SUMMARY OF AUDIT FINDINGS

Table 3 – Internal Sewer Flooding

PREPARED BY: [X]

DATE: 30 October 2018

1. Key Findings

RR18 Table Criteria	RAG	Assessment
Independent Review of Performance and Reporting	Green Amber	Performance good. Reporting process, is labour intensive, involving significant levels of manual checking, but is well managed. However, Company may have under reported incidents involving small blocks of flats
Methodology	Green	Methodology consistent with current process, control points identified and understood. Weaknesses understood
Assumptions	Green	Assumptions reasonable and appropriately applied
Source Data	Blue	Source data is often incomplete, requiring significant follow up in order to assess each incident
Clarity of Audit Trails	Blue	Audit trails often not available, but sufficient investigation completed to enable appropriate assessment
Confidence Grades	Green	Confidence grade appropriate and rationale clearly documented
Governance	Green	Evidence of engagement and of final sign-off not available at time of audit.

- The overall sewer flooding process for NI Water is broadly unchanged from that applied in previous years, whereby the number of actual incidents of internal flooding, year on year, remains at very manageable levels, enabling the Company to ensure all internal flooding incidents are captured.
- The Company has continued to review and assess every internal flooding contacts to establish the true nature of the contact, and we are comfortable that all internal flooding contacts are being captured.
- For AIR18, NI Water has not experienced any incidents of internal flooding (due to overloaded sewers).
- Review of a number of FOC Blockage incidents suggests that NI Water may not be correctly reporting the number of properties affected for incidents affecting communal areas of flats.
- NI Water has reported a 22 property reduction in the number of properties on the 2in10, 1in10 & 1in20yr flooding registers, reflecting a number of capital schemes and investigations completed during the year. At year-end, there were 61 properties on the 2in10/1in10yr Flooding Registers, with a further 73 properties on the 1in20 Register.

2. Audit Scope

- For AIR18, a Level 2 audit was completed for Table 3, which included:
  - Checks on key control points and QA procedures to ensure Company methodology has been followed, and
  - Sample checks to test process and check methodology and thus confirm completeness of data reported within Table 3

- To complete our review and check on a sample basis, all reported AIR18 Table 3 data, we undertook two separate audits with the key NI Water system holders, including representatives from Wastewater Operations and Asset Management.
- The audits, which were held on the 11th June 2018, included; a review of the methodology adopted; a check to ensure consistency of the methodology for Table 3 and; an audit of individual incidents/properties to confirm appropriateness of the reported data.

3. Performance and Significant Events

3.1 General

We found that the overall sewer flooding process for NI Water is broadly unchanged from that applied in previous years, whereby, the Wastewater Business Unit (WwBU) is required to undertake additional investigation in order to establish the nature/cause of each reported flooding incident.

However, as the number of actual incidents of internal flooding, year on year, remains at very manageable levels, the additional effort required by WwBU to assess and verify each reported incident, appears to be sustainable, enabling the Company to ensure all internal flooding incidents are captured. On this basis, the Company's methodology is appropriate for AIR reporting.

In order to improve the verification process, details of a flooding incident are submitted next day to the Wastewater Business Unit (WwBU), rather than by month end (as had previously been the case), and this continues to work well.

We understand that the WwBU has continued to hold regular briefings with front line maintenance and call centre staff, to reinforce the Company's processes to accurately capture the details of each flooding incident, thus ensuring sufficient information is captured to enable easy verification. Whilst the level of evidence captured for each incident is improving, and the number of 'false' flooding contacts raised by the CRC has continued to reduce, the quality of evidence captured on the FIR for each incident is still quite variable from the maintenance teams and we also identified a few instances where the CRC have 'cut and paste' details from previous incidents to populate current incidents for a particular address, providing misleading details for the 'live' incident.

3.2 Internal Flooding Incidents (Overloaded Sewers)

The Company has continued to review and assess every internal flooding contact to establish the true nature of the contact, and we are comfortable that all internal flooding contacts are being captured. We undertook a review of the contact analysis completed for 2017/18 and note that 316 internal flooding contacts were received, of which 76 were not related to an internal flooding incident, reflecting a further improvement in performance by the CRC. Of the remaining 213 contacts, 131 related to repeat/follow-on jobs, 37 contacts related to incidents on private sewers and a further 31 contacts were identified as cancelled or test jobs. As part of our audit, we reviewed the details for several of the excluded contacts, deemed not to relate to internal flooding and confirm the appropriateness of the Company's assessment. We found that a large number of flooding contacts were received during August 2017, coinciding with a severe weather event in the Londonderry area. Although a number of properties were flooded during the 1in150-400yr storm event, the flooding was found to have been caused by overland flow from an adjacent river, that burst its banks.

For AIR18, NI Water has reported 0 incidents of internal flooding (due to overloaded sewers).

In order to test the process adopted by NI Water to assess and correctly verify all properties that have flooded during the year we undertook a detailed review of 4 contacts that were not deemed to be internal flooding incidents, the results of which are detailed in Section 4 below.

3.2 Internal Flooding Incidents (Other Causes)

For AIR18, NI Water has reported 27 incidents of flooding due to other causes, 20 due to blockage and 7 due to collapse.

NI Water continue to deliver steady year on year improvements in the number of blockages experienced, with the total number of blockages in 2017/18 (14,332) circa 49% lower than reported in 2008/09 (~28,000) – a significant achievement.

We understand that the Company has continued to proactively target repeat blockages, whereby a dedicated CCTV crew has been assigned to each area to complete CCTV inspections on the worst blockage hotspots in each area, and carry out cleaning, desilting and repairs, where problems are identified. This has been further assisted through the delivery of the PC15 DAP programme, whereby comprehensive CCTV and desiltation of critical sewers has been completed in 23 drainage areas. Whilst this has primarily been undertaken to define hydraulic models that are being developed/updated as part of the DAP process, the process has also facilitated a further improvement in blockage/collapse performance.

Additionally, the results of the CCTV inspections will continue to be used to develop/refine a prioritised sewer rehabilitation programme that can be accelerated if, and when additional public expenditure (PE) funding is available. We understand NI Water are targeting 11km of sewer rehabilitation each year. Through the development of a well-defined, prioritised programme (similar to that established for Water Mains Rehabilitation Programme), NI Water will be able to respond quickly to changes in PE, improving the Company's chances of delivering this programme.

As above, we undertook a detailed review of a selection of FOC incidents. Whilst the results are detailed in Section 4 below, we did identify an issue, that highlighted NI Water were potentially understating the number of properties affected by internal flooding (FOC). We found 2 instances where a communal entry foyer to 2 small blocks of flats had experienced internal flooding, however, NI Water had only reported a single affected property for each incident. We advised NI Water that all affected dwellings should be reported (including upstairs flats that use the common entrance) and recommended that NI Water investigate the 2 incidents affecting [X] and [X] and update Table 3 as appropriate. We anticipate that this may potentially increase the number of incidents of internal flooding (FOC) by a further 6 incidents, and anticipate that NI Water will address and update prior to submission.

3.3 DG5 Flooding Register

For AIR18, NI Water has reported a 22 property reduction in the number of properties on the 2in10, 1in10 & 1in20yr flooding registers, reflecting a small number of capital schemes and investigations completed during the year.

At year-end, there were 61 properties on the 2in10/1in10yr Flooding Registers, with a further 73 properties on the 1in20 Register.

In terms of removals due to company action (Lines 22 and 30), the Company has completed 4 schemes during the year, whereby 6 properties were removed from the 2in10/1in10yr Register and 11 properties from the 1in20yr Flooding Register.

Against an overall PC15 target of 54 capital removals, NI Water were funded to deliver 8 capital removals in Year 3 of PC15 (2017/18), meaning NI Water has exceeded the PC15 target for Year 3.

In addition to the 4 schemes delivered during the year (17 outputs), the Company has also completed a number of investigations of properties that had been historically added to the DG5 Register, but had not experienced flooding in the past 10-12 years, which resulted in the removal of an additional 5 properties from the 1in20yr register due to better information. Customer interview and DAP model results confirmed that whilst some of the properties had been subject to external flooding historically, there was no evidence of internal flooding, which was subsequently confirmed by the respective DAP model.

Consistent with the fact that NI Water experienced 0 incident of internal flooding (due to overloaded sewers), NI Water has reported 0 better information (actually flooded) additions to the various flooding registers for AIR18.

