SCOTTISH WATER

WIC ANNUAL RETURN

Commentary

June 2017

Revised post Query Process 31Aug17

A Tables Base Information

Table A1 Connected and Billed Properties

General Comments

Property numbers are for the report year as at 30 September 2016.

A confidence grade of A2 has been applied to the figures reported in Table A1 for household properties in the report year, and B4 for non-household properties. The confidence grade reflects the remaining number of properties from the gap sites project expected to be added at the Central Market Agency (CMA) and the net movement expected from de-registrations and further gap sites via the current Scottish Assessors Association Project, in addition to the other known issues noted in this commentary. Further details are set out below.

Data Sources

The non-household figures have been sourced from settlement reports supplied by the CMA, which are loaded into Scottish Water's reconciliation datamart. The vacancy status, used to determine whether the property is 'Billed' or 'Void', has been sourced from the Market Data Set (MDS) files which are also published by the CMA along with the disaggregated settlement reports. This is consistent with the previous two Annual Returns.

The September 2016 2nd Reconciliation (R2), the latest available at the end of March 2017, along with the MDS file published at the same time were used to populate the A Tables.

The disaggregated settlement reports include all premises which are in settlement at the CMA. When new supply points are created, via either the New Connection or the Gap Site processes, there are a number of steps to be followed, starting with the supply point being requested by Scottish Water and finishing with it being accepted into charge by the Licensed Provider. Between these two points, the supply points have a status of 'New' or 'Partial' and are held in the Central Systems but are not in settlement and therefore not reflected in the A Tables.

As of 1st April 2017, there were 183 water and 555 sewerage 'New' and 'Partial' supply points registered at the CMA. The current balance of 'New' and 'Partial' supply points consists of an on-going run-rate of new connections and gap sites.

The current 'gap sites' project; Gap Site Phase 3, commenced during 2014 and is expected to end in March 2018. The CMA undertook a comparison between premises listed in the records of the Scottish Assessors Association (SAA) and premises registered in the market to establish a cross-reference between them. Where no match was obtained, and the CMA consider the assessed property to be an eligible premise, it was considered to be a potential gap site for review by Scottish Water and Licensed Providers. This exercise matched the majority of properties and the cross referencing was made available in the CMA's Central Systems in the interests of data quality.

The CMA presented 55,239 potential gap sites for investigation by Scottish Water, the attrition rate is relatively high as many candidate properties do not have services from Scottish Water or are already in the market. In addition, a further 19,000 candidates have been identified from on-going additions to the SAA since the CMA's initial comparison in 2013. By project completion, circa 30,000 gap sites are projected to be tradable in the market; at the time of the September R2 settlement run, used to populate this year's Annual Return, 20,494 gaps sites had been fully processed into the market and were tradable at the CMA.

Following on from the CMA's work, Scottish Water has initiated a further project with the objectives of improving market data quality, completing the matching of Supply Points to SAA data and facilitating changes in charging policy planned by the Scottish Government. This project, which concludes in summer 2017, is being implemented by Scottish Water under the governance of the CMA board and is likely to have an impact on next year's Annual Return.

Scottish Water has continued to monitor the occupancy status of properties. As of March 2017, 11.7% of tradable supply points were flagged as vacant; this is a 1.7% decrease from last year and a considerable reduction from 20.4% five years ago.

The Scottish Government has introduced water, sewerage and drainage charges for vacant premises with effect from 1 April 2017; this has influenced the net positive movement towards occupied. It is expected that the number of vacant properties will drop further over the coming months. There are a number of reasons for this movement:

- Licensed Providers being made aware of a previously unidentified occupier when starting to bill a landlord for a vacant property;
- Landlords choosing to permanently disconnect unwanted supplies due to the application of charges at vacant properties; and
- Deregistration of incorrect Supply Points (e.g. a duplicate Supply Point relating to a property already registered and in charge on a separate Supply Point) which have been flagged as vacant and are identified as a result of the application of charges for the first time.

Occupancy status changes in 12 months prior to Annual Return data cut	Occupied to Vacant	Vacant to Occupied	Net change in occupied SPIDs
2010/11	14,032	12,741	-1,291
2011/12	19,029	16,400	-2,629
2012/13	33,191	26,045	-7,146
2013/14	23,762	31,890	8,128
2014/15	21,698	20,257	-1,441
2015/16	25,819	22,728	-3,091
2016/17	23,011	25,791	2,780

Forecast data for 2017/18

Our Delivery Plan for 2015-21 assumes zero growth in non-household revenue before allowing for the impact of the Gap Site Phase 3 Project.

Forecast non-household data for the 2017/18 financial year has therefore been derived by adding the forecast new non-household premises which will have been processed into settlement by the Gap Site Phase 3 Project to the actuals for 2016/17.

8,050 gap sites are expected to be added to the market and be tradable by next Annual Return runtime.

Analysis of project gap sites already in the market and information from project planning suggests 60% of these sites will be Surface Water Drainage Only; the remaining 40% will predominantly be measured sites (28%) with Water, Sewerage and Surface Water Drainage services, the remainder will be Unmeasured. The vacancy split has been calculated from the status of the current market project sites; Surface Water Drainage at 16.5%, Measured sites at 7% and Unmeasured sites at 20%.

Non-household connected properties

The number of connected non-household properties taking water services has increased by 3,611 to 155,680. Non-household properties taking sewerage services have similarly increased by 3,107 to 127,954.

Line ref.	Non-household connected properties	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.8	Unmeasured non-household connected properties – water	28,132	27,754	-378
A1.9	Measured non-household connected properties - water	123,937	127,926	3,989
A1.8 + A1.9	Total connected non-household connected properties - water	152,069	155,680	3,611
A1.18	Unmeasured non-household connected properties – sewerage	24,958	24,537	-421
A1.19	Measured non-household connected properties - sewerage	99,889	103,417	3,528
A1.18 + A1.19	Total connected non-household connected properties – sewerage services	124,847	127,954	3,107

These increases are primarily due to measured properties being processed into the market as a result of the current gap site project; Gaps 3. This increase is less than the total number of gap sites which have entered the market as it is offset by properties being deregistered from the market and the removal of measured services.

Although there has been c.1,900 unmeasured gap sites added to the market over the annual return period, the overall number of unmeasured properties has decreased slightly. This is due to the deregistration of properties, meters being installed at unmeasured properties and the removal of unmeasured charges where they are being wrongly applied. This typically relates to multi-tenancy premises where it is identified that water and foul sewerage charges are already being applied to the entire premises on a metered basis.

Other factors affecting the totals include new connections to the network, changes to services recorded at properties and premises changing their status, namely from Council Tax to business rated and in the reverse direction, for example holiday chalets or houses for short term lettings, leading to some churn in this sector.

Changes to Unmeasured Connected Properties

Removed

	Total	Dereg/ Pdisc	Remove Unm Service Element	Unmeasured to Measured
Water	**2,321**	1,446	4	871
Sewerage	**2,133**	672	626	835

Added

	Total	Gap Site/ New Conn	Unm Service Element Added	Measured to Unmeasured
Water	**1,943**	1,463	319	161
Sewerage	**1,712**	1,209	362	141

Changes to Measured Connected Properties

Removed

	Total	Dereg/ Pdisc	Remove Metered Service Element	Measured to Unmeasured
Water	**1.277**	1.114	2	161
Sewerage	**1.107**	798	168	141

Added

	Total	Gaps & New Conn	Metered Service Element Added	Unmeasured to Measured
Water	**5.266**	3.118	1.277	871
Sewerage	**4.635**	2.664	1.136	835

Non-household void properties

The number of void non-household properties taking water and foul sewerage services in the table below has been derived by subtracting the reported billed properties from the connected properties. The number of void properties taking water services has decreased by 1,520 in the report year and the number taking sewerage service has decreased by 1,498 in the report year.

As set out above, the movements are mainly due to data cleansing, disconnections and properties being deregistered from the market ahead of the introduction of charging at vacant properties. Deregistration's are generally skewed towards unmeasured, void properties; duplicate supply points have been found to be more prevalent for unmeasured properties and historically sites have often been flagged as vacant to stop charges prior to being deregistered.

The 12 months prior to the September 2016 R2 settlement report used to populate this year's Annual Return saw a net movement in supply points turning from vacant to occupied at the CMA. There continues to be issues with properties which are flagged as vacant at the CMA by the registered Licensed Provider but which Scottish Water is unable to agree are unoccupied or where the property should be deregistered or disconnected. However, the position is greatly improved compared with previous years and the introduction of charging at vacant sites from April 2017 is expected to result in appropriate incentives on all parties to address these issues.

Void properties	2015/16 Annual Return	2016/17 Annual Return	Variance
Unmeasured void properties – water	7,169	6,718	-451
Measured void properties – water	11,771	10,702	-1,069
Total void properties – water	18,940	17,420	-1,520
Unmeasured void properties – sewerage	6,526	6,084	-442
Measured void properties - sewerage	10,330	9,295	-1,035
Total void properties - sewerage	16,856	15,379	-1,477

Non-Household billed properties and wholesale revenue

As shown in the table below, there has been an increase in billed properties, since last year's Annual Return; 5,131 for water and 4,584 for sewerage. As set out above, this is the net effect of supply points being processed into settlement, the deregistration of properties found to be incorrectly in the market (for example duplicates, domestic and demolished properties), disconnection activity and changes in occupancy status.

Line ref.	Water services – billed	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.3 + A1.4	Total billed Non-household properties – water	133,129	138,260	5,131
A1.13 + A1.14	Total billed Non-household properties - sewerage	107,991	112,575	4,584

Movement of Properties between Void and Billed

	Void to Billed	Billed to Void
Water	5,052	3,790
Sewerage	4,591	3,338

A1.1 & 1.6 Household properties (connected and billed)

The data for these lines has been sourced directly from the WIC4 reports of September 2016 for report year. Report year +1 household growth is obtained directly from the final determination forecast.

The growth in billed properties (including exempt) was 18,216. The growth in connected properties of 15,706, differs to the growth in billed properties as we are now billing properties which were, in the past, connected but not billed.

Line ref.		2015/16 Annual Return	2016/17 Annual Return	Variance
A1.1	Unmeasured household billed properties - potable water (including exempt)	2,423,640	2,441,856	18,216
	Number of void properties	56,443	53,933	-2,510
A1.6	Unmeasured household connected properties	2,480,083	2,495,789	15,706

A1.1-5 Billed Properties – Water

A1.2 Measured household billed properties

The number of measured households has decreased by 5 customers compared with 7 customers in the previous year. This reduction is principally due to customers determining that Council Tax based charging is more economic. The confidence grade of A2 is consistent with previous year. The forecast of 441 measured households for 2017-18, a reduction of 64 is based on the average movement over the last 2 years.

A1.3-4 Unmeasured and Measured non-household billed properties

The recorded number of billed non-household properties has increased by 5,131 to 138,260 compared with the 2015/16 Annual Return. This movement was due to the combined effect of changes in occupancy status at supply points, gap sites and new connections processed into settlement and deregistration's as set out above.

Line ref.	Water services - (connected and billed)	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.3	Unmeasured non-household billed properties – potable water (including exempt)	20,963	21,036	73
A1.4	Measured non-household billed properties - potable water	112,166	117,224	5,058
	Total billed non-household properties	**133,129**	**138,260**	**5,131**

A1.6-10 Connected Properties – Water

A1.6 Unmeasured Household Connected Properties

This figure is the cumulative total of billed properties, exempt properties and void properties which is sourced directly from the WIC4 reports and therefore given a confidence grade of A2. For the current report year, the void property total is 53,933.

A1.7 Measured household connected properties

The number of Measured household connected properties is described in the commentary to line A1.2.

A1.8-9 Unmeasured and Measured non-household connected properties

The recorded number of connected non-household properties receiving water services has increased by 3,611 to 155,680 compared with the 2015/16 Annual Return. As set out earlier, this is primarily due to gap site properties being processed into the market as a result of the current gap site project. The number of unmeasured properties has decreased due to the deregistration of supply points and properties moving to measured following meter installations.

Line ref.	Connected Properties	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.8	Unmeasured non-household connected properties	28,132	27,754	-378
A1.9	Measured non-household connected properties	123,937	127,926	3,989
	Total connected Non-household properties	152,069	155,680	3,611

A1.11-15 Billed Properties – Foul Sewerage

A1.11 Unmeasured household billed properties

There has been growth of 16.690 unmeasured household billed properties for sewerage in the report year.

The confidence grade remains unchanged at A2

A1.12 Measured household billed properties

The number of measured household properties has remained static at 115 properties.

The confidence grade of A2 has not altered.

A1.13-14 Unmeasured and Measured non-household billed properties

The recorded number of billed non-household properties receiving sewerage services has increased by 4,584 to 112,575 compared with the 2015/16 Annual Return. This movement was due to the combined effect of changes in occupancy status at supply points, gap sites and new connections processed into settlement and deregistration's as set out above.

Line ref.	Billed Properties	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.13	Unmeasured non-household billed properties – sewerage	18,432	18,453	21
A1.14	Measured non-household billed properties – sewerage	89,559	94,122	4,563
	Total billed Non-household properties	**107,991**	**112,575**	**4,584**

A1.16-20 Connected Properties – Foul Sewerage

A1.16 Unmeasured Household Connected Properties

For the current report year, the void property total is 51,862. The number of voids is calculated by subtracting A1.11 from line A1.16.

A1.17 Measured Household Connected Properties

The number of measured household properties has remained static at 115 properties.

The confidence grade of A2 has not altered.

A1.18 – A1.19 Unmeasured and Measured Non-household connected properties

The recorded number of connected non-household properties taking sewerage services has increased by 3,107 to 127,954 compared with the 2015/16 Annual Return. As set out earlier, this is primarily due to gap site properties being processed into the market as a result of the current gap site project offset by the deregistration of properties found to be incorrectly in the market (generally duplicates, domestic and demolished properties) and the removal of unmeasured services (generally multi-tenancy premises where the water and foul sewerage charges are already being recovered through metered charges for the whole site).

Line ref.	Connected Properties	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.18	Unmeasured non-household connected properties	24,958	24,537	-421
A1.19	Measured non-household connected properties	99,889	103,417	3,528
	Total connected Non-household properties	124,847	127,954	3,107

A1.21 – A1.27 Billed Properties – Surface Drainage

A1.21 Unmeasured Household Billed Properties (including exempts) not billed for Property Drainage

Due to our tariff structure, there are zero unmeasured billed properties not billed for property drainage.

A1.23 - A1.24 Measured and Unmeasured Billed Properties not billed for Property Drainage

The number of properties not billed for property drainage has increased by 850 to 4,048 since 2015/16. This is the result of gap sites entering the market which are not liable for property drainage and the removal of property drainage charges where properties are found not to drain to the public sewer following requests to verify the drainage services. This is offset by changes to occupancy status and de-registrations.

Line ref.	Properties not billed for Property Drainage	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.23	Unmeasured non-household billed properties not billed for property drainage	1,306	1,974	668
A1.24	Measured non-household billed properties not billed for property drainage	1,892	2,074	182
	Total billed Non-household properties	**3,198**	**4,048**	**850**

A1.25 Household Billed Properties billed for Surface Drainage only

Due to our tariff structure, there are zero unmeasured billed properties not billed for surface drainage.

A1.26 Non-household properties billed for surface drainage only

The number of non-household properties billed for surface drainage only has increased by 6,734 to 24,427 since 2015/16. This increase is mainly due to gap sites being process into the market from the current gap site project. The largest proportion of these sites are charged for surface drainage only due to being multi-tenancy premises where water and foul sewerage charges are applied to the entire premises on a metered basis. Some data corrections have also been made which have resulted in changes to services on supply points; either at multi-tenancy premises where unmeasured water and foul sewerage charges on individual rated components are removed, leaving only surface drainage charges, or where drainage charges are added when found to be missing.

A1.30-31 Non-household Connected Properties – Surface Drainage

The recorded number of connected non-household properties connected for surface drainage has increased by 8,994 to 156,457 compared with the 2015/16 Annual Return. As set out earlier, this relates to gap sites being processed into the market. This number accounts for the increase in surface drainage only SPIDs as well as those with water and sewerage services as these mostly have surface drainage services.

Line ref.	Properties connected for Surface Drainage	2015/16 Annual Return	2016/17 Annual Return	Variance
A1.30	Unmeasured non-household connected properties	51,629	57,818	6,189
A1.31	Measured non-household connected properties	95,834	98,639	2,805
	Total connected Non-household properties	**147,463**	**156,457**	**8,994**

A1.33 Number of Billed Properties

The number of billed properties has decreased from 1,338 reported in AR16 to 1,324. The decrease in billed DPIDs is a result from a couple of large dischargers closing and new Licensed Providers for Trade Effluent customers have highlight sites consented which are no longer required and are terminated.

The forecast number of billed properties is 1,317. This is the number of properties that existed at P06 that were also billed at P012.

The confidence grade for the report period and forecast is A2 and A3 respectively.

A1.34 Connected Properties

The number of billed and connected properties has increased from 3,103 to 3,203. This reflects the fact that Scottish Water continues to issue an increasing proportion of “Letters of Authorisation” to small dischargers, rather than full consents.

The forecast number of billed and connected properties is 3,211.

Note, these figures are not affected by the inappropriate disconnection of SPIDs as the number is sourced from Scottish Water’s trade effluent system ICMS, which holds up to date information on all discharge points, regardless of whether they are billable or not.

The confidence grade for the current and forecast years remains at A2 and A3 respectively.

A1.35 Trade Effluent load receiving secondary treatment

The total BOD load receiving secondary treatment reported has increased from 16,192T/yr to 16,338T/yr. Further analysis is required to identify the specific reasons.

The forecast figure is up slightly to 16,339T/yr mainly due to the number of billed DPIDs which Scottish Water is directing on to Letters of Authorisations as not deemed to be high risk discharges

The confidence grade has been revised to B4 for the current and forecast years. This is primarily due to the change in volume calculation method and the need for the system to updated with meter readings by Licensed Providers in order for the volume calculations to be correct.

A1.36 Trade Effluent load receiving secondary treatment

The reported total COD load receiving secondary treatment has decreased from 35,515T/yr to 32,826T/yr.

The forecast is 32,830T/yr. Again this has decreased in line with the number of billed DPIDs being moved on to Letters of Authorisation.

The confidence grade has been revised to B4 for the current and forecast years. This is primarily due to the change in volume calculation method and the need for the system to updated with meter readings by Licensed Providers in order for the volume calculations to be correct.

Table A2 Population, Volumes and Loads (Water)

A2.1 Population Water & Wastewater – Winter

Population data is based on National Records of Scotland (NRS) Population Projections for this year. Populations are derived from the published NRS 2012 based Population Projections.

A2.2 Population Water – Summer

To determine the increment of the summer population (above the winter population), business classifications from Ordnance Survey Address Point Record OSAPR and Address Based Premium (ABP) were used to identify properties which offer accommodation to visitors and to which was applied the average bed space supplied by Visit Scotland. A derived number for summer visitors of 185,402 was reached. This figure has increased from AR16. This could be in part due to the more complete matching between Address Points and Address Based Premium, due to work on-going through this year.

No change in the confidence grade has occurred in the year.

A2.3 Population of unmeasured household properties

The population of unmeasured household properties connected to our networks has increased by 15,270 for water, reflecting the National Records for Scotland 2012 projection.

The confidence grade remains the same at A2.

A2.4 Population of measured household properties

The population of measured household properties taking water services has decreased by 13, reflecting the decrease by 5 in the number of measured household properties reported in line A1.2. The confidence grade remains the same at A2.

A2.6 Net Distribution input treated water (water put into supply)

The net DI has increased from 1,779.8 Ml/d in AR16 to 1784.8 Ml/d.

A2.7 Unmeasured household volume of water delivered (including losses)

The unmeasured household volume of water delivered has decreased from 905.2 Ml/d to 891.1 Ml/d.

The confidence grade for this line remains at B2, reflecting the continued confidence associated with the Scottish Water unmeasured household volume calculated using data reported from Scottish Water's Continuous Area Per Household Consumption (PHC) Monitor.

A2.8 Measured household volume of water delivered (including losses)

The measured household volume of water delivered is 0.3 Ml/d. The percentage of meter under-registration has remained at 4.1%, taken as a mean from the 2007/08, 2008/09 and 2009/10 supporting information documents for the OFWAT Service and Delivery report.

The confidence grade reported for this line remains at B2.

A2.9 & 10 Unmeasured & Measured non-household volume of water delivered (including Losses)

The calculation of non-household consumption follows the same method as used for the 2015/16 Annual Return. Consumption data calculated by the Central Market Agency (CMA) has been used to populate lines A2.9 and A2.10.

For each settlement run, the CMA provides an aggregated settlement report which is used by Scottish Water for billing purposes, and a disaggregated settlement report to enable reconciliation of wholesale charges by market participants. The data reported in lines A2.9 and A2.10 has been derived from these disaggregated settlement reports.

Table A2 has been populated using the latest available data at the time of reporting. For April to July 2016 inclusive, the R3 report has been used; for August 2016 to January 2017 the R2 report has been used; and for February and March 2017, the R1 report has been used.

A2.11 Water taken unbilled – legally

The volume reported as water taken legally unbilled (WTLU) has decreased from 62.8 Ml/d in 2015/16 to 59.1 Ml/d in this report year. The confidence grading remains at C4 due to the nature and estimation of the volume reported. The methodology has remained the same for the each of the components making up WTLU.

