequence
111	storm water tank, with scrapers	Con
112	septic tank, general	Con
113	rising main, > 150 nb <= 225 nb	Low
114	rising main, > 225 nb <= 300 nb	Low
115	rising main, > 300 nb <= 450 nb	Low
116	rising main, > 450 nb <= 600 nb	Low
117	rising main, > 600 nb <= 900 nb	Low
118	rising main, > 900 nb	Low
119	rising main, <= 150 nb	Low
120	rising main, general	Low
121	sedimentation tank, final (activated sludge process)	Low
122	sedimentation tank, general	Low
123	activated sludge plant, diffused air equipment	Low
124	activated sludge plant, general	Low
125	activated sludge plant, horizontal rotor	Low
126	activated sludge plant, mixer	Low
127	activated sludge plant, oxygen injection	Low
128	activated sludge plant, package equipment	Low
129	activated sludge plant, vertical rotor	Low
130	activated sludge tank	Low
131	activated sludge tank, anoxic tank	Low
132	activated sludge tank, oxidation ditch	Low
133	cess pit area general	Low
134	covered storage tank, general	Low
135	filtration area	Low
136	rotating biological contactor, general	Low
137	screening, inline comminution/maceration	Low
138	lagoon, bankside storage	Low
139	lagoon, general	Low
140	lagoon, sludge	Low
141	lagoon, tertiary	Low
142	sludge mechanical thickening, general	Low
143	water pump station, general	Low
144	water sampling	Low
145	manhole	Low
146	screenings handling, dewaterer	Low
147	telemetry outstation, general	Low
148	telemetry outstation, owned cable	Low
149	telemetry outstation, private wire	Low
150	telemetry outstation, pstn	Low
151	telemetry outstation, satellite	Low
152	telemetry outstation, uhf radio	Low
153	telemetry peripheral, general	Low
154	telemetry peripheral, private wire	Low
155	telemetry peripheral, pstn	Low
156	telemetry peripheral, satellite	Low
157	telemetry peripheral, uhf radio	Low
158	fencing + gates	Low
159	site secutity measures	Low
160	ozone dosing plant, general	Low
161	building services	Low
162	building, admin/control/mess	Low

Cons ID	Consequence Description	Consequence
163	building, garage	Low
164	building, general	Low
165	building, laboratory	Low
166	building, non-operational	Low
167	building, process	Low
168	building, store	Low
169	building, workshop	Low
170	other facilities, general	Low
171	overhead crane, electrical	Low
172	overhead crane, mechanical	Low
173	valve house	Low
174	drainage	Low
175	landscaping + planting	Low
176	off site access, general	Low
177	road bridge	Low
178	site roads + paving	Low
179	sludge drying bed, general	Low

Sewage Pumping Stations Consequences

Cons ID	Consequence Description	Consequence
1	sewage pump station, general	Maj
2	sewage pump station, submersible	Maj
3	power supply	Maj
4	wet well	Maj
5	dry well	Maj
6	sew. p/station,vertical shaft drive	Maj
7	sewage pump station, in - line pumps	Maj
8	sewage pump station, ejector	Maj
9	sewage pump station, screw	Maj
10	emergency generating unit, general	Maj
11	sewage pmp station,+ve displacement	Maj
12	sewage pump station, auto priming	Maj
13	sludge pumping, general	Maj
14	power generation plant	Maj
15	control and monitoring	Con
16	non surveyed asset	Con
17	screening, general	Con
18	storm water tank, general	Con
19	storm overflow	Con
20	storm water screens, general	Con
21	flow meter, non - intrusive	Con
22	screening, coarse (>25 mm)	Con
23	effluent discharge	Con
24	screening, medium (9 - 25 mm)	Con
25	screening, fine (< 9mm)	Con
26	flow meter, intrusive	Con
27	inlet works	Con
28	grit removal plant, general	Con
29	storm water separator, general	Con
30	tertiary treatment area general	Con

Cons ID	Consequence Description	Consequence
31	septic tank, general	Con
32	washwater systems	Con
33	manual grit removal	Con
34	storm water screens, fine (< 9mm)	Con
35	wash/waste water tank, general	Con
36	grit removal plant, cv channels	Con
37	h/chlor.dosing precontact/treatment	Con
38	fuel oil tank	Con
39	grit removal plant,trap(pista type)	Con
40	storm water screens,medium(9 - 25mm)	Con
41	grit rem. plant,detritor(dorr type)	Con
42	other facilities, general	Low
43	rising main, general	Low
44	telemetry outstation, general	Low
45	telemetry outstation, pstn	Low
46	building, process	Low
47	rising main, <= 150 nb	Low
48	off site access, general	Low
49	building, admin/control/mess	Low
50	site roads + paving	Low
51	fencing + gates	Low
52	landscaping + planting	Low
53	rising main, > 150 nb <= 225 nb	Low
54	screening,inline comminution/macer.	Low
55	rising main, > 225 nb <= 300 nb	Low
56	building, store	Low
57	covered storage tank, general	Low
58	valve house	Low
59	rising main, > 450 nb <= 600 nb	Low
60	rising main, > 300 nb <= 450 nb	Low
61	rising main, > 600 nb <= 900 nb	Low
62	building, general	Low
63	overhead crane, electrical	Low
64	water pump station, general	Low
65	water sampling	Low
66	telemetry outstation, uhf radio	Low
67	overhead crane, mechanical	Low
68	manhole	Low
69	cess pit area general	Low
70	building services	Low
71	rising main, > 900 nb	Low
72	screenings handling, dewaterer	Low
73	telemetry outstation, private wire	Low
74	telemetry peripheral, pstn	Low
75	site security measures	Low
76	building, non - operational	Low
77	telemetry peripheral, general	Low

Sludge Treatment Consequences

Cons ID	Consequence Description	Consequence

Cons ID	Consequence Description	Consequence
1	sludge pumping, general	Maj
2	power supply	Maj
3	sludge digestion tank	Maj
4	sewage pump station, submersible	Maj
5	chemical dosing, flocculants	Maj
6	sludge screening, general	Maj
7	sludge plant	Maj
8	sewage pump station, general	Maj
9	sludge pressing,belt press to cake	Maj
10	sludge reception system	Maj
11	sludge pumping, +ve displacement	Maj
12	sludge digestion plant	Maj
13	gas powered generation plant, gen.	Maj
14	gas holder, separate	Maj
15	flare stack	Maj
16	sew. p/station,vertical shaft drive	Maj
17	chemical dosing, general	Maj
18	sludge pressing,centrifuge to cake	Maj
19	emergency generating unit, general	Maj
20	plant monitoring and control	Maj
21	non surveyed asset	Con
22	sludge holding tank, general	Con
23	sludge cake store	Con
24	control and monitoring	Con
25	washwater systems	Con
26	tertiary treatment area general	Con
27	sludge holding tank,batch thickener	Con
28	screening, general	Con
29	flow meter, intrusive	Con
30	covered storage tank, general	Con
31	sedimentation tank, no desludge	Con
32	package plant	Con
33	inlet works	Con
34	fuel oil tank	Con
35	chemical dosing, ph adjustment +ve	Con
36	lagoon, sludge	Low
37	other facilities, general	Low
38	sludge drying bed, general	Low
39	building, process	Low
40	sludge mech. thickening, general	Low
41	building, general	Low
42	off site access, general	Low
43	building, store	Low
44	building, admin/control/mess	Low

Life Expectancies - Infrastructure

Material Code	Material Description	Water LE	Wastewater LE
AC	Asbestos Cement	65	45
AK	Alkathene	50	50
BR	Brick	120	80

Material Code	Material Description	Water LE	Wastewater LE
CI	Cast iron < DN450	80	55
CO	Concrete	50	40
CU	Copper	50	20
DI	Ductile Iron	40	40
FAHDPE	Unknown (FAHD Polyethylene)	50	40
FC	Fire Clay	80	50
GI	Galvanised Iron	30	20
GRP	Glass Reinforced Plastic	50	40
GS	Galvanised Mild Steel	20	15
HDPE	HD Polyethylene	50	40
HEP30	Hepworth Polyethylene	50	40
HPPE	HP Polyethylene	50	40
MAC	Masonary	120	80
MDPE	MD Polyethylene	50	40
MOPVC	Modified Polyvinylchloride	50	40
P	Polyethylene Derivatives	50	40
PB	Lead	60	40
PC	Precast Concrete	60	40
PE	Polyethylene	50	40
PF	Pitch Fibre	15	10
POLY	Polyethylene	60	50
PSC	Prestressed Concrete	50	40
PVC	Polyvinylchloride	30	30
PVCU	Unplasticised Polyvinylchloride	30	30
RC	Reinforced Concrete	100	80
SI	Spun Iron	60	40
ST	Steel	100	70
unset	Unset	80	50
UPVC	Unplasticised Polyvinylchloride	30	30
VC	Vitrified Clay	150	120
X	Unset	80	50

Water Treatment Works Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
ADCX	Absorption clarifier	Long	-	100	0
BATR	Raw water tank, remote storage	Long	-	100	0
BATX	Balancing tank, general	Med/Long	-	60	0
BLDA	Building, admin/control/mess	Long	-	100	0
BLDG	Building, garage	Med/Long	-	60	0
BLDL	Building, laboratory	Long	-	100	0
BLDN	Building, non-operational	Long	-	100	0
BLDP	Building, process	Long	-	100	0
BLDS	Building, store	Long	-	100	0
BLDW	Building, workshop	Long	-	100	0
BLDX	Building, general	Med/Long	-	60	0
BRSX	Bagging room	Short	-	20	0
BSRV	Building services	-	Short	0	15
CAMX	Control and monitoring	-	Medium	0	30