NI Water reported an average capex cost per output of £184.5k for the 2in10/1in10 outputs and £216.6k for the 1in20 outputs in AIR18. We reviewed the costs associated with the 4 schemes and confirm the calculation used to derive the average costs. Whilst 3 of the 4 schemes delivered, were relatively low cost solutions, [X] , which delivered 10 of the 17 outputs, out-turned at [X] (ESL element), or [X] per output. Enhancement spend on this scheme alone represented 88% of the total DG5 capital removal expenditure incurred during the year. As above, a more detailed review of the capital removals and BI removals was completed and is summarised in Section 4 below.

As mentioned in previous years, a large number of the properties that remain on the current DG5 Register are associated with large catchment wide problems in Belfast, where the proposed solutions are both large and expensive. We sought an update on the Sicily Park scheme and found that the scheme is still on hold, due to protracted stakeholder issues that has compromised the proposed solution. However, routine, proactive maintenance/desilting in the area has ensured network capacity is maximised and as a result, the area has not suffered from flooding in the past 5 years. This raises questions over the ongoing need for delivery of the proposed [X] solution, when routine maintenance may be sufficient to maintain capacity. Furthermore, we have previously highlighted the benefit of providing mitigation to these properties in order to prevent further incidents of internal flooding. We believe there continues to be great benefit in offering mitigation to all confirmed flooders. Whilst mitigation does not resolve the capacity/drainage problem, it does reduce the risk of internal flooding to the particular property at risk.

4. Summary of Audit Checks

Incident Location	Date of Incident	Incident Summary
[X]	15/8/17	• Investigation confirmed flooding to detached garage, therefore not reported as internal flooding • **Reporter agrees with exclusion, but recommends NIW ensure incident is captured on T3a – external flooding**
[X]	28/8/17	• Internal flooding during a severe weather event, however, flooding caused by overland flow from adjacent river that had burst its banks. • **Reporter agrees with exclusion from reporting**
[X]	24/1/18	• Initially reported as internal flooding to [X], but no evidence of internal flooding on site (confirmed using photographic evidence). External flooding only. • **Reporter agrees with transfer of incident to Asset Management for inclusion on T3a – external flooding**
[X]	4/8/17	• Internal flooding to cellar due to mainline blockage. • Initially reported as 'no flooding' by maintenance crew, but follow up investigation by Network Technician identified evidence of minor flooding to the cellar • **Reported as FOC Blockage - Reporter agrees**
[X]	10/12/17	• Internal flooding to communal entry foyer of small block of apartments (4 flats) • Flooding caused by blockage due to 'wipes' • Reported as internal FOC to [X], however, as all flats in building would use the communal entrance, all 4 should therefore all be included in T3 Line 6/9 • **Reporter recommends that investigation is undertaken to confirm the number of properties affected and T3 updated accordingly.**
[X]	11/2/18	• Following our findings at [X], above, the Reporter reviewed other incidents affecting similar property

Incident Location	Date of Incident	Incident Summary
		types. • Internal flooding to communal entry foyer of small block of apartments (4 flats) caused by blockage – same type of building as above • Reported as internal FOC to [X], however, as all flats in building would use the communal entrance, all 4 should therefore all be included in T3 Line 6/9 • **Reporter recommends that investigation is undertaken to confirm the number of properties affected and T3 updated accordingly.**
[X]	23/8/17	• Internal flooding to property • 2 properties affected • Blockage caused by poor misaligned connection to manhole – poor quality installation • **Reported as FOC blockage - Reporter agrees. Issue could be easily resolved by small capital scheme to re-lay connection**
[X]	10/2/18	• Internal flooding to integral garage • Investigation confirmed flooding caused by collapse • **Reported as FOC collapse – Reporter agrees**
[X]	30/3/18	• Internal flooding to property • Investigation confirmed flooding caused by collapse • **Reported as FOC collapse – Reporter agrees**

Location	Status	Findings
[X]	Removed from 2in10, 1in10 and 1in20 Registers	• Scheme delivered to construct 500m of new 300-750mm Ø sewer and increase capacity of 700m of 525mm Ø sewer to 1200mm Ø and 400m of 225mm Ø to 450mm Ø sewer to provide additional storage • 10 outputs – 2 x 2in10, 1 x 1in10 and 7 x 1in20 • Scheme completed in March 2018 at a cost [X], of which [X] was allocated to ESL. Model confirmed no longer at risk. Signed off by DG5 Panel
[X]	Removed from 2in10 and 1in20 Registers	• Scheme delivered to construct 72m of new 750mm Ø sewer, 23m of new 450mm Ø abnd upsize of existing 300mm Ø sewer along Newtonbreda Rd • 3 outputs – 2 x 2in10 and 1 x 1in20 • Scheme completed in March 2018 at a cost of [X], of which [X]was allocated to ESL. Model confirmed no longer at risk. Signed off by DG5 Panel
[X]	Removed from 1in20 Register	• Scheme involved the upsize of local sewer network to provide additional in line storage. • 2 outputs – 2 x 1in20 • Scheme completed in September 2017 at a cost of [X], of which [X] was allocated to ESL. Model confirmed no longer at risk. Signed off by DG5 Panel
[X]	Removed from 1in10 and 1in20 Registers	• Scheme involved the construction of an online tank sewer – 75m x 675mm Ø • 2 outputs – 1 x 1in10 and 1 x 1in20 • Scheme completed in September 2017 at a cost of [X], of which [X] was allocated to ESL. Model confirmed no longer at risk. Signed off by DG5 Panel
[X]	BI Removal from 1in20 Register	• Property historically added to the 1in20 Register. • No record of flooding since 2006 • Customer interview confirmed historic incidents of external flooding, but these ceased following sewer rehab. No history of internal flooding • DAP model confirms no capacity issues in the area, therefore no risk of internal flooding • Reporter agrees with assessment
[X]	BI Removal from 1in20 Register	• Property historically added to the 1in20 Register. • Customer interview confirmed historic incidents of external

Location	Status	Findings
		flooding, due to surcharge of blocked storm culvert. No history of internal flooding • Reporter agrees with assessment to remove and not sure whether NIW responsibility anyway
[X]	BI Removal from 1in20 Register	• Property historically added to the 1in20 Register. • Customer interview confirmed no history of flooding • DAP model confirms no capacity issues in the area, therefore no risk of internal flooding • Reporter agrees with assessment

5. Confidence Grades

The Company has assigned a confidence grade of B2 to Lines 2 to 11, 15a & 17 on the basis that all data is derived from Ellipse, and that the Company undertakes an investigation of all reported incidents, which we support.

On the basis the data is derived from the same source as above, the Company has also assigned a B2 confidence grade for lines 12–16, 22–26 and 30–34.

6. Recommendations

- During the audit we identified an issue, that highlighted NI Water were potentially understating the number of properties affected by internal flooding (FOC). We found 2 instances where a communal entry foyer to 2 small blocks of flats had experienced internal flooding, however, NI Water had only reported a single affected property for each incident. We advised NI Water that all affected dwellings should be reported (including upstairs flats that use the common entrance) and recommended that NI Water investigate the 2 incidents affecting [X] and [X] and update Table 3 as appropriate. We anticipate that this may potentially increase the number of incidents of internal flooding (FOC) by a further 6 incidents, and anticipate that NI Water will address and update prior to submission.

SUMMARY OF AUDIT FINDINGS

Table 5 Lines 13-17 and 19-25 DG9 and Customer Satisfaction Measures

PREPARED BY: [X]

DATE: 04 July 2018

1. Key Findings

This indicator identifies the ease with which customers can make telephone contact with the Company.

AIR18 Table Criteria	RAG	Assessment
Independent Review of Performance and Reporting	**Green**	Performance good. Reporting process well managed
Methodology	**Green**	Methodology consistent with current process, control points identified and understood
Assumptions	**Green**	Assumptions reasonable and appropriately applied
Source Data	**Green**	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of Audit Trails	**Green**	Detailed and comprehensive audit trail to all numbers available
Confidence Grades	**Green**	Confidence grade appropriate and rationale clearly documented
Governance	**Green**	Responsibilities for integrity of data and commentary clearly defined, data and commentary approvals governed through SharePoint tasks. Final sign-off confirmed.

- Overall call volumes have decreased during AIR17 from that reported previously. We have checked and confirmed the DG9 performance reported in Table 5.
- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.

2. Audit Scope

The scope of this audit was the DG9 telephone contact which comprises Table 5 Lines 13-17 and the customer satisfaction measures, Table 5 Lines 19-25.

3. Performance and Significant Events

We found the procedures and methodology broadly consistent to that reviewed previously for lines 13-17 and lines 19-25.