A summary of changes to the individual components which make up WTLU is provided below:

- No significant change in fire service use (from 8.3 Ml/d to 8.6 Ml/d).
- Increase in licensed standpipe use volumes from 17.0 Ml/d to 18.4 Ml/d.
- Increase in Waste Water Treatment Works (WWTW) volumes from 14.2 Ml/d to 15.0 Ml/d.
- No significant change in Scottish Water Offices and Depot which remains at 0.2 Ml/d.
- No significant change in Scottish Water jetting volumes which remain at 1.2 Ml/d this year.
- No significant movement in unbilled field trough usage (from 11.1 Ml/d to 11.0 Ml/d).
- Increase in water used for temporary building connections (from 1.4 Ml/d to 2.2 Ml/d).
- Unbilled water use by non-household users has decreased from 9.5 Ml/d to 2.6 Ml/d. The reduction is due to network reconfiguration which resolved an issue in April 2016.

A2.12 Water taken unbilled – illegally

The volume of water reported as water taken illegally unbilled (WTIU) has increased slightly from 1.7 Ml/d to 1.8 Ml/d.

The confidence grade has remained at C4 due to the nature and estimation of the volume reported. The data sources and methodology used to calculate this component have remained the same.

- Void property use – the volume has decreased from 0.9 Ml/d to 0.8 Ml/d.

- Hydrant misuse - the volume has remained at 0.2 Ml/d.

- Illegal standpipes - the volume has increased from 0.6 Ml/d to 0.7 Ml/d.

A2.13 Water take unbilled – Distribution System Operational Use (DSOU)

The volume of water reported as distribution system operational use (DSOU) has increased from 3.2 Ml/d in 2015/16 to 3.3 Ml/d in this reporting year. The confidence grade remains at C3 due to the nature and estimation of the volume reported. The changes in volumes can be explained as follows:

- Service Reservoir Cleaning – the volume has increased from 0.4 Ml/d to 1.2 Ml/d.

- Proactive Flushing & Swabbing - the volume has decreased from 2.0 Ml/d to 1.4 Ml/d in this reporting year.

- Burst Repairs / Other Network Interruptions –volume remains constant at 0.3 Ml/d.

- Reactive Water Quality Incidents – volume remains constant at 0.2 Ml/d.

- Planned Water Quality Sampling – the volume reported remains constant at 0.1 Ml/d.

A2.14 Net Consumption (including supply pipe losses)

Net consumption has decreased from 1,371.8 Ml/d to 1,350.1 Ml/d, and the confidence grade remains at B3.

A2.15 Distribution losses (including trunk mains and reservoirs)

Distribution losses have increased from 408.0 Ml/d in AR16 to 434.7 Ml/d. The increase in distribution losses is primarily a result of alignment issues with main components of the "top down" and "bottom up" water balances.

The confidence grade for this line remains B3.

A2.16 Customer supply pipe losses

Customer supply pipe losses (SPL) have been calculated using the same method as in AR16. SPL losses have increased slightly from 123.0 Ml/d to 124.6 Ml/d.

The confidence grade remains the same at C3.

A2.17 Overall water balance

The confidence grade for the overall water balance remains at B3.

A2.18 Total Leakage (pre-MLE Adjustment)

The 'Total Leakage' by definition within the guidance documentation is considered by Scottish Water to include summing the DMA reported leakage, Service Reservoir leakage and Trunk Main leakage. The Total Leakage has reduced from 492.0 Ml/d to 479.9 Ml/d this year. A summary of each of the components making up these components is given below:

- DMA leakage has reduced from 435.6 Ml/d in AR16 to 419.6 Ml/d in the current reporting year. The coverage of reportable DMAs has increased slightly from 89.2%.to 92.2%.

- Service Reservoir leakage has increased from 8.9 Ml/d in AR16 to 12.0 Ml/d this year.

- Trunk Main leakage has increased from 47.5 Ml/d in AR16 to 48.2 Ml/d this year.

A2.19 Water Balance Closing Error

The Water Balance Closing Error is the difference between the top down and bottom up leakage figures expressed as a percentage of net DI. The closing error has increased from 2.2% for AR16 to 4.4% in AR17.

A2.20 MLE Adjustment

The MLE adjustment for AR17 is 14.9 Ml/d. The overall AR17 MLE calculation is associated with the appropriate MLE confidence grades (mid point of WICS' confidence grades), being assigned to water balance components in line with WICS' confidence grades.

The confidence grade for this line is B3.

A2.21 Total Leakage (post-MLE Adjustment)

Where the water balance closing error (A2.23) between top down and bottom up leakage is less than 5% of DI, this is accepted as an indicator of a robust water balance. In such circumstances, a MLE statistical calculation is then undertaken to determine the leakage figure to be reported. If the closing error is > 5% of DI, then the top down leakage figure will be reported.

The trend in leakage reduction since AR09 (2008/09) is:

Report Year	Top Down Leakage (Ml/d)	Bottom Up Leakage (Ml/d)	MLE Leakage (Ml/d)
AR09	868	776	816
AR10	783	705	738
AR11	757	693	699
AR12	661	617	629
AR13	617	561	575
AR14	608	553	566
AR15	590	531	544
AR16	531	492	500
AR17	559	480	495

The AR17 Maximum Likelihood Estimation (MLE) leakage is 494.8 Ml/d and is reported with confidence grade B3. This is a reduction of 4.8 Ml/d from the AR16 MLE leakage figure of 499.6 Ml/d.

A2.22 Volume of non-potable water delivered

Eleven non-household customers receive non-potable water supplies. In most cases there is also a separate potable supply to the premises. Several of these Supply Points are subject to Schedule 3 charging arrangements and all of the non-potable supplies are now metered.

The volume reported in line A2.26 reflects the consumption calculated by the CMA for the metered non-potable supplies in addition to a calculated consumption for one supply, Buckieburn Farm and Freshwater Research Unit. A battery powered logger was installed in April 2015 due to the difficulty of providing a power supply at the site and flow data is being collected periodically. This flow data has been used to extrapolate an annual consumption of 13.17 ML/day, representing a significant improvement on the previous estimates. Investigations are on-going into the feasibility of alternative power supplies which would require less intervention and allow data to be transmitted real time rather than collected from site.

A2.23 Per Household consumption (unmeasured h/hold – excl s/pipe leakage)

The PHC figure for AR17 is 315.8 l/prop/day, compared with an AR16 reported figure of 324.6 l/prop/day. This is a 2.7% reduction of 8.8 l/prop/day.

The PHC reported at AR17 has been determined using the same methodology as AR16. The reduction in reported PHC is explained, in part, by the cool summer with higher than average rainfall which suppressed household demand. In addition, we have continued to use pressure management across our network which is benefiting both mains leakage reduction and, in the case of PHC, leakage from household internal plumbing systems.

The confidence grade remains at B2.

A2.24 Per Household consumption (measured h/hold – excl s/pipe leakage)

The PHC figure for AR17 is 545.9 l/prop/day, compared with an AR16 reported figure of 566.4 l/prop/day. This is a 3.6% reduction of 20.5 l/prop/day.

The confidence grade remains at B3.

A2.25 Meter under-registration (measured households) (included in water delivered)

Scottish Water has derived meter under-registration from the mean value between 2007/08 and 2009/10 from the supporting information document for the OFWAT Service and Delivery Supporting Information Reports and remains at 4.1%. When applied to the domestic metered volume the total measured household meter under-registration is 0.01 Ml/d.

A2.26 Meter under-registration (measured non-households) (included in water delivered)

The 2007/8, 2008/09 and 2009/10 OFWAT 'Service and Delivery' supporting information documents have been used to derive a mean figure for non-household meter under-registration, which remains at 4.7%. The decrease in the meter under-registration volume from 17.0 Ml/d to 16.8 Ml/d is due to a decrease in the volume of water delivered to measured non-households.

Forecast data for 2017-18

The Forecast Report year +1 data provided in sections “Water Balance”, “Leakage” and “Water Delivered- components” of the A2 table are based on a forecast reduction of 5 Ml/d to the total leakage reported in line A2.18 this year. This reduction is reflected in reductions of 5 Ml/d in lines A2.6 and A2.15. For all other lines it has been assumed volumes will remain consistent with this year.

This volumetric reduction of 5 Ml/d is an estimate that comes from a forecast range. There is uncertainty attached to this estimate given factors such as weather can greatly affect this volume.

Table A3 Population, Volumes and Loads (Waste water)

A3.1-A3.4 Summary – Population

A3.1 Population Water & Waste – Winter

Population data is based on National Records for Scotland (NRS) Population Projections for this year. The winter population for waste water has increased by 13,664.

A3.2 Population Waste – Summer

To determine the increment of the summer population (above the winter population), business classifications from OSAPR Address Based Premium (ABP) were used to identify properties which offer accommodation to visitors and to which was applied the average bed space supplied by Visit Scotland. A total of 120,954 summer population is included. This figure has increased from AR16. This could be in part due to the more complete matching between Address Points and Address Based Premium, due to work on-going through this year.

The confidence grade remains the same at B2.

A3.3 Household Population connected to the wastewater service

The population of unmeasured household properties connected to our networks has increased by 14,830 for waste water reflecting the NRS 2012 dataset and growth over the year in connected dwellings.

A3.4-A3.10 Sewage – Volumes

A3.4 Unmeasured household volume (including exempt)

The unmeasured household volume has increased marginally from 717.67 Ml/d to 719.85 Ml/d.

A3.5 Measured household volume

The measured household volume has increased to 0.063 Ml/d. The confidence grade remains at A2.

A3.6 Unmeasured non-household foul volume (including exempt)

The non-household foul volume remains the same as last year (14.4 Ml/day).

The confidence grade remains at B3 as volumes are based on an estimate derived from the use of actual data from the installed Full Bore meters (FBM).

A3.7 Measured non-household foul volume

The total volume of foul waste from measured non-households has increased from 138.510 Ml/d to 144.65 Ml/d. The confidence grade remains at B3.

A3.8 Trade Effluent Volume

The volume of trade effluent discharged has decreased from 74.569Ml/d to 66.158Ml/d. This figure is the volume associated with the Drainage Point Identifiers (DPIDs) billed at P06. As noted, the CMA system now calculated the Trade Effluent volume. In order to do this, it is necessary for the Licensed Provider to submit meter readings, when this doesn't happen, the CMA system defaults to an "industry standard" volume which is very low. This may account for the apparently significant reduction.

Volumes reported this year are taken from the latest available reconciliation run from the CMA for the reporting period. For DPIDs which haven't been billed by the CMA we have used in order of preference, volumes submitted by the Licensed Provider for the DPID for the reporting period (the CMA system accepts these volumes even though the DPID doesn't appear on reconciliation runs), or the process for calculating the annual volume estimate sent to the CMA when the DPID is initially set up, which is 200 times the consented daily volume.

The forecast is for this to increase slightly to 66.159Ml/d. This is calculated by pro-rating of the current year's volume, based on the number of DPID still active in IP12.

The confidence grade has been revised to B2 for the current and B4 for forecast year. This is primarily due to the change in volume calculation method and the need for the system to be updated with meter readings by Licensed Providers in order for the volume calculations to be correct.

A3.9 Total Volume

The confidence grade remains at B3.

A3.10 Volume septic tank waste

The measured household volume is currently 38.740 Ml.

As there has been no change to the methodology used the A3 confidence grade is unchanged from last year.

A3.11-A3.25 Sewage Load (BOD/yr)

The household load reported is based on household occupancy multiplied by 60g BOD per head per day in line with E table guidance.

The slight increase in unmeasured household load to 107,705 BOD t/yr is a result of an increase in household population.

The measured household load has decreased to 8.852 t.

There has been no change in methodology therefore the confidence grade remains the same.

A3.12- Measured household load

The measured household load for this year has reduced to 8.852 t.

A3.13-A3.14 Unmeasured and measured non-household load

The non-household load is derived as 300g BOD/m3 applied to the volumes of sewage reported in lines A3.7 and A3.8.

There has been no change in methodology therefore the confidence grade remains the same

A3.15 Trade effluent load

The total BOD load discharged to the network has increased from 17,018T in AR16 to 17,367T so this could indicate the increase of strength of effluent being discharged from a lower number of billed Discharge Points.

The forecast figure also increases to 17,369T.

The confidence grade has been revised to B2 for the current and B4 FOR forecast year. This is primarily due to the change in volume calculation method and the need for the systems to updated with meter readings by Licensed Providers in order for the volume calculations to be correct.

A3.17-A3.18 Private / Public Septic Tank Load

The reported septic tank loads (lines A3.17 and A3.18) are derived by applying an assumed load of 6,543g/m3 to the volumes removed from private and public septic tanks respectively.

A3.19 Other Tanker Loads

The other taker loads has increased this year to 1172.628.

A3.21 Average COD concentration

The average settled COD concentration used to calculate Trade Effluent charges continues to be 350mg/l. No significant change has occurred and the confidence grade remains the same as the prior year.

A3.22 Average suspended solids concentration

The average suspended solids concentration used to calculate Trade Effluent charges continues to be 250mg/l. No significant change has occurred and the confidence grade remains the same as the prior year

A3.23 Equivalent population served (resident)

The figure reported in A3.23 is the total load divided by 60g/h/day. The equivalent population reported is 6,669,924 which is a small increase from the 6,568,503 reported in the previous year. The confidence grade remains the same as prior years.

A3.24 Equivalent population served (resident) (numerical consents)

The figure reported in A3.24 is the total load divided by 60g/h/day, (for works that have a numerical consent). The equivalent population reported is 6,613,577 which is an increase from the 6,360,618 reported in the previous year. The confidence grade remains the same as prior years.

A3.25 Total load receiving treatment through PPP treatment works

In the report year an increase from 64,465t to 65,551t mainly due to an increase in the population equivalents for trade effluent sites receiving treatment through PPP treatment works. There has been no change in methodology therefore the confidence grade remains the same.

A3.26-A3.28 Sewage Sludge Treatment and Disposal

The reported mass of waste water treatment sludge recycled was 123.476 ttds, of which the majority came from the PPP/PFI works 109.906 ttds. As with AR10 all our figures reported were taken direct from the Gemini system and recycling contractors' duty of care documentation. As in previous years we have retained the existing confidence grade.

For the Scottish Water sludge a significant decrease in the volume of enhanced treated sludge was noted 2.85 ttds. This was mainly attributable to de-watered sludge cake being produced which was sent to land restoration outlets due to contractual issues with a framework supplier to Scottish Water at two sites that they undertook de-watering and treatment of liquid sludge during the reporting period.

Conventional sludge production showed a small decrease by 0.87 ttds from the previous year. This is mainly associated with pathogen quality issues of cake from sludge treatment centre facilities in the central belt which in turn was disposed to land restoration facilities as per the requirements of the Safe Sludge Matrix and also commensurate with the requirements of the newly introduced voluntary Biosolids Assurance Scheme.

0.40 ttds of untreated cake continues to be landfilled in the Shetland Islands.

D Tables – Activities

Table D5 Activities – Water Service

D5.1-11 Mains – Asset Balance

Lines D5.1-D5.11 report the water mains asset balance at March 2017 and the number of communication pipes replaced in the Report Year.

The closing balance for water mains on line D5.8 is 99.9km higher than the opening value reported on line D5.1 (which is consistent with the 48,480.37km on line H3.4).

The methodology for the collation of the figures for lines D5.2 through to D5.7 has changed in this reporting year due to improvements in data return processes. This data can now be taken direct from our GIS corporate data repository. However the full benefits of this approach are not yet available due to limitations with the incumbent GIS. This will improve over time as we embed our new GIS and data model.

D5.2 & D5.3 Mains renewed and mains relined

Lines D5.2 and D5.3 report mains replaced as part of our Mains Rehabilitation Programme in 2016/17, lengths replaced by reactive operations capital maintenance lines and lengths from named projects. 62.62km of mains have been reported as renewed water mains and 7.85km of mains have been reported as relined.

D5.4 Mains cleaned (Total)

The 1,541.59km length reported has been derived from the length of flushing of 674.78km plus 866.81km through the capital programme.

D5.5 Distribution mains cleaned for quality

The length reported of 276.87km has been derived from the length of 135.22km reported against routine flushing and swabbing, as these works are carried out for water quality reasons, plus the 141.65km reported against capital programme work packages in D5.4 above.

D5.6 New mains

Line D5.6 is a combination of the length adopted for new developments and lengths delivered as part of our capital programme. The length reported for AR17 is 505.63km.

D5.7 Mains abandoned

The length of mains abandoned equals the length of mains renewed taken from D5.2 above less reduction in total length reported from the mains rehabilitation programme. The length reported for AR17 is 192.31km.

D5.7a Other Changes

The length reported is the balancing value to bring the total changes in the year in line with the closing balance reported in D5.8. The length reported for AR17 is 276.04km.

D5.8 Total length of mains (closing balance)

The total length reported is consistent with line H3.4.

D5.9 Lead communication pipes replaced - quality

We are not reporting any lead communication pipes as being replaced in this report year for quality purposes. The number reported last year was a cumulative total over the years since this table was last submitted.

D5.10 Lead communication pipes replaced – maintenance or other

We report 26 lead communication pipes as being replaced this year for maintenance and other reasons.

D5.11 Communication pipes replaced - other

A cumulative total of 588 communication pipes of materials other than lead have been replaced through mains rehabilitation programmes and as part of the capital maintenance programme over the reporting year.

Table D6 Activities – Waste water Service

D6.1-13 Critical/Non-Critical Sewers
The total reported length of critical sewer has decreased by 26.62km. The net length of all sewers recorded has increased by 292.99km when compared to the 2015/16 inventory.

As with the water mains reported on table D5 the methodology to provide these lines has been revised to utilise the corporate GIS systems to report the lengths required.

D6.1 Total length of sewers – opening balance
The opening balance is taken from the Annual Return 2015/16 line D6.13.

D6.2 Total length of critical sewer – opening balance
The opening balance is taken directly from both Annual Return 2015/16 line E7.13 and line D6.8 which reflects the closing balance from the previous reporting year.

D6.3 New critical sewers added during the year
The total value of 40.87km new sewers added is reported from GIS.

D6.4 Critical sewers inspected by CCTV or man entry during the year
9.6km of inspections were recorded in the report year. These are made up from 6.62km of FMAP and PMAP surveys, and 2.98km from the sewer rehab programme.

D6.5 Critical sewers – renovated
0.32km of critical sewers were renovated as part of the sewer rehabilitation programme in this report year.

D6.6 Critical sewers – replaced
No critical sewer replacements were reported from the CID Q&SIII infrastructure programme in this reporting year.

D6.7 Abandoned “critical” sewers
The total length of 30.16km is reported from GIS due to operational activities.

D6.7a Other changes to “critical” sewers
This line reports the balance between the changes reported through the lines above to bring the total in line with the closing balance reported in D6.8 and in line with E7.13. For a more expansive explanation of the changes undertaken this year please refer to lines D5.1 to D5.11 above. The methodology has been revised to utilise our corporate GIS.

D6.8 Total length of critical sewer (closing balance)
The total length of 11,154.9km is consistent with the line H4.1.

D6.9 New “non-critical” sewers
Line D6.9 reports 367.84km of new sewers, taken from GIS.

D6.10 “Non-critical” sewers - renovated
0.12km of sewer renovations are reports as part of our rehabilitation programme.

D6.11 “Non-critical” sewers – replaced
No sewer replacements were reported.

D6.12 Abandoned “non-critical” sewers
The 67.78km of abandoned sewer is reported from GIS.

D6.12a Other changes to "non-critical" sewers

This line reports the balance between the changes reported through the lines above with the closing balance reported in D6.13. For a more expansive explanation of the changes undertaken this year please refer to lines D5.1 to D5.11 above. The methodology has been revised to utilise our corporate GIS.

D6.13 Total length of sewers – closing balance

The length of 49,881.49km is the total length of sewers.

Table D7 and D8 Capital Maintenance Expenditure

General comments

D7 reports capital maintenance investment on wastewater assets. In 2016/17, a total of £127.3m was allocated to capital maintenance waste water assets. D8 reports capital maintenance investment on water assets in the Report Year. Total expenditure on capital maintenance of water assets equated to £213.8m. The combined figure of £341.1m equates to the total spend on capital maintenance in 2016/17.

The capital maintenance investment includes £37.0m of exceptional capital maintenance associated with the Ayrshire resilience scheme and the Strategic mains diversions. Excluding exceptional capital maintenance gives in-year capital maintenance spend of £304.1m.

With the exception of Management and General, the investment is reported against operational regions.

Each project is assigned to one of the four operational regions. Where projects are flagged as Scottish Water Wide, they span more than one operational area and are split equally between the four operational areas.

The financial values reported in D7 and D8 are based on the percentage of capital maintenance allocated to projects.

D7.21 and D8.16 – Wastewater/Water Management and General

These lines include all support services. The non-operational assets have been allocated to either water or wastewater. Wastewater Management and General equated to £28.5m while Water accounted for £23.8m investment in 2016/17.

E Tables - Operating Costs and Efficiency

General Comments

Methodology

Cost analysis in E Tables (E4, E6, E7, E8, E9 and E10) was prepared using reports from Scottish Water's Activity Based Management (ABM) systems on a historic cost basis excluding IFRS adjustments.

ABM provides analysis of the costs of key activities and processes and links these to the factors that cause or drive the level of cost. This allows us to develop an understanding of the full cost of providing services, either internally within Scottish Water, or to our external customers.

Cost Allocation

Consistent with prior years, costs are captured or allocated in line with Regulatory Accounting Rules including modifications, agreed with the Commission, to reflect the Scottish retail market.