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
CFMX	Flash mixer, general	Med/Long	Medium	60	30
CHDA	Chemical dosing, ph adjustment -ve	-	Medium	0	25
CHDB	Chemical dosing, ph adjustment +ve	-	Medium	0	25
CHDC	Chemical dosing, coagulants	-	Medium	0	25
CHDD	Pac dosing	-	Medium	0	30
CHDF	Chemical dosing, flocculants	-	Medium	0	25
CHDN	Chemical dosing, chlorammination	-	Medium	0	25
CHDP	Chemical dosing, phosphates	-	Medium	0	25
CHDX	Chemical dosing, general	-	Medium	0	25
CL2P	Chlorination, pre-contact/treatment	-	Medium	0	25
CL2R	Chlorination, residual/marginal	-	Medium	0	25
CLDX	Chlorine dosing, general	-	Medium	0	25
CLHP	Hypochlorite dosing pre-contact/treatment	-	Medium	0	25
CLHR	Hypochlorite dosing residual/marginal	-	Medium	0	25
CNTX	Contact tank, general	Long	-	100	0
CSPG	CESS PIT AREA GENERAL	Long	-	20	0
CSTX	Covered storage tank, general	Long	-	100	0
DAFX	Dissolved air flotation tank, general	Long	-	80	0
DAPX	Dissolved air production, general	Long	Medium	100	25
DCP2	Sulphur dioxide de-clorination plant	Long	Medium	100	25
FAGX	Fencing + gates	Med/Long	-	60	0
FLCX	Flocculation zone, general	Long	Medium	100	25
FLMX	FILTRATION AREA	Medium	-	60	0
FLPX	Fluoridation plant, general	Long	Medium	100	25
FMTI	Flow meter, intrusive	-	Short	0	15
FMTN	Flow meter, non-intrusive	-	Short	0	15
FUEL	Fuel oil tank	Long	-	100	0
GACR	Gac contactor, rectangular	Long	Medium	100	30
GACV	Gac contactor, vessel or shell	Long	Medium	100	30
GACX	GAC CONTACTOR, GENERAL	Long	Medium	100	30
GENE	Emergency generating unit, general	Long	Medium	100	30
GENH	Hydro power generation	Long	Medium	100	30
GRPX	Grit removal plant, General	Short	Medium	40	30
IWAX	Inlet works	Long	Short	80	15
LAGS	Lagoon, sludge	Long	Short	80	15
LAGX	Lagoon, general	Long	Short	80	15
LAPX	Landscaping + planting	Non Depr	-	150	0
LOCG	Loch area general	Non Depr	-	150	0
MEMX	Membrane filtration plant	Med/Long	Medium	60	30
MWCS	Major works control system	-	Medium	0	25
ODPX	Ozone dosing plant, general	Long	Medium	100	25
OSAX	Off site access, general	Long	-	100	0
OSEC	On site electrolytic chlorine generation	Med/Long	Medium	60	25
OTFX	Other facilities, general	Long	-	100	0
PAPX	PACKAGE PLANT	Med/Long	Medium	40	20
PFPP	Polerite filter	Long	Medium	100	25
PFPX	Pressure filter, general	Long	Medium	100	30
PGPX	Power generation plant	-	Short	0	15
PMCS	Plant monitoring and control	-	Medium	0	30
POWX	Power supply	-	Medium	0	30
PRSP	Sludge pressing, plate press	Long	Medium	100	30

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
PRSX	Sludge pressing, general	Short	Short	40	15
RAPX	Site roads + paving	Long	-	100	0
RBRX	Road bridge	Non Depr	-	150	0
RGFX	Rapid gravity filter, general	Long	Medium	100	30
RWSR	Raw water reservoir area general	Long	-	100	0
SAMP	Water sampling	-	Medium	0	30
SBCF	Sludge blanket clarifier, flat bottom	Long	Medium	100	30
SBCH	Sludge blanket clarifier, hopper bottom	Long	Medium	100	30
SBCP	Sludge blanket clarifier, pulsator	Long	Medium	100	25
SBCX	Sludge blanket clarifier, general	Long	Medium	100	30
SCOU	Scour	Long	-	100	0
SCRS	Screening, micro-strainer	Short	Short	40	15
SCRX	Screening, general	Long	Medium	100	30
SCSX	Sludge cake store	Short	Medium	40	25
SDBX	Sludge drying bed, general	Long	Long	60	40
SEDA	SEDIMENTATION TANK, AUTO DESLUDGE	Short	Short	60	20
SEDM	SEDIMENTATION TANK,MANUAL DESLUDGE	Short	Short	60	20
SEDX	SEDIMENTATION TANK, GENERAL	Short	Short	60	20
SEPX	SEPTIC TANK, GENERAL	Long	-	100	0
SHTP	Sludge holding tank, with picket fence thickener	Long	Medium	100	30
SHTT	Sludge holding tank, batch thickener	Short	Short	40	15
SHTX	Sludge holding tank, general	Long	Medium	100	30
SISM	Site secutity measures	-	Medium	0	25
SLPX	Sludge plant	-	Medium	0	30
SMTX	Sludge mechanical thickening, general	Med/Long	Medium	50	25
SOAX	SODA PLANT	Medium	Medium	20	20
SPLP	Sludge pumping, +ve displacement	-	Short	0	15
SSFX	Slow sand filter, general	Short	Short	40	15
TEAX	TERTIARY TREATMENT AREA GENERAL	-	Medium	0	20
TLCR	Telemetry outstation, uhf radio	-	Short	0	10
TLCS	Telemetry outstation, satellite	-	Short	0	10
TLCT	Telemetry outstation, pstn	-	Medium	0	25
TLCW	Telemetry outstation, private wire	-	Medium	0	25
TLCX	Telemetry outstation, general	-	Medium	0	25
TLPR	Telemetry peripheral, uhf radio	-	Short	0	15
TLPX	TELEMETRY PERIPHERAL, GENERAL	-	Medium	0	10
UVDX	Ultra-violet disinfection, general	Long	Medium	100	25
VLVX	Valve house	Long	-	100	0
WASH	Washwater systems	-	Medium	0	25
WPSI	Water pump station, in-line pumps	-	Medium	0	25
WPSS	Water pump station, submersible	-	Medium	0	25
WPSV	Water pump station, vertical shaft drive	-	Medium	0	30
WPSX	Water pump station, general	-	Medium	0	30
WWTC	Waste water tank, chemical	Long	Medium	100	25
WWTR	Waste water tank, recovery	Long	Medium	100	30
WWTS	Wash water tank, supply	Med/Long	Medium	60	25
WWTX	Wash/waste water tank, general	Long	Medium	100	30
XXXX	Non Surveyed Asset	Long	Medium	60	25

Water Storage Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
BLDA	BUILDING, ADMIN/CONTROL/MESS	LONG	-	60	0
BLDG	BUILDING, GARAGE	LONG	-	60	0
BLDL	BUILDING, LABORATORY	LONG	-	60	0
BLDP	BUILDING, PROCESS	LONG	-	60	0
BLDS	BUILDING, STORE	LONG	-	60	0
BLDW	BUILDING, WORKSHOP	LONG	-	60	0
BLDX	BUILDING, GENERAL	LONG	-	60	0
BSRV	BUILDING SERVICES	-	MEDIUM	0	60
CAMX	CONTROL AND MONITORING	-	SHORT	0	20
CL2R	CHLORINATION, RESIDUAL/MARGINAL	MED/LONG	MEDIUM	60	25
CLDX	CHLORINE DOSING, GENERAL	MED/LONG	MEDIUM	60	25
CSTS	COVERED STORAGE TANK, SINGLE	LONG	MEDIUM	100	30
CSTT	WATER TOWER	LONG	SHORT	100	15
CSTX	COVERED STORAGE TANK, GENERAL	LONG	-	100	0
DCPX	DE - CHLORINATION PLANT	-	MEDIUM	0	25
FAGX	FENCING + GATES	MED/LONG	-	60	0
FLMX	FILTRATION AREA	MEDIUM	-	60	0
FMTI	FLOW METER, INTRUSIVE	-	SHORT	0	20
FMTN	FLOW METER, NON - INTRUSIVE	-	SHORT	0	20
GENE	EMERGENCY GENERATING UNIT, GENERAL	SHORT	SHORT	20	20
IWAX	INLET WORKS	LONG	SHORT	60	20
JHDX	JACKHEAD	LONG	MEDIUM	80	25
LAPX	LANDSCAPING + PLANTING	NON DEPR	-	120	0
OSAX	OFF SITE ACCESS, GENERAL	LONG	-	100	0
OTFX	OTHER FACILITIES, GENERAL	LONG	-	100	0
PBRX	PIPE BRIDGE	LONG	-	100	0
PGPX	POWER GENERATION PLANT	-	SHORT	0	15
POWX	POWER SUPPLY	-	SHORT	0	20
RAPX	SITE ROADS + PAVING	LONG	-	100	0
SAMP	WATER SAMPLING	-	SHORT	0	20
SCRX	SCREENING, GENERAL	MED/LONG	SHORT	60	20
SEPX	SEPTIC TANK, GENERAL	LONG	-	100	0
SISM	SITE SECURITY MEASURES	-	SHORT	0	20
SWYX	SPILLWAY	LONG	MEDIUM	100	30
TEAX	TERTIARY TREATMENT AREA GENERAL	-	MEDIUM	0	40
TLCO	TELEMETRY OUTSTATION, OWNED CABLE	-	SHORT	0	10
TLCR	TELEMETRY OUTSTATION, UHF RADIO	-	SHORT	0	7
TLCS	TELEMETRY OUTSTATION, SATELLITE	-	SHORT	0	7
TLCT	TELEMETRY OUTSTATION, PSTN	-	SHORT	0	7
TLCW	TELEMETRY OUTSTATION, PRIVATE WIRE	LONG	MEDIUM	100	25
TLCX	TELEMETRY OUTSTATION, GENERAL	-	SHORT	0	7
TLPR	TELEMETRY PERIPHERAL, UHF RADIO	LONG	SHORT	100	15
TLPS	TELEMETRY PERIPHERAL, SATELLITE	-	SHORT	0	10
TLPT	TELEMETRY PERIPHERAL, PSTN	-	SHORT	0	10
TLPW	TELEMETRY PERIPHERAL, PRIVATE WIRE	-	SHORT	0	10
TLPX	TELEMETRY PERIPHERAL, GENERAL	-	SHORT	0	10
VLVX	VALVE HOUSE	MED/LONG	-	60	0
WASH	WASHWATER SYSTEMS	-	MEDIUM	0	40
WPSX	WATER PUMP STATION, GENERAL	-	MEDIUM	0	40

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
XXXX	NON SURVEYED ASSET	LONG	-	100	0