General
The volume of calls received on each line is taken directly from Call Media reports (and HVCA reports for calls passed from the Waterline number).
The High Volume Call Answering System (HVCA) has operated since March 2013. This is designed to improve the customer experience when demand on the telephony system is high e.g. during an operational incident, the DG9 reporting methodology includes calls handled by this system. We have consolidated our comments on the HVCA system below.

High Volume Call Answering (HVCA) system
Under normal circumstances, a call received from a customer is logged by the telephony system and routed directly to an agent. When all agents are busy, the customer call is placed in a queue until the next available agent is free. Deployed exclusively on the Waterline, the HVCA system aims to direct the customer's call to the most appropriate team or message via a series of routing options.

The system's intelligence identifies and recognises customer details (e.g. location) from the details held on the billing system. Depending on the call routing and this intelligence the system asks various questions to help answer the customer query or raise a work order.

It is important to recognise that whilst the HVCA is constantly available, calls are only routed into the system at busy periods using predefined capacity criteria. This limits the volume of calls fed to the systems and under normal circumstances customers would reach an agent.

Abandonment
All calls abandoned on HVCA are now classified as answered due to agreement with the Regulator and CCNI. However, for monthly Business and annual Regulatory reporting purposes all calls handled by HVCA continue to be analysed and reported as answered or abandoned using the agreed hang up location methodology. NI Water is able to classify each hang up location as either 'answered' if the caller has reached a point in the call flow at which they can hear a salient message or 'abandoned' as HVCA has 226 distinct hang up locations allowing for detailed analysis of where the customer call ended and what messages the customer was presented with. There were an additional 994 abandoned on the HVCA system.

Calls received (Line 13)
NI Water reported that they have received 212,095 calls from customers during the year. We confirm the total volume of calls received is 2.3% lower than received in 16/17.

All lines busy (Line 14)
The Company report that 18 calls received an engaged tone during the year. This is a significant decrease on the previous year (63). This is due to an investigation by BT which determined that the vast majority of engaged calls coming through were due to network congestion. BT now remove any engaged calls they deem not to be legitimate from the monthly upload.
At audit the BT Inbound Analyst tool was found to change data when rerunning historical data. The predominant issue is duplication but there were also some changes between calls being connected or engaged. This does not impact on the resulting figure as the data used was from the original extract.

Abandoned calls (Line 15)
The number of abandoned calls has marginally increased. Overall, performance of calls not abandoned was 99.51%.

Call handling satisfaction (Line 16)
Scores from the customer satisfaction survey (Line 16) are no longer reported in agreement with the Regulator.

Telephone Complaints (Line 17)

The telephone complaints figure is reported as 57,940, which comprises of a 7.8% decrease in complaint volumes. During our audit we reviewed the spreadsheets used to compile the data and located no errors.

We have reviewed the methodology and confirm we consider the reported data appropriate.

Total contacts (Line 19), Unwanted contacts (Line 20)
Total contacts are reported as 250,753. Unwanted contacts are reported as 105,964, these are both reductions from AIR17. The percentage of unwanted contacts is 42.26% (42.73% in AIR17).
The definition of 'contact' and 'unwanted contact' will be updated in AIR19. NI water should then use the meanings as agreed by the Customer Measures / Satisfaction Working Group (CM/SAT-WG) who report to the Consumer Engagement Oversight Group (CEOG).

Unwanted contacts as a % of total contacts (Line 21)
This line is not included in Table 5 for AIR18.

First Point of Contact Resolved (FPOCR) (Line 22)
The contacts which are resolved on the first point of contact are reported to be 65.8%. This is marginally less than in AIR17 (66.5%).

When a contact requires an action and this action is completed at first point of contact and there is no repeat contact from the same property on the same issue within a 90 day period then it shall be counted as 'First Point of contact resolution'.

The table below shows the number of contacts resolved in, 0, 1, 10, 30, 60, 90, 120 and 180 days. This shows that 79.3% are resolved within 10 days.

No. of days	No. of contacts resolved	% of contacts resolved
0	144720	54.2%
1-10	66908	25.1%
11-30	15220	5.7%
31-60	6388	2.4%
61-90	5624	2.1%
91-120	4793	1.8%
121-180	10600	4.0%
>180	12809	4.8%

Customer advocacy measure (Line 23)
The Customer Advocacy measure follows the standard approach for Net Promoter Score. The sample (~800 contacts, in 4 waves, 200 per wave) is selected from resolved contacts only (from telephone and written channels) in relation to both billing and operational areas and is selected on a 1 in n basis from an unsorted list to ensure a random sample. This is carried out by an independent market research company Allto (McCallum & Layton). Allto will issue an email in advance to notify which week's data will be required. The sample data set is obtained from a bespoke CorVu report entitled 'SIM Resolved Contacts Query LIVE with date prompt' which was created by NIW. Customers are asked "Likelihood of recommending Northern Ireland Water 1-10?" This measure is reported as 31 which is an improvement on 27 in AIR17. This is on a scale from -100 (bad) to +100 (good).

Omnibus survey question 1 (Line 24), Omnibus survey question 2 (Line 25)
For 17/18 in place of the Omnibus Survey, an Interim PC15 Research Customer Views Survey was carried out, as part of the regulatory requirement to return at mid-point of Price Control 15 (PC15) to determine if customer views and priorities had changed.

The customer survey is based on a sample of 1026 domestic consumers and 250 non-domestic consumers from the whole customer dataset. Kantar Milward Brown) carried out the survey. Survey size, statistical significance, and sampling approach are clear and considered appropriate.

As in the benchmark survey conducted in 2014, consumers were asked about their 'satisfaction with the services' provided by NI Water.

Overall satisfaction with NI Water has significantly improved amongst domestic consumers, increasing from 80% in 2014 to 93% in 2017. Uplift can similarly be seen, and indeed is more stark, amongst the non-domestic market, increasing from 58% to 90% in the same period.

The score for question 1 is provided as a combined percentage from the domestic and non-domestic responses of those that gave an answer of 1 or 2 (strongly or tend to agree). The reported figure is 92.4%.

Customers were then asked; 'how likely they would be to recommend NI Water company to a friend or colleague if they could choose a different provider' (1= not likely at all, 10 = extremely likely). Approximately 1 in 3 respondents of both samples thought it extremely likely. As per the table below the score was calculated based on the overall average which returns a score between 0-10. Of the 1026 domestic customers surveyed the average was 8.23 and of the 250 commerical customers surveyed the average was 7.85. The overall score achieved and reported figure is 8.2.

Post-audit, it was found that the methodology stated in the commentary did not match the methodology used for the value in the table. This was queried with NI Water and it was confirmed that the data in the table is correct. The commentary has since been updated to reflect this.

Assumptions
We believe that all relevant and material assumptions have been disclosed above by either the Company or the Reporter.

4. Compliance Methodology and Process Controls

Overview
The Company's Levels of Service Methodology describes the configuration of its telephony system. NI Water has also identified the telephone numbers (PACC lines) and locations against which they are reporting in their Methodology Statement.

Calls received outside of their advertised times are not included in the report of calls received or calls abandoned. No message manager systems or answering machine facilities were used during the reporting year.

Switchboard and internal transfer calls are excluded.

Occasionally NI Water will run an emergency test system. There is an emergency call centre located at Monkstown where calls are then received. Calls logged during this period will need to be added into the total from a different system. This has been added into the AIR18 figures.

Call Services offered/telephony configuration
During our AIR15 audit we questioned the Company on the call services it offered in terms of non IVR

Queuing or automated speech recognition facilities as we are aware from other experience that calls via such services are often difficult to track and report.

NI Water advised that their telephony system in the report year has been configured so that an HVCA capability can be deployed if required (see HVCA comments) however no additional services are currently offered.

This methodology has not changed in AIR18.

Reporting
NI Water advised that the telephony system is configured to produce data required by the Reporting Requirements. As such data, with the exception of HVCA, is provided for the total number of calls received and calls abandoned and is taken directly from the Call Media system. Telephone complaint volumes are derived from CMS logs in Rapid and exported via a Corvu query based on the list of CMS codes identified as a complaint and any other contact that has the complaint indicator selected.

We have not undertaken any checks on the configuration of these reports. The Company has a documented methodology of how data is collated from the system and during the audit the representatives outlined the processes they follow. Data for the all lines busy indicator is derived from NI Water's telephony provider's systems. Again, we have not tested the reliability or accuracy of this report.