A more detailed commentary on ABM methodology and cost allocation is provided in support of Regulatory Accounts Tables M18 and is not repeated in this document. ABM data (financial and non-financial) is captured in various corporate systems which are also described in the M18 methodology document.

Confidence Grades – Confidence grades of the operating cost lines on the E Tables remain consistent with 2015/16.

Direct costs are predominantly captured in the core corporate financial system, with labour costing feeds from the core corporate works management system. A high proportion of direct costs are captured by asset or zone, hence the A2 confidence grade. A smaller proportion of costs – mainly general and support costs – remains to be allocated to asset/zone by means other than direct capture.

In order to achieve A1 accuracy, Scottish Water will need to increase the level of direct cost capture further and build in more accurate and tested allocations of cost where direct cost capture does not provide splits by regulatory classification, e.g. single power meter at a dual function asset.

Table E3 and E3a PPP Project Analysis

Table Overview

Table E3 provides details of the 21 PPP wastewater treatment works that are managed under 9 separate PPP Concession agreements.

The following works form part of each scheme:

PPP Scheme	Wastewater Treatment Works *
Highland	Fort William, Inverness
Tay	Hatton
Aberdeen	Fraserburgh, Peterhead, Nigg, Persley
Moray Coast	Lossiemouth, Buckie, Banff/Macduff
AVSE	Seafield, Newbridge, East Calder, Blackburn, Whitburn
Levenmouth	Levenmouth
Dalmuir	Dalmuir
Daldowie*	Daldowie sludge treatment centre
MSI	Meadowhead, Stevenston, Inverclyde

* Daldowie is a sludge treatment centre only.

E3.0-3 Project data

E3.1 Annual average resident connected population

The annual average resident connected population increased by 11,810 to 2,203,243. This reflects the increase in the general population reported in Table E7.1. The confidence grade remains at B3.

E3.2 Annual average non-resident connected population

The annual average non-resident connected population increased by 5461 to 27,069. This is partly due to better matching of Address Based Premium tourist accommodation and Address Points. The confidence grade remains at B3 which is unchanged from the Annual Return last year.

E3.3 Population equivalent of total load received

The population equivalent of total load received increased by 49,604 to 2,993,221. This increase is mainly due to an increase in the trade effluent load and reported as being received at these WWTW.

The population equivalent of total load received consists of the following constituents:

- Population
- Non-domestic load
- Tourist
- Trade effluent
- Imported public septic tanks
- Imported private septic tanks
- Imported WTW sludge
- Imported WWTW sludge
- Imported other loads
- Sludge return liquors

	Population	Non-domestic load	Tourist	Trade effluent	Imported public septic tanks
AR17	2,203,243	407,843	27,069	345,485	129
% of Total	73.61%	13.63%	0.90%	11.54%	0.00%
AR16	2,191,433	394,320	21,608	324,856	208
% of Total	74.45%	13.40%	0.73%	11.04%	0.01%
Difference	11,810	13,523	5,461	20,629	-79

	Imported private septic tanks	Imported WTW sludge	Imported WWTW sludge	Imported other loads	Sludge return liquors	Total
AR17	440	0	7,293	0	1,720	2,993,221
% of Total	0.01%	0.00%	0.24%	0.00%	0.06%	
AR16	1,051	0	8,422	0	1,720	2,943,618
% of Total	0.04%	0.00%	0.29%	0.00%	0.06%	
Difference	-611	0	-1,129	0	0	49,603

E3.4-8 Scope of works

E3.4 Sewerage

Fort William	Includes 4 pumping stations and associated pumping mains.
Inverness	Includes 14 pumping stations and associated pumping mains/gravity sewer.
Hatton	Includes 16 pumping stations and associated pumping mains/gravity sewer.
Nigg	Includes 14 pumping stations and associated pumping mains/gravity sewer.
Persley	Includes a short section of gravity sewer.
Peterhead	Includes a short section of gravity sewer.
Fraserburgh	Includes 1 pumping station and a section of gravity sewer.
Lossiemouth	Includes 7 pumping stations and extensive pumping mains.
Buckie	Includes 12 pumping stations and extensive pumping mains.
Banff/Macduff	Includes 10 pumping stations and extensive pumping mains.
Seafield	Includes 7 pumping stations, the Esk valley trunk sewerage network and a number of storm water works with overflows.
Newbridge	Includes 2 pumping stations, a section of sewer and a storm water works with overflow.
Whitburn	Includes 1 pumping station.
Levenmouth	Includes 8 pumping stations and associated pumping mains and gravity sewers.
Daldowie	Includes 1 pumping station and pumping main.
Inverclyde	Includes a short section of gravity sewer.

E3.5 Sewage Treatment

Only Daldowie does not include sewage treatment as it is exclusively a sludge treatment centre.

E3.6 Sludge Treatment

Permanent sludge treatment facilities

Inverness	Indigenous sludge, imports from Fort William, plus Scottish Water imports
Hatton	Indigenous sludge plus Scottish Water imports
Nigg	Indigenous sludge, imports from Persley, Peterhead, Fraserburgh, plus Scottish Water imports
Lossiemouth	Indigenous sludge, imports from Buckie, Banff/Macduff, plus Scottish Water imports
Seafield	Indigenous sludge, occasional imports from Newbridge, East Calder, Blackburn, Whitburn, plus Scottish Water imports
Newbridge	Indigenous sludge, imports from East Calder, Blackburn, Whitburn, plus Scottish Water imports
Levenmouth	Indigenous sludge, plus Scottish Water imports
Daldowie	Receives sludge from Dalmuir and Scottish Water wastewater treatment works (Daldowie, Shieldhall, Paisley, Dalmarnock and Erskine) by sludge pipeline, and from SW tankered imports
Meadowhead	Indigenous sludge, plus imports from Stevenston and Inverclyde

Some raw cake using thickening was disposed of from Persley, Peterhead and Fraserburgh but there is no sludge treatment on site.

Temporary sludge treatment facilities

The following sites do not have a permanent sludge treatment centre but temporary sludge treatment facilities were deployed on site.

Dalmuir	Temporary centrifuging deployed to limit the pass forward sludge to Daldowie STC to a maximum ferric content of 2 tonne/day

Shieldhall centrifuge operations is now operated and managed by Scottish Water.

E3.7 Terminal Pumping Station

This means a pumping station that is the final point on the forward flow path from a sewerage network into a wastewater treatment works and may include both pumping of all/partial 'FFT' flows or stormwater flows to storm tanks and/or storm outfalls. The Terminal Pumping Station may form part of the sewerage network (i.e. be remote from the WwTW) or may be associated with a wastewater treatment works depending on actual location and power supply source. It is not a Combined Pumping Station or a Stormwater Pumping Station.

The following works include incoming terminal pumping stations as part of the PPP scheme. Maximum capacity (l/s) of terminal pumping station, excluding standby capacity, is given in brackets.

Fort William	Caol Transfer (118 l/s), Fort William WwTW (590 l/s).
Inverness	Allanfearn WwTW (50 l/s)This pumping station receives flows from a small part of the catchment.
Hatton	South Balmossie (1,563 l/s), West Haven (110 l/s), Inchcape Park (241 l/s).
Fraserburgh	Fraserburgh Inlet (195 l/s).
Lossiemouth	Duffus Junction (33 l/s), Moycroft (300 l/s).
Buckie	Nook (84 l/s), Shipyard (70l/s), Buckie WwTW (13 l/s).
Banff/Macduff	Craigfauld (552l/s), Banff/Macduff WwTW (222 l/s).
Seafield	A proportion of total flow is delivered via Marine Esplanade Terminal PS (1420 l/s).
Newbridge	A proportion of total flow is delivered via the Ratho Sewer Terminal PS (196 l/s).
Whitburn	A proportion of total flow is delivered via the Harrison Sewer Terminal PS (45 l/s).
Levenmouth	All flow delivered via terminal pumping stations; Methil M2 (125 l/s), Leven (212 l/s), Buckhaven (133 l/s), Levenmouth WwTW inlet FFT flows (1,650 l/s), Levenmouth WwTW inlet storm flows (2,347 l/s).

E3.8 Other - No plants in this category.

E3.9-14 Effluent consent standards

Data obtained from the current SEPA consents. Where an effluent consent standard includes both CAR and UWWTD elements the stricter standard is given in the return.

E3.9 Suspended solids consent – All CAR**.**

E3.10 BOD consent

All UWWTD except Newbridge, East Calder, Blackburn and Whitburn.

E3.11 COD consent – All UWWTD.

E3.12 Ammonia consent – All CAR.

At Dalmuir, an Improvement Plan and Variation Notice had been introduced in May 2012. This Variation Notice, as varied, suspended the ammonia consent condition until 30 June 2016. Ammonia sampling continued to be suspended throughout 2016, but came back into force in January 2017 to coincide with the issue of an amended License.

E3.13 Phosphate consent – All CAR.

At Newbridge, East Calder, Blackburn and Whitburn the consent is expressed as; 'Mean concentration of total phosphorous of any series of composite samples taken at regular but randomised intervals in any period of 12 months'.

E3.14 Compliance with effluent consent standards

Compliance for BOD, COD, SS, Ammonia, and Phosphate is reported for each works, based on the total number of sample results and exceedances (upper and lower tier) for sanitary determinands (to the exclusion of other parameters that may be included in the SEPA consent). Where effluent consent standard includes both CAR and UWWTD standards both sets of samples are used for the calculation of compliance.

Percentage compliance is calculated as:

(1-(total number of failures/total number of samples)) x 100

The SEPA Annual Compliance Report for the period ending 31 December 2016 has been taken as the definitive data source, provided by SEPA, and as such it has been assigned a Confidence Grade of A1.

Compliance calculated under this methodology may cause conflicts with Table C4 (C4.19) "Number of discharges confirmed as failing", which considers all SEPA consent parameters.

Failures

Site		Parameter	Exceedance (E) / Failure (F)	
Nigg	UWWTD	BOD	F	26/01/16
	UWWTD	COD	E	26/01/16
Lossiemouth	UWWTD	COD	E	06/01/16
	UWWTD	COD	E	17/11/16
East Calder	CAR	Ammonia	E	20/07/16
Blackburn	CAR	BOD	E	17/03/16
	CAR	BOD	E	28/09/16
Inverclyde	UWWTD	BOD	E	07/12/16

E3.15-21 Treatment works category

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

E3.15 Primary – All plants.

E3.16 Secondary activated sludge - Includes all plants except Blackburn.

E3.17 Secondary biological - Blackburn**.**

E3.18 Tertiary A1 (activated sludge process)

East Calder	Nitrifying filters.
Whitburn	Nitrifying filters.
Dalmuir	Nitrifying filters - Initial commissioning commenced in 2015 but were not taken into the ownership and control of the PFI Company until March 2017.

E3.19 Tertiary A2 (activated sludge process)

Inverness	UV disinfection.
Persley	UV disinfection.
Fraserburgh	UV disinfection.
Banff/Macduff	UV disinfection.
Levenmouth	Densadeg lamella settlement tanks followed by UV disinfection.
Newbridge	Low head loss sand filters.
East Calder	Disc filters.
Whitburn	Low head loss sand filters.
Meadowhead	Biofors tertiary filter.

UV disinfection at Seafield was discontinued in 2016 following a change to the SEPA licence.

E3.20 Tertiary B1 - No plants sit in this category.

E3.21 Tertiary B2 (biological sludge process).

Blackburn	Disc filters.

E3.22-32 Sewerage Data

Includes all sewerage (sewers, pumping stations, rising mains, outfalls and long sea outfalls).

Data sources: Project Agreements, Operator O&M manuals, Operator asset inventories, Scottish Water GIS system, as built drawings, SEPA consents.

Pump capacity (kW) has been obtained from motor drive rating, not the pump duty point.

E3.22 Total length of sewer – Length of outfalls included in data unless noted otherwise in commentary. Where terminal pumping stations are located remote from a wastewater treatment works, the length of rising main connecting the terminal pumping station and wastewater treatment works is included.

E3.23 Total length of critical sewer – All PPP sewers (including relief sewers, rising mains and CSO outfalls) are deemed to be critical.

E3.24 Number of pumping stations – Includes stormwater, combined and terminal pumping stations. Interstage and final effluent pumping stations forming part of a wastewater treatment plant are not included.

E3.25 Capacity of pumping stations (m3/d) - Includes stormwater, combined and terminal pumping stations. Maximum flow pumped forward per day. This excludes capacity of standby pumps.

E3.26 Capacity of pumping stations (kw) - Includes stormwater and combined pumping stations, but not terminal pumping stations. Includes capacity of standby pumps.

E3.27 Number of combined pumping stations - Combined pumping station means a network wastewater pumping station containing a pump or pumps transferring wastewater and surface drainage within the downstream sewerage network. The transferred wastewater flow rate from the combined pumping station is the "FFT" rate, the generally accepted term used in design and SEPA consents. For the sake of clarity, where stormwater storage tank returns are pumped back into the sewerage system for onward flow, this shall be classed as a combined pumping station (as such flows become part of 'FFT'). Terminal pumping stations are not included.

The following combined pumping stations are included:

Fort William	Blar Mhor, Caol No1
Inverness	Longman
Hatton	Riverside, KGV, Stannergate, West Ferry, Broughty Castle, Fort Street, Gray St.
Nigg	Downies, Portlethen Village, Newtonhill Clifftop, Portlethen South, Backies, Cowie (3), Slughead, Bridge of Muchalls, Cammachmore, Portlethen North
Lossiemouth	Burghead, Cummingston, Hopeman, Moycroft
Buckie	Portgordon West, Portgordon East, Seatown, Cluny, Cullen East, Portknockie, Findochty, Portessie
Banff/Macduff	Whitehills, Whitehills Harbour, Inverboyndie, Scotstown, Castlehill Park, Union Road, Bankhead
Seafield	Wallyford Transfer, Wallyford SWW, Portobello SWW, Harelaw SWW, Dalkeith SWW, Mayshade SWW*
Newbridge	Broxburn SWW
Levenmouth	Methil M1

*Mayshade SWW: pumping station comprises a separate duty/standby pump set in two separate storm tanks. As only one duty pump operates at any one time (i.e. storm tank 1 emptied before commencing emptying of storm tank 2) these four pumps have been entered as a single combined pumping station on a 1 duty/3 standby basis.

E3.28 Capacity of combined pumping stations (m3/d)

Maximum flow pumped forward per day. This excludes capacity of standby pumps.

E3.29 Number of stormwater pumping stations

Stormwater pumping station means a network wastewater pumping station containing a pump or pumps transferring wastewater, containing stormwater, to a stormwater storage tank or storm overflow. The stormwater pumping station transfers wastewater in excess of "FFT", the generally accepted term used in design and SEPA consents. For the sake of clarity, the function of the stormwater pumping station is to prevent and/or limit surcharging of the upstream sewerage system.

The following stormwater pumping stations are included:

Inverness	Longman (2)
Hatton	Riverside, KGV, Stannergate, Westhaven, Broughty Castle, Inchcape Park
Nigg	Backies (2)
Lossiemouth	Moycroft
Buckie	Portessie
Banff/Macduff	Bankhead
Levenmouth	Leven, Roundall

E3.30 Capacity of stormwater pumping stations (m3/d)

Maximum flow pumped forward per day. This excludes capacity of standby pumps.

E3.31 Number of combined sewer overflows &
E3.32 Number of combined sewer overflows (screened)

CSOs that overflow within the sewerage system rather than to an outfall discharging direct to the environment are not included. The following CSOs are included:

Fort William	Caol No1, Caol Transfer
Inverness	Longman
Hatton	Riverside, KGV, Stannergate, South Balmossie, Westhaven, Broughty Castle, Inchcape Park, Panmurefield/Balmossie Mill (2)
Nigg	Downies, Portlethen Village, Newtonhill Clifftop, Backies (2), Cowie, Portlethen North, Nigg
Fraserburgh	Fraserburgh Inlet (Watermill)
Lossiemouth	Burghead, Cummingston, Hopeman, Moycroft
Buckie	Portgordon West, Portgordon East, Seatown, Cluny, Nook, Cullen East, Portknockie, Findochty, Portessie, Shipyard
Banff/Macduff	Whitehills, Whitehills Harbour, Inverboyndie, Scotstown, Castlehill Park, Union Road, Bankhead, Craigfauld
Seafield	Wallyford, Dalkeith*, Hardengreen, Harelaw, Haveral Wood, Middlemills, Newbattle, Newtongrange, Suttieslea*
Newbridge	Broxburn
Levenmouth	Buckhaven, Methil M2 CSO2**, Methil CSO1**, Leven, Roundall

*Seafield - Dalkeith SWW consists of two separate screen overflows on two separate legs of the sewer which combine at the SWW. As each screened overflow is located on the same site and feeds one common storm water tank and outfall, this overflow has been recorded as a single CSO. Suttieslea: 'Copa Sac', (equivalent to 6 mm screen), provided on outfall from storm tank.

**Levenmouth - Methil CSO1 and Methil M2 CSO2 discharge into a common outfall.

E3.33-40 Sludge Treatment and Disposal Data

The quantities reported are the total sludge tonnages prior to the sludge treatment process. This is in accordance with the methodology used in England & Wales.

The information is based on PPP Company records of sludge disposed to the appropriate route.

At Seafield pasteurised cake is recycled to Farmland Advanced with non-pasteurised cake going to Reclamation.

Allanfearn sludge quantities disposed of by Scottish Water are included in Table E3 and the corresponding costs are included in Table E3a to be consistent with the rest of the PPP works.

From 2016/17 sludge disposed from Shieldhall is included with the Scottish Water data (Table E10) as this facility is now operated and managed by Scottish Water. In 2016/17 the centrifuge facility produced raw cake from a number of sources including Paisley, Shieldhall and Dalmuir. In previous years the Shieldhall facility had been used for Dalmuir sludge under the direction of the PPP Team.

TABLE E3a

Table E3a provides operating costs for each scheme. As actual data is not available, all costs have been extracted from the relevant contractual financial models. Where the financial models do not split costs into specific categories the following has been assumed:

- Works with a Sludge Centre: 72 % Ww Treatment Costs, 28% Sludge Costs
- All other works: 80% Ww Treatment Costs, 20% Sludge Costs. These sludge costs have been allocated to the appropriate sludge treatment centre where the sludge is treated, e.g. Fort William sludge costs appear against Inverness sludge centre.

The cost split was reviewed in detail and agreed with WICS in May 2007 and has not been subject to further discussion since that date.

E3a.1, 8, 16 Estimated Direct Operating Cost

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

Where the model identified Rates and SEPA charges these have been deducted otherwise actual charges were deducted.

No adjustments were made at AVSE (for Rates), Daldowie (for Rates), and MSI (SEPA and Rates) as charges are paid by Scottish Water and are not included in the financial model. At Dalmuir, Scottish Water pays the charges but amounts are also included in the financial model, therefore an adjustment to the model costs is made (Rates and SEPA charges included in the model are refunded to Scottish Water).

Actual costs are not known and could, in reality, vary considerably from the contractual financial model. A confidence grade of D6 has therefore been used. A confidence grade of A3 was allocated to the Dalmuir sludge treatment costs as these costs are available.

E3a.2, 9, 17 Rates paid by the PPP Contractor

These are based on the rateable value and poundage published on the government website (www.saa.gov.uk). Rates paid by Scottish Water are also included and are based on actual charges for the year (Dalmuir, Daldowie, MSI, AVSE).

Confidence grade for total rates paid for each site is A2, but because rates have to be split to take account of the sewerage, treatment and sludge elements a lower confidence grade has been applied.

	E3a.2	E3a.9	E3a.17	
Site	**Sewerage**	**Sewage Treatment**	**Sludge Treatment**	**Comment on confidence grade**
Fort William	N	B3	N	No sludge centre at works, sludge cost moved to Inverness
Inverness	N	B3	B3	Cost distribution is estimated
Hatton	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Nigg	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Persley	N	B3	N	No sludge centre at works, sludge cost moved to Nigg
Peterhead	N	B3	N	No sludge centre at works, sludge cost moved to Nigg
Fraserburgh	N	B3	N	No sludge centre at works, sludge cost moved to Nigg
Lossiemouth	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Buckie	N	B3	N	No sludge centre at works, sludge cost moved to Lossiemouth
Banff/Macduff	N	B3	N	No sludge centre at works, sludge cost moved to Lossiemouth
Seafield	N	B3	B3	Cost distribution is estimated, based on the Financial Model
Newbridge	N	B3	B3	Cost distribution is estimated, based on the Financial Model
East Calder	N	B3	N	No sewerage and no sludge centre at works, sludge cost moved to Newbridge
Blackburn	N	B3	N	No sewerage and no sludge centre at works, sludge cost moved to Newbridge
Whitburn	N	B3	N	No sludge centre at works, sludge cost moved to Newbridge
Levenmouth	N	B3	B3	Cost distribution is estimated
Dalmuir	N	B3	N	No sewerage and no permanent sludge centre at works
Daldowie	N	N	A2	No sewage treatment at works
Meadowhead	N	B3	B3	Cost distribution is estimated
Stevenston	N	B3	N	No sewerage and no sludge centre at works, sludge cost moved to Meadowhead
Inverclyde	N	B3	N	No sludge centre at works, sludge cost moved to Meadowhead

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E3a.3, 10, 18 SEPA charges paid by the PPP Contractor

Cost allocation is as per the relevant SEPA invoices for 2015/16.