Water Resources Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
BATB	BALANCING TANK, BANKSIDE STORAGE	LONG	MEDIUM	65	25
BATR	RAW WATER TANK, REMOTE STORAGE	LONG	MEDIUM	100	30
BATX	BALANCING TANK, GENERAL	LONG	-	60	0
BLDA	BUILDING, ADMIN/CONTROL/MESS	LONG	-	60	0
BLDN	BUILDING, NON - OPERATIONAL	LONG	-	60	0
BLDP	BUILDING, PROCESS	LONG	-	60	0
BLDS	BUILDING, STORE	LONG	-	60	0
BLDX	BUILDING, GENERAL	LONG	-	60	0
CAMX	CONTROL AND MONITORING	-	SHORT	0	20
CMPX	COMPENSATION STRUCTURE	LONG	SHORT	100	20
CSTX	COVERED STORAGE TANK, GENERAL	LONG	-	100	0
CWSX	FISH PASS AND COMPENSATION WATER	LONG	MEDIUM	100	25
DAMC	DAM,CONCRETE	LONG	SHORT	100	15
DAME	DAM, EARTH FILL	LONG	SHORT	100	15
DAMM	DAM, MASONRY	LONG	SHORT	100	15
DAMX	DAM, GENERAL	LONG	SHORT	100	15
DPIP	DRAW - OFF PIPEWORK	LONG	MEDIUM	100	30
DTBR	DRAW - OFF TOWER BRIDGE	LONG	MEDIUM	100	30
DTNX	DRAW - OFF TUNNEL	LONG	MEDIUM	100	30
DTWX	DRAW - OFF TOWER	LONG	MEDIUM	100	30
FAGX	FENCING + GATES	MED/LONG	-	60	0
FLMX	FILTRATION AREA	MEDIUM	-	60	0
FMTI	FLOW METER, INTRUSIVE	-	SHORT	0	20
FMTN	FLOW METER, NON - INTRUSIVE	-	SHORT	0	20
GENE	EMERGENCY GENERATING UNIT, GENERAL	SHORT	SHORT	20	20
GENH	HYDRO POWER GENERATION	LONG	MEDIUM	100	30
GVIX	GRAVITY INTAKE	LONG	SHORT	100	15
IMPX	IMPOUNDING RESERVOIR, GENERAL	LONG	MEDIUM	100	30
IPPX	INTER - PROCESS PIPEWORK + CHANNELS	NON DEPR	MEDIUM	150	25
IWAX	INLET WORKS	LONG	SHORT	60	20
LAGB	LAGOON, BANKSIDE STORAGE	MED/LONG	MEDIUM	60	25
LAPX	LANDSCAPING + PLANTING	NON DEPR	-	120	0
LOCG	LOCH AREA GENERAL	NON DEPR	MEDIUM	150	25
MHLX	MANHOLE	LONG	-	100	0
OSAX	OFF SITE ACCESS, GENERAL	LONG	-	100	0
OTFX	OTHER FACILITIES, GENERAL	LONG	-	100	0
PBRX	PIPE BRIDGE	LONG	-	100	0
POWX	POWER SUPPLY	-	SHORT	0	20
PTCH	PITCHING (UPSTREAM)	LONG	-	100	0
RAPX	SITE ROADS + PAVING	LONG	-	100	0
RBRX	ROAD BRIDGE	LONG	-	100	0
RWSR	RAW WATER RESERVOIR AREA GENERAL	LONG	MEDIUM	100	30
SAMP	WATER SAMPLING	-	SHORT	0	20

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
SCOU	SCOUR	LONG	MEDIUM	100	30
SCRC	SCREENING, COARSE (>25 MM)	MED/LONG	SHORT	60	20
SCRF	SCREENING, FINE (< 9MM)	MED/LONG	SHORT	60	20
SCRM	SCREENING, MEDIUM (9 - 25 MM)	MED/LONG	SHORT	60	20
SCRP	SCREENING, PIPELINE STRAINER	LONG	MEDIUM	60	20
SCRX	SCREENING, GENERAL	MED/LONG	SHORT	60	20
SWYX	SPILLWAY	LONG	MEDIUM	100	30
TLCR	TELEMETRY OUTSTATION, UHF RADIO	-	SHORT	0	7
TLCS	TELEMETRY OUTSTATION, SATELLITE	-	SHORT	0	7
TLCX	TELEMETRY OUTSTATION, GENERAL	-	SHORT	0	7
VLVX	VALVE HOUSE	MED/LONG	-	60	0
WAVE	WAVE WALL	LONG	-	100	0
WEIR	WEIR	LONG	MEDIUM	100	25
WPSB	WATER PUMP STATION, BOREHOLE PUMPS	LONG	MEDIUM	100	25
WPSS	WATER PUMP STATION, SUBMERSIBLE	LONG	MEDIUM	100	25
WPSX	WATER PUMP STATION, GENERAL	-	MEDIUM	0	40
XXXX	NON SURVEYED ASSET	LONG	-	100	0

Water Pumping Stations Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
BATB	BALANCING TANK, BANKSIDE STORAGE	LONG	MEDIUM	65	25
BATR	RAW WATER TANK, REMOTE STORAGE	LONG	MEDIUM	100	30
BATX	BALANCING TANK, GENERAL	LONG	-	60	0
BLDA	BUILDING, ADMIN/CONTROL/MESS	LONG	-	60	0
BLDG	BUILDING, GARAGE	LONG	-	60	0
BLDP	BUILDING, PROCESS	LONG	-	60	0
BLDS	BUILDING, STORE	LONG	-	60	0
BLDX	BUILDING, GENERAL	LONG	-	60	0
CAMX	CONTROL AND MONITORING	-	SHORT	0	20
CHDA	CHEMICAL DOSING, PH ADJUSTMENT - VE	-	MEDIUM	0	40
CL2R	CHLORINATION, RESIDUAL/MARGINAL	MED/LONG	MEDIUM	60	25
CLDX	CHLORINE DOSING, GENERAL	MED/LONG	MEDIUM	60	25
CSTX	COVERED STORAGE TANK, GENERAL	LONG	-	100	0
DAMX	DAM, GENERAL	LONG	SHORT	100	15
DTNX	DRAW - OFF TUNNEL	LONG	MEDIUM	100	30
FAGX	FENCING + GATES	MED/LONG	-	60	0
FMTI	FLOW METER, INTRUSIVE	-	SHORT	0	20
FMTN	FLOW METER, NON - INTRUSIVE	-	SHORT	0	20
FMTT	FLOW MEASUREMENT, TEMPORARY	-	SHORT	0	15
GENE	EMERGENCY GENERATING UNIT, GENERAL	SHORT	SHORT	20	20
IMPX	IMPOUNDING RESERVOIR, GENERAL	LONG	MEDIUM	100	30
IPPX	INTER - PROCESS PIPEWORK + CHANNELS	NON DEPR	MEDIUM	150	25
IWAX	INLET WORKS	LONG	SHORT	60	20
LAPX	LANDSCAPING + PLANTING	NON DEPR	-	120	0
LOCG	LOCH AREA GENERAL	NON DEPR	MEDIUM	150	25
OSAX	OFF SITE ACCESS, GENERAL	LONG	-	100	0
OTFX	OTHER FACILITIES, GENERAL	LONG	-	100	0

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
PGPX	POWER GENERATION PLANT	-	SHORT	0	15
PMCS	PLANT MONITORING AND CONTROL	-	SHORT	0	20
POWX	POWER SUPPLY	-	SHORT	0	20
RAPX	SITE ROADS + PAVING	LONG	-	100	0
RBRX	ROAD BRIDGE	LONG	-	100	0
RWSR	RAW WATER RESERVOIR AREA GENERAL	LONG	MEDIUM	100	30
SAMP	WATER SAMPLING	-	SHORT	0	20
SCRC	SCREENING, COARSE (>25 MM)	MED/LONG	SHORT	60	20
SCRF	SCREENING, FINE (< 9MM)	MED/LONG	SHORT	60	20
SCRP	SCREENING, PIPELINE STRAINER	LONG	MEDIUM	60	20
SCRS	SCREENING, MICRO - STRAINER	MED/LONG	SHORT	60	20
SCRX	SCREENING, GENERAL	MED/LONG	SHORT	60	20
SISM	SITE SECURITY MEASURES	-	SHORT	0	20
SSEX	SURGE SUPPRESSION	-	MEDIUM	0	20
SWYX	SPILLWAY	LONG	MEDIUM	100	30
TLCO	TELEMETRY OUTSTATION, OWNED CABLE	-	SHORT	0	10
TLCR	TELEMETRY OUTSTATION, UHF RADIO	-	SHORT	0	7
TLCS	TELEMETRY OUTSTATION, SATELLITE	-	SHORT	0	7
TLCT	TELEMETRY OUTSTATION, PSTN	-	SHORT	0	7
TLCW	TELEMETRY OUTSTATION, PRIVATE WIRE	LONG	MEDIUM	100	25
TLCX	TELEMETRY OUTSTATION, GENERAL	-	SHORT	0	7
TLPR	TELEMETRY PERIPHERAL, UHF RADIO	LONG	SHORT	100	15
TLPS	TELEMETRY PERIPHERAL, SATELLITE	-	SHORT	0	10
TLPT	TELEMETRY PERIPHERAL, PSTN	-	SHORT	0	10
TLPW	TELEMETRY PERIPHERAL, PRIVATE WIRE	-	SHORT	0	10
WEIR	WEIR	LONG	MEDIUM	100	25
WPSB	WATER PUMP STATION, BOREHOLE PUMPS	LONG	MEDIUM	100	25
WPSH	WATER PUMP STATION, HYDROPNEUMATIC	LONG	MEDIUM	100	25
WPSI	WATER PUMP STATION, IN - LINE PUMPS	LONG	MEDIUM	100	25
WPSS	WATER PUMP STATION, SUBMERSIBLE	LONG	MEDIUM	100	25
WPSV	W/PUMP STATION,VERTICAL SHAFT DRIVE	LONG	MEDIUM	100	30
WPSX	WATER PUMP STATION, GENERAL	-	MEDIUM	0	40
WPWD	DRY WELL	LONG	MEDIUM	100	30
WPWW	WET WELL	LONG	MEDIUM	100	30
XXXX	NON SURVEYED ASSET	LONG	MEDIUM	60	25

Sewage Treatment Works Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
ASPD	ACTIVATED SLUDGE PLANT, DIFFUSED AIR	-	MEDIUM	0	20
ASPH	ACTIVATED SLUDGE PLANT, HORIZONTAL	-	MEDIUM	0	20
ASPI	ACTIVATED SLUDGE PLANT, OXYGEN	-	MEDIUM	0	20
ASPM	ACTIVATED SLUDGE PLANT, MIXER	-	MEDIUM	0	20
ASPP	ACTIVATED SLUDGE PLANT, PACKAGE	-	MEDIUM	0	20
ASPV	ACTIVATED SLUDGE PLANT, VERTICAL ROTOR	-	MEDIUM	0	20
ASPX	ACTIVATED SLUDGE PLANT, GENERAL	-	MEDIUM	0	20
ASTA	ACTIVATED SLUDGE TANK, ANOXIC TANK	LONG	-	60	0
ASTO	ACTIVATED SLUDGE TANK, OXIDATION DITCH	LONG	-	60	0