We have checked and confirm that the totals presented in the DG9 lines of Table 5 are consistent with the summary Call Media reports compiled by the Company.

Surveys
We found that the Company reports all calls received to the market researcher and no exclusions are made. As such it is possible that allowable exclusions are included in the market researchers' sample in each of the designated weeks.

Wanted/Unwanted calls lookup
At audit we were provided with the wanted/unwanted lookup table. This contains 1368 CMS codes, an increase of 7 on AIR17:

Wanted = 162 (decrease of 1 from AIR17)
Unwanted = 237 (decrease of 1 from AIR17)
Exclusions = 428 (increase of 9 from AIR17)
Closures = 540 (same as AIR17)
Blanks = 1 (same as AIR17)

It was noted that the majority of these were defined as exclusions or closures. In AIR17 NI Water provided the following, this process remains the same in AIR 18:

"The Lookup list covers all CMS codes logged within Rapid, this includes Customer raised CMS codes, Internal CMS Codes (to track work flows on Rapid internally) and Closure CMS codes.
We have used Ofwat guidance to determine what is a Wanted and Unwanted contact and anything that does not fall within either category is an Exclusion, for example if a customer contacts NI Water regarding a different company and the query is not related to NI Water then is an Exclusion which is represents by a CMS code.

When a contact is received, it is assigned an Original CMS Code which determines whether it is a Wanted or Unwanted contact, when the contact has been dealt with the outcome will be reflected in the Closure CMS code. For example, a customer may contact NI Water to pay a bill and request a copy of the receipt this will have an Original CMS code for Credit/debit card payment, once this has been dealt with the closure CMS code will be changed to Receipt Request CMS Code. So, for the purposes of reporting on the Original CMS code theses codes are classified as Closures."

Quality Assurance
NI Water advised that they carry out call listening every month to sample 10 calls to assess how they are handled, logged and ensure any follow up requests or requests from the customer have been completed. Following the recommendation at AIR17 for a sample to be taken of Wanted & Unwanted Contacts to confirm that these were being logged correctly. A sample of 50 Wanted & 50 Unwanted closed contacts are currently taken at month end, any anomalies in the categorisation are fed back to the relevant team for training purposes. CCNI will also undertake call listening twice a year.

These checks are important controls within the reporting process and we would encourage the Company to continue these checks in at least the same level of detail.

5. Summary of Audit Checks

Our audit consisted of an interview with the NI Water system holders, a review of the current methodology for data collation and an audit of the data provided. We have also checked the data in the final submission for consistency with previously audited data. We have not attempted to reconcile the numbers of calls received to the number of calls logged on the Company's contact management system. The monthly call listening was undertaken for June during the period of the audit. Although these were not AIR18 records, it was a useful indicator of the wanted/unwanted codes being applied to calls. For the 10 calls that were heard, these were considered to be correctly coded.

Consistency checks
We can confirm that:

- Line 13 is equal to Table 44 Line 49
- Line 14 is equal to Table 44 Line 51
- Line 15 is equal to Table 44 Line 48
- Table 5 Line 13 and 15 are used to calculate Table 44 Line 50. Line 50 is equal to Table A Line 9.
- Table 5 Line 13 and 14 are used to calculate Table 44 Line 52. Line 52 is equal to Table A Line 10.

6. Confidence Grades

We believe the confidence grades assigned to Lines 13 to 17 (A2) are appropriate but have not undertaken any specific or statistically significant checks to verify the volume of calls reported. The confidence grades applied to lines 19-25 (19 – 22 A2, 23-25 A1) are considered to be appropriate based on the amount of processing involved in producing the figures.

7. Recommendations

For ease at audit, suggest adding a more detailed explanation of how the scores from the survey results are calculated into the line methodology/commentary.

SUMMARY OF AUDIT FINDINGS

Table 11 – Water Service Activities

PREPARED BY: [X]

DATE: 30 October 2018

1. Key Findings

Criteria	RAG	Assessment
Independent review of performance and reporting	Green	Performance good. Reporting process well managed
	Blue	We suggest additional resources (Educators) would help NIW respond to demand for NIW's water education programme.
Methodology	Green	Methodology consistent with current process, control points identified and understood
Assumptions	Green	Assumptions reasonable and appropriately applied
Source data	Green	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of audit trails	Blue	Content with reported information but some audit trails and explanation of year-on-year changes appear limited, for example lead communication pipe replacements.
Confidence grades	Green	Confidence grade appropriate and rationale clearly documented
Governance	Green	Responsibilities for integrity of data and commentary clearly defined. Good evidence of engagement and of final sign-off. (Note: Line 26&27 are considered blue as final sign off not available because the reviewer is on long term sick leave)

- The length of mains renewed is has decreased from 161 km in AIR17 to 110 km in AIR18. The higher value in AIR17 was due 'catching up' from the lower value in 2015-16 due to this being the first year of PC15.
- The Company has exceeded its target of 93 km of new, renewed or relined mains delivered under the watermain rehabilitation programme, with 126 km reported in AIR18.
- The Company has replaced 2,460 lead communication pipes, which is a significant decrease from the value of 4,311 reported at AIR17.
- The Company has reported only 76 lead communication pipes have been replaced, which is significantly below the number reported at AIR17 (599). We challenged the company to check that lead communication pipe replacement was being correctly recorded on the job management system.
- All zonal study models were completed in 2012-13, so the Company has reported 100% completion. The Company has continued to update the models when investment is planned and requires an up-to-date model.
- The confidence grades are similar to last year, with small changes due to the balance of data from different sources with different levels of confidence.
- The number of mains bursts reported (Line 11) has increased from 79.7 to 91 bursts per 1000 km, which is consistent with the extreme weather event in early 2018 and the additional leakage activity that this led to.
- The Company has continued to improve its process for collating the data for this table from various sources, but we recommend that further improvements could be made, particularly in developing a single spreadsheet to collate the returns.

- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.
- This commentary for Lines 2-11, 13-17, 28 is based on a draft commentary and table, which was edited during audit; the final commentary remains utstanding.
- The Company has changed to report overall compliance against all regulatory consented parameters (previously the Company was reporting Mean Zonal Compliance).
- Percentage Overall compliance is similar to that reported in AIR17 which indicates continued stability against drinking water regulations. Our audit confirmed Percentage Overall compliance at 99.88% (99.86% in AIR17) exceeding the target of 99.79%.
- Percentage Compliance at consumers' taps (Line 19) was confirmed at 99.77% (99.74% in AIR16) meeting the target of 99.69%.
- Percentage Iron compliance at customers' taps (Line 20) has increased from 98.66% in 2016 to 98.85% in 2016. The OPA target is 97.90% and the Overall target is 97.10%. Both targets have been achieved.
- NIW has continued its educational programme targeting schools and other educational events. Demand for this is high with 2018/19 fully booked and 70 schools already on the waiting list for 2019/20. NIW would benefit from additional resources to meet demand.
- NIW has completed a total of 21 Catchment Management Plans/Studies with three completed in the Report Year. Two remain to be completed in the current year. NIW is on target overall to complete the 23 required. The outputs result in multiple potential SCaMP NI projects over the next five years and NIW would benefit from additional staff to progress the recommendations, many of which require liaison with farmers and councils, with some cross north/south border activities.
- The Company has improved its process for collating the data for this table from various sources, but we recommend that further improvements could be made, particularly in the supporting commentary to explain any significant year-on-year changes.
- We audited the reported data and challenged the processes on a sample basis. Except where detailed below, we consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and that are properly implemented with effective quality control and governance arrangements.

2. Audit Scope

The audit consisted of interviews with the NI Water system holders to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years

3. Performance and significant events

Company performance has largely been in line with AIR16, except in the following areas:

- The length of mains renewed has reduced from 161km in 2016-17 to 110 in 2017-18.
- The Company has exceeded its target of 93km of new, renewed or relined mains delivered under the watermain rehabilitation programme, with 126 km reported in AIR18.
- The Company has replaced only 76 lead communication pipes which is significantly below the number reported at AIR17 (599). We challenged the company to check that lead communication pipe replacement was being correctly recorded on the job management system.

- Although all distribution studies have been completed the Company has started the process of updating these as up-to-date information is required. A further seven models were rebuilt in AIR18.
- The burst rate, which is effectively a 'repair rate' has increased due to an extreme winter weather event and the resultant additional leakage activity by the Company.

4. Compliance methodology and process controls

4.1 Compliance methodology

This information will provide a statement of activities in the Report Year relating to the water service. It includes activities and asset balance in respect of water distribution; information on water distribution zone studies and delivery of nominated outputs.