The following confidence grades have been assigned:

	E3a.3	E3a.10	E3a.18	
Site	Sewerage	Sewage Treatment	Sludge Treatment	Comment on confidence grade
Fort William	A2	A2	N	No sludge centre at works
Inverness	N	A2	A2	No separate cost for sewerage
Hatton	A2	A2	A2	
Nigg	A2	A2	A2	Cost split between PFI Co and SW is based on PFI Co assessment
Persley	N	A2	N	No separate cost for sewerage, no sludge centre at works
Peterhead	N	A2	N	No separate cost for sewerage, no sludge centre at works
Fraserburgh	N	A2	N	No separate cost for sewerage, no sludge centre at works
Lossiemouth	A2	A2	N	No subsistence charge included in invoices
Buckie	A2	A2	N	No sludge centre at works
Banff/Macduff	A2	A2	N	No sludge centre at works
Seafield	A2	A2	A2	
Newbridge	A2	A2	N	No WML charge included in invoice
East Calder	N	A2	N	No sewerage and no sludge centre at works
Blackburn	N	A2	N	No sewerage and no sludge centre at works
Whitburn	N	A2	N	No sewerage and no sludge centre at works
Levenmouth	A2	A2	A2	
Dalmuir	N	N	N	SEPA fees paid by SW
Daldowie	N	N	A2	Sludge treatment only
Meadowhead	N	N	A2	Only PPC fees paid by the PFI Co
Stevenston	N	N	N	SEPA fees paid by SW
Inverclyde	N	N	N	SEPA fees paid by SW

E3a.4, 11, 19, 23 Total Direct Cost

Total of E3a.1-3, 8-11 and 16-18. Confidence grade for Total direct cost is D6 as per E3a.1, 8 and 16 (Estimated direct operating cost) as this is the most significant element of Total direct cost. A confidence grade of A3 was allocated to the Dalmuir sludge treatment costs as these costs are available.

E3a.5, 12, 20 Scottish Water General and Support Expenditure

This includes costs such as advisors and legal costs, power, rent and insurance and the cost of the Scottish Water PPP department that administers the PPP projects which have been allocated to projects based on opex. Costs are as per the P&L. In addition, Scottish Water costs of sludge disposal from Inverness, inter-site sludge tankering and terminal pumping costs (where tankering or pumping has taken place between a Scottish Water works and a PFI site) and additional support costs have been included

Confidence grade for total charges is A1, but because Scottish Water PPP department costs have to be split across all sites and all charges have to be split to take account of the sewerage, treatment and sludge elements the following confidence grades have been assigned:

A confidence grade of A3 was allocated to the Dalmuir sludge treatment costs as these costs are available.

	E3a.5	E3a.12	E3a.20	Comment
Site	Sewerage	Sewage Treatment	Sludge Treatment	Comment on confidence grade
Fort William	CX	C4	N	Network cost very small, no sludge centre at works
Inverness	C4	C4	C4	
Hatton	C4	C4	C4	
Nigg	C4	C4	C4	
Persley	CX	C4	N	Network cost very small, no sludge centre at works
Peterhead	CX	C4	N	Network cost very small, no sludge centre at works
Fraserburgh	CX	C4	N	Network cost very small, no sludge centre at works
Lossiemouth	C4	C4	C4	
Buckie	C4	C4	N	No sludge centre at works
Banff/Macduff	C4	C4	N	No sludge centre at works
Seafield	C4	C4	C4	
Newbridge	CX	C4	C4	Network cost very small
East Calder	N	C4	N	No sewerage and no sludge centre at works
Blackburn	N	C4	N	No sewerage and no sludge centre at works
Whitburn	CX	C4	N	Network cost very small, no sludge centre at works
Levenmouth	C4	C4	C4	
Dalmuir	N	C4	A3	No sewerage
Daldowie	C4	N	C4	No sewage treatment at works
Meadowhead	N	C4	C4	No sewerage
Stevenston	N	C4	N	No sewerage and no sludge centre at works
Inverclyde	CX	C4	N	Network cost very small, no sludge centre at works

E3a.6, 13, 21 Scottish Water SEPA Charges

With the exception of Dalmuir and MSI, all standard SEPA charges are paid for by the PFI Company 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. Costs are as per the P&L and reflect charges as invoiced by SEPA.

	E3a.6	E3a.13	E3a.21	
Site	Sewerage	Sewage Treatment	Sludge Treatment	Comment on confidence grade
Fort William	N	N	N	SEPA charges paid by PFI Co
Inverness	N	N	N	SEPA charges paid by PFI Co
Hatton	N	N	N	SEPA charges paid by PFI Co
Nigg	N	N	N	Treatment cost only (exotics), costs are included with E3a.26
Persley	N	N	N	SEPA charges paid by PFI Co
Peterhead	N	N	N	SEPA charges paid by PFI Co
Fraserburgh	N	N	N	SEPA charges paid by PFI Co
Lossiemouth	N	N	N	SEPA charges paid by PFI Co
Buckie	N	N	N	SEPA charges paid by PFI Co
Banff/Macduff	N	N	N	SEPA charges paid by PFI Co
Seafield	N	N	N	SEPA charges paid by PFI Co
Newbridge	N	N	N	SEPA charges paid by PFI Co
East Calder	N	N	N	SEPA charges paid by PFI Co
Blackburn	N	N	N	SEPA charges paid by PFI Co
Whitburn	N	N	N	SEPA charges paid by PFI Co

	E3a.6	E3a.13	E3a.21	
Site	**Sewerage**	**Sewage Treatment**	**Sludge Treatment**	**Comment on confidence grade**
Levenmouth	N	N	N	SEPA charges paid by PFI Co
Dalmuir	N	A2	N	No sewerage, no charge for temporary sludge centre at works
Daldowie	N	N	N	SEPA charges paid by PFI Co
Meadowhead	N	A2	N	Treatment cost only, sludge costs are paid by the PFI Co
Stevenston	N	A2	N	No sewerage and no sludge centre at works
Inverclyde	BX	A2	N	No sludge centre at works

E3a.7, 14, 22 Total sewerage cost, total sewage treatment cost, total sludge treatment costs and disposal cost

Confidence grade is D6 as per E3a.1, 8 and 16 (estimated direct operating Cost) as this is the most significant element of the cost.

A confidence grade of A3 was allocated to the Dalmuir sludge treatment and disposal costs as these costs are available.

E3a.15 Estimated terminal pumping cost

Reported costs are as per the costs incurred for the SW operated terminal pumping stations.

Where the terminal pumping station is part of the PPP scheme the costs are met by the Concessionaire and are included in the tariff rates and not reported as part of E3a.15.

E3a.24 Total Scottish Water cost

Total of Scottish Water General and Support Expenditure, and Scottish Water SEPA Charges (E3a.5-6, 12-13 and 20-21).

Confidence grade for total charges is A1, but because Scottish Water PPP department costs and internal recharges have to be split across all sites a confidence grade of C4 has been allocated.

Site	16/17 £m	15/16 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Ft William	0.018	0.013	0.005	16/17 includes lower ABM support costs £0.002m,	16/17 includes higher other Scottish Water operating costs £0.007m
Inverness	0.524	0.615	-0.091	16/17 includes lower legal/consultants fees £0.036m, lower sludge tankering and disposal costs £0.058m, and lower ABM support costs £0.015m	16/17 includes higher other Scottish Water operating costs £0.017m and higher terminal pumping costs £0.001m,
Hatton	0.279	0.259	0.020	15/16 includes lower sludge tankering costs £0.008m, and lower ABM support costs £0.011m,	16/17 includes higher other Scottish Water operating costs £0.038m and higher terminal pumping costs £0.003m,

Site	16/17 £m	15/16 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Nigg	0.709	0.774	-0.065	16/17 includes lower legal/consultants fees £0.028m, lower sludge tankering costs £0.025m, and lower ABM support costs £0.040m,	16/17 includes higher other Scottish Water operating costs £0.028m
Persley	0.023	0.016	0.007	16/17 includes lower ABM support costs £0.002m	16/17 includes higher other Scottish Water operating costs £0.009m
Peterhead	0.026	0.018	0.008	16/17 includes lower terminal pumping costs £0.002m and lower ABM support costs £0.002m	16/17 includes higher other Scottish Water operating costs £0.012m, and higher terminal pumping costs £0.003m
Fraserburgh	0.025	0.014	0.011	16/17 includes lower ABM support costs £0.002m	16/17 includes higher other Scottish Water operating costs £0.013m
Lossiemouth	0.145	0.133	0.012	15/16 includes lower sludge tankering costs £0.006m, and lower ABM support costs £0.003m	16/17 includes higher other Scottish Water operating costs £0.021m
Buckie	0.027	0.015	0.012	16/17 includes lower ABM support costs £0.001m	16/17 includes higher other Scottish Water operating costs £0.013m
Banff/Macduff	0.024	0.018	0.006	16/17 includes lower ABM support costs £0.002m	16/17 includes higher other Scottish Water operating costs £0.008m
Seafield	0.158	0.147	0.011	16/17 includes lower legal/consultants fees £0.008m, and lower ABM support costs £0.020m	16/17 includes higher other Scottish Water operating costs £0.039m
Newbridge	0.035	0.030	0.005	16/17 includes lower ABM support costs £0.004m	16/17 includes higher other Scottish Water operating costs £0.009m
East Calder	0.020	0.015	0.005	16/17 includes lower ABM support costs £0.002m	16/17 includes higher other Scottish Water operating costs £0.007m
Blackburn	0.015	0.010	0.005	16/17 includes lower ABM support costs £0.001m	16/17 includes higher other Scottish Water operating costs £0.006m
Whitburn	0.016	0.012	0.004	16/17 includes lower ABM support costs £0.002m	16/17 includes higher other Scottish Water operating costs £0.006m
Levenmouth	0.250	0.326	-0.076	16/17 includes lower other Scottish Water operating costs £0.043m, and lower ABM support costs £0.039m	16/17 includes higher legal/consultants costs £0.006m
Dalmuir	1.008	1.148	-0.140	16/17 includes lower legal/consultants costs £0.001m, lower Scottish Water sludge disposal costs £0.068m, and lower other Scottish Water operating costs £0.022m, and lower ABM support costs £0.050m	

Site	16/17 £m	15/16 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Daldowie	1.325	1.545	-0.220	16/17 includes lower Shieldhall centrifuging costs £0.141m, lower sludge tankering costs £0.088m, and lower ABM support costs £0.020m	16/17 includes higher other Scottish Water operating costs £0.029
Meadowhead	0.958	1.161	-0.203	16/17 includes lower Scottish Water sludge disposal costs £0.040m, lower terminal pumping costs £0.161m, and lower ABM support costs £0.005m	16/17 includes higher legal/consultants costs £0.003m,
Stevenston	0.401	0.393	0.008	16/17 includes lower Scottish Water sludge disposal costs £0.011m, and lower ABM support costs £0.003m	16/17 includes higher terminal pumping costs £0.022m,
Inverclyde	0.418	0.450	-0.032	16/17 includes lower terminal pumping costs £0.045m, and lower ABM support costs £0.003m	16/17 includes higher other Scottish Water operating costs £0.016m,
Totals	**6.404**	**7.112**	**-0.708**		

E3a.25 Total operating cost

Confidence grade for Total operating cost is D6 as per E3a.23 Total direct cost, as this is the most significant element of Total operating cost.

E3a.26 Annual charge

The Annual charge is based on the service fees for the year, provisions and business rates (including rebates). Expenditure is taken from the P&L.

Confidence grades for each of the schemes is A1 other than the AVSE scheme which is B3 as the charges are based on the total AVSE flows as there is no separate tariff for each scheme.

Site	16/17 £m	15/16 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Ft William	3.595	4.400	-0.805	16/17 lower flows/loads £0.818m, higher penalties £0.010m, higher release of accruals £0.040m	16/17 inflation £0.058m, higher Carbon Reduction Commitment £0.005m
Inverness	7.029	7.806	-0.777	16/17 lower flows/loads £0.853m, higher penalties £0.090m	16/17 inflation £0.115m, higher Carbon Reduction Commitment £0.025m, lower release of accruals £0.026m
Hatton	21.920	22.006	-0.086	16/17 lower flows £0.116m, no Carbon Reduction Commitment £0.159m, higher release of accrual £0.016m	16/17 inflation £0.205m

Site	16/17 £m	15/16 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Nigg	14.199	11.603	2.596	16/17 lower flows/loads £0.167m	16/17 lower penalties £2.480m, inflation £0.120m, lower business rates rebate £0.010m, SEPA recharge from KWS £0.002m and electricity recharge from KWS £0.005m, lower release of accruals £0.146m
Persley	2.450	2.498	-0.048	16/17 lower flows/loads £0.111m, higher release of accruals £0.012m	16/17 lower penalties £0.047m, inflation £0.026m, lower business rates rebate £0.002m
Peterhead	2.071	2.015	0.056	16/17 higher release of accruals £0.009m	16/17 higher flows/loads £0.035m, lower penalties £0.005m, inflation £0.022m, lower business rates rebate £0.001m, higher Carbon Reduction Commitment £0.002m
Fraserburgh	1.928	1.899	0.029	16/17 lower flows/loads £0.013m	16/17 inflation £0.022m, higher fishing season costs £0.009m, lower business rates rebate £0.001m, lower release of accruals £0.010m
Lossiemouth	4.321	4.332	-0.011	16/17 lower flows £0.306m, no Carbon Reduction Commitment £0.047m, higher release of accruals £0.016m	16/17 lower penalties £0.282m,inflation £0.038m, claim: Damage to Equipment £0.038m,
Buckie	2.783	2.735	0.048	16/17 higher penalties £0.014m, no Carbon Reduction Commitment £0.014m, higher release of accruals £0.006m	16/17 higher flows £0.061m, inflation £0.021m
Banff/Macduff	3.295	3.207	0.088	16/17 higher penalties £0.007m, no Carbon Reduction Commitment £0.008m, higher release of accruals £0.006m	16/17 higher flows £0.080m, inflation £0.029m
Seafield	21.387	21.083	0.304	16/17 lower flows £0.198m, higher sludge rebate £0.015m	16/17 based on 100% compliance with the contract plus inflation £0.283m, higher Seafield Odour Improvement project costs £0.130m, higher Carbon Reduction Commitment £0.026m, higher business rates £0.066m, lower release of accruals £0.108m
Newbridge	3.095	3.051	0.044		
East Calder	1.688	1.664	0.024		
Blackburn	0.844	0.832	0.012		
Whitburn	1.126	1.110	0.016		

Site	16/17 £m	15/16 £m	Variance £m	Costs lower than previous year	Costs higher than previous year
Levenmouth	11.123	12.156	-1.033	16/17 lower flows £0.825m, lower Odour Project chemical dosing £0.068m, lower Leven PS fence £0.009m, higher release of accruals £0.215m	16/17 inflation £0.084m,
Dalmuir	13.802	13.046	0.756	16/17 lower flows £0.098m, lower annual operations compensation payment £0.024m, lower centrifuge project £0.212m, higher release of accruals £0.548m	16/17 inflation £0.057m, higher Capital Project opex £1.556m, higher business rates £0.025m
Daldowie	20.290	19.702	0.588	16/17 lower necessary change costs £0.001m, lower additional works £0.010m, higher release of accruals £0.058m	16/17 higher sludge volumes £0.313m, inflation £0.231m, excess ragging £0.100m, higher business rates £0.013m
Meadowhead	8.024	7.819	0.205	16/17 lower additional works £0.126m, no Sludge Odour Sampling Project £0.065m	16/17 inflation £0.046, higher Landfill Tax & Gas cost £0.150m, higher PADR2 £0.050m, higher business rates £0.015m, higher trader necessary change £0.001m, lower release of accruals £0.134m
Stevenston	3.530	3.709	-0.179	16/17 lower flows £0.156m, higher release of accruals £0.063m	16/17 inflation £0.030m, higher business rates £0.010m
Inverclyde	3.799	3.674	0.125	16/17 lower flows £0.054m, higher release of accruals £0.009m	16/17 inflation £0.034m, higher business rates £0.004m, Overton WTW increased sludge costs £0.150m
TOTAL	**152.299**	**150.347**	**1.952**		

E3a.27 Public sector capital equivalent values

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 PPP cost was used in the absence of a PSCE value, similarly for Levenmouth and AVSE the values have been taken from the 2001/02 WIC return.

E3a.28 Contract period

The period quoted is the Contract Period as defined in the Contract.

E3a.29 Contract end date

Contract end date is as defined in the Contract.

Table E4 Water Explanatory Factors - Resources and Treatment

E4.1 – E4.5 Source Types

The number of sources has increased by 4 to 283. This increase is due to the addition of 2 new spring sources feeding to Portree Torvaig WTW. Due to a change in operation at Whalsay WTW, Huxter Loch now feeds direct to the WTW and is therefore an addition to the total count of source (previously classed as indirect and therefore not counted). The other additional source is Long Loch which feeds Corsehouse WTW. This is classed as an Emergency source and therefore not used every year. The source was not used during AR16 but was used for several months during AR17 due to water quality issues at Craigendunton Reservoir. Details are provided in the table below:

	2015/16 No. of sources	**279**
Additions	New sources	2
Additions	Direct / Indirect status change	1
Additions	Emergency Source	1
	2016/17 No. of sources	**283**

Distribution input (DI) is also reported on these lines.

Changes are detailed in the table below:

Source Type	**2015/16**	**2016/17**	**Net Change**
	Distribution input (DI) *Ml/d*		
Impounding reservoirs	1,326.036	1,324.029	-2.007
Lochs	19.550	19.465	-0.085
River and burn abstractions	367.764	376.292	8.528
Boreholes	66.443	65.046	-1.397
Total	**1,779.793**	**1,784.832**	**5.039**

As in previous years, we have completed columns 110–140 by assuming that, where multiple sources feed a WTW, the total average daily output only comes from the primary source. The primary source is therefore allocated 100% of the DI and all other sources are allocated 0%.

The confidence grade for columns 110-140 (the average daily output of these sources) remains at B2 (in line with reported confidence for table A2).

E4.13 Peak demand - peak to average ratio

This line reports the ratio A: B where –

> A = the average daily volume into supply in the peak seven day period in the peak year of the preceding year.

The peak year of the last five years was 2016/17. In that year, A was 1784.832 Ml/d and the peak to average ratio is therefore 1.055.

No changes were made to the process or methodology used to report this line. As the figure is based on weekly reported distribution input (DI), the confidence grade assigned to it is based on the confidence grade of the DI in the peak year. The confidence grade is therefore C3, the same as that for the DI data in AR08.

E4.14 Average pumping head – resources and treatment

The reported Average Pumping head this year is 28.4, an increase of 0.5m from the previous year.

As limited flow and pressure data is available, the methodology used was to update last year's figures by calculating the change to the "Work Done" (m^4) at regional level based on the proportional (regional) change to DI. This figure was then divided by the Regional DI to obtain the Regional Pumping Head, which was then aggregated.

Although the definitions include a requirement to report on inter-stage pumping for this line, we have again not included any such information due to insufficient data in this area.

Pumping head data

We note that due to data limitations our confidence grade has remained at C4. We currently have a limited dataset from which we extrapolate an overall pumping head value across the whole of Scottish Water. We acknowledge that further work is required to improve the quality of this data.

E4.20-26 Water Treatment Works by Process Type

The number of water treatment works (WTW) increased by 1 to 245; the total distribution input (DI) increased by 5.04 Ml/d to 1,784.83 Ml/d.

The process for completing Table E is the same as for previous years. Changes to the numbers of WTW by process type have arisen as a result of operational changes this year.

Note: Table E reports all WTW that provided water into supply at any time during the year.

The confidence grade for the number of WTW remains at B2. The confidence grade for total DI remains at B3

E4.28-38 Water Treatment Works by Size Band

Changes to the number of water treatment works (WTW) in use and proportions (%) of total distribution input (DI) this year are broken down by WTW size band in the table below:

Size Band	2015/16		2016/17		Net Change	
	No.	*% (1)*	*No.*	*%*	*No.*	*%*
<= 1 Ml/d	132	1.11	132	1.15	0	0.04
>1, <= 2.5 Ml/d	25	1.37	25	1.3	0	-0.07
>2.5, <= 5 Ml/d	23	2.66	23	2.66	0	0
>5, <= 10 Ml/d	18	4.76	19	4.87	1	0.11
>10, <= 25 Ml/d	19	10.6	19	10.44	0	-0.16
>25, <= 50 Ml/d	12	14.72	12	15.29	0	0.57
>50, <= 100 Ml/d	9	23.26	9	22.76	0	-0.5
>100, <= 175 Ml/d	4	21.63	4	21.46	0	-0.17
>175 Ml/d	2	19.88	2	20.07	0	0.19
Total	**244**		**245**		**1**	

The confidence grade for proportion of total DI remains at C3.

E4.15-39 Functional costs by operational area, process and size band

Water Resources & Treatment E4.19

	Total
Functional expenditure:	£m
2016/17	57.856
2015/16	61.464
Variance	**+3.608**

Water resources and treatment costs decreased by £3.6m (5.9%) from 2015/16. This is analysed as follows:

- £0.9m (6.0%) decrease in employment costs reflecting lower levels of employee time recorded at source and treatment sites;
- £0.7m (6.0%) increase in power costs due to the impact of higher tariffs (£0.5m) and an increase in consumption of £0.2m linked to lower rainfall;
- £0.3m (3.0%) increase in materials and consumables costs mainly due to higher chemicals costs of £0.7m to maintain compliance offset by additional procurement rebates of £0.3m and other reductions of £0.1m;
- £0.1m (6.4%) decrease in other direct costs due mainly to reduced insurance claims;
- £3.6m (26.5%) decrease in general and support costs, £0.4m of which relates to reductions in VR costs and increased procurement rebates partially offset by increased pension costs associated with IAS 19. Additionally, income for generating renewable energy has been allocated to water resources and treatment in 2016/17 more accurately reflecting the nature of Scottish Water's renewable schemes (previously allocated on a mark-up basis across all channels). This has resulted in a £3.2m reduction in general and support costs allocated to water resources and treatment.