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
ASTX	ACTIVATED SLUDGE TANK	LONG	-	60	0
BAFX	BAF FILTER	MED/LONG	-	60	0
BAPX	BAF PLANT	MEDIUM	-	60	0
BATX	BALANCING TANK, GENERAL	LONG	-	60	0
BFPA	BIO-FILTER, ALTERNATING DOUBLE	MED/LONG	MEDIUM	60	20
BFPH	BIO-FILTER, HIGH RATE	MED/LONG	MEDIUM	60	20
BFPN	BIO-FILTER, NITRIFYING	MED/LONG	MEDIUM	60	20
BFPR	BIO-FILTER, RECIRCULATING	MED/LONG	MEDIUM	60	20
BFPS	BIO-FILTER, SINGLE FILTRATION	MED/LONG	MEDIUM	60	20
BFPX	BIO-FILTER, GENERAL	MED/LONG	MEDIUM	60	20
BLDA	BUILDING, ADMIN/CONTROL/MESS	LONG	-	60	0
BLDG	BUILDING, GARAGE	LONG	-	60	0
BLDL	BUILDING, LABORATORY	LONG	-	60	0
BLDN	BUILDING, NON-OPERATIONAL	LONG	-	60	0
BLDP	BUILDING, PROCESS	LONG	-	60	0
BLDS	BUILDING, STORE	LONG	-	60	0
BLDW	BUILDING, WORKSHOP	LONG	-	60	0
BLDX	BUILDING, GENERAL	LONG	-	60	0
BRSX	BAGGING ROOM	SHORT	-	20	0
BSRV	BUILDING SERVICES	-	MEDIUM	0	60
CAMX	CONTROL AND MONITORING	-	SHORT	0	20
CHDA	CHEMICAL DOSING, PH ADJUSTMENT - VE	-	MEDIUM	0	40
CHDC	CHEMICAL DOSING, COAGULANTS	-	MEDIUM	0	40
CHDF	CHEMICAL DOSING, FLOCCULANTS	-	MEDIUM	0	40
CHDX	CHEMICAL DOSING, GENERAL	-	MEDIUM	0	40
CSPG	CESS PIT AREA GENERAL	LONG	-	100	0
CSTX	COVERED STORAGE TANK, GENERAL	LONG	-	100	0
DGPX	SLUDGE DIGESTION PLANT	MEDIUM	SHORT	40	20
DGTX	SLUDGE DIGESTION TANK	LONG	SHORT	60	20
DRNX	DRAINAGE	LONG	SHORT	60	20
EDP1	EFFLUENT DISCHARGE, <= 150 NB	LONG	-	120	0
EDP3	EFFLUENT DISCHARGE,>225 NB<=300NB	LONG	-	120	0
EDPX	EFFLUENT DISCHARGE	LONG	-	120	0
FAGX	FENCING + GATES	MED/LONG	-	60	0
FLMX	FILTRATION AREA	MEDIUM	-	40	0
FMTI	FLOW METER, INTRUSIVE	-	SHORT	0	20
FMTN	FLOW METER, NON-INTRUSIVE	-	SHORT	0	20
FUEL	FUEL OIL TANK	LONG	-	100	0
GENE	EMERGENCY GENERATING UNIT, GENERAL	SHORT	SHORT	20	20
GENG	GAS POWERED GENERATION PLANT,	MEDIUM	SHORT	40	20
GPTT	GRASS PLOT, TERTIARY	LONG	MEDIUM	60	20
GRPC	GRIT REMOVAL PLANT, CV CHANNELS	MED/LONG	SHORT	60	20
GRPD	GRIT REMOVAL PLANT, DETRITOR (DORR	MED/LONG	SHORT	60	20
GRPM	MANUAL GRIT REMOVAL	MEDIUM	-	40	0
GRPT	GRIT REMOVAL PLANT, TRAP (PISTA TYPE)	MED/LONG	MEDIUM	60	40
GRPX	GRIT REMOVAL PLANT, GENERAL	MED/LONG	MEDIUM	60	40
GSFX	GRAVITY SAND FILTER, GENERAL	MED/LONG	MEDIUM	60	40
IWAX	INLET WORKS	LONG	SHORT	60	20
LAGS	LAGOON, SLUDGE	LONG	SHORT	100	20
LAGT	LAGOON, TERTIARY	LONG	SHORT	100	20
LAPX	LANDSCAPING + PLANTING	NON DEPR	-	120	0

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
MACR	SCREENING, INLINE	-	MEDIUM	0	20
MHLX	MANHOLE	LONG	-	100	0
MSFX	MODULAR SAND FILTRATION, GENERAL	MED/LONG	SHORT	60	20
OCRM	OVERHEAD CRANE, MECHANICAL	-	MEDIUM	0	40
OSAX	OFF SITE ACCESS, GENERAL	LONG	-	100	0
OTFX	OTHER FACILITIES, GENERAL	LONG	-	100	0
PAPX	PACKAGE PLANT	MED/LONG	MEDIUM	60	40
PBRX	PIPE BRIDGE	LONG	-	100	0
PMCS	PLANT MONITORING AND CONTROL	-	SHORT	0	20
POWX	POWER SUPPLY	-	SHORT	0	20
PRSD	SLUDGE PRESSING, DRUM FILTER	MED/LONG	SHORT	60	20
PRSP	SLUDGE PRESSING, PLATE PRESS	MED/LONG	SHORT	60	20
PRSV	SLUDGE PRESSING, VACUUM FILTER TO CAKE	MED/LONG	SHORT	60	20
RAPX	SITE ROADS + PAVING	LONG	-	100	0
RBCX	ROTATING BIOLOGICAL CONTACTOR,	MED/LONG	SHORT	60	20
RBDT	REED BED, TERTIARY	MED/LONG	-	60	0
RBDX	REED BED, GENERAL	MED/LONG	-	60	0
RBRX	ROAD BRIDGE	LONG	-	100	0
SAMP	WATER SAMPLING	-	SHORT	0	20
SCHB	SCREENINGS HANDLING, BYPASS	MED/LONG	SHORT	60	20
SCHD	SCREENINGS HANDLING, DEWATERER	MED/LONG	SHORT	60	20
SCRC	SCREENING, COARSE (>25 MM)	MED/LONG	SHORT	60	20
SCRF	SCREENING, FINE (< 9MM)	MED/LONG	SHORT	60	20
SCRM	SCREENING, MEDIUM (9 - 25 MM	MED/LONG	SHORT	60	20
SCRS	SCREENING, MICRO-STRAINER	MED/LONG	SHORT	60	20
SCRX	SCREENING, GENERAL	MED/LONG	SHORT	60	20
SCSX	SLUDGE CAKE STORE	LONG	MEDIUM	60	40
SDBX	SLUDGE DRYING BED, GENERAL	LONG	MEDIUM	100	40
SEDA	SEDIMENTATION TANK, AUTO DESLUDGE	LONG	SHORT	60	20
SEDF	SEDIMENTATION TANK, FINAL (activated sludge	LONG	SHORT	60	20
SEDM	SEDIMENTATION TANK, MANUAL DESLUDGE	LONG	MEDIUM	60	40
SEDN	SECONDARY TREATMENT AREA	LONG	SHORT	60	20
SEDX	SEDIMENTATION TANK, GENERAL	LONG	SHORT	60	20
SEPX	SEPTIC TANK, GENERAL	LONG	-	100	0
SHTP	SLUDGE HOLDING TANK, WITH PICKET FENCE	LONG	SHORT	60	20
SHTT	SLUDGE HOLDING TANK, BATCH THICKENER	LONG	SHORT	60	20
SHTX	SLUDGE HOLDING TANK, GENERAL	LONG	SHORT	60	20
SISM	SITE SECUTITY MEASURES	-	SHORT	0	20
SLPX	SLUDGE PLANT	-	MEDIUM	0	20
SLSX	SLUDGE SCREENING, GENERAL	MED/LONG	MEDIUM	60	20
SMTB	SLUDGE MECHANICAL THICKENING, BELT	MED/LONG	MEDIUM	60	20
SMTC	SLUDGE MECHANICAL THICKENING,	MED/LONG	MEDIUM	60	20
SMTX	SLUDGE MECHANICAL THICKENING, GENERAL	MED/LONG	MEDIUM	60	20
SOFX	STORM OVERFLOW	LONG	-	100	0
SPLP	SLUDGE PUMPING, +VE DISPLACEMENT	-	MEDIUM	0	40
SPLX	SLUDGE PUMPING, GENERAL	-	MEDIUM	0	40
SPSA	SEWAGE PUMP STATION, AUTO PRIMING	-	MEDIUM	0	40
SPSC	SEWAGE PUMP STATION, SCREW	-	MEDIUM	0	40
SPSI	SEWAGE PUMP STATION, IN-LINE PUMPS	-	MEDIUM	0	40
SPSP	SEWAGE PUMP STATION, +VE DISPLACEMENT	-	MEDIUM	0	40
SPSS	SEWAGE PUMP STATION, SUBMERSIBLE	-	MEDIUM	0	40

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
SPSV	SEWAGE PUMP STATION, VERTICAL SHAFT	-	MEDIUM	0	40
SPSX	SEWAGE PUMP STATION, GENERAL	-	MEDIUM	0	40
SPWD	DRY WELL	LONG	-	100	0
SPWW	WET WELL	LONG	-	100	0
SRSX	SLUDGE RECEPTION SYSTEM	LONG	SHORT	60	20
SSFX	SLOW SAND FILTER, GENERAL	MED/LONG	SHORT	60	20
STDG	THERMAL DRYING AND PELLETISING PLANT	MED/LONG	SHORT	60	20
SWOX	STORM WATER SEPARATOR, GENERAL	LONG	-	60	0
SWSC	STORM WATER SCREENS, COARSE (>25 MM)	LONG	MEDIUM	60	40
SWSF	STORM WATER SCREENS, FINE (< 9MM)	LONG	MEDIUM	60	40
SWSM	STORM WATER SCREENS, MEDIUM (9 - 25 MM)	LONG	MEDIUM	60	40
SWSX	STORM WATER SCREENS, GENERAL	LONG	-	60	0
SWTS	STORM WATER TANK, WITH SCRAPERS	LONG	SHORT	60	20
SWTX	STORM WATER TANK, GENERAL	LONG	SHORT	60	20
TCLX	TERTIARY CLARIFIER, GENERAL	-	MEDIUM	0	40
TEAX	TERTIARY TREATMENT AREA GENERAL	-	MEDIUM	0	40
TLCR	TELEMETRY OUTSTATION, UHF RADIO	-	SHORT	0	7
TLCS	TELEMETRY OUTSTATION, SATELLITE	-	SHORT	0	7
TLCT	TELEMETRY OUTSTATION, PSTN	-	SHORT	0	7
TLCX	TELEMETRY OUTSTATION, GENERAL	-	SHORT	0	7
TLPX	TELEMETRY PERIPHERAL, GENERAL	-	SHORT	0	7
UVDD	ULTRA-VIOLET DISINFECTION, DIRTY WATER	MED/LONG	SHORT	60	20
VLVX	VALVE HOUSE	MED/LONG	-	60	0
WASH	WASHWATER SYSTEMS	-	MEDIUM	0	40
WPSX	WATER PUMP STATION, GENERAL	-	MEDIUM	0	40
WWTC	WASTE WATER TANK, CHEMICAL	LONG	MEDIUM	60	40
WWTX	WASH/WASTE WATER TANK, GENERAL	LONG	SHORT	60	20
XXXX	NON SURVEYED ASSET	LONG	MEDIUM	60	40