4.2 Process/methodology controls

The entries of Lines 1 to 17 in this table are largely a summation of values provided from Networks Water Operations (NWO) and Engineering Procurement (EP). The values are collated centrally before compilation of the commentary and table. As in previous years we recommend that the data providers (EP and Networks Water or their contractors) supply a commentary with their data which discusses trends and highlights any reasons for a-typical years.

For **Lines 18 to 21** the Company explained that there was no change in its methodology which we confirmed. The data source is the LIMS system which is an Oracle database interrogated using specific SQL queries. Monthly reports are produced, at month end, for ongoing monitoring of Water Quality compliance. This data is produced using the same SQL queries as used for the AIR year end information.

Where the number of samples taken and analysed is greater than the number required by the DWI, the reported number is adjusted to be the number required. The Company confirmed that any exceedances are reported even if they originate from a larger number of samples than required. The Company therefore does not selectively report sample results when a greater number is available to the number required.

A small number of shortfalls occurred which are not considered to be material:

- Water supply zones – results deemed indicative only following quality control failure identified by external UKAS audit after year end. This was 23 samples (11 Boron and 12 Chromium).

- Authorised supply points – four results discounted (3 following quality control failure identified by external UKAS audit after year end, 1 lost/broken sample bottle by external laboratory)

- Water treatment works – 42 results discounted where one of the outlet supply pipes at Dorisland WTW was closed for drought mitigation (with the area fed from a different WTW), however samples for the WTW as a whole were lifted from that pipe for six days and were deemed unrepresentative.

A total of 101,928 samples were taken and analysed in the year. The total number used for all water quality reporting is 99,382 which accounts for the number of samples that were taken above the regulatory number required and the shortfalls described above. The reduction in number is considered to be not material and still meets the regulatory requirement.

We note the Company's methodology requires that the table and commentary are signed off by senior management.

The Company demonstrated the quality assurance controls it has in place to ensure the data collation process is robust. The use of Remote Sampler which is a mobile data collection solution designed specifically for use in the water and environmental sectors was introduced in 2016 and has been used throughout the 2017 year. Remote Sampler allows NIW's field technicians using Toughpads to receive and complete sampling jobs scheduled and managed from a central hub application. A centrally located scheduler using the hub can extract sample, bottle and test information from LIMS and flexibly assigned to the different devices and users in the sampling team. This provides a full audit trail for samples which records when the sample was taken, the exact location of the sample point, flushing that took place, sample bottle references, and when they were returned to the hub and dispatch to the laboratory. This improved audit trail can assist in the event of a sample failure because the process of obtaining the sample (disinfection) and delivery top the lab can be fully demonstrated.

Remote Sampler also assists the field team with samples that are to be taken from customers' taps. For example, if the selected address is not accessible Remote Sampler provides 100 other addresses which are guaranteed to be on the same water supply zone.

For **Lines 22-24**, all relevant data is extracted directly from CPMR.

5. Summary of audit checks

Total length of mains (Lines 1 and 12)

Line 1 is a copy of the AIR17 reported length of mains. We confirmed that the reported number is consistent with the AIR17 data at 26,778.15.

To derive Line 12, the MapBasic script queries the cut of mains data for just NI Water mains and filters out abandoned mains or mains not in service. Because of recommendations in the AIR14 audit, trunk mains which are not in service are added back into the output (because they could be brought back into service). We confirmed that the MapBasic script runs as expected and when run during the audit reproduced the reported number of 26,837.45.

Changes during report year (Lines 2 to 11)

There have been no significant changes to the overall methodologies or commentary structures compared to last year. The commentary segregates the inputs from Networks Water Operations (NWO) and Engineering & Procurement (EP) for Lines 2 to 10. The level of detail provided for Lines 7 to 10 has been improved from the AIR17 commentary, we consider further improvements could be made to improve the audit trails.

Main renewal, relining and cleaning (Lines 2-6)

In line with the Reporting Requirements, the inputs into the line totals comprise input data from EP and NWO.

Trunk main lengths have been included in the totals, with details of trunk mains included in the commentary as required by the reporting requirements.

Line 2 - Mains Renewals

The Company reports a decrease in mains renewals this year from 161.29km to 109.57km. The cumulative length of mains renewal under the watermain renewal programme has been exceeded (see line 6b).

Line 3 - Mains Relined

Pipes replaced by pipe bursting or structural lining methods (standard slip-lining techniques are generally considered to replace the existing main) are correctly included in Line 2 as these are deemed to replace the existing pipe. Only where a lining is applied to the fabric of the existing pipe (e.g. spray application) is it reported in Line 3. Historically, the Company does not employ any non-structural lining methods and hence the Line 3 total is zero.

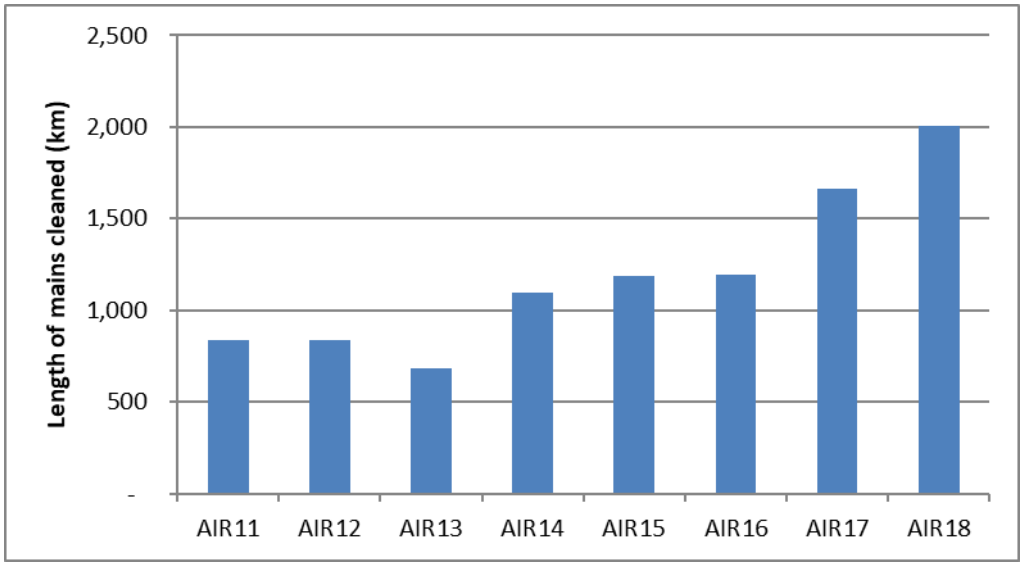
Line 4 - Mains Cleaning

Mains cleaning is all undertaken by Networks Water under maintenance activity and hence the EP input is zero. This year, the Line 4 total of 2,008.61km and increase from the AIR17 value of 1,665.69km. Although the mains length has increased, the number of flushing jobs has decreased from 7,058 to 6,763 flushings.

The company continues to revise the factor that is used to convert from number of mains flushing to length of mains flushed on a year-to-year basis as more data is gathered. The revised factor is based on a sample of 150 mains flushing events, and has increased from 0.236km per flush to 0.297km per flush. This estimate will be revised further in future years.

The Company undertakes manual checks to assess the data for errors and duplication. NI Water admits that there remains a potential for some double counting (primarily of repeated one-off incidents within year or for cleaning in response to customer water quality complaints following a mains repair), but advised that these occurrences are 'minimal'. We agree that recent changes to the system through the adoption of work codes and that carrying out manual checks on the data have greatly improved the reliability and reduced the potential for error.

We are therefore satisfied that the impact of any remaining duplications is likely to be within the margin of error covered by the current B3 confidence grade.