Water resources and treatment costs analysed by region:

	North	East	South	West	Direct	General and Support	Total
Functional expenditure:	£m	£m	£m	£m	£m	£m	£m
2016/17	10.636	12.636	9.368	15.331	**47.971**	9.885	**57.856**
2015/16	11.021	12.847	9.445	14.696	**48.009**	13.455	**61.464**
Variance	**+0.385**	**+0.211**	**+0.077**	**(0.635)**	**+0.038**	**+3.570**	**+3.608**

Changes to the numbers of WTW by process type and size band have arisen as a result of operational changes and process re-classifications in WTW during 2016/17. Re-stating 2015/16 figures on like-for-like basis shows the following variations:

Analysis of water resources and treatment costs by process type:

	2016/17	2015/16	Variance
Process Type	£m	£m	£m
SD : Simple Disinfection	1.275	1.368	+0.093
W1 : SD plus simple physical or chemical treatment	0.124	0.170	+0.046
W2 : Single stage complex physical or chemical treatment	9.998	9.870	(0.128)
W3 : Multiple stage complex treatment, excluding W4	31.427	31.467	+0.040
W4 : Very high cost treatment Process	5.147	5.134	(0.013)
Direct	**47.971**	**48.009**	**+0.038**
General and Support	9.885	13.455	+3.570
Total	**57.856**	**61.464**	**+3.608**

Direct costs by process type have moved in line with overall cost increases explained above with the exception of:

- Simple Disinfection associated with reductions in power costs at both Terregles WTW and Stronsay WTW (both boreholes with variable use).
- Process type W1 reflecting a reduction in employee hours recorded at Durness Keodale WTW.

Analysis of water resources and treatment costs by size band:

	2016/17	2015/16	Variance
Size band	£m	£m	£m
<=1 Ml/d	6.617	6.592	(0.025)
>1 to <=2.5 Ml/d	2.898	3.198	+0.300
>2.5 to <=5 Ml/d	3.666	3.915	+0.249
>5 to <=10 Ml/d	4.465	4.940	+0.475
>10 to <=25 Ml/d	8.025	7.859	(0.166)
>25 to <=50 Ml/d	7.598	7.541	(0.057)
>50 to <=100 Ml/d	6.172	5.791	(0.381)
>100 to <=175 Ml/d	4.836	4.570	(0.266)
>175 Ml/d	3.694	3.603	(0.091)
Direct	**47.971**	**48.009**	**+0.038**
General and Support	9.885	13.455	+3.570
Total	**57.856**	**61.464**	**+3.608**

Costs by size band have remained broadly consistent with 2015/16.

Costs which are directly attributable to abstraction and treatment are charged to the specific asset cost code in PeopleSoft, either via direct charging, Ellipse timesheets or work orders. Of the £48.0m total direct resource and treatment costs, £42.5m of costs or 88.6% have been directly charged to assets in our corporate costing system.

Other costs have been allocated to Water Resources and Treatment through ABM support activity allocation, e.g. stores based on number of issues, IT applications based on number of users, etc. Therefore, support costs are allocated on a resource consumed basis. However, many of these costs are not specific to an asset; they are generally attributable to an employee. It follows that the majority of these support costs should be allocated to the activities the employees have been completing.

Confidence Grades – Confidence grades on Table E4 are consistent with grades in the general E table commentary and remain consistent with 2015/16.

Table E6 Water Distribution

The methodology used to allocate properties and population to the 4 operational regions remains unchanged from the previous year across this table.

The figure reported on Line E6.1 reports the annual average resident connected population and is consistent with the figure reported in A2.1.

The total number of connected properties reported on line E6.2 is consistent with the figure reported in A1.10.

The value reported on line E6.3 reflects the volume of water delivered to households. This figure is consistent with the sum of the figures reported in A2.7 and A2.8.

The volume was calculated by operational region using the property figures calculated for line E6.2, multiplied by the regional specific Per Household Consumption figure.

Scottish Water has updated its leakage reporting methodologies in relation to the amount of water used in domestic properties at night. This data improvement in relation to Household Night Use (HHNU) brings us in line with industry averages and comes on the back of extensive internal studies. This is a step towards using a Scottish Water specific HHNU value in the future, something which is deemed best practice.

The volume of water reported as delivered to non-households as shown on line E6.4 is consistent with the sum of the figures reported in A2.13 and A2.14.

Measured and unmeasured non-household volumes are allocated to water operational areas and summed to regional level; the method remains unchanged from last year.

There has been no change to the operational regions in the last year and the area reported on line E6.5 has remained the same at 79,799km^2. The confidence grade at A1 reflects the fact that the operational region boundaries are taken directly from the corporate GIS.

The number of supply zones reported on line E6.6 was calculated using the same methodology as last year and matches the number reported to the Drinking Water Quality Regulator. Changes in zones topology are tracked and recorded by the Water Quality Regulation Zone procedure and a full audit trail is available.

There were no significant changes in the figures of Bands 1-4 or the reported total length of mains shown on lines E6.12 to E6.16.

These table lines reflect data in our corporate GIS, where the diameter field is populated to 99.3%. The infill default value used for the remainder is DN150, (Band 1).

Line E6.17 reports the total length of unlined iron mains held in our corporate GIS.

The report used relies on population of the material and lining attributes in the inventory. 46Km of GIS potable main was populated by the Infill material model and is defaulted to unlined spun iron.

The information available for pipe lining is not fully complete, with 40.58% of the lined ferrous inventory having null or unknown lining attribute. GIS lining attributes held as “bitumen” or “unknown” for cast, grey and spun iron are included as unlined iron main.

Line E6.18 is a calculated cell that reports a subset of the total water main inventory to reflect those mains with a diameter greater than 320mm.

The reported number of water mains bursts on line E6.19 is derived from both the number of customer and non-customer reported bursts for the reporting year.

The reported top-down leakage level shown on line E6.20 is aligned with the figures on tables A2 and G3, where we report leakage in terms of Maximum Likelihood Estimation (MLE) leakage.

Line E6.21 reports the overall number of properties subject to low pressure. Targeted investment and operational changes have improved pressure to a number of properties during the report year. 15 properties have been recorded as being added to the register due to investigation work, through customer complaints, or due to better information. 4 properties have been removed due to better information and 13 properties were removed due to operational improvements.

E6.22-25 Pumping Stations

Lines E6.22 to E6.24 report the numbers and capacity of water pumping stations recorded in the asset inventory for the report year. Changes in the reported numbers are caused by additions and removals across the network to reflect operational interventions, and data improvements in the corporate systems involved.

The changes reported in the total capacity of pumping stations on lines E6.23 and E6.24 this year are attributed to the increase in asset numbers and improved data quality. The data available has resulted in an increase in the capacity reported.

Our methodology for determining the design capacity (in kW) of these pumping stations remains unchanged.

E6.25 Average pumping head

Due to limited new flow and pressure data becoming available, the previous methodology was retained to update last year's figures using the "Work Done" (m^4) at regional level based on the proportional change to DI.

We currently have a limited dataset from which we extrapolate an overall pumping head value across the whole of Scottish Water.

E6.26-27 Service Reservoirs

The changes reported for the total number of service reservoirs are generally the result of operational revisions across the network.

The changes reported for the total reported capacity of service reservoirs are mainly due to improvement in data quality and the result of operational revisions across the network.

E6.28-29 Water Towers

The total number of water towers has reduced to 18, with a corresponding reduction in total volume to 29.3 Ml, reflecting the position held in our corporate asset inventory.

E6.7-11 Functional Cost

Water Distribution E6.11

	Total
Functional expenditure:	£m
2016/17	63.687
2015/16	61.271
Variance	**(2.416)**

Water distribution costs increased by £2.4m (3.9%), from 2015/16. This is analysed as follows:

- £0.3m (1.4%) increase in employment costs due to pay progression and an increase in employer National Insurance Contributions (NICs);
- £0.4m (4.3%) increase in power costs mainly due higher tariffs of £0.3m and slightly increased consumption of £0.1m;
- £0.6m (6.4%) increase in hired and contracted services mainly due to an increase in network leakage detection costs of £0.3m and additional contract costs of £0.3m incurred across a number of other distribution activities including mains flushing and resolving complaints;
- £0.4m (20.2%) decrease in materials and consumables costs mainly due to reduced mains repair costs of £0.3m linked to a lower number of water network incidents in 2016/17.
- £1.1m (27.1%) decrease in 'other direct costs' due mainly to reduced insurance claims; and
- £2.6m (14.9%) increase in general and support costs mainly due to one-off project costs associated with pressure management to improve customer service of £2.2m. The change in allocation method for renewable energy income described in E4 above has increased general and support costs allocated to water distribution by £0.4m.

Water distribution costs are analysed by region:

	North	East	South	West	Total	General and Support	Total
Functional expenditure:	£m	£m	£m	£m	£m	£m	£m
2016/17	5.847	12.554	13.049	14.781	**46.231**	17.456	**63.687**
2015/16	5.839	11.853	13.799	14.961	**46.452**	14.819	**61.271**
Variance	**(0.008)**	**(0.701)**	**+0.750**	**+0.180**	**+0.221**	**(2.637)**	**(2.416)**

Confidence Grades – Confidence grades on Table E6 are consistent with grades in the general E table commentary and remain consistent with 2015/16.

Scottish Water has slightly lower confidence levels on Network cost analysis than treatment cost analysis. This is due to lower levels of direct labour capture on Networks.

Table E7 Wastewater Explanatory Factors - Sewerage & Sewage treatment

Lines E7.1 to E7.2 report the annual average resident, and non-resident, connected populations, which reflect the increases in the general population and more accurate address information.

As with previous years, tourist population has been determined on the basis of average bed spaces multiplied by an average occupancy factor. Average occupancy rates are taken from Visit Scotland's latest available Tourism in Scotland report.

The daily average volume of sewage collected is reported on line E7.3.

The average daily volume collected has been calculated as the flow which arrives in a public sewer (of any type) from any source e.g. rainfall, infiltration, domestic use, industrial use, tidal flows and connected watercourses. The approach used is the same as that in previous years and has been applied consistently across the country. It uses data sets for rainfall, connected properties and sewered areas consistent with the wastewater elements 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 that relates the number of connected properties to the amount of sewer flow in periods without rainfall. To establish this figure a number of recordings of flows with a known connected population were analysed to establish a range of flow per connected population. 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 was used and an average value of run-off per millimetre 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 region calculated.

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

The total number of connected properties reported on line E7.4 reflects the number of properties connected to the wastewater network as reported in A1.20.

The reported value of the drained area reported on line E7.6 is a result of on-going verification of the sewered areas in our corporate GIS.

Line E7.7 reports the annual precipitation recorded over the report year. This reflects data obtained from the Met office across the report year.

The total length of sewer reported on line E7.8 reflects values held in our corporate GIS and a statistical calculation of lateral sewer length using unit length connections by dwelling type.

The statistical calculation of the length of lateral sewers is then used to populate line E7.9. The calculation also uses the number of properties connected to the waste water network (connected properties). This is the same methodology as used in previous returns.

The length of combined sewer held in our corporate GIS is reported on line E7.10.

As modern sewerage systems are constructed with separate foul and storm sewers for new builds, any rise in the length of combined sewer is the result of legacy record data being added to the corporate system, and any new outfall pipe construction.

The length of separate storm sewer reported in line E7.11 reflects the construction of separate storm sewers for new build developments.

Line E7.12 reports the length of sewer greater than 1000mm diameter. The continuous asset recording from our capital investment programme is resulting in a consistent rise in this figure.

The length of critical sewer reported on line E7.13 is derived from analysis of a recorded inventory with known gaps in asset stock.

The classification of critical sewers uses the WRc methodology for asset size, material, depth and proximity to particular features.

We continue to utilise an improved infill methodology which results in less default diameters (225mm), materials & depths being used. This has meant greater accuracy and an overall increase in sewers assessed correctly for criticality.

Line E7.14 reports the number of sewer collapses over the report year. Due to the application of an updated methodology over the last two reporting years, a more robust number of reported collapses is therefore now available.

E7.15-19 Sewerage Costs

Sewerage E7.19

	Total
Functional expenditure:	£m
2016/17	42.416
2015/16	41.767
Variance	**(0.649)**

Sewerage costs increased by £0.6m (1.6%) from 2015/16. This is analysed as follows:

- £0.1m (1.0%) increase in employment costs due primarily to pay progression and an increase in NICs;
- £1.1m (12.7%) decrease in power costs due to reduced pumping costs mainly as a result of lower rainfall (£1.3m) partially offset by the impact of higher tariffs of £0.2m;
- £0.2m (5.3%) decrease in hired and contracted costs due to a reduction in contracted labour for the operation of CSOs;
- £0.3m (12.3%) increase in SEPA service charges due to inflation (£0.1m) and an increase in the number of sewer network licences (£0.2m);
- £1.1m (296.9%) increase in 'other direct costs' mainly due to an increase in the cost of insurance claims; and

- £0.5m (4.9%) increase in general and support costs mainly due to pay progression, NICs and pension cost increases of £0.3m, lower VR costs of £0.4m, and increased IT costs of £0.2m. The change in allocation method for renewable energy income described in E4 above has increased general and support costs allocated to sewerage by £0.4m.

Sewerage costs are analysed by region:

	North	East	South	West	Direct	General and Support	Total
Functional expenditure:	£m	£m	£m	£m	£m	£m	£m
2016/17	3.398	8.600	7.951	10.822	**30.771**	11.645	**42.416**
2015/16	3.683	8.147	7.608	11.226	**30.664**	11.103	**41.767**
Variance	**+0.285**	**(0.453)**	**(0.343)**	**+0.404**	**(0.107)**	**(0.542)**	**(0.649)**

E7.20 – E7.27 Wastewater Pumping Stations

Lines E7.20 to E7.27 reflect the numbers and capacities of our wastewater pumping stations.

A pumping station is defined as an individual site (i.e. not an individual pump). It includes foul, combined and stormwater pumping stations situated at treatment works but excludes inter-stage pumping. Changes since the last submission are reflective of asset data improvement, changes to pump units, and additions and removals of asset locations to reflect operational revisions.

The reported m3/d capacity figure on line E7.21 is based on extrapolated corporate data as not all stations have a design capacity recorded in the corporate asset inventory. The confidence grade remains at C4, reflecting the level of extrapolation used to derive the figure.

The total capacity (Kw) of pumping stations reported on line E7.22 utilises the same methodology as in previous years. The changes reported are therefore indicative of asset stock revisions over the year.

The average pumping head reported on line E7.23 has been calculated by additions, deletions and corrections to the pumping data contained in the historic annual return spreadsheets. Due to data limitations our confidence grade has remained at C5. We currently have a limited dataset from which we extrapolate an overall pumping head value across the whole of Scottish Water. We acknowledge that further work is required to improve the quality of this data.

The total number and capacities of combined pumping stations reported on lines E7.24 and E7.25 continue to utilise the same methodology as in previous years.

A review of the sewer usage at pumping stations identified combined pumping stations that were actually storm or foul assets. This resulted in an overall reduction in the number of combined pumping stations and a decrease in volume. The volume decreased further due to 2 large combined pumping stations being removed from the AR17 inventory.

The confidence grade has remained at C4, reflecting the level of extrapolation used to derive the reported figures.

The total number and capacities reported on lines E7.26 and E7.27 of stormwater pumping stations reflect data from our corporate asset inventory. Changes recorded this year are attributed to a net increase in numbers and capacities across the regions mainly due to better identification of sewer usage at existing pumping stations.

E7.28 & E7.29 Number of combined sewer overflows

The number of combined sewer overflows (CSOs) has been confirmed using selected desktop and site surveys. Continual improvement has been undertaken to identify abandoned CSO and duplicate records. Additionally we continue to identify and record the presence and type of screens (powered/ non-powered) to report on line E7.29.

The changes reported this year are mainly due to better recording of the presence of screens at CSOs and increased numbers of powered screens.

Line E7.30 reports the number of sewage treatment works (WWTW) using our corporate asset inventory.

The increase/ decrease in the total load reported on line E7.31 reflects the net change in the constituent components of the works loads. Due to rounding the individual differences may not add up to the total difference.

The load consists of the following constituents:

- Population
- Tourist
- Non-domestic load
- Trade effluent
- Imported private septic tanks
- Imported public septic tanks
- Imported other loads
- Imported WWTW sludge
- Imported WTW sludge
- Sludge return liquors

Population (72.1% of total load)
The population load increased by 156kg BOD/day. The increase in population load is a reflection of the increase in population reported in line E7.1.

Tourist (1.6% of total load)
The tourist load increased by 620 kg BOD/day. This increase is due to a greater occupancy rate being reported at tourist accommodation.

Non-domestic load (10.3% of total load)
The non-domestic load decreased by 1010 kg BOD/day due to a reduction in the metered non-domestic volumes recorded

Trade effluent (10.8% of total load)
The trade effluent load decreased by 527 kg BOD/day.

Imported private septic tanks (0.1% of total load)
The imported private septic tanks load increased by 103 kg BOD/day.

Imported public septic tanks (0.2% of total load)
The imported public septic tanks load increased by 21 kg BOD/day.

Imported other loads (1.4% of total load)

The imported other load increased by 667 kg BOD/day. This is due to a correction at Kinneil Kerse STW from AR15, as some of the tanker loads were identified as going straight to sludge holding tanks rather than for treatment through the STW.

Imported WWTW sludge (2.9% of total load).

The imported WWTW sludge load increased by 1,755 kg BOD/day.

Imported WTW sludge (0.4% of total load).

E7.32-36 Sewage Treatment Costs

Sewage Treatment E7.36

	Total
Functional expenditure:	£m
2016/17	56.622
2015/16	50.866
Variance	**(5.756)**

Sewage treatment costs have increased by £5.8m (11.3%) from 2015/16, which reflects the SR15 focus on enhanced operational management and chemical dosing to ensure compliance at all WWTW. The main movements have been analysed as follows:

- £2.0m (17.1%) increase in employment costs due to pay progression and NIC increases of £0.2m, an increase in asset operating costs of £1.5m to maintain WWTW compliance (including recruitment of modern apprentices) and higher E&M maintenance costs of £0.3m;
- £0.4m (2.4%) decrease in power costs mainly due to lower energy consumption associated with reduced rainfall of £0.9m partially offset by the impact of higher tariffs of £0.5m;
- £1.0m (52.0%) increase in hired and contracted costs mainly due to increased tankering costs as a result of contractual changes in 2016/17;
- £0.9m (32.6%) increase in materials and consumables mainly due to increased chemicals usage of £1.2m offset by increased procurement rebates of £0.3m;
- £2.2m (23.2%) increase in general and support costs mainly due to pay progression, NICs and pension cost increases of £0.3m, increased IT costs of £0.5m, and other costs relating to one-off project costs associated with storm tank cleaning (£0.2m). The change in allocation method for renewable energy income described in E4 above has increased general and support costs allocated to sewage treatment by £1.2m.

Sewage treatment costs are analysed by region:

	North	East	South	West	Direct	General and Support	Total
Functional expenditure:	£m	£m	£m	£m	£m	£m	£m
2016/17	6.651	10.631	14.438	13.363	**45.083**	11.539	**56.622**
2015/16	6.235	9.864	13.559	11.844	**41.502**	9.364	**50.866**
Variance	**(0.416)**	**(0.767)**	**(0.879)**	**(1.519)**	**(3.581)**	**(2.175)**	**(5.756)**

Confidence Grades – Confidence grades on Table E7 are consistent with grades in the general E table commentary and remain consistent with 2015/16.

Scottish Water has slightly lower confidence levels on Network cost analysis than treatment cost analysis. This is due to lower levels of direct labour capture on Networks.

Table E8 Waste water Explanatory Factors - Sewage Treatment Works

E8.1 – E8.7 Sewage treatment works size bands

Lines E8.1 to E8.7 report the numbers of our wastewater treatment works, split by the size bands required, across the asset inventory. Changes to the number of WWTW reflect additions and removals from our asset inventory, and the impact of capital investment activities.

The total number of sewage treatment works (WWTW) decreased by 3 to 1,848. Changes to the number of WWTW this year are broken down by size band and treatment category in the tables below:

Size Band	2015/16	2016/17	Net Change
0	1,134	1,116	-18
1	214	221	7
2	138	145	7
3	183	185	2
4	125	120	-5
5	36	40	4
6	21	21	0
Total	**1,851**	**1,848**	**-3**

Treatment Category	2015/16	2016/17	Net Change
Septic Tanks	1,176	1,175	3
Primary	39	41	-4
Sec Activated Sludge	179	180	0
Sec Biological	297	296	1
Tertiary A1	37	35	2
Tertiary A2	18	17	0
Tertiary B1	60	60	0
Tertiary B2	14	14	0
Sea Preliminary	8	8	0
Sea Screened	4	3	0
Sea Unscreened	19	19	-5
Total	**1,851**	**1,848**	**-3**

The confidence grade remains at B3.

E8.9 & E8.10 Small sewage treatment works with ammonia consent 5-10 mg/l and <= 5 mg/l

These lines report on the number of small sewage treatment works with specific ammonia consents. The numbers are sourced from our compliance database and are as agreed with SEPA under the relevant discharge consents.