Sewage Pumping Stations Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
BLDA	BUILDING, ADMIN/CONTROL/MESS	LONG	-	60	0
BLDN	BUILDING, NON - OPERATIONAL	LONG	-	60	0
BLDP	BUILDING, PROCESS	LONG	-	60	0
BLDS	BUILDING, STORE	LONG	-	60	0
BLDX	BUILDING, GENERAL	LONG	-	60	0
BSRV	BUILDING SERVICES	-	MEDIUM	0	60
CAMX	CONTROL AND MONITORING	-	SHORT	0	20
CLHP	H/CHLOR.DOSING PRECONTACT/TREATMENT	-	MEDIUM	0	25
CSPG	CESS PIT AREA GENERAL	LONG	-	100	0
CSTX	COVERED STORAGE TANK, GENERAL	LONG	-	100	0
EDPX	EFFLUENT DISCHARGE	LONG	-	120	0
FAGX	FENCING + GATES	MED/LONG	-	60	0
FMTI	FLOW METER, INTRUSIVE	-	SHORT	0	20
FMTN	FLOW METER, NON - INTRUSIVE	-	SHORT	0	20
FUEL	FUEL OIL TANK	LONG	-	100	0

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
GENE	EMERGENCY GENERATING UNIT, GENERAL	SHORT	SHORT	20	20
GRPC	GRIT REMOVAL PLANT, CV CHANNELS	MED/LONG	SHORT	60	20
GRPD	GRIT REM. PLANT,DETRITOR(DORR TYPE)	MED/LONG	SHORT	60	20
GRPM	MANUAL GRIT REMOVAL	MEDIUM	-	40	0
GRPT	GRIT REMOVAL PLANT,TRAP(PISTA TYPE)	MED/LONG	MEDIUM	60	40
GRPX	GRIT REMOVAL PLANT, GENERAL	MED/LONG	MEDIUM	60	40
IWAX	INLET WORKS	LONG	SHORT	60	20
LAPX	LANDSCAPING + PLANTING	NON DEPR	-	120	0
MACR	SCREENING,INLINE COMMINUTION/MACER.	-	MEDIUM	0	20
MHLX	MANHOLE	LONG	-	100	0
OCRE	OVERHEAD CRANE, ELECTRICAL	-	SHORT	0	15
OCRM	OVERHEAD CRANE, MECHANICAL	-	MEDIUM	0	40
OSAX	OFF SITE ACCESS, GENERAL	LONG	-	100	0
OTFX	OTHER FACILITIES, GENERAL	LONG	-	100	0
PGPX	POWER GENERATION PLANT	-	SHORT	0	15
POWX	POWER SUPPLY	-	SHORT	0	20
RAPX	SITE ROADS + PAVING	LONG	-	100	0
RMN1	RISING MAIN, <= 150 NB	LONG	-	100	0
RMN2	RISING MAIN, > 150 NB <= 225 NB	LONG	-	100	0
RMN3	RISING MAIN, > 225 NB <= 300 NB	LONG	-	100	0
RMN4	RISING MAIN, > 300 NB <= 450 NB	LONG	-	100	0
RMN5	RISING MAIN, > 450 NB <= 600 NB	LONG	-	100	0
RMN6	RISING MAIN, > 600 NB <= 900 NB	LONG	-	100	0
RMN9	RISING MAIN, > 900 NB	LONG	-	100	0
RMNX	RISING MAIN, GENERAL	LONG	-	100	0
SAMP	WATER SAMPLING	-	SHORT	0	20
SCHD	SCREENINGS HANDLING, DEWATERER	MED/LONG	SHORT	60	20
SCRC	SCREENING, COARSE (>25 MM)	MED/LONG	SHORT	60	20
SCRF	SCREENING, FINE (< 9MM)	MED/LONG	SHORT	60	20
SCRM	SCREENING, MEDIUM (9 - 25 MM)	MED/LONG	SHORT	60	20
SCRX	SCREENING, GENERAL	MED/LONG	SHORT	60	20
SEPX	SEPTIC TANK, GENERAL	LONG	-	100	0
SISM	SITE SECURITY MEASURES	-	SHORT	0	20
SOFX	STORM OVERFLOW	LONG	-	100	0
SPLX	SLUDGE PUMPING, GENERAL	-	MEDIUM	0	40
SPSA	SEWAGE PUMP STATION, AUTO PRIMING	-	MEDIUM	0	40
SPSC	SEWAGE PUMP STATION, SCREW	-	MEDIUM	0	40
SPSE	SEWAGE PUMP STATION, EJECTOR	-	MEDIUM	0	40
SPSI	SEWAGE PUMP STATION, IN - LINE PUMPS	-	MEDIUM	0	40
SPSP	SEWAGE PMP STATION,+VE DISPLACEMENT	-	MEDIUM	0	40
SPSS	SEWAGE PUMP STATION, SUBMERSIBLE	-	MEDIUM	0	40
SPSV	SEW. P/STATION,VERTICAL SHAFT DRIVE	-	MEDIUM	0	40
SPSX	SEWAGE PUMP STATION, GENERAL	-	MEDIUM	0	40
SPWD	DRY WELL	LONG	-	100	0
SPWW	WET WELL	LONG	-	100	0
SWOX	STORM WATER SEPARATOR, GENERAL	LONG	-	60	0
SWSF	STORM WATER SCREENS, FINE (< 9MM)	LONG	MEDIUM	60	40
SWSM	STORM WATER SCREENS,MEDIUM(9 - 25MM)	LONG	MEDIUM	60	40
SWSX	STORM WATER SCREENS, GENERAL	LONG	-	60	0
SWTX	STORM WATER TANK, GENERAL	LONG	SHORT	60	20
TEAX	TERTIARY TREATMENT AREA GENERAL	-	MEDIUM	0	40

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
TLCR	TELEMETRY OUTSTATION, UHF RADIO	-	SHORT	0	7
TLCT	TELEMETRY OUTSTATION, PSTN	-	SHORT	0	7
TLCW	TELEMETRY OUTSTATION, PRIVATE WIRE	-	SHORT	0	7
TLCX	TELEMETRY OUTSTATION, GENERAL	-	SHORT	0	7
TLPT	TELEMETRY PERIPHERAL, PSTN	-	SHORT	0	7
TLPX	TELEMETRY PERIPHERAL, GENERAL	-	SHORT	0	7
VLVX	VALVE HOUSE	MED/LONG	-	60	0
WASH	WASHWATER SYSTEMS	-	MEDIUM	0	40
WPSX	WATER PUMP STATION, GENERAL	-	MEDIUM	0	40
WWTX	WASH/WASTE WATER TANK, GENERAL	LONG	SHORT	60	20
XXXX	NON SURVEYED ASSET	LONG	MEDIUM	60	40

Sludge Treatment Works Asset Life categories and Life Expectancies

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
BLDA	BUILDING, ADMIN/CONTROL/MESS	LONG	-	60	0
BLDP	BUILDING, PROCESS	LONG	-	60	0
BLDS	BUILDING, STORE	LONG	-	60	0
BLDX	BUILDING, GENERAL	LONG	-	60	0
CAMX	CONTROL AND MONITORING	-	SHORT	0	20
CHDB	CHEMICAL DOSING, PH ADJUSTMENT +VE	-	MEDIUM	0	40
CHDF	CHEMICAL DOSING, FLOCCULANTS	-	MEDIUM	0	40
CHDX	CHEMICAL DOSING, GENERAL	-	MEDIUM	0	40
CSTX	COVERED STORAGE TANK, GENERAL	LONG	-	100	0
DGPX	SLUDGE DIGESTION PLANT	MEDIUM	SHORT	40	20
DGTX	SLUDGE DIGESTION TANK	LONG	SHORT	60	20
FLSX	FLARE STACK	MED/LONG	SHORT	60	20
FMTI	FLOW METER, INTRUSIVE	-	SHORT	0	20
FUEL	FUEL OIL TANK	LONG	-	100	0
GASS	GAS HOLDER, SEPARATE	MED/LONG	SHORT	60	20
GENE	EMERGENCY GENERATING UNIT, GENERAL	SHORT	SHORT	20	20
GENG	GAS POWERED GENERATION PLANT, GEN.	MEDIUM	SHORT	40	20
IWAX	INLET WORKS	LONG	SHORT	60	20
LAGS	LAGOON, SLUDGE	LONG	SHORT	100	20
OSAX	OFF SITE ACCESS, GENERAL	LONG	-	100	0
OTFX	OTHER FACILITIES, GENERAL	LONG	-	100	0
PAPX	PACKAGE PLANT	MED/LONG	MEDIUM	60	40
PMCS	PLANT MONITORING AND CONTROL	-	SHORT	0	20
POWX	POWER SUPPLY	-	SHORT	0	20
PRSB	SLUDGE PRESSING,BELT PRESS TO CAKE	MED/LONG	SHORT	60	20
PRSC	SLUDGE PRESSING,CENTRIFUGE TO CAKE	MED/LONG	SHORT	60	20
SCRX	SCREENING, GENERAL	MED/LONG	SHORT	60	20
SCSX	SLUDGE CAKE STORE	LONG	MEDIUM	60	40
SDBX	SLUDGE DRYING BED, GENERAL	LONG	MEDIUM	100	40
SEDN	SEDIMENTATION TANK, NO DESLUDGE	LONG	SHORT	60	20
SHTT	SLUDGE HOLDING TANK,BATCH THICKENER	LONG	SHORT	60	20
SHTX	SLUDGE HOLDING TANK, GENERAL	LONG	SHORT	60	20
SLPX	SLUDGE PLANT	-	MEDIUM	0	20
SLSX	SLUDGE SCREENING, GENERAL	MED/LONG	MEDIUM	60	20

Asset Type	Description	Asset Life Cat Civil	Asset Life Cat E&M	Civil Life	E&M Life
SMTX	SLUDGE MECH. THICKENING, GENERAL	MED/LONG	MEDIUM	60	20
SPLP	SLUDGE PUMPING, +VE DISPLACEMENT	-	MEDIUM	0	40
SPLX	SLUDGE PUMPING, GENERAL	-	MEDIUM	0	40
SPSS	SEWAGE PUMP STATION, SUBMERSIBLE	-	MEDIUM	0	40
SPSV	SEW. P/STATION,VERTICAL SHAFT DRIVE	-	MEDIUM	0	40
SPSX	SEWAGE PUMP STATION, GENERAL	-	MEDIUM	0	40
SRSX	SLUDGE RECEPTION SYSTEM	LONG	SHORT	60	20
TEAX	TERTIARY TREATMENT AREA GENERAL	-	MEDIUM	0	40
WASH	WASHWATER SYSTEMS	-	MEDIUM	0	40
XXXX	NON SURVEYED ASSET	LONG	MEDIUM	60	40