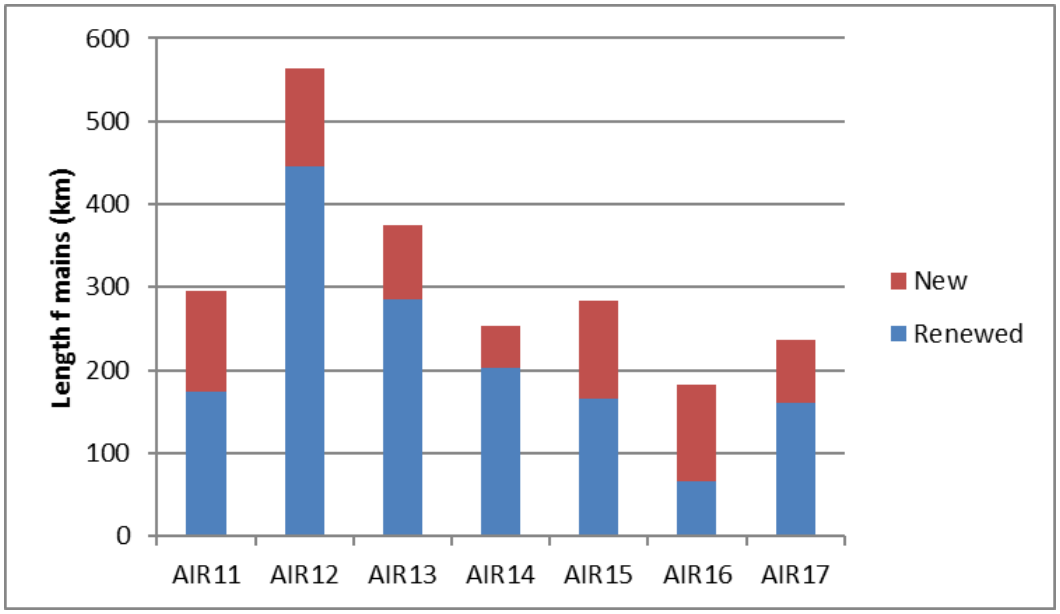
Line 6 – New mains

The reported length of new mains installed has increased significantly from 75.22km to 92.43km within the Report Year. This comprises 74.83km (55.59km last year) reported by NWO and 17.6km (19.63km last year) reported by EP.

The total reported by NWO relates to new housing developments.

Line 6a – New, renewed or relined mains

This is a calculated line, the sum of Lines 2, 3 and 6, which is 202.00km, an increase from the relatively low value reported last year (236.51km in AIR17). The following graph presents a comparison with previous years.



Line 6b – New, renewed or relined mains delivered under the watermain rehabilitation programme

This is a calculated line, the sum of Lines 2, 3 and 6 (202.00km) minus new mains on new developments (76.00km).

The Company has exceeded the monitoring plan target of 93km per year in PC15 by 33km.

Mains abandoned and other changes (Line 7)

The Company has reported a total of 124.24 (167.55km last year) of abandoned mains this year, with the majority which are reported by EP under the mains rehabilitation programme (122.89km). Lengths are based on data provided by individual project managers. The decrease is in-line with the reduction in the mains renewal programme.

Our review concluded that the lengths of abandoned mains have been correctly extracted in accordance with the Reporting Requirements. The total includes both wholly abandoned mains and those replaced by renewals as per the Line 7 definition. Due to the way the Company reports abandoned mains, it is not possible to ascertain from the data how much of this length was wholly abandoned and how much was through the process of renewal.

Communication pipes (Lines 8 to 10)

These lines present details of communication pipe replacement, with details of the material and the reasons leading to the communication pipe being replaced.

Line 8a – Lead communication pipes replaced as a consequence of water quality sample failures

This activity is undertaken by NWO, with a total of 43 reported this year; this is very similar to the 44 reported in AIR17.

Line 8b – Lead communication pipes replaced as a consequence of customers notifying NI Water that they are replacing their lead supply pipe

This activity is undertaken by NWO only; we were provided with monthly totals that confirm the annual total is 574. This is consistent with average of the previous three years of 623.

Line 8c – Opportunistic lead communication pipes replacement undertaken under the watermain rehabilitation programme or during burst service pipe repairs

There has been great variability in the value reported in this line over recent years:

Line 8c	AIR15	AIR16	AIR17	AIR18
Networks Water	2,747	660	1,801	76

At AIR16 the Company reported a significant reduction in this line from 2,747 to 660 due to a combination of factors including 2015-16 being the first year of the PC15 period and mains renewal being targeted to rural areas. The AIR17 value then increased significantly to 1,801 back towards previous values, but for AIR18 there has been a significant fall to 76. We do not consider this low number reasonable given the length of mains renewed.

We asked the company to explain the decrease in the AIR18 number, and to confirm that lead commination pipes that are replaced under the watermain rehabilitation programme are correctly included within this line.

Line 8d - Lead communication pipes replaced under the proactive lead replacement programme

This activity is undertaken by EP and relates to a new programme that started in April 2014. The AIR18 value of 1,767 is similar previous values (1,867 at AIR17 and 1,822 at AIR16).

Line 9 - Lead communication pipes replaced - maintenance or other

The Company has reported a value that is the summation of 8a, 8b, 8c and 8d (2,460) which represents a significant decrease from the AIR17 value of 4,311. Until we get confirmation of the supporting data for line 8c we suspect that this value may be under-reported.

Line 10 - Communication pipes replaced - other

The number of communication pipes replaced in a year reflects both the length of mains replaced and the rural/urban mix; urban mains will have a greater density of communication pipes per km of mains. In AIR17 the Company has replaced 3,769 which is consistent with the range over recent years of 5,608 (AIR17), 3,915 (AIR16) and 7,469 (AIR15).

The AIR18 value is built up from 2,336 from EP (4,419 in AIR17 and 2,736 in AIR16) and 1,415 from Networks Water (1,189 in AIR17 and 1,179 in AIR16).

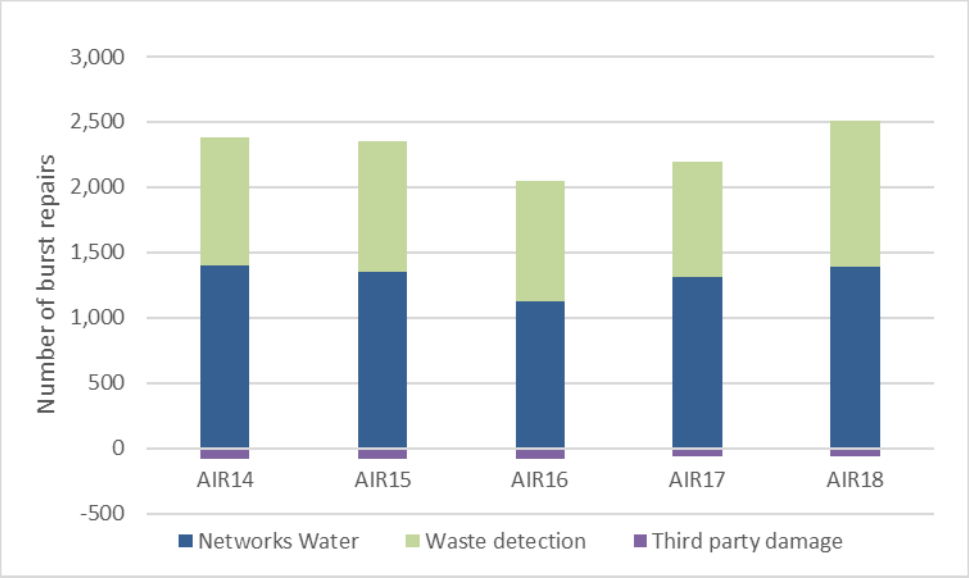
Line 11 - Mains bursts per 1000km

There has been an increase in the reported number of mains bursts per 1,000km this year, increasing 74 (73.8 to 1dp) to 80 (79.7 to 1dp) bursts per 1,000km. As explained in the Company's commentary, this figure is derived from the total number of recorded burst events, divided by the total length of mains.

The number of bursts is calculated directly from data compiled and reported primarily by the Water Business Unit and agreed with field managers within Networks Water Function.

A check against the source data confirmed the contributing total of 1,394 reported burst mains repairs by Networks Water with an additional 1,116 repairs were undertaken due to waste detection (active leakage control). Additionally, 66 repairs due to third party damage on mains were deducted from the total giving a total of 2,444 repairs in the report year. The values for the last five years are shown in the following table and chart.

Number of bursts	AIR14	AIR15	AIR16	AIR17	AIR18	Change (AIR17 to AIR18)
Networks Water	1,397	1,352	1,127	1,313	1,394	+6%
Waste detection	985	996	924	883	1,116	+26%
Third party damage	-83	-82	-79	-61	-66	+8%
Total	2,299	2,266	1,972	2,135	2,444	+14%



The increase in the number of bursts is consistent with the additional leakage activity undertaken by the company to recover its leakage.

The line total is confirmed as the correct summation of the data obtained from the two data sources divided by 1,000km as required.