E8.11 - E8.18 Average Daily Loads

These lines report on the total average daily load, excluding septic tanks, for each treatment works type noted, utilising the numbers of works reported on lines E8.1 to E8.7. The confidence grades for each line reflect the degree of calculation required to derive the reported figures.

E8.19 & E8.20 Small sewage treatment works with ammonia consent 5-10 mg/l and <= 5 mg/l

These lines report on the loads received at our small sewage treatment works with specific ammonia consents. The numbers are sourced from our compliance database and are aligned with lines E8.9 and E8.10

E8.21-30 Compliance

The percentage compliance reported on these lines has been calculated on the basis of SEPA results. Our methodology for calculating compliance is the same as last year and, in the case of two-tier consents, all failures have been counted, not just upper-tier failures. WWTW that are not sampled are not included in the averaging process for individual treatment categories and size bands. The sampling period is the financial year 2016/17.

The number of failing waste water treatment works is being reported as 4 for 2016/17,

Where the cells in this section are listed as 0 and AX confidence grade, this means that there was no WWTW in that treatment category and size band thus there has been no sampling.

The average compliance has been maintained or improved at all WWTW treatment categories with the exception of Secondary Biological.

E8.29 & E8.30 Small sewage treatment works with ammonia consent 5-10 mg/l and <= 5mg/l

The above lines report the compliance at small sewage treatment works with specific ammonia consents (5-10 mg/l and <=5mg/l). Compliance has been maintained at all treatment categories.

E8.31-42 Costs

Overall movements are explained in table Sewage Treatment E7.36 earlier in this commentary. The costs of treating and disposing of sludge are contained within Table E10 Sludge Treatment and Disposal.

Analysis of sewage treatment costs by process type:

Changes to the numbers of STW by process type have arisen as a result of operational changes and process re-classifications in STW during 2016/17. Re-stating 2015/16 figures on like-for-like basis shows the following variations:

	Septic tanks	Primary	Secondary	Tertiary	Sea Outfalls	Direct	General and Support	Total
Total treatment works	£m	£m	£m	£m	£m	£m	£m	£m
2016/17	2.605	1.243	31.833	9.111	0.291	**45.083**	11.539	**56.622**
2015/16	2.713	1.216	29.185	8.126	0.262	**41.502**	9.364	**50.866**
Variance	**+0.108**	**(0.027)**	**(2.648)**	**(0.985)**	**(0.029)**	**(3.581)**	**(2.175)**	**(5.756)**

Costs which are directly attributable to treatment are charged to the specific asset cost code in PeopleSoft, either via direct charging, Ellipse timesheets or work orders. Of the £45.1m total direct wastewater treatment costs, £42.5m of costs or 94.2% have been directly charged to assets in our corporate costing system.

Other costs have been allocated to Wastewater Treatment through ABM support activity allocation, e.g. stores based on number of issues, IT applications based on number of users, etc. Therefore, support costs are allocated on a resource consumed basis. However, many of these costs are not specific to an asset; they are generally attributable to an employee. It follows that the majority of these support costs should be allocated to the activities the employees have been doing.

Confidence Grades – Confidence grades on Table E8 are consistent with grades in the general E table commentary and remain consistent with 2015/16.

Table E9 Large Sewage Treatment Works Information Database

E9.0 & E9.0a Name and Operational Area

These lines report the specific large non-PPP waste water treatment works for this reporting year with their operational area noted. Changes in the reported list of assets reflect the variation in both domestic, tanker, and trade effluent loads received at these works. The number of assets reported in aligned with Line E8.7.

Large waste water treatment works are defined as those that receive an average loading in excess of 1,500 kg BOD/day which is approximately equivalent to a population of 25,000.

E9.1 Population equivalent of total load received

This line reports the overall population equivalent of the total load received.

Changes to the population equivalent of each large waste water treatment works are detailed in the below table (due to rounding the total may not equal the sum of the individual values):

WWTW	2015/16	2016/17	Net Change	% Change
Allers	42,397	44,870	2,473	5.83%
Alloa	44,984	42,664	-2,320	-5.16%
Ardoch	64,293	57,806	-6,487	-10.09%
Carbarns	48,404	49,335	931	1.92%
Dalderse	94,158	96,381	2,223	2.36%
Daldowie	266,599	272,164	5,565	2.09%
Dalmarnock	247,420	243,244	-4,176	-1.69%
Dunbar	26,596	27,072	476	1.79%
Dunfermline	79,718	81,267	1,549	1.94%
Dunnswood	31,073	30,493	-580	-1.87%
Erskine	78,089	78,496	407	0.52%
Galashiels	35,549	32,221	-3,328	-9.36%
Hamilton	61,434	63,352	1,918	3.12%
Kinneil Kerse	49,532	88,837	39,305	79.35%
Kirkcaldy	61,715	62,921	1,206	1.95%
Laighpark (Paisley)	113,961	119,687	5,726	5.02%
Perth	90,522	112,339	21,817	24.10%
Philipshill	60,289	63,687	3,398	5.64%
Shieldhall	590,695	555,185	-35,510	-6.01%
Stirling	75,005	74,532	-473	-0.63%
Troqueer	44,157	48,499	4,342	9.83%
Total	**2,206,590**	**2,245,052**	**38,462**	

E9.2 – E9.6 Compliance

These lines report on regulatory compliance using consent data as taken from our corporate consents database. The most onerous of CAR or UWWT parameter was used to report.

BOD consent standards have generally remained the same, except Kirkcaldy, which has changed from 225 to 0, Laighpark (Paisley), which has changed from 75 to 15 and Dalderse which has changed from 20 to 75.

Ammonia consent standards have also generally remain unchanged apart from Erskine which changed from 30 to 40. Perth Ammonia consent has changed from 0 to 45. Stirling has changed from 45 to 15.

Confidence grades remain at A1, reflecting the fact that the data is obtained directly from our corporate consents database.

E9.7 Compliance with effluent consent standard

We have used SEPA data from March 2016 to the end February 2017 for this line. For waste water treatment works with a two tier consent we have taken exceeding the lower tier as being a non-compliant sample.

E9.8-14 Treatment Works Category

These lines report the information held in the corporate asset inventory in relation to treatment type.

E9.15-21 Works cost

Analysis of functional costs for large sewage treatment works:

	2016/17 £m	2015/16 £m	Variance £m
Daldowie	1.100	1.048	(0.052)
Galashiels	0.069	0.104	+0.035
Tertiary treatment	**1.169**	**1.152**	**(0.017)**
Allers	0.286	0.312	+0.026
Alloa	0.528	0.368	(0.160)
Ardoch	0.430	0.365	(0.065)
Dunbar	0.337	0.317	(0.021)
Carbarns	0.325	0.331	+0.006
Dalderse	0.268	0.329	+0.061
Dalmarnock	1.507	1.384	(0.124)
Dunfermline	0.204	0.288	+0.084
Dunnswood	0.288	0.351	+0.063
Erskine	0.573	0.509	(0.064)
Hamilton	0.557	0.632	+0.075
Kinneil Kerse	0.445	0.380	(0.065)
Kirkcaldy	0.643	0.593	(0.050)
Laighpark (Paisley)	0.931	0.962	+0.031
Perth	0.491	0.454	(0.037)
Philipshill	0.866	0.977	+0.111
Shieldhall	2.084	2.115	+0.031
Stirling	0.729	0.596	(0.133)
Troqueer	0.320	0.310	(0.010)
Secondary treatment	**11.812**	**11.572**	**(0.240)**
Direct large treatment works	**12.981**	**12.724**	**(0.257)**
General and Support	2.035	1.690	(0.345)
Total large treatment works	**15.016**	**14.414**	**(0.602)**

The increases across our large sites are explained by:

- Stirling STW has experienced problems with their sludge tanks in the year resulting in higher sludge tankering costs.
- Alloa STW has experienced sludge process issues resulting in additional tankering costs. There has also been a problem with a rake screen at site resulting in additional hire costs.
- Dalmarnock STW has had new equipment installed resulting in increased power consumption.
- Phillipshill STW has decreased due to lower rainfall in the year resulting in lower power costs at site.

Confidence Grades – Confidence grades on Table E9 are consistent with grades in the general E table commentary and remain consistent with 2014/15.

Estimated terminal pumping station costs are graded slightly lower in confidence than treatment costs, as terminal pumps (as defined) sit in networks or are costed as part of the treatment works.

Table E10 Wastewater Explanatory Factors - Sludge Treatment and Disposal

E10.1-2 Sludge Volumes

E10.1 Resident population served

The resident population served by each sludge disposal route is reported on line E10.1. The reported values reflect the change of treatment undertaken at a number of treatment assets resulting in their outputs not requiring to be reported on this line.

We again report the population treated at Scottish Water operated WWTW that have their sludge treated at PPP sludge treatment centres. This accounts for the anomaly in aligning a population reported against the 'incineration' and 'other' routes but no Scottish Water sludge volumes being recycled through these routes.

E10.2 Amount of sewage sludge

Line 10.2 reports the mass of sewage sludge across the noted disposal routes. All Scottish Water figures reported were taken direct from our Gemini system.

In relation to the reported value of Scottish Water sludge we have reported a decrease in the volume of enhanced treated sludge. This was mainly attributable to de-watered sludge cake being produced which was diverted to land restoration outlets due to contractual issues with one of Scottish Water's framework suppliers. This occurred at two sites on which de-watering and treatment of liquid sludge was undertaken during the reporting period.

Conventional sludge production also showed a small decrease from the previous year. This is mainly associated with pathogen quality issues with cake from sludge treatment centre facilities in the central belt, which in turn required disposal to land restoration facilities as per the requirements of the Safe Sludge Matrix and also commensurate with the requirements of the newly introduced voluntary Biosolids Assurance Scheme.

0.40 ttds of untreated cake continues to be landfilled in the Shetland Islands.

The confidence grade remains the same as the prior reporting year.

E10.3-9 Sludge Treatment and Disposal Costs

Sludge Treatment E10.9

	Total
Functional expenditure:	£m
2016/17	15.082
2015/16	14.726
Variance	**(0.356)**

Sludge treatment costs have increased by £0.4m (2.4%) from 2015/16. This is analysed as follows:

- £0.1m (1.9%) increase in employment costs due mainly to pay progression and an increase in NICs of £0.1m;
- £0.2m (7.0%) increase in power costs mainly due to the impact of higher tariffs, £0.1m, and increased de-watering at Kinneil Kearse and Perth, £0.1m.

Scottish Water incurs costs associated with the transportation of sludge from its own sewage treatment works to PPP sludge treatment centres (£3.2m). These costs have been reported within E3a.20 with the corresponding sludge loads reported in E3.

The allocation of sludge treatment and disposal costs by disposal route relies on robust sludge movement data linked to financial data. Scottish Water links sludge movement data from the Gemini waste management system to ABM costs to produce E10 cost analysis.

Analysis of sludge treatment costs by disposal route:

	2016/17 £m	2015/16 £m	Variance £m
Farmland:			
Untreated	0.000	0.000	+0.000
Conventional	2.852	4.567	+1.715
Advanced	5.322	6.114	+0.792
Incineration	0.000	0.000	+0.000
Landfill	0.984	1.094	+0.110
Composted	0.000	0.000	+0.000
Land reclamation	5.924	2.951	(2.973)
Other	0.000	0.000	+0.000
Total	**15.082**	**14.726**	**(0.356)**

The change in costs by disposal route has been affected by the following main factor:

- Disposal to both Farmland Conventional and Farmland Advanced has reduced significantly in the year (£2.5m). This has been due to the breakdown of an existing contract with a framework supplier at two sites. This has meant that de-watering has taken place at these sites and disposed of through Land reclamation. This has also resulted in slightly higher costs as a result of increased transportation costs.

Confidence Grades – Confidence grades on Table E10 are consistent with grades in the general E table commentary and remain consistent with 2015/16.

Sludge cost analysis by ultimate disposal route requires analysis of all sludge treatment, tankering and disposal costs by works, linked to intermediate works (where applicable) and ultimate disposal route. Certain costs are clearly captured by works with identified disposal route. However, certain costs are not fully captured directly against sludge. The main areas of difficulty are inter-site sludge tankering and sludge treatment / conditioning at dual combination of: ABM analysis, direct cost capture by asset, and Scottish Water sludgfunction works (sludge / wastewater treatment). Table E10 is completed on the basis of a ce model analysis.

Confidence grades on Table E10 are lower (B2) than other E Table cost analysis due to these reasons.

G Tables

Tables G1 – G2: General Comments

Tables G1 – G2 present a summary of Scottish Water's investment programmes for Q&S4, Q&S3a & 3b (completion programme). The investment costs and outputs reported in these tables reflect the position at the end of March 2017. Elements reported include investment within the report year, 2016/17, and our forecasts to 2020/21.

Exceptional Capital Maintenance is included within line G1.01 and is forecast at £141.0m. This is split as follows: £24.2m for Strategic Mains Diversions and £116.8m for Ayrshire Resilience.

Total forecast gross investment shown on G1 is £4,362.0m comprising £325.2m for completion programme (Q&S3a & Q&S3b), £3,352.5m for Q&S4 and £684.3m (£302m 2015-21 and £382.3m post 2020-21) for the IR18 allowances. Programme risk, rebates, and contingencies have been allocated to programme areas as required.

Scottish Water successfully delivered £626.7m of investment in 2016/17. Table G1 reports the total investment in the report year of £503.7m on Q&S4 projects and £123.0m on completion (Q&S3a and Q&S3b).

The Q&S3b Unplanned Completion programme has 8 projects remaining as at March 2017. Of the 37 remaining at 31 March 2015, 29 have been delivered.

Capital maintenance investment accounts for 54.4% of the investment in 2016/17.

The table below reflects the inflation assumptions used within the G Tables. Inflation assumptions have been updated to reflect our 2016/17 Delivery Plan and actual RPI at the end of March 2017.

Inflation Assumptions

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Overall RPI Assumption 2012/13 = 100%	106.0%	108.3%	112.6%	116.6%	120.7%	124.3%

Table G1 Summary - Investment

The total gross capital investment shown on table G1 is £4,362.0m, which is the forecast cost to complete the SR15 programme and the remaining outputs from the SR10 programme. This includes a programme forecast cost of £3,918.9m; £14m of SR15 Programme to be financed post 2020-21; £382.3m to be financed post 2020-21 based on our current understanding of IR18 outputs; and £46.8m Q&S4 Start Early. The table below provides reconciliation with our Delivery Plan 2017 update.

	£m
Total in Delivery Plan 2017 update	**3,916.8**
Additional Service Relocations Income	16.0
Additional Infra Charge Utilisation	21.5
Actual 2016-17 Indexation Update	-4.4
Potential risk release	-31.0
Revised Programme Forecast	**3,918.9**
Early Start Expenditure	46.8
IR18 Financed Post 2020-21	382.3
SR15 Financed Post 2020-21	14.0
Table G Total Gross Capital Investment (G1.54)	**4,362.0**

As part of our investment planning and delivery arrangements for the 2015-21 period a strengthened risk management regime has been implemented. Under this regime sub-programme and programme risk allowances are removed from project allocations and are held and governed centrally. As projects mature, the central risk allocation can be drawn down to projects or increased as appropriate. For the purposes of Table G1, the inflation risk allowances removed from project costs have been re-instated and programme risk has been proportioned across the programme.

Table G1 includes investment for the PFI project at Dalmuir. This has been included within the cost of the non OMG180 completion programme. The expected total cost of Dalmuir is £23.6m with £5.8m forecast in the 2015-21 period. We forecast in the Annual Return tables the OMG 180 programme cost of £263.1m in the 2015-21 period; this is within the cost range of £251m to £283m reported to the OMG in March 2017.

G1.1- G1.6 Q&S4 Capital Maintenance

Projects containing Capital Maintenance drivers are captured in these lines. In 2016/17 expenditure of £341.1m was made on Capital Maintenance; the total expenditure for the capital maintenance programme is forecast at £2,073.7m. This includes £141 million of Exceptional Capital Maintenance for Ayrshire Resilience and Strategic Mains Diversions. The table below shows the CM components:

CM Components (£m)	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Total
CM Indexation Risk	0.0	0.0	0.0	29.0	29.0	29.0	87.0
Forecast CM Profile	256.4	304.1	320.0	320.0	322.7	322.5	1,845.7
Total Capital Maintenance	256.4	304.1	320.0	349.0	351.7	351.6	1,932.7
Exceptional CM	5.2	37.0	36.5	20.3	25.7	16.3	141.0
Total Capital Maintenance (G1.06)	261.6	341.1	356.5	369.3	377.4	367.8	2,073.7

G1.7– G1.13 Q&S3b Growth Investment

Projects containing Supporting Economic Development drivers are captured in these lines. In 2016/17 expenditure of £50.1m was made against Q&S4 Growth; the total forecast to complete the growth element of the programme is shown in the tables to be £226.1m in the 2015-21 period. Since the previous return, Supporting Economic Development has increased in forecast cost by £44.9m mainly through additional third party financing for Service Relocations and Infra Charge projects. Previous IR18 Developer Asset Adoptions now form part of G1.7 to G1.13.

G1.14- G1.21 Q&S4 Enhancement Expenditure

Projects containing enhancement drivers are captured in these lines. In 2016/17 expenditure of £111.7m was made against Q&S4 enhancements; the total forecast to complete the enhancements is shown in the tables to be £1,052.6m including £100.0m to cover emerging risks for Daldowie and Dalmarnock waste water treatment works. This has increased by £131.3m last year due primarily to a new programme for Kelvingrove UIDs and Portobello West bathing water +£34.9m, increased potential cost of Sewer Flooding +£46.8m, +£9.0m additional investment for Reservoir Safety as well as general project cost increases that have materialised as the programme matures.

G1.22: IR18 Enhancements

£0.7m of investment has been made in 2016/17 relating to IR18 outputs. The total forecast allowance for outputs to be confirmed in the rolling investment review 2018 (IR18) is £684.3m as shown in the table below.

	£m
IR18 allowances 2015-21 @ 2012/13 Prices	**286.4**
IR18 allowances 2015-21 @ outturn Prices	**347.7**
Less: Transfers/confirmed outputs	-38.1
Less: OMG180 increased costs	-7.6
IR18 allowances 2015-21(Table G Reported)	**302.0**
IR18 allowances post 2021	382.3
Total IR18	**684.3**

The following removals from the IR18 allowances have been made since April 2015:

Code	Description	2012/13 prices £m	Outturn £m	Year Adjustment Made
50115	Bradan Water Supply Improved Resilience	5.3	6.0	2015-16
50118	- West Lothian Improved Resilience	1.7	1.9	2015-16
50119	Tayside Improved Resilience	1.1	1.2	2015-16
50380	Afton WTW	10.5	11.7	2015-16
50543	Raw Water Security Improvement Pilot	0.8	0.9	2016-17
50903	Improving resilience of supplies	4.0	4.5	2015-16
51010	Sustainable Urban Drainage Systems	3.1	3.4	2016-17
51011	IR18 Upgrade of Legacy Assets Adopted	3.2	3.6	2016-17
53186	IR18 Allowance for SEMD	1.4	1.6	2016-17
50270	Fisherrow (Musselburgh) Bathing Water	2.9	3.3	2016-17
	Total	**34.0**	**38.1**	

The IR18 allowances have also been reduced by £7.6m to finance the forecast increased cost of the OMG180 programme. In November 2014 the OMG180 programme was closed to new outputs with any underspend or overspend on the programme taken into account in IR18 – i.e. any overspend on the OMG180 would decrease the amounts available for IR18 and vice versa.

G1.23 – G1.25 Q&S3a & 3b Completion Expenditure

Projects from the completion programme are captured in these lines. In 2016/17 a total expenditure of £123.0m was made against this programme with the majority of spend being on outputs included in the OMG180 programme.

G1.26: Q&S5 Early Start.

No investment is forecast for the Q&S5 early start programme.

G1.27 – G1.40: Total Additional Operating Expenditure

Additional operating expenditure is calculated through the analysis of the proportion of capital spend allocated to quality, enhanced level of service or growth for future years. The value in the report year is based on the actual opex released as a consequence of the capital programme.

G1.41 – G1.48: Grants and Capital Contributions

Contributions received to the end of March 2017 have all related to Service Relocations and Infrastructure Charges. A forecast has been made based on investment run-rate.

G1.49 – G1.57: Expenditure Totals

These lines sum the figures provided in G1.1 to G1.48 and are automatically populated.

Table G2 Summary – Outputs

The following is a summary of all the output programmes included in the G2 table, the number of outputs delivered in 2016/17 and the total number of outputs being delivered in the regulatory period.

G2.1 – G2.4 Growth

G2.1 Strategic Capacity Water Treatment

We increased the strategic capacity of our water treatment sites during 2016/17 to the equivalent of 14,509 customers. We are forecasting to increase the strategic capacity of treated water to 47,897 customers by the end of 2020/21. This includes 33,000 customers for the Inverness and Nairn WRZ.

G2.2 Strategic Capacity Wastewater Treatment

We increased the strategic capacity of our waste water treatment sites during 2016/17 to the equivalent of 792 customers. We are forecasting that this will increase to 72,607 customers by the end of 2020/21.

G2.3 Strategic Capacity Water Network Capacity

This line reflects outputs delivered through the Infrastructure Charge Programme for Part 3 assets. 12,758 outputs were delivered during 2016/17. We are forecasting to provide additional network capacity to 40,948 customers by the end of 2020/21.