J Tables – Cost Base

General Comments

Executive Summary

- Scottish Water (SW)has completed all the tables (J1, J2, J3, J4, J5, J6, J7 and J8) as part of this submission. Tables, J2, J4, J7 and J8 ask for the projected expenditures on a percentage basis, for each of the elements of the Cost Base: this has been completed based on the June 2002 capital programme. Tables J1, J3, J5 and J6 are the unit costs at which SW constructs the WIC-specified models noted.
- The methodology is generally unchanged from the previous year's approach. However, for infrastructure a statistical approach was undertaken to establish some of the unit costs.
- The methodology used for data capture and analysis involves analysing tenders (traditional projects or term contracts) or target costs at Capex 3 stage (ie projects where SW has committed to spend).
- The professional statistician engaged last year to verify the statistical integrity of the process component level cost curves, which underlie the standard cost models, was retained this year.
- The changes to the definitions for Table J, to align the Cost base with Ofwat's PR04 Cost Base, has proved to be very challenging within the timescales for this year's June Return and due to the timing of issue of documentation from the WIC's office but it has been achieved.
- The Office of National Statistics issue the COPI figures on a quarterly basis with the last two quarters stated as predicted values. The process of producing Non Infrastructure cost equations involves using the most up to date COPI predicted values prior to the issuing of the final WIC Definitions. This results in potentially different predicted COPI figures being used at various stages of the process, ie producing cost equations and producing cost estimates from the cost equations for establishing unit costs.
- In addition to the benchmarks specified by WIC, the remainder of the capital programme is benchmarked using models either extended from the WIC sizes or in a consistent manner from other treatment processes. These are used as the basis for establishing EARCs (Equivalent Asset Replacement Costs) for Table H (as specified by the Reporting Requirements).
- The process component costs are uplifted by pro-rated general project costs, design and supervision, project and programme management, tender to out-turn variation and allowable Scottish Water (client) costs to arrive at the Standard Cost for each model.
- Non-infrastructure models are based on designs to the WIC specification and the process components are priced on actual Scottish Water projects.
- Where possible, data from a wide geographical spread of projects has been used. The Cost Base can therefore be said to be representative of Scottish Water's construction conditions. A very small amount of the less common process component models have small data sets. Where this has occurred, the opinion of the professional statistician has been sought as to the integrity of the cost curve.
- For the infrastructure assets, all the data analysed is Scottish Water's, normalised to the precise WIC specification checklists and is representative of the whole region. A statistical method was adopted, where possible, to produce cost equations that would be used to calculate unit costs.
- The cost equations produced for last years June Return were revisited with the view of retiring data in excess of 10 years old. This was generally successful with the exception of a few cost equations where it was essential that the older data be retained to ensure statistically robust cost equations. However, it is still generally considered that efficiency improvements of recent years have been diluted by the need to continue to include older data to ensure there are enough data points to verify the statistical validity

of the models. This older data will persist in masking efficiency gains in future returns until the data sets are sufficiently updated.

- The review of the standard designs to match the recently implemented SW Standards and Specifications have resulted in more efficient treatment solutions for wastewater.
- We have undertaken extensive analysis of the efficiency gains achieved so far in the second year of the Q&S 2 period and are confident we have matched the targets set out in the 'Strategic Review of Charges 2002-06' document.
- The efficiency gains (in real terms) from last years June Return have been calculated for each category with the four Tables and are as follows:
  (This equates to approximately 7% across the whole capital programme)

  - **Water Infrastructure**

Mains Laying	4.5% efficiency
Mains Rehab	7.8% efficiency
Comms Pipes	20.9% efficiency

  - **Sewerage Infrastructure**

Sewer Laying	4.6% efficiency
Sewer Rehab	11.9% efficiency

  - **Water Non Infrastructure**

Treatment	2.2% efficiency
Storage	1.7% efficiency

  - **Sewerage Non Infrastructure**

Storm Detention	2.6% efficiency
Pumping Stations	3.1% efficiency
Sewage Treatment	19.1% efficiency

Methodology and Data Source

Infrastructure (Tables J1 & J3)

There has been inclusion of new models for Mains Laying by Directional Drilling and for Sewer Laying by Pipe Jacking and Microtunelling in this year's tables.

For Infrastructure, the methods and systems used for the preparation of costs for use in both the population of the Table J and Table H are different this year with a Statistical Method employed for the first time. The methodology from previous years (the Arithmetical Method) was also employed as back up to the Statistical Method. The list of which unit costs were obtained from the Statistical Method and which unit costs were obtained using the Arithmetical Method is shown in Section 2.2.6.

Data Capture

In order to widen the scope and optimise the retrieval of cost data the current capital programme has been re-allocated into the four operational zones of SW, and, into its working management structure. Therefore projects have been categorised as North West, North East, South East and South West, and then sub-categorised into SWS ACIP (Scottish Water Solutions Allocated Capital Investment Programme), SWS Managed and SW projects.

To achieve the degree of continuity and standardisation required of this year's captured and analysed data it is recorded in line with the WIC guidance requirements and on standard file Data Capture Standard Sheets for each project.

The cost data was obtained from a number of sources, which included Scottish Water Solutions (SWS) Capex 3 Target Costs, Term Contracts and named projects either from SWS Managed Programme or projects still managed by SW.

Data Analysis

The approach for data analysis was to collect as much relevant data as possible and send all the data points to an independent statistician to produce cost equations. Where substantially robust equations could not be derived, then the Arithmetical Method (as per AJR03) was adopted. These equations would then be used to establish the unit costs for Table J1 and J3.

The analysis of costs relating to pipelines for mains laying does not make any allowance for the different pipe material used by SW in its capital projects, nor if the design pressure of the pipeline exceeds 10bar. Each pipeline project is analysed and costs combined irrespective of the pipeline materials and pipe pressure rating.

The analysis of costs relating to pipelines for sewer laying, does not make any allowances for different pipeline material. Each pipeline project is analysed and costs combined irrespective of the pipeline materials. The frequency of lateral connections has been normalised to WIC specified frequencies.

For sewer laying, the data analysis covered a ranged of sewer depth bands as follows; 0 – 2m, 2 – 3m, 3 – 4m, 4 – 5m, 5 – 6, & 6 – 9m. A cost equation was produced for the data points solely within the depth band 2 – 3m and this equation was used to produce the Table J unit costs.

For each data point (up to) four separate data Collection Sheets were completed. These four sheets are as follows:

- Sheet 1 – Data Analysis for WIC Specification and WIC Fittings Frequencies
- Sheet 2 – Data Analysis for WIC Specification and fittings at Project Specific Frequencies
- Sheet 3 – Data Analysis for WIC Specification adjusted for Site Specifics and fittings at Project Specific Frequencies
- Sheet 4 – Data Analysis for WIC Specification adjusted for Site Specifics and fittings at WIC Fittings Frequencies

The data captured and recorded on Sheet 1 was used to establish cost equations to produce the unit rates for Table J1 and J3.

The data captured and recorded on Sheets 2 and 3 was not used.

The data captured and recorded on Sheet 4 was used to establish cost equations to EARC the Table H asset stock.

It was determined during the course of the data analysis that the new procurement processes through the advent of Scottish Water Solutions (SWS) could allow this year's water data to stand on its own statistically from weightings of the historical data. Sewer data, however, had very little SWS data and the data was calculated statistically with historical data included.

The Infrastructure Team undertook a self audit, whereby the three team members audited some projects which has been analysed by other members to ensure a degree of consistency in data analysis.

Cost Data from all the regional data capture / analysis teams was then collated centrally to allow the appropriate on costs to be applied.

On Costs

The on costs applied to the infrastructure data were Scottish Water Internal Costs and a Tender to Outturn factor.

The SW Internal Cost was obtained from SW's Finance Capital Investment Manager and relates to the period 2003 – 2004.

The Tender to Outturn factor was established by reviewing a group of Infrastructure projects that had achieved Capex 5 status (i.e. Beneficial Use stage) and comparing the Capex 5 value against the Capex 3 value. The combined differences between the Capex 3 values and the Capex 5 values produced the Tender to Outturn percentage.

COPI

All data points were tagged with its base date to allow all costs to be brought to the common priced date of 3Q2003 as stated in the WIC Definitions.

Cost Equations & Arithmetical Approach

The basis for costing out Tables H and Table J for information has been calculated, where possible, with the use of cost equations. These cost equations have been prepared by an independent statistical company, Engineering Statistical Services Ltd. (ESSL) appointed directly by SW, and using recognised statistical techniques.

Unit Costs

The Table J1 & J3 unit costs were either established from the cost equations produced by the independent statistician or established using an arithmetic approach. These are listed below.

- **Water Mains Laying**
  The statistical approach produced robust cost equations, but only up to 300mm nominal bore. For 450mm and 600mm nominal bores the arithmetical approach was adopted.

- **Water Mains Laying by Directional Drilling**
  The arithmetical approach was used to establish unit costs.

- **Water Mains Rehab**
  The statistical approach was used to produce cost equations for the following rehab categories; surface applied internal coatings, slip lining & pipe bursting.

- **Sewer Laying**
  The statistical approach was used to produce cost equations for all depth bands in grassland, rural/suburban and urban categories.

- **Sewer Rehab**
  The statistical approach was used to produce cost equations for the Insituform category. The arithmetical approach was adopted to produce unit rates for the Pipe bursting and Man Entry categories.

Checklists

The checklists as supplied by WIC have been completed as required. However there may be some anomalies due to the data capture and analysis process commencing in early January 2004.

Engineering Judgement Grades

EJGs have been derived using the WIC frameworks, but some concern has been noted over the empirical, or statistical, derivation of the WIC percentage bandings. ESSL have derived confidence bandings using statistical confidence bands but these do not align with the accuracy band "Comments" of the WIC Framework table, hence the concern noted above.

Engineering Judgement Grades for Infrastructure have been assessed for each submitted WIC line using the WIC Table 3 Framework for Accuracy Bands "Comments" column as the basis and added to the final table accordingly.

All Infrastructure EJGs fall within either band B2 or B3 (B1) in tables.

The reliability band B - the main source of data used in the standard cost estimation relates to work where SW has experience in its own region and can call on data from either a limited number of completed projects or detailed design estimates in a similar size band.

The accuracy band 2 – represents work where reliable SW specific data is available. SW is confident that all adjustments for site specific factors have been made accurately and as specified in the guidance.

The accuracy band 3 - represents work where reasonable SW specific data is available. Some source data may be from a non-company source. SW is less confident that all adjustments for site specific factors have been made accurately and as specified in the guidance.

Non Infrastructure (Tables J5 & J6)

The WIC has made a number of changes to the requirements for this year's Table J submission, particularly Tables J5 and J6.

The methods and systems used for the preparation of costs for use in both the population of the Table J and Table H are generally in line with those adopted for last year's submission, in order to afford a level of continuity.

Due to the changes in the WIC requirements, SW's procurement procedures (ie the formation of Scottish Water Solutions (SWS)) and, its transition to a new standardised costing and estimating database, some adaptations to the presentation and use of cost data have been made. However in principle the high level methodology of using SW own data is still intact.