Distribution Studies (Lines 13 to 17)

NI Water's zonal model development started in 1999 leading to the adoption of a distribution zonal study programme in 2001. The programme aimed to set up models to cover all 71 water supply zones, and the final 7 models were completed by 2012-13. NI Water now has models for all 71 distribution zones, and consequently 100% of the zones studies have been completed, and 100% of the population are now covered.

Now that all models have been completed, the company has started a new programme to update the oldest models, those where significant changes may have occurred, and those covering areas where there may be operational problems or investment planned.

Over the last three years the company has rebuilt a total of 26 models, which represents 48% of the total number of models.

Hydraulic model rebuilds	AIR16	AIR17	AIR18
Models	9	9	7
Properties ('000)		224	136

Water quality compliance measures (Lines 18 to 21)

The Company reports Percentage Overall compliance with drinking water regulations for Line 18. Percentage Overall compliance is similar to that reported in AIR17 which indicates continued stability against drinking water regulations. Our audit confirmed Percentage Overall compliance at 99.88% (99.86% in AIR17) exceeding the target of 99.79%.

Percentage Compliance at consumers' taps (Line 19) was confirmed at 99.81% (99.77% in AIR17) meeting the target of 99.69%.

Percentage Iron compliance at customers' taps (Line 20) has increased from 98.66% in 2016 to 98.85% in 2017. The OPA target is 97.90% and the Overall target is 97.10%. Both targets have been achieved.

Service Reservoirs with coliforms detected in >5% of samples (line 21) is reported as zero because no service reservoir sites had more than three failures during the year (three failures = the site has failed for the year).

We confirmed all results are reported for the 2017 calendar year.

Nominated Water Service Outputs (Lines 22-24)

During our audit of Tables 40 and 40a of AIR18 and associated interrogation of CPMR we were able to confirm the total number of nominated Trunk Main, WTW and Reservoir improvements delivered during the year (line 22 to 24).

For AIR18, there were no nominated Trunk Main (Line 22) or WTW (Line 23) outputs forecast for delivery in Year 3 of PC15, hence the Nil return for these lines.

NI Water has however claimed that 1 x Service Reservoir nominated output (Line 24) was delivered during the year – a clearwater tank at Monaclough SR (JC385). Although not initially a nominated output for PC15, NI Water advised that Monaclough SR was added to the PC15 programme as a nominated output in 2016/17 within the adjusted outputs submission

We note that DWI have full visibility of the programme and sign off individual outputs confirming delivery of the outputs reported in Lines 22 to 24.

Number of Catchment Management Plans (Line 25)

NIW's approach to catchment management is to work with farmers and stakeholders in partnership rather than in an enforcing role. This approach is appropriate and has been successful in companies in England that adopt a similar tact.

NIW's activity in the year are reported on in detail in the commentaries for Table 47. We reviewed Table 47 and confirmed that the Catchment Management Plans (CMPs) for Carron Hill, Rathlin and Dungonnell were completed as planned (on target) in 2017/18. We reviewed the approach, methodology and outputs of these CMPs which are comprehensive studies. The outputs are recorded in a summary spreadsheet of all CMPs, which capture abstraction rates, population served, risks, external pressure on catchments, measures and next steps. In summary, they are:

- Rathlin (borehole site with risks of THMs and cryptosporidium) - capital needs to protect the borehole source and liaison with farmers regarding livestock
- Dungonnell (upland catchment/peat bog) – need for completion of the bog restoration project through the 'CABB' INTERREG project and abstraction monitoring programme for each intake and borehole rather than the WTW. Research with Queens University to establish raw water quality implications of a restored peat bog versus an unrestored bog.
- Carron Hill (at risk of MCPA pesticide) – cross border catchment which requires liaison with Irish Water and councils in Northern Ireland and in the South particularly in relation to MCPA.

CMPs for Killyhevlin and Belleek are underway in the current year under INTERREG funding. Once these are complete, NIW will complete the 23 studies (originally 24 until Camlough wtw was closed).

Projects that have taken place in the year include:

- 'Source to Tap' – a rush solution where 40 farmers engaged to undertake weed wiping
- CABB project (Co-operation Across Boarders for Biodiversity) – activity of blocking land drains at Garron Plateau to prevent fines washing down during flood events causing turbidity and discoloration problems. Results of this were demonstrated with graphs of improvement in water quality for both measures.

NIW has 23 catchments where WTWs have been abandoned/closed and are still under the company's ownership. Work is planned to verify the number of sites in the current year, then look at biodiversity legal obligations that are required to be undertaken.

The outputs of the CMPs translate into multiple projects to be implemented over the next five years. Likely changes in agriculture in the next five years could mean that by PC21, many of the CMPs outputs could be out of date and could need re-visiting prior to delivery in a future price control period. Additional resources may be needed in future price control period if the the CMP outputs become a programme of work. NIW may wish to consider the possible need for resources. The current resources of one FTE and six staff who each provide one day a month on a 'voluntary' in addition to their role would be insufficient to progress recommendations in a future PC period.

Number of school visits (Line 26)

We reviewed spreadsheet records to confirm a total of 219 school visits during the 2017/18 year. The annual target is 176 school visits which has been outperformed. 257 school visits took place in 2016/17.

Data includes all visits to school classes, visits made by NIW's Waterbus to schools, visits by school pupils to NIW's Heritage Centre at Bretland WWTW and school visits to Silent Valley organised by NIW. A lower number of schools were visited because of some cancellations during periods of poor weather (October storms and the March freeze/thaw), and the Waterbus was off the road for maintenance for a month.

However, it should be noted that whilst the number of schools visited has reduced compared to 2016/17, 18,863 pupils took part which is almost the same as 2016/17 (19,700 pupils). NIW has also spent more time at schools by visiting larger ones for a full day rather than two smaller schools in a day. The number of pupils and teachers visited at each school is recorded by NIW.

Number of other education visits (Line 27)

This is a manual count of hard copy records which is entered on the "Community Events" spreadsheet. We confirmed 62 events in 2017/18 (64 in 2016/17). The annual target is 57 events which has been outperformed. This activity has reached some 6,000 people.

We observe that there is high demand for both school and educational visits promoting the efficient use of water with a significant waiting list for school visits and NIW's Waterbus is fully booked for the 2018/19 year and some 70 schools are on the waiting list for 2019/20. Currently NIW has two Educators and a customer demand that can't be met with current resources. To better respond to demands, NIW would benefit from additional resources such as a Part Time or 'Term Time' Educator (NIW staff or external Temp). We understand a business case has been presented for this, however it has not yet achieved internal approval. We recommend the case for additional resources is pursued in order support this good work and reputation of NIW.

Service Reservoir Sample Taps (Line 28)

This was a new line at AIR16, and reports the percentage of service reservoirs where sample taps have been assessed, and if necessary upgraded, to the appropriate standard. As work was just staring the company reported a value of zero for AIR17.

During AIR18 a total of 212 sample taps were installed, which represents 73% of the total. The remaining sample taps are planned to be installed during 2018-19.

6. Confidence Grades

During the audit we discussed the confidence grades assigned and the Company's rationale and concur with the Company's assessments in all cases.

Lines 2 to 12

The Company generally apply average confidence grades for Lines 2-10 to reflect the two separate streams of information from Engineering and Procurement (EP) and Network Water Operations (NWO).

Currently, all data provided by EP for Lines 2-10 is applied a confidence grade of either A1 or A2 due to the detailed project records held and theoretical accuracy of the data. Data provided by NWO for Lines 2-10 is applied confidence grades varying from A1 to B3. Given the relative accuracy of the various data sources, we consider these confidence grades to be appropriate.

The overall grade applied to each line is generally to lower of the confident grades from the relevant data sources, unless one source dominates then the confidence grade from the dominant source is used.

Line 12 (mains length) is assigned a grade of B3 which is the same as AIR17. This grade is because it is based on historical sources of information which could be old and poor quality (even though the current system for storing data, Oracle, is high quality). There is some delay in updating information for new or abandoned mains into the system which means the length may be inaccurate (hence +-5%).

Lines 13 to 17

Given the discrete data entities, we support the Company's decision to report an A1 confidence grade for these lines.

Lines 18 to 21

The Company's confidence grades remain unchanged from last year, maintaining the policy of reporting A2 grades for all data based on a calculation. Where a value is reported on an absolute value of zero (i.e. pass/fail) for Line 21, A1 is appropriate

Lines 22 to 24

NI Water has reported a confidence grade of A1 for all nominated output related data, as it is derived directly from CPMR and the beneficial use date is embedded into CPMR to ensure output has been handed over to Operations.

Lines 26 to 28

We confirmed confidence grades of A1 are appropriate for these lines.