G2.4 Strategic Capacity Wastewater Network Capacity

This line reflects outputs delivered through the Infrastructure Charge Programme for Part 3 assets. No outputs were delivered during 2016/17. We are forecasting to deliver 683 outputs by the end of 2020/21.

G2.5 – G2.26 Q&S4 Enhancements

Outputs delivered in this section reflect the forecast position on the milestone graphs provided to the Output Monitoring Group working group in May 2017.

Explanation of movement in forecasts, projects or programme specific issues are detailed within the quarterly monitoring report and graph commentary to the OMG working group.

G2.27 – 2.43 Drinking Water Quality Indicators (Annual Measure)

G2.27 Number of lead communication pipes replaced

This is a demand driven measure as lead pipes are replaced at customers' request. We are forecasting to replace 6,500 lead communications pipes within the regulatory period which is in accordance with our Delivery Plan 2015-21.

G2.28 Assessment of levels of pressure for all customers and number of improvements if low levels of service are found

We have been funded to carry out a study in 2018/19 (line 13 p 16 DP Original). No data will be reported until 2017/18.

G2.29 Improve response times to reduce average duration of short term interruptions to supply

We are measured on ITS response through lines G3.17, G3.17a and G3.18. In addition bursts are reported through G3.19.

G2.30 Number of water efficiency advice and water saving packs provided (to 2% of customer base)

We ran a pilot in 2016/17 providing 233 water efficiency advice packs.

G2.31 Number of internal flooding improvements

We are reporting 39 internal properties removed from the at risk register.

G2.32 Number of internal flooding improvements – completion programme

There are no completion programme internal flooding improvements outputs to be delivered in this regulatory period.

G2.33 Number of external flooding investigations and improvements

We are reporting a total of 22 external properties removed from the at risk register in 2016/17.

G2.34 % of customers covered by flood resilience assessments

66.4% of customers are covered by flood resilience assessments.

G2.35 Number of surface water management investigations

There is only 1 Surface Water Management Investigation taking place in the 2015-21 regulatory period. This has been delivered in 2016/17.

G2.36 Number of connections for new households and businesses

We are committed to providing new connections for waste and waste water services for both our domestic and commercial customers in accordance with demand. Based on the predicted demand for new connections, we are forecasting to make a total of 239,728 new connections to all services in the regulatory period.

G2.37 New waste water capacity for 58,000 people

We have committed in our Delivery Plan 2015-21 to increase waste water capacity to 58,000 people. We are currently forecasting to increase the waste water capacity by 69,342 by the end of the regulatory period.

G2.38 Number of developer constructed assets (Part 2&3) adopted

We are reporting 416 assets adopted during 2016/17:

Asset Type	Number
Pipework (Water)	318
Pumping Station (Water)	0
Pipework Surface Water (Waste)	29
Pipework Foul (Waste)	64
Pumping Station (Waste)	5
Total	**416**

G2.39 Number of first time non domestic meters installed

We are reporting 3,313 first time non-domestic meters installed in 2016/17. Data includes installations for the following categories:

Installations:	Gap Site	1,691
	Install	990
	IT Related	113
	New Connection	517
	Reconnection	2
Installations Total		**3,313**

We have classed the 2 reconnections as first time. During a temporary disconnection we would normally leave the meter in-situ, however on two occasions during 2016/17 there was no existing meter on-site and during the reconnection process we had to install a meter.

G2.40 Number of statutory requirements to relocate services for transport infrastructure projects

We are reporting 59 services relocated in 2016/17. Data is based on Transportation Schemes completed in year and takes into account activity for both New Road & Streetworks Act (NRSWA) and the Aberdeen Western Peripheral Route (AWPR).

G2.41 Improved contact management and proactive communication

There is one project in the 2015-21 period which is intended to improve Scottish Water's customer contact system, 'Promise'. This is forecast to be delivered in 2017/18.

G2.42 Number of wholesale meter accuracy improvements

We are reporting 10,441 wholesale meter accuracy improvements in 2016/17, split across the following categories:

Exchanges:	Accuracy Test	14
	Exchange	634
	Fault & Repair	948
	Proactive	6,753
	Resize	2,092
Exchanges Total		**10,441**

G2.43 Number of strategic mains diversions

During the course of the 2015-21 investment period, Scottish Water will be undertaking a total of 5 large scale strategic mains diversion projects. 3 of these are forecast to be delivered in 2017/18, with the remaining 2 being delivered in 2018/19.

G2.44 – G2.46 Q&SIIIa & Q&SIIIb Delivery Projects

This section summarises the projects remaining in the 'Unplanned' completion programme.

G2.44 Q&SIIIa Projects Remaining

Killylour was the last remaining Q&S3a project to be delivered. This achieved regulatory sign-off in 2016/17.

G2.45 Q&SIIIb Projects Remaining

During 2016/17 6 projects have been completed within this programme leaving 8 Q&S3b projects remaining. Our forecast range for the combined Q&S3a and 3b completion projects is presented below:

	March 2015	March 2016	March 2017	March 2018	March 2019	March 2020	March 2021
Projects due to have completed by March 2015	36	14	8	4-6	1-4	1	0

G2.46 Q&SIIIb Km of Mains Rehabilitated Remaining

The projects for this line are already counted in line G2.14 Drinking Water Quality '2010-15 outputs planned to complete in the 2015-21 period' and it was agreed at the OMG working group that, to avoid confusion, we would no longer report these outputs separately.

Table G3 Monitoring Serviceability

G3.1 – G3.5 Drinking Water Quality Indicators (Calendar Measure)

G3.1 – G3.2 % of compliant zones for Iron & Manganese

The exclusion of iron from drinking water improved by 3 failing zones from 21 in 2015 to 18 in 2016.

The exclusion of manganese from drinking water has improved by 4 failing from 11 in 2015 to 7 in 2016.

G3.3 Number of microbiological failures at water treatment works

The number of microbiological failures at water treatment works has increased by 17 from 16 in calendar year 2015 to 33 in calendar year 2016.

G3.4 Number of Customer Contacts relating to Taste

The total number of contacts relating to taste for calendar year 2016 was 2,526 decreasing from the 2,691 reported in calendar year 2015.

G3.5 Number of Customer Contacts relating to Discolouration

The total number of contacts relating to discolouration for calendar year 2016 was 5,973 decreasing from 6,325 in calendar year 2015.

G3.6 – G3.15 Environment Serviceability Indicators

G3.6 Number of Failing Waste water treatment works

The number of failing waste water treatment works is reported as 4 for 2016/17, a decrease from the 6 reported in 2015/16. The assets involved were: Newmachar (serving 2,549 customers); Dufftown (serving 1,573 customers); Fyvie (serving 470 customers); Meigle: (serving 336 customers).

G3.7 Number of sludge treatment facilities improved to comply with safe sludge matrix

This measure was delivered in 2015/16.

G3.8 The maximum number of UIDs

This indicator is dependent on the outcome of the 7-stage process and studies, which may reduce or increase the number of outputs to be delivered, and the number of known unsatisfactory discharges.

At March 2017 there were 738 UIDs compared to a position of 761 UIDs in March 2016. Studies continue to be undertaken during the 2016/17 period.

We no longer include this measure in our Delivery Plan. We will continue to monitor the maximum number of UIDs and would request consideration be given to removing this line from the G tables to align with our Delivery Plan commitments.

G3.9 Number of Pollution Incidents

Environmental Pollution Incidents occur where there is a failure at a water or waste water asset that impacts on the environment, as agreed with SEPA. These are classified by SEPA as water or waste water category 1, 2 or 3 incidents. We recorded a total of 239 water and waste water incidents in 2016/17. The number of agreed Cat 1, 2 & 3 incidents are listed below.

Water Cat 1&2	1 incident agreed
Sewerage Cat 1&2	12 incidents agreed
Sewerage Cat 3	226 incidents agreed

G3.10 Pollution incidents (sewerage)

There were 238 pollution incidents (sewerage) during 2016/17.

G3.11 Serious pollution incidents (sewerage)

There were 12 serious pollution incidents (sewerage) during 2016/17.

G3.12 Serious pollution incidents (water)

There was 1 serious pollution incident (water) during 2016/17.

G3.13 Discharge permit compliance

Discharge permit compliance has increased by 0.34% from 98.98% in 2015/16 to 99.32% during 2016/17.

G3.14 Satisfactory sludge disposal

Satisfactory sludge disposal was 100% during 2016/17.

G3.15 Greenhouse Gas (GHG) Emissions (ktCO2e).

We have improved our reporting processes and are now able to report our operational greenhouse gases earlier than in previous years. We therefore report two years' results this year: those for 2015/16 and 2016/17.

The greenhouse gas emissions (ktCO2e) position for 2015/16 was 390, a decrease of 14 ktCO2e from 2014/15. This was largely due to the reduction in the emissions factor for grid electricity.

The greenhouse gas emissions (ktCO2e) position for 2016/17 was 352, a decrease of 38 ktCO2e from 2015/16. This was due to a combination of the reduction in the emissions factor for grid electricity and a reduction in electricity use.

G3.16 – G3.36 Customer Service Serviceability Indicators

G3.16 Properties on the Low Pressure Register

The number of properties on the Low Pressure Register is reported as 45 (excluding allowable exclusions) which is a decrease of 2 from the 2015/16 reported position of 47.

G3.17 Properties with Unplanned Interruptions to Supply > 12 hours

The overall figure for 2016/17 for properties affected for more than 12 hours was 648 properties, a decrease of 68 properties from 2015/2016. In this reporting year no individual incidents affected more than 100 properties for greater than 12 hours and only 3 incidents affected over 50 properties. The combined impact of these 3 events, which occurred in April 2016 (1) and December 2016 (2), affected 202 properties for greater than twelve hours.

G3.17a Properties with Unplanned Interruptions to Supply > 6 hours

The overall figure for 2016/17 for properties affected more than 6 hours was 6,027.

G3.18 Number of hours lost due to water supply interruptions for three hours or longer

There were 0.2607 hours per property lost due to water supply interruptions for three hours or longer, a reduction of 0.0004 from the 2015/16 position of 0.2611 hours.

G3.19 Number of Bursts per 1,000km of mains

There were 137 mains bursts per 1,000km during 2016/17. This was a decrease of 3 from 2015/16.

G3.20 Properties at Risk of Internal Flooding

In total, 39 properties where removed from the 'at risk of internal flooding' register in 2016/17.

At 31 March 2017 the number of properties on our internal sewer flooding register was 381 (315 if the Oak Mall shopping centre, Greenock was treated as three properties).

This year there was a higher than average 86 additions to the register. The primary reason for this has been the Oak Mall shopping centre, Greenock. Following a flooding event in 2015, 30 premises within the Mall were added to our high risk register in 2015/16. Further detailed investigations have confirmed that a total of 69 premises in the Mall are at high risk.

As a result of the number and complexity of additions this year, and particularly the 69 additions at Oak Mall, we expect the number of properties on our 'at risk of internal sewer flooding' register will remain above the expected service level minimum of 370 until at least 2019.

In 2015/16, we reported 334 properties which included 30 properties relating to Greenock. If we exclude the Oak Mall properties from both the 2015/16 and 2016/17 positions there has been an increase of 8 properties in 2016/17 compared with 2015/16.

G3.21 Properties internally flooded due to other causes

The figures reported here relate to flooding caused by blockages or failure of main and lateral sewers. The number of properties internally flooded in 2016/17 was 328, a decrease of 61 on the previous year.

G3.22 Properties internally flooded due to overloaded sewers

The number of properties internally flooded due to overloaded sewers in 2016/17 was 121, an increase of 26 properties from the previous year.

G3.23 Incidents of internal sewer flooding for properties that have flooded within the last ten years

There were 241 incidents of internal sewer flooding during 2016/17 at properties that have flooded within the last ten years, a decrease of 2 incidents on the 2015/16 position.

G3.24 Properties at risk of external sewer flooding

The number of properties at risk of external sewer flooding at March 2017 was 3,699. This is based on: 1:10; 2:10; 1:10 default; 2:10 default; and holding.

G3.25 Incidents of external sewer flooding due to other causes

The number of incidents of external sewer flooding due to other causes at March 2017 was 8,565 which is a reduction of 1,416 from the previous year.

G3.26 Incidents of external sewer flooding due to overloaded sewers

The number of incidents of external sewer flooding due to overloaded sewers in 2016/17 was 159, a reduction of 190 from the previous year.

G3.27 The Overall Satisfaction level (from the customer service questionnaire)

The Overall Satisfaction level at March 2017 was 90.7%. This was an increase of 1.2% compared to the reported March 2016 position of 89.5%.

G3.28 The maximum number of 'second tier' complaints referred to Scottish Public Services Ombudsman (Regulator Upheld Complaints)

The overall number Regulator Upheld Complaints in 2016/17 was 2 which is an increase of 1 on the previous year. Following discussion with the Reporter (B&V) it was agreed that this measure should change to Regulator Upheld Complaints in the report year.

G3.29 The number of telephone contacts relating to drinking water quality

Total number of telephone contacts which related to drinking water quality in 2016 was 10,563, a decrease of 1,104 from 2015.

G3.30 The Overall Performance Assessment (OPA) Score (In Year Value)

The March 2017 OPA score was 398 which is an increase of 5 points compared to our reported March 2016 position.

G3.31 The Overall Performance Assessment (OPA) Score (Period Average)

The period average OPA score was 396. As per our Delivery Plan for 2015-21, our commitment is to achieve a minimum average OPA score of 382.5 over the 2015 to 2021 period.

G3.32 The average annual level of leakage

The 2016/17 Maximum Likelihood Estimation (MLE) leakage is 494.758 Ml/d. This is a reduction of 4.87 Ml/d from the 2015/16 MLE leakage figure of 499.63 Ml/d.

G3.33 Household Customer Experience Measure (hCEM)

The 2016/17 hCEM score was 85.88 compared to the 2015/165 score of 84.32.

G3.34 Non-Household Customer Experience Measure (nhCEM)

We have developed and in 2017/18 are now operating a separate non household Customer Experience Measure that will support us in improving the service and experience to our non-household customers. This new measure covers a wide sector such as Licensed Providers, Developers and business customers. For the first time we are now collecting feedback from business customers who have contacted us directly, with a view to understanding different levels of expectations and how we can improve their experience of dealing with Scottish Water. We are committed to delivering a year on year improvement in our performance to non-household customers. This will be enabled by the use of our new Customer Relationship Management system which is due to be implemented in 2017.

G3.35 High Esteem Test

The 2016/17 High Esteem Test score was 76.40.

G3.36 Wholesale Key Performance Indicator (KPI's)

The 2016/17 Wholesale KPI score is reported as 91.92%. Performance remained high across many service areas but fell below target in our connections service in the first half of the year. Performance has improved significantly in the second half of the year with KPI above 94% in the last five months and overdue work reduced significantly providing a base for improved performance in 2017/18.

The Wholesale KPI relates to requests for service from Licensed Providers. It reflects the percentage of tasks completed by Scottish Water within the relevant timescale specified in the Operational Code or Disconnections Document. For 2017/18, two additional processes will be included in the Wholesale KPI: charitable exemption applications which were added into the Operational Code from April 2017 and pro-active meter exchanges by Scottish Water which have not been included historically due to technical constraints.

G3.37 to 3.38 Resilience of Supply

G3.37 Water Available for Supply Index (covered by 1:40 level of service)
G3.38 Water Available for Supply Index (covered by 1:100 level of service)

The reported WASI data for Table G3 lines 37-38 is provided in the table below. This provides a comparison against the equivalent figures back to 2013/14.

	1 in 40	1 in 100
2013/14	96.5%	77.6%
2014/15	88.9%	71.5%
2015/16	87.3%	77.3%
2016/17	86.8%	82.2%
% change since 2015 /16	-0.5%	+4.9%

The table above shows that there has been a slight drop in the % population in surplus at the 1 in 40 level of service since 2015/16 (-0.5%), but an increase in the % population in surplus at the 1 in 100 level of service (+4.9%).

A total population of 0.91% in 17 WRZs has gone into deficit at the 1 in 40 level of service, with a slightly smaller proportion (0.46%) of population in 16 WRZs coming out of 1 in 40 deficit. This gives a net reduction in population in surplus of -0.5% compared to AR16.

These changes are mostly made up of small WRZs with populations less than 0.05% of the total Scotland population. The largest WRZ which has gone into 1 in 40 deficit is Tullich (0.21%) while the largest WRZ coming out of 1 in 40 deficit is Rawburn (0.33%).

The majority of the increase in population receiving a 1 in 100 level of service is accounted for by the Fife WRZ which has a population of 7.09% of the total Scotland population. Its level of service has increased from approximately 1 in 85 in 2015/16 and is now just above the 1 in 100 level. This change is due to a 3.6% reduction in the WRZ demand for Fife.

This increase in population above the 1 in 100 level of service has been offset partially by a small number of WRZ which have gone into deficit at 1 in 100. The largest of these is the Badentinan & Glenlatterach WRZ which accounts for 1.27% of total Scotland population.

G3.39 to 3.49 Asset Health Index

The asset health indices use Scottish Water's Residual Life Expectancy Index (RLEI).

Currently this Index is being used over a trial period as the approach to asset health indices remains under review.

The RLEI calculates the current age of each asset and divides it by an estimate of the expected life of the asset. This score is subtracted from 1 to give a score of between 1 and 0, where 1 represents a brand new asset and 0 represents an asset at the end of its expected life span.

The current ages for infrastructure and non-infrastructure assets are sourced from Scottish Water information systems. The expected lives are estimates from models. Reservoirs are an exception as they are not covered by models.

We note that:

- Sea outfalls and sewer structures are excluded as they are not recognised as specific sites in Ellipse;
- For water resources (G3.39), the value of civil works is sourced from an internal review (2013);
- For water mains (G3.40), ARM assumes retained service standards.

Summary and comparison of indicators from WIC2016 to WIC2017

In the table below, a value of 1 as an indicator represents a brand new asset and zero represents an asset at the end of its expected life.

The values largely remain unchanged from last year. However the indicator for water mains has increased by 83.7% which suggests that this asset type has a greater expected life. This is driven by the change to the cost model which when optimized with the reliability model indicates that we will operate water mains for longer before replacement.

Line Ref.	Asset Serviceability Indicators	AR16 indicators	AR17 indicators	Change	Change (%)
G3.39	Water resources	0.617	0.617	0.000	0
G3.40	Water mains	0.411	0.755	0.344	83.7
G3.41	Water treatment works	0.782	0.786	0.004	0.5
G3.42	Water storage	0.754	0.754	0.000	0
G3.43	Water pumping stations	0.755	0.755	0.000	0
G3.44	Wastewater sewers	0.816	0.813	-0.003	-0.4
G3.45	Wastewater sewer structures	n/a	n/a	n/a	n/a
G3.46	Wastewater sea outfalls	n/a	n/a	n/a	n/a
G3.47	Wastewater sewage pumping stations	0.540	0.541	0.001	0.2
G3.48	Wastewater sewage treatment works	0.551	0.551	0.000	0
G3.49	Wastewater sludge treatment facilities	0.581	0.586	0.005	0.9

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Table G4 OMD Inputs including Q&S3a and Q&S3b completion project sign-off

G4.1 - G4.22 show the enhancements under the Q&S4 programme by OMD grouping. The number of outputs recorded is split by the following 5 delivery milestones by quarter:

- Milestone 1: Feasibility
- Milestone 2: Approval of Financial Budget
- Milestone 3: Start on site
- Milestone 4: Scottish Water's internal acceptance of beneficial use to customers
- Milestone 5: Regulatory sign-off

The data reflects the cumulative actual and forecast position by year over the 2015-21 period. The data also reflects the position recorded in the milestone outputs graphs presented to the OMG working group on 11 May 2017.

Table G5: Growth

Lines G5.1 to G5.14 show the investment Scottish Water has made or is forecast to make on growth for the 2015-21 programme. The report has been produced using the same methodology as table G1 with the actual expenditure of projects taken from Scottish Water's financial systems and the forecast expenditure taken from Primavera(P6). The % allocation assigned to each project has been taken from the systems which hold Scottish Water's CAPEX gateway approval forms. Most projects have 100% assigned to growth but there is significant growth investment delivered as part of some of the large quality schemes.

The total Growth expenditure shown on table G5 aligns with the total Growth on table G1. Table G1 additionally shows the split between Part 3 and Part 4 assets and also the split between household and non-household for Reasonable Cost Contributions (RCC).

The table has been revised since last year with additional drivers added to distinguish projects on Part 3 and Part 4 assets and also a section to analyse the costs and associated contributions for Service Relocations (NRSWA).

At the start of the SR15 period projects were set up to allow specific reporting against each unitary authority, water / waste water and household/non household. This allows G1.9, G1.10 and lines G5.1, G5.2, G5.4 and G5.5 to be populated from the resultant outputs.

Total Net Growth Expenditure is £19.4m in the reporting year and is forecast to be £61.4m in the 2015-21 period but there is currently a significant unallocated amount within IR18 funding which will increase that figure.

G5.15 to G5.19 - Total Service Relocations costs in 2016/17 were £19.84m and customer contributions released against these projects was £16.35m giving a net spend of £3.49m in the period. The overall forecast for SR15 is a net spend after contributions of £7.5m.

G5.20 & G5.26 – Water household infrastructure charge income for the period to March 2017 is £6.5m, which relates to 19,244 new properties being connected, or applying to be connected, to the water network.