SW has analysed projects which have been constructed or SW have committed to construct (ie have gained Capex 3 approval). The cost data analysed has been adjusted to exclude atypical site factors to ensure that unit costs comply with the WIC stylised definitions.

The cost data analysed represents actual costs incurred (or to be incurred) by SW, where possible, from recent projects within the current capital investment programme. However, the standard costs differ from actual work or projects in that "atypical" costs (for work items and additional factors) are excluded (as defined in the standard cost checklists, definitions and classification tables (for pumping stations); and the cost of construction or installation is adjusted to meet the standard cost definitions eg capacity, equipment list, pipe depth etc.

Data Capture

As with previous submissions the tasks of capturing and analysing cost data has been split between infrastructure and non-infrastructure.

In order to widen the scope, and optimise the retrieval, of cost data the current capital programme has been re-allocated into the four operational zones of SW, and, into its working management structure. Therefore projects have been categorised as North West, North East, South East and South West, and then sub-categorised into SWS ACIP (Allocated Capital Investment Programme), SWS Managed and SW projects.

Data Analysis

The data analysed for Non Infrastructure requires that all non construction costs are stripped out with the base construction cost recorded for each process component along with the process component size and quantifier. Data, where available, has been captured and analysed for the full series of cost models, approximately 100, however only about 25 are required for pricing the Table J standard cost models.

Cost data from analysed projects has then been collated by process component giving details of type, costing parameter or quantifier, base dates and COPI indices.

On Costs

The analysis of data for construction on-costs has been carried out independently of the main construction data analysis function. The information is captured at area level and passed to the on cost team for collation and analysis. There are two types of on costs. Level 1 on costs are applied (not compounded) to the base construction cost and include general items, design and project management. Level 2 on costs are applied to the combined cost of the base construction costs and the Level 1 on costs (the numerous Level 2 on costs are not applied compounded) and include SW internal costs and Tender to Outturn factor.

Additional cost information gathered this year for on costs has been collated and combined with the information from previous years on costs.

This has resulted in the on-cost percentages for:- General Items, Site Telemetry, SW Internal Costs and Tender to Out-turn Factor showing decreases over last year. The standard percentage for Design & Supervision has shown a slight increase.

COPI

All data points were tagged with its base date to allow all data costs to be brought back to the common priced date of 3Q1996. The cost equations and all other costs are then COPI'ed to produce unit costs which are to the base date of 3Q2003 as stated in the WIC Definitions.

The use of inflation indices continues to be a contentious issue when deriving standard costs in relation to efficiency targets. There is still a degree of incongruity in the fact that forward costing and projected targets and efficiencies are adjusted for RPI, yet backward costing, ie WIC Cost Base Solutions are adjusted by the consistently higher COPI.

Retiral of Historical Data

As part of SW's process for developing and upgrading the existing cost databases, data over 10 years old has been "retired" from the statistical system with a view to reflecting more current cost trends. It is our understanding that this procedure is in line with the policy of some of SW's counterpart English water companies.

The retiral of data was undertaken on most process components cost equations. However for some models this was not possible due to insufficient data to ensure statistically robust cost equations. Where this was the case the data was not retired.

Cost Equations

The basis for costing out Tables H and J has been, as in previous years, the use of cost equations for industry standard process component models. These cost equations have been prepared by an independent statistical company, Engineering Statistical Services Ltd. (ESSL) appointed directly by SW, and using recognised statistical techniques.

This current data is added to existing data, which has been used to create the equations used for last year's submission, and new equations developed.

Review of SW 2002 Standard Designs

Due to the changes in structure and procurement, ie the formation of SWS, the Engineering section of SWS has reviewed the standard design solutions for each table line relating to treatment. Amendments have been made where appropriate, in line with SW current specification and design philosophy now in place and adopted by SW as standard designs and specifications. They have also put forward designs for the new WIC line requirements. The final design solutions are contained in the files J5 Design Solutions 2004; J6 Design Solutions 2004; J6.1b CSO design info; J6.1b CSO design sketch and J6.14 and J6.14a.

The models reviewed by SWS Engineering section are:

- J5.1, J5.2, J5.3, J5.3a, J5.4, J5.5, J5.5a & J5.5c
- J6.1b, J6.5, J6.6, J6.7a, J6.8, J6.11, J6.12, J6.13, J6.14, J6.15 & J6.16

Unit Costs

Whilst the basis of costing tables H and J are the cost equations, the method in which they are utilised and applied varies between both tables.

For previous year's Table J submissions the direct use of the Watcost system has generated composite estimates based on standard SW designs to meet the WIC specifications for each table line. The Watcost system utilised a database, into which the cost equations were input. These equations were then linked to quantified process component models within each estimate to produce a net construction cost, to which, on-costs were added to provide a standard cost in line with the WIC specifications and check lists.

As SW are moving toward a new database system, and given the scope of changes contained within this year's submission the costing applications have been moved out of the Watcost system and into a Microsoft Excel format. This has allowed for a greater degree of flexibility in accommodating new and revised design solutions, comparing this year's with last year's submission and the ability to facilitate electronic transfer.

These spreadsheets, or costing models, are in essence Excel versions of Watcost, which have been checked and calibrated against the Watcost system to ensure compatibility of output.

An initial spreadsheet file provides a direct comparison of last year's submission with this year's, prior to any WIC changes being enforced. This has allowed SW to gauge capital efficiencies on standard models on a like for like basis.

A further spreadsheet file New Models contains costed out versions of the new, revised and actual standard models to be submitted for this year. It also allows, where no changes have occurred, a direct comparison with last year.

Two further spreadsheet files were created to accommodate costed options. One contains a costed option for clarifiers in lieu of DAF plant for line J5.3. contains costed options for plastic media package plant filters in lieu of traditional mineral media trickling filters for lines J6.6

and J6.8. It also costs out lines J6.14 and J6.14a using the amended cost equations for biofilters which accommodates data on package plastic media filters. Additional sheets were created to cost out line J3.13 and J6.1b (sewerage self-contained pumping unit and CSO with powered screen, respectively).

Checklists

The checklists as supplied by WIC on 26 April 2004 have been completed as required. However there may be some anomalies due to the data capture and analysis process commencing in early January 2004.

Engineering Judgement Grades

EJG's have been derived using the WIC frameworks. ESSL have derived confidence bandings using statistical confidence band but these do not align with the accuracy band comments of the WIC framework table, hence the concern noted above.

Engineering Judgement Grades have been assessed for each submitted WIC line using the comments as a basis, and the grading rationale is set out below:-

J5 Table – Water Non Infrastructure

Water Treatment Works
B2 – All SW data that directly relates to the process component required of the WIC Model.
B3 – Majority SW data used but with some reliance on outside source data, ie, TR61 for chemical dosing.

Storage
B2 – All SW data that directly relates to the process component required of the WIC Model.

Management & General
B3 – Based on SW data but adjustments made using outside source factors.

J6 Table – Sewerage Treatment Works

Sewage Structures
B3 – All SW data but certain process components costed using the nearest equivalent Standard Cost model.

Sewage Pumping Stations
B3 – All SW data used but some reservations over the degree of accuracy in defining particular pumps.

Treatment Works
B2 – All SW data with a significant degree of confidence and a direct link to the process component requirements.

B2 – All SW data but some reservations on the amount and quality of base data used in some process component standard costs.

Composition of Investment by Asset Type (Tables J7 & J8)

The methodology adopted for this year's June Return is as the methodology used in last year's June Return.

The approach last year was to undertake an electronic search of project names within the Q&S2 programme and automatically allocate the project and the project costs to the

individual lines within Table J7 and J8. (Note that last year the approach centred around the 4 year period 2003-04 to 2006-07 as stated on last years Table J spreadsheet).

The information analysed last year was reviewed and the four year period relating to capital spend was corrected for the period 2002-03 to 2005-06. Where necessary incorrectly allocated projects in last years submission were corrected and re-allocated for this year's Return.

Examples of previous incorrectly allocated projects are:

- Loch Katrine Water Supply Scheme which was originally allocated as a water infrastructure scheme (automated approach read the project name ie water supply). This has been reallocated as a Water Treatment project.

- Several (originally West of Scotland Water) Coastal Communities projects had the title ST Facilities (ie short for sewerage treatment). However the automated process read ST and allocated this group of projects to the Sludge Treatment line.

The Management and General category for last year's submission was only contained with Table J5. However for this year's Return, it is now allocated to both Table J5 and Table J6.

Infrastructure Projected Expenditure (Table J2 & J4)

For Tables J2 and J4, there was insufficient additional new informational available to allow further re allocation of the percentages between the categories within the Tables. Therefore the percentages from last year are still applicable this year.

Analysis of J Tables

Table J1 – Water Infrastructure Standard Costs

J1.13a/b and J1.14 a/b Communication Pipes, New/Renew, Long Side/Short Side

Comms pipes do not comply with WIC Definitions ie lengths specified by WIC as 3m for short sides and 7m for long sides. No attempt has been made to normalised the comms pipes analysed by SW. Note that this definition is new for this years Return.

J1.15 / 16 Household Meters.

The data collection, analysis and methodology for these categories were determined by the non-infrastructure team.

Household meters – SW do not have a large programme of work relating to household meters. However costs have been obtained by an analysis of meters for commercial premises. Note that costs for Internal Meters were to include for abortive house visits. For the unit costs submitted, SW has allowed for one abortive visit. However in practise over a programme of work, the average number of abortive visits would be expected to be less than one abortive visit per meter installation.

Table J1 Generally

As with previous years' submissions the capturing of significant quantities of data has proved difficult. However lower diameter Mains Laying and Rehabilitation data from SWS was enough to allow it to be stand alone this year from any weighting of historical data on the statistical equations. The new model, directional drilling, proved difficult to obtain data for and came from a term contract that had recently been renegotiated and was not envisaged to result in more work past this year.

Table J2 – Water Mains – Projected Expenditure

As stated in Section 2.5, the approach used last year has been adopted for this years Return. As such the same percentages submitted last year are still valid for this years Return.

For the new lines J2.3a, J2.3b and J2.3c, SW has limited information as to the value of work undertaken or that will be undertaken in these categories. Therefore the value of work for these categories is deemed to be included within the percentages contained within lines J2.1, J2.2 and J2.3.

Table J3 – Sewerage Infrastructure Standard Costs

J3.6ab-c / bb-c Sewer laying by pipe jacking or microtunelling

With no historical data for this new WIC category and very few data points obtained for this year, which by themselves could not be utilised by ESSL into a statistical equation no confidence was attributed to the data and no rate has been submitted for this submission.

J3.7b Sewer rehabilitation, Insituform, 150mm

The data obtained for this model was almost 50% from Term Contracts and 50% SWS All-in rates.

Table J3 Generally

As there have been less work completed on sewers compared to Water, historical data remains in the calculations for the rates, whether by the statistical or arithmetical methods. Also, efficiency/inefficiency can be less easily attributed to any specific reason, rather than say Water where the bulk of SWS data can suggest their revised procurement methods as the reason for any changes.

Table J4 – Sewerage Infrastructure – Projected Expenditure

As stated in Section 2.5, the approach used last year has been adopted for this years Return. As such the same percentages submitted last year are still valid for this years Return.

For the new lines J4.3a, J4.3b and J4.3c, SW have limited information as to the value of work undertaken or that will be undertaken in these categories. Therefore the value of work for these categories is deemed to be included within the percentages contained within lines J4.1, J4.2 and J4.3.

Table J5 – Water Non Infrastructure Standard Costs

J5.1 New Treatment Works type SW1, 12ML/D

To allow for losses across the works SWS have increased the size of the RGFs by 2%.

Generally the major process component equations used for this model size are showing a saving, and it should be noted that due to problems with quality and interpretation of SW data for chemical dosing the TR61 equation has been adopted.

J5.2 New Treatment Works type SW1, 5ML/D

Following SWS review the size of the RGFs in the existing solution is adequate.

Dosing pipework has been added, as has a sludge balance tank, which was omitted from last year's submission.

Also the comment on chemical dosing applies here.

J5.3 New Treatment Works type SW2, 30ML/D

The size of the RGFs has been increased in line with SWS review.

The major change in this model is the inclusion now of a DAF pre-treatment plant. This was not included last year, as it could not be agreed that this was a standard requirement across all previous authorities.

SWS have offered an option for this pre-treatment stage by using clarifiers rather than a DAF plant. SW have insufficient data on clarifiers therefore TR61v5 cost have been used.
Again TR61 v5 has been used for chemical dosing.

J5.4 New Filtration System type SW2, 10ML/D

There has been no change to the design specification for this model.

J5.5 New Filtration System type SW2, 30ML/D

Changes in the design have resulted in the increase in the RGFs sizing and the works building floor area.

J5.5a Plumbosolvency Control at Borehole, 8ML/D

This is a new model with a design developed by SWS to install orthophosphoric dosing.

SW have limited data on orthophosphoric dosing and the data on dosing generally is suspect in its present form, therefore TR61v5 costs form the bulk of the cost of this model.

J5.3a Alterations to Water Treatment Works, 30ML/D

This is a new model with a design developed by SWS to install an ultra filtration plant.

SW have limited data in this type of filtration on a works of this large size. A cost equation does exist for membrane filters but only for small works. However it has been used in this instance.

J5.5b Nitrate Removal at a Borehole, 10ML/D

This type of work is not carried out by SW therefore a design solution has not been developed or costed.

J5.5c Cryptosporidium Protection on a Borehole, 2.5ML/D

This is a new model with a design developed by SWS similar to J5.3a

The same comments on costing apply to this model.

J5.6 New Service Reservoir 1ML

There have been no changes to this model other than a revision to the basic cost equation for service reservoirs.

J5.7 New Service Reservoir 4ML

This model is similar to J5.6.

J5.8 Refurbishment of Service Reservoir 6ML

The cost of this model is generated outwith the cost equation methodology.

J5.8a New Service Reservoir 15ML

This model is new for this year's submission, and has been costed similar to the smaller reservoir models.

J5.9 Variable Speed Pumps 1-3 ML/D

This line has been withdrawn by WIC from this year's submission.

J5.10 Variable Speed Pumps 6-9 ML/D

SW's databases do not have a sufficiently detailed level of base cost data to allow a standard cost for this model.

No data, specific to this line, has been captured or analysed. Therefore no standard cost is available.

J5.11 Variable Speed Pump Motors 110kW

This is a new model introduced this year by the WIC, and replaces the previous J5.11 model.

As with other specific pump models SW has insufficient cost data to allow a standard cost to be produced.

J5.12 New Fixed Speed Pump Set 10ML/D

Again insufficient cost information precludes the creation of a standard cost.

J5.13 New Fixed Speed Pumpset 20ML/D

This line has been withdrawn by WIC from this year's submission.

J5.13a – J5.13e Various Pump and MCC New Installations or Replacements

These lines are new to this year's submission. Again, with existing pump line models, no data is available to generate a standard cost at this time.

J5.14 Extension to Office Accommodation

In previous year's no submission has been made for this line. A standard cost is being derived for this year and this will be based on the standard cost equation for General Buildings with adjustments made to suit the WIC specification, using recognised building industry factors.

J5.15 Satellite Stations and Transmission Station

Data has been gathered this year specifically for this line.

Table J5 Generally

As with previous years' submissions the capturing of significant quantities of data has proved difficult. However data has been used to update some cost equations allowing the use of SW specific costs as a basis in most instances. The exceptions are clarifiers and chemical dosing where TR61v5 has been reverted to.

Table J6 – Sewerage Non Infrastructure Standard Costs

Note that the following unit rates quote in the Commentary for Table J are incorrect. The values submitted on Table J table below are correct.

The unit rates incorrectly quoted in the commentary are:

Number	Description	Incorrect Rate	Correct Rate
J6.5	Primary treatment works pe 10,000	£1,541.7	£1,623.6
J6.6	Addit secondary treatment pe 5,000	£2,856.6	£3,240.2
J6.8	New secondary treat STW pe 5,000	£4,618.8	£5,084.3
J6.11	First time rural STW pe 200	£17,983.6	£18,341.6
J6.14	Addit ammonia removal pe 2,000	£1,777.7	£1,442.3
J6.14a	Addit ammonia removal at ex sec works pe 40,000	£224.4	£241.0

J6.1 Storage Tank to CSO 750m3

It should be noted that the storage tank is costed as a service reservoir due to lack of cost data specifically on underground sewerage tanks.

J6.1a Large Storage Tank to CSO 3000m3

This is a new model introduced by the WIC for this year. It has been costed in the same manner as J6.1.

J6.1b CSO Chamber with Powered Screen

This is a new model introduced by the WIC for this year. A design specification to meet the WIC definition has been generated by SWS for adoption by SW.A standard cost has been prepared from this design. Due to the absence of consistent CSO cost data the service reservoir model has been utilised for the chamber, and a new model developed for CSO (storm) screens.

J6.2 Replacement Pumps and Motors 12kW

Further attempts have been made this year to obtain more replacement specific cost data. The method for costing, based on re-analysing pump station M&E cost equations, has again been adopted to generate a pump only specific cost equation.

For this model, and J6.3 and J6.4, it could be argued that there is no need for Design & Supervision as the work is straight replacement without the need for a design input and that any supervision would be covered by the General Items and/or SW Internal Cost elements. Therefore that particular on cost could be omitted.

J6.4a – J6.4e Various Pump and MCC Replacements

These are new models introduced by the WIC this year. The current SW costing databases do not go down to this level of detail.

Therefore production of standard costs for these models is not possible this year.

J6.5 Primary Treatment Works p.e. 5,000

This year Scottish Water has omitted Odour Control, as it is no longer a requirement of the WIC definition.

J6.6 Additional Secondary Treatment p.e. 5,000

The design solution for this model has been re-assessed in line with SW/SWS standard solutions. The new specification is to install trickling filters in lieu of activated sludge plant.

The use of traditional mineral media large diameters filters. The alternative design utilising package plastic media filters has been adopted for this year's submission. Additional cost data has been used to generate a separate cost equation for this type of process.

J6.7 Additional Secondary Treatment p.e. 60,000

There has been no change to the design requirements for this model. However as more cost data has become available on Buildings, the cost equation for the more specific Control Buildings has been used in place of General Buildings.

J6.8 New Secondary Treatment Works p.e. 5,000

The main secondary process has been re-specified in line with J6.6.

J6.9 New Secondary Treatment Works p.e. 70,000

The cost changes for this model are similar to J6.7, with the additional removal of chemical dosing which is no longer required.

J6.10 Reconstruction of Preliminary Treatment p.e. 25,000

Again the Control Building equation has been used in preference to that for General Buildings.

J6.11 First Time Rural Sewage Treatment p.e. 200

The design solution for this model has been slightly modified in line with current specifications. The primary tank has been replaced with septic tanks, and the requirement for screening removed. A new cost equation has been developed for septic tanks and the Control Building model adopted.

J6.12 Additional Nutrient Removal p.e. 12,000

A re-assessment of the WIC specification in line with current design solutions has resulted in the removal of sludge thickening or dewatering plant, along with its associated poly dosing.

J6.13 Additional Nutrient Removal p.e. 40,000

The comments on this model are similar to those for J6.13.

J6.14 Additional Ammonia Removal p.e. 2,000

The main alteration to this model has been the replacing of the cost of a traditional trickling filter with that for the more cost effective package plastic media type.

J6.15 & J6.16 Additional UV Disinfection

There is insufficient SW cost data to allow a standard cost to be calculated using the preferred methodology.

J6.7a Installation of Denitrification at an Existing Secondary Works p.e. 40,000

This is a new model included this year by the WIC. Upon review of the definition and specification, by SWS, SW would not require to carry out such a process. Therefore no standard cost has been derived.

J6.14a Additional Ammonia Removal p.e. 40,000

This is a new model for this year inserted by the WIC. It has been costed similar to J6.14.

J6.17 & J6.18 Sludge Treatment & Disposal

These are also new models for this year. However sludge treatment and disposal do not form part of the current capital investment programme as the policy is now to have these processes carried out under PFI schemes.

Table J6 Generally

A relatively substantial amount of new data from this past year has been added to the database. This, in conjunction with the retiral of older data, has resulted in the majority of cost equations used for Table J6 being updated. Dependent on the range of sizes and quantifiers for process components used to meet the WIC specification some costs have increased whilst others have decreased at this level. Overall we would suggest that the costs derived are more accurate than last year.

This table, far more than J5, has been affected by the new design principles and specifications now being adopted by SW.

Table J7 – Composition of Investment by Asset Type – Water Service

There has been an additional line added to this Table since last year. J7.13 for water meters has been allotted 1.8% of the total water service spend, which previously was contained in the Management and General category.

J7.12 percentage has also reduced due to the inclusion of a new line in Table J8, Management and General for Sewerage Service.

Other major percentage changes have occurred from the undertaking of a sense check of last years methodology (ie Loch Katrine from potable mains to water treatment, see section 2.4).

Table J8 – Composition of Investment by Asset Type – Sewerage Service

There has been an additional line added to this Table since last year. J8.16 for Management and General for Sewerage Service has been allotted 4.4% of the total sewerage service spend. This value was previously contained in the Management and General category of Table J7.

Other major percentage changes have occurred from the undertaking of a sense check of last years methodology (ie (WoSW) Coastal Communities projects reallocated from sludge treatment to sewerage treatment, see section 2.4).

APPENDIX 1 – Output Measures Methodology

APPENDIX 2 - Additional and Restated E Tables

APPENDIX 3 – Table J Standard Cost Checklists