G5.21 & G5.27 – Water non-household infrastructure charge income for the period to March 2017 is £189k, which relates to 559 new non-household properties being connected, or applying to be connected, to the water network.

G5.22 & G5.28 – Waste water household infrastructure charge income for the period to March 2017 is £5.1m, which relates to 15,061 new households being connected, or applying to be connected, to the waste water network.

G5.23 & G5.29 – Waste water non-household infrastructure charge income for the period to March 2017 is £77k, which relates to 229 new non-household properties being connected, or applying to be connected, to the waste water network.

G5.24 – Total infrastructure charge income across all activities in the period is £11.9m and is forecast to be £81.1m in the 2015-21 period from a combined 239,728 connections to the water and waste networks in SR15.

G5.25 – Total Net Growth Expenditure after all contributions is £19.3m in the period and is forecast to be £61.4m in the 2015-21 period but there is currently a significant unallocated amount within IR18 funding which will increase that figure.

G5.32 – For the period to March 2017 we paid RCC to developers for 14,393 household properties that are connected to our water assets (Part 2 & 3).

G5.33 – For the period to March 2017 we did not pay RCC to any developers for non-household properties connected to our water assets (Part 2 & 3).

G5.35 – For the period to March 2017 we paid RCC to developers for 11,211 household properties that are connected to our waste water assets (Part 2 & 3).

G5.36 – For the period to March 2017 we did not pay RCC to any developers for non-household properties that are connected to our waste water assets (Part 2 & 3).

G5.38 – For each new household property connected to the water network an Infrastructure Charge is applicable. Therefore, for the period to March 2017, the number of household properties paying an infrastructure charge to Scottish Water for additional water strategic capacity is 22,214 (as line G5.26).

G5.39 – For each new non-household property connected to the water an Infrastructure Charge is applicable. Therefore, for the period to March 2017, the number of non-household properties paying an infrastructure charge to Scottish Water for additional water strategic capacity is 630 (as line G5.27).

G5.41 – For each new household property connected to the waste water network an Infrastructure Charge is applicable. Therefore, for the period to March 2017, the number of household properties paying an infrastructure charge to Scottish Water for additional waste water strategic capacity is 19,022 (as line G5.29).

G5.42 - For each new non-household property connected to the waste water network an Infrastructure Charge is applicable. Therefore, for the period to March 2017, the number of non-household properties paying an infrastructure charge to Scottish Water for additional waste water strategic capacity is 171 (as line G5.30).

G5.44 - For the period to March 2017 the additional population equivalent served from new part 4 investment – water was 14,509 (as line G2.1).

G5.45 - For the period to March 2017 the additional population equivalent served from new part 4 investment – waste water was 792 (as line G2.2).

Table G6 Project Analysis – Actuals & Forecast – Water & Waste water

General Comments

The datasets used to create tables G1, G2 and G4 are taken from our corporate systems and are then also used to complete this table. The data in this table is consistent with Scottish Water's end of year reporting to our Board. The table analyses the 2015-21 programme by individual Project (by Row), detailing out Investment, Outputs and Dates (by Column).

Column 1 - Contains the unique project auto code number.

Column 2 - Contains the Project Title.

Column 3 - Contains the Q&S Period for each project. This is a project level assessment – some projects may have split funding.

Column 4 - Contains the group each project belongs to and is used by Scottish Water to allocate project ownership and project type.

Column 5 - Contains a more detailed view of programme groupings.

Column 6 - Shows the split project ID to allow projects with multiple outputs to be shown

Column 7 – Shows the output group for the split projects

Column 8 – Shows the split between water, waste water and general

Column 9 - Contains the Technical Expression sign-off owner (if required).

Column 10 - Contains the internal delivery vehicle assignment.

Column 11 - Contains a sub set of Programme Grouping.

Column 12 – Shows the current milestone stage.

Column 13 - 17 Show the forecast Milestone dates.

Column 18 – Contains the Local Authority area each project falls into if it has one location.

Column 19 to 25 –Contain the project expenditure analysed by financial year.

Column 26 – Contains the total actual or forecast project expenditure to March 2021.

Column 27 - Post 2021 project expenditure

Column 28 - Grand total project expenditure.

Column 29 – Contains the Table K budget allocation. This is in outturn prices and reflects Table K with additional budget for contributions and allocations from elsewhere in Scottish Water. In many cases, projects that were originally identified in Table K have been split into multiple projects or aggregated to form larger projects. Although Scottish Water does assess the programme cost compared with the Table K allocation, this is generally done at sub-programme and programme level.

Column 30 & 31 – Contain the infrastructure & non-infrastructure grants received.

Column 32 & 33 – Contain the infrastructure & non-infrastructure contributions received.

Column 34 – Contains the impact of projects on operating expenditure.

Column 35 – This has not been populated as any project with a regulatory output will require regulatory signoff or equivalent.

Column 36-55 – Contain the project's drivers and allocations as confirmed through the CAPEX approvals process.

Column 56 – 105 – Contain the low level output groups and show the project level allocation of outputs.

H Tables – ASSET INVENTORY

Summary of gross MEAV

Scottish Water's reported Annual Return 2016/17 gross asset inventory valuation is £66.5 billion.

The gross valuation is dominated by the infrastructure valuation of £56 billion, comprising 83.81% of the total.

The non-infrastructure total valuation is £11 billion, which is 15.83% of the total valuation.

Support services valuation is approximately £157 million representing 0.23% of the gross asset inventory valuation.

Asset Type	AR16 Gross MEAV (£m)	% of total	AR17 Gross MEAV (£m)	% of total
Water Infrastructure	14,331	22.85%	16,701	25.10%
Water Non - Infrastructure	5,284	8.43%	5,121	7.70%
Wastewater Infrastructure	37,598	59.94%	39,050	58.70%
Wastewater Non-Infrastructure	5,342	8.52%	5,493	8.26%
Support Services	165	0.26%	157	0.24%
Total	**62,723**	**100%**	**66,522**	**100%**

The combined gross valuation of water and wastewater infrastructure assets has increased by £3,821 million and there has been a decrease in the gross valuation for non-infrastructure assets of £13 million.

The total valuation of the asset stock has increased by £3,799 million since 2015/16 primarily due to:

- updated cost curves (v10.2 in AR16 to V13 in AR17); and
- an increase in RPI indexation of 2.14%.

Detailed summary of gross MEAV

Line Ref.	Asset Type	AR16 Gross MEAV (£m)	% of total	AR17 Gross MEAV (£m)	% of total	Change (£m)	% change
H1.1	Water treatment works	3,072	4.90%	3,018	4.54%	-54	-1.76%
H1.2	Water storage	1,764	2.81%	1,789	2.69%	25	1.42%
H1.3	Water pumping stations	448	0.71%	314	0.47%	-134	-29.91%
H1.4	Water resources	2,842	4.53%	3,206	4.82%	364	12.81%
H1.5	Water mains	11,490	18.32%	13,494	20.29%	2,004	17.44%
H1.6	Sewers	36,246	57.79%	38,008	57.12%	1,762	4.86%
H1.7	Sewer structures	517	0.82%	609	0.92%	92	17.79%
H1.8	Sea outfalls	835	1.33%	433	0.65%	-402	-48.14%
H1.9	Sewage pumping stations	1,021	1.63%	962	1.45%	-59	-5.78%
H1.10	Sewage treatment works	4,107	6.55%	4,323	6.5%	216	5.26%
H1.11	Sludge treatment facilities	215	0.34%	208	0.31%	-7	-3.26%
H1.12	Support services	166	0.26%	157	0.24%	-9	-5.42%
	Total	**62,723**	**100%**	**66,522**	**100%**	**3,799**	

The table above shows the change in the total gross asset valuation of Scottish Water's assets from 2015/16 to 2016/17 by asset category.

Summary and comparison of net valuations from AR16 to AR17

The total net depreciated value of Scottish Water's non-infrastructure asset inventory (including support services depreciable assets) is £3.84 billion.

Line Ref.	Asset Type	AR16 Net MEAV (£m)	% of total	AR17Net MEAV (£m)	% of total	Change (£m)	% change
H1.1	Water treatment works [101]	1,221	33.25%	1,054	27.47%	-167	-13.65%
H1.2	Water storage [102]	690	18.79%	757	19.73%	67	9.73%
H1.3	Water pumping stations [103]	177	4.83%	132	3.45%	-45	-25.38%
H1.9	Sewage pumping stations [109]	328	8.93%	397	10.35%	69	21.11%
H1.10	Sewage treatment works [110]	1,089	29.65%	1,331	34.69%	242	22.28%
H1.11	Sludge treatment facilities by disposal type [111]	63	1.73%	62	1.61%	-1	-2.62%
H1.12	Support services [112]	103	2.81%	105	2.72%	1	1.22%
	Total	**3,671**	**100%**	**3,838**	**100%**	**167**	

The table above shows the changes to the net valuation by asset category.

Summary of Confidence grades (MEAV)

There has been no movement in the confidence grade for MEAV from 2015/16 to 2016/17. The MEAV confidence grade is dominated by the absence of data at certain levels within the asset inventories resulting in C4 grades for non-infrastructure assets and B4 or C4 for infrastructure.

Summary of Confidence grades (Asset Stock)

There has been no movement in the confidence grade for asset stock from 2015/16 to 2016/17. The confidence grades applied to the asset stock is a reflection of the asset inventories.

Table H2: Water Non Infrastructure

H2.1-2.8: Water Treatment Works

Asset Stock: The total number of Water Treatment Works in this reporting year is 238. This is a reduction of 5 from the 243 reported in the Annual Return 2015/16.

WTW Sites	Number
AR16 Sites Reported	243
Sites Non-Operational AR17	8
Sites Non-SW Owned AR17	0
Newly Reported AR17	3
AR17 Sites Reported	**238**

Asset Valuation: The asset valuation for water treatment works for the reporting year has decreased to £3,018 million from £3,072 million. The valuation has decreased because of the reduction in the number of works and due to the improved methodology for valuing individual process stages within WTW.

H2.9-2.10: Water Storage

Asset Stock: There has been an overall increase in Water Storage Assets. The total number of water storage assets in this reporting year is 1,327. This is an increase of 2 from the 1,325 reported in 2015/16.

WS Sites	Number
AR16 Sites Reported	1,325
Sites Non-Operational AR17	6
Sites Non-SW Owned AR17	0
Newly Reported AR17	8
AR17 Sites Reported	**1,327**

The net change in the number of reported Water Storage sites is summarised in the tables above

Asset Valuation: The asset valuation for water storage assets for the reporting year has increased from £1,764 million to £1,789 million. The valuation has increased mainly due to the RPI increase.

H2.11-2.13: Water Pumping Station

Asset Stock: The total number of Water Pumping Stations (WPS) in this reporting year is 768. This is an increase of 4 from the 764 reported in the Annual Return 2015/16.

WPS Sites	Number
AR16 Sites Reported	764
Sites Non-Operational AR17	3
Sites Non-SW Owned AR17	4
Newly Reported AR17	11
AR17 Sites Reported	**768**

Asset Valuation: The asset valuation for water pumping stations for the reporting year has decreased to £314 million from £448 million. The valuation has decreased mainly due to the updated v13 WPSX1 (KW) cost curve.

Table H3: Water Infrastructure

H3.1: Water Resources – Dams & Impounding Reservoirs

Asset Stock: The total number of Dams & Impounding Reservoirs in this reporting year is 211. This is a reduction of 6 from 2015/16.

Asset Valuation: The asset valuation for dams and impounding reservoirs for the reporting year has increased from £1,352 million to £1,372 million. The valuation has increased mainly due to RPI increase.

H3.2: Water Resources – Raw Water Intakes

Asset Stock: The total number of raw water intakes for the reporting year is 304. This is a reduction of 4 from 2015/16.

Asset Valuation: The asset valuation for raw water intakes for the reporting year has remained broadly stable at £33 million.

For the MEAV methodology for Dams and Impounding Reservoirs and Raw Water Intakes, costs have been determined for a representative set of modern equivalent assets. The costs were developed by Berkeley Consultants in 2008 who estimated the structure cost on the basis of labour, plant and materials only. Included in the cost of the intake are concrete costs of the weir and the intake chamber, as well as all screens, valves and contractor preliminaries.

H3.3: Water Resources – Raw Water Aqueducts

Asset Stock: The total length of Raw Water Aqueducts in this reporting year is 1,724.5km. This is an increase of 22.4km from 2015-16.

Asset Valuation: The asset valuation for this reporting year has increased from £1,457 million to £1,802 million. The valuation has increased as a result of an improved methodology based on pipe material being used to infill unknown pipe diameters. Overall, this resulted in larger pipe diameters being estimated, which generate a higher replacement value. The updated infrastructure cost curves has also caused an increase in the asset valuation.

H3.4: Water Mains – Mains Potable

Asset Stock: The total length of Potable Mains in this reporting year is 48,480.4km. This is an increase of 99.9km from 2015/16.

Asset Valuation: The asset valuation for this reporting year has increased from £10,499 million to £12,406 million. The valuation has increased mainly due to the updated v13 WAMLR (water mains laying rural) cost curve and associated on-costs.

H3.5: Mains Other

Asset Stock: The total length of Other Mains in this reporting year is 137.3km. This is an increase of 0.87km from 2015/16.

Asset Valuation: The asset valuation for this reporting year has increased from £24 million to £27 million. The valuation has increased mainly due to the updated v13 WAMLR (water mains laying rural) cost curve and associated on-costs.

H3.6: Communication Pipes (Lead)

Asset Stock: The total number of Communication Pipes (Lead) in this reporting year is 63,995. This is a decrease of 293 from 2015/16. The reduction is due to better identification of pipe material in Scottish Water's GIS and on-going lead pipe replacement in the ground.

Asset Valuation: The asset valuation for this reporting year has increased from £31 million to £34 million. The valuation has increased mainly due to the updated v13 COMP cost curve.

H3.7: Communication Pipes (Other)

Asset Stock: The total number of communication pipes (other) in this reporting year is 1,833,174. This is an increase of 9,931 from 2015/16. The increase is due to new housing connections, better identification of pipe material in Scottish Water's GIS and on-going lead pipe replacement in the ground.

Asset Valuation: The asset valuation for this reporting year has increased from £874 million to £960 million. The valuation has increased mainly due to the updated v13 COMP cost curve.

H3.8: Water Meters

Asset Stock: The total number of Water Meters in this reporting year is 135,653. This is an increase of 1,563 from 2015/16.

Asset Valuation: The asset valuation for this reporting year has increased from £62 million to £67 million. The valuation has increased mainly due to a combination of RPI increase and the updated on-costs for water infrastructure.

Table H.4: Wastewater Infrastructure

H4.1: Sewers – Critical Sewers

Asset Stock: The total length of Critical Sewers in this reporting year is 11,154.9km. This is a decrease of 26.6km from 2015/16. For wastewater infrastructure an improved method of applying default values has been used, which is based on average pipe diameter by pipe material, rather than a single average pipe diameter for all pipes.

Asset Valuation: The asset valuation for this reporting year has increased from £13,332 million to £14,004 million. The valuation has increased as a result of updated infrastructure cost curves and RPI increase. This has been partially offset by the improved method used to infill unknown pipe diameters which resulted in smaller diameter pipes with a lower replacement value being estimated. Overall however, there has been in an increase in the asset valuation.

H4.2: Sewers – Non Critical Sewers

Asset Stock: The total length of Non-Critical Sewers in this reporting year is 38,726.6km. This is an increase of 319.6km from 2015/16. For wastewater infrastructure an improved method of applying default values has been used, which is based on average pipe diameter by pipe material, rather than a single average pipe diameter for all pipes.

Asset Valuation: The asset valuation for this reporting year has increased from £22,439 million to £23,538 million. The valuation has increased as a result of updated infrastructure cost curves and RPI increase. This has been partially offset by the improved method used to infill unknown pipe diameters which resulted in smaller diameter pipes with a lower replacement value being estimated. Overall however, there has been in an increase in the asset valuation.

H4.3: Sewers – Sewage and sludge pumping mains

Asset Stock: The total length of sewage and sludge pumping mains in this reporting year is 1,317.7km. This is an increase of 15.8km from 2015/16.

Asset Valuation: The asset valuation for this reporting year has decreased to £465 million from £474 million. The valuation has decreased due to more accurate land use classification of each rising main. This has shown that there are more mains laid in grassland than previously thought.

H4.4 and H4.5: Sewer Structures: CSOs and Other Sewer Structures

Asset Stock: The number of combined sewer and emergency overflows in the report year is 3,777; an increase of 28 from the Annual Return 2015/16. The number of Other Sewer Structures is 312, the same as reported in 2015/16. The overall increase is due to the discovery of previously unrecorded CSO discovered during UID studies and drainage area studies.

Asset Valuation: The asset valuation for this reporting year has increased from £517 million to £609 million. The valuation has increased mainly due to the updated v13 CSOM and CSOP cost curves.

H4.6 and H4.7: Sea Outfalls: Short and Long Sea Outfalls

Asset Stock: The total number of Sea Outfalls in this reporting year is 1,452. This has remained the same from 2015/16.

Asset Valuation: The asset valuation for this reporting year has decreased to £433 million from £835 million. The valuation has decreased significantly mainly due to the updated v13 OUTS (short sea outfall) and OUTL (long sea outfall) cost curves.

Table H5: Waste Water Non-Infrastructure

H5.1 and H5.2: Sewage Pumping Stations

Asset Stock: The total number of Sewage Pumping Stations (SPS) in this reporting year is 2,207. This is an increase of 7 from the 2,200 reported in the Annual Return 2015/16.

SPS Sites	Number
AR16 Sites Reported	2,200
Sites Non-Operational AR17	6
Sites Non-SW Owned AR17	4
Newly Reported AR17	17
AR17 Sites Reported	**2,207**

The net change in the number of reported SPS Sites is summarised in the table above.

Asset Valuation: The asset valuation for the reporting year has decreased to £962 million from £1,021 million. The valuation has decreased mainly due to the updated SPSx (sewage pumping) cost curves.

H5.3 to H5.7: Sewage Treatment Works

Asset Stock: The total number of Sewage Treatment Works in this reporting year is 1,834. This is a reduction of 4 from the 1,838 reported in 2015/16.

SPS Sites	Number
AR16 Sites Reported	1,838
Sites Non-Operational AR17	3
Sites Non-SW Owned AR17	3
Newly Reported AR17	2
AR17 Sites Reported	**1,834**

The net change in the number of reported WWTW Sites is summarised in the table above.

Asset Valuation: The asset valuation for the reporting year has increased from £4,107 million to £4,323 million. The valuation has increased mainly due to updated v13 cost curves and due to the RPI increase. The increase has been affected by the improved methodology for valuing individual process stages within STW, which has reduced the valuation of Preliminary STW, but increased the value of Primary STW.

H5.8 and H5.9: Sludge Treatment Facilities

Asset Stock: The total number of sludge treatment facilities in this reporting year is 20. This is the same as was reported in the Annual Return 2015/16.

STC Sites	Number
AR16 Sites Reported	20
Sites Non-Operational AR17	0
Sites Non-SW Owned AR17	0
Newly Reported AR17	0
AR17 Sites Reported	**20**

Asset Valuation: The asset valuation for the reporting year has decreased to £208 million from £216 million. The valuation has mainly decreased due to the updated v13 cost curves.

Table H6: Support Services

H6.1-H6.7: Support Services

Asset Stock: The changes to the asset stock in the last year include; the reduction of two depots and one office site.

Building Type	2015/16	2016/17
Control Centre	0	0
Depot	38	36
Laboratory	2	2
Offices	7	6

Asset Valuation: The asset valuation for the report year has decreased from £87 million to £78 million.

As with the previously reporting year, existing condition grades have been used to calculate the remaining life of non-operational buildings, which all have an asset design life of 60 years. The remaining asset life was used to calculate the net MEAV which has decreased to £60 million from £63 million.

H6.4: Vehicle & Plant

Asset Stock: We currently have 120 vehicles listed on the Goods Vehicle Operator Licence. The operator licence is granted by the Traffic Commissioner (TC) for Scotland with all admin through the Office of The Traffic Commissioner (OTC) Leeds. The regulatory authority is the Driver & Vehicle Standards Agency (DVSA). DVSA investigate issues relating to the operator licence undertakings and report their findings to the TC

Asset Valuation: The gross valuation has remained at approximately £36 million (£35.71 million) as in 2015/16. Net values were calculated based on the age and design life of each vehicle or plant using the same method as previous Annual Returns.

H6.5: Telemetry Systems

Asset Stock: The 5,083 telemetry sites reported show an increase from 4,939 as reported in 2015/16. This equates to having 46% coverage of Scottish Water's operational sites. Ongoing data improvement has improved the telemetry system inventory.

Asset Valuation: The asset valuation for the report year has increased slightly from £22 million to £23 million, based on the same standard unit valuation as used in 2015/16.

The process in unchanged from explained in AR09 Commentary, Annex 1. All telemetry outstations were assigned a short (6-15 year) design life, as recommended in the WIC guidance notes

H6.6: Information Systems

Asset Stock: Laptops have increased to 4,262 from 3,351, desktops reduced from 1,149 to 996 and servers reduced from 313 to 321.

Asset Valuation: The value has increased slightly to £5.63 million.

H6.7: Other Non-Operational Assets

Asset Stock: There are 34 properties/land reported as being owned by Scottish Water in this reporting year which is 2 less than in 2015/16. One property was sold and one was closed during the year.

Asset Valuation: The asset valuation for the report year has reduced slightly but remains at £15 million. Farm and grazing land values are based on valuations carried out in 2008/09.