7. Recommendations

The reported numbers for the total length of mains is calculated using a separate process to that which calculates the new and abandoned lengths. In this and previous years, it appears that the difference between the year start and year end totals do not necessarily match the total of asset changes (new and abandoned).

In future, we recommend that the process is updated to include a review of the totals compared to the changes (new length, abandoned length etc). If the change in totals does not match the calculated changes based on new and abandoned pipe, any differences can then be reviewed and described in the commentary.

The entries of Lines 2 to 17 in this table are largely a summation of values provided from Networks Water Operations (NWO) and Engineering Procurement (EP). The values are collated centrally before compilation of the commentary and table. We also recommend that the data is collated into a single spreadsheet that also contains a summary from previous years to enable trend analysis of both the components and totals.

The Company has reported only 76 lead communication pipes replacements which is significantly below the number reported at AIR17 (599) and previous years. The company is requested to check that lead communication pipe replacement was being correctly recorded on the job management system.

We recommend NIW considers an additional resource to assist with expanding the educational programme promoting the efficient use of water, as described under Lines 26 & 27 above.

SUMMARY OF AUDIT FINDINGS

Table 16 - Sewerage Service Activities

PREPARED BY: [X]

DATE: 5th July 2018

1. Key Findings

AIR18 Table Criteria	RAG	Assessment
Independent Review of Performance and Reporting	**Green**	Performance good. Reporting process well managed.
Methodology	**Blue**	Methodology consistent with current process, control points identified and understood For the asset balance (Table 16 Lines 3-11a), we recommend introducing a stage in the process to review the asset balance comparing the totals and changes to understand if there are material differences (and describe any such differences in the commentary).
Assumptions	**Green**	Assumptions reasonable and appropriately applied
Source Data	**Green**	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of Audit Trails	**Green**	Detailed and comprehensive audit trail to all numbers available
Confidence Grades	**Green**	Confidence grade appropriate and rationale clearly documented
Governance	**Green**	Responsibilities for integrity of data and commentary clearly defined. Good evidence of engagement and of final sign-off

- With regard to sewerage service asset changes, there have been less new and rehabilitated critical sewers this year and comparatively more changes to non-critical sewers compared to last year.
- Whilst the number of reported collapses are relatively stable, the number of blockages are continuing to reduce year on year, demonstrating the benefits of a proactive hotspot programme, with secondary benefits from the PC15 DAP Programme.
- Since 2010/11, NI Water has reported a 852 (49%) reduction in the number of blockages experienced, which represents a significant achievement for NI Water.
- The Company can report on the time required to repair a blockage (Lines 13a-13c) and NI Water also collates a list of all the work order numbers on the blockage drafts which are not 'full rate' blockage clearance jobs and these jobs are excluded from the Ellipse data, thus improving the accuracy of the reported data.
- There is a significant change in the number of completed DAPs from last year to this year. The increase does not represent the number of DAPs completed in the year, rather a correction of the reported number to reflect all DAPs completed since 2003.

2. Audit Scope

The responsibility for the compilation of this table is split between numbers of managers who collate information from a number of contributors, each of whom was audited. The audit consisted of an interview with the line owners to discuss the methodology and data used to generate this table. The systems and methodologies used to gather data were also reviewed.

3. Performance and Significant Events

Asset Balance (Lines 1 to 2 and 14 to 15)

The total length of sewers has increased by 113km from AIR17 and the total length of critical sewers has increased by 32km. The sewerage district area is unchanged from last year.

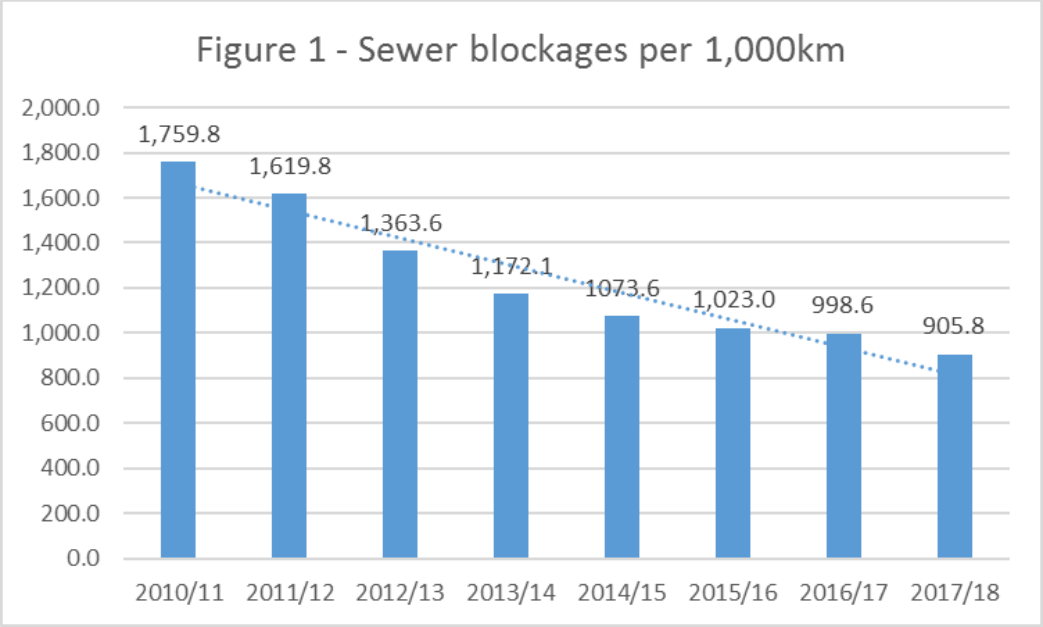
Changes during Report Year (Lines 3 to 11a)

With regard to sewerage service asset changes, there have been no significant changes in the length of new critical and non-critical sewers compared to AIR17 and no significant changes in the length of sewers renovated or replaced. In contrast, there has been a large increase in the length of CCTV surveys compared to AIR17 rising from 90km to 150km. This is as a result of major funding introduced to address the shellfish and bathing water directive resulting in the production of more DAPS and therefore resulting in more CCTV surveys being completed.

Sewer Collapses and Blockages (Lines 12 to 13c)

For AIR18, NI Water has reported 76 collapses per 1000km and 906 blockages per 1000km. Rising main failures account for <1% of collapses. The total number of blockages and collapses used to derive the metrics in Lines 12 and 13, are based on checked and paid contractor invoices for the numbers of blockages and collapses resolved.

Although the number of collapses per 1000km reported year on year is relatively stable, the number of blockages continues to improve year on year. As demonstrated in Figure 1 below, over the previous 8-year period, NI Water has achieved a circa 49% reduction in blockages.



As reported previously, the Company has adopted a more proactive response to repeat blockages, whereby a dedicated CCTV crew has been assigned to each area to complete CCTV inspections on all blockage hotspots and carry out cleaning, desilting and repairs, where problems are identified. Additonally, blockage performance has been further assisted through the delivery of the PC15 DAP programme, whereby comprehensive CCTV and desiltation of critical sewers has been completed in 23 drainage areas. Whilst this has primarily been undertaken to define hydraulic models that are being developed/updated as part of the DAP process, the process has also facilitated a further improvement in blockage/collapse performance. Performance in AIR18, suggests this combined strategy is delivering positive results, with a further 9% reduction in blockages reported for the year.

Whilst the above strategy is delivering results in reducing the number of blockages, the number of collapses remain at a relatively stable level, suggesting the structurally deficient sections of their sewerage infrastructure are not being as effectively addressed through the blockage hotspot strategy. As reported previously, we suggested that there may be benefit in implementing a similar strategy to address poor performing lengths of sewer and introduce a proactive, targeted CCTV and re-lining programme, and we are pleased to see that the Company are now targeting 11km of sewer rehabilitation each year. Through the development of well defined, prioritised programme (like that established for Water Mains Rehabilitation Programme), NI Water will be able to respond quickly to changes in PE, improving the Company's chances of delivering this programme.

To report on the time to repair blockages in Table 16 L13a-13c, NI Water run a monthly report in 'Ellipse' which confirms the length of time a sewer blockage job took to be completed. We found that for reporting purposes, NI Water now collates a list of all the work order numbers on the blockage drafts which are not "full rate" blockage clearance jobs and these jobs are excluded from the above-mentioned Ellipse data. Since the Ellipse system calculates the length of time a job takes from the time the work request is raised, until the work request is closed, all jobs exceeding 24 hours are investigated, as all follow-on jobs are included in the time the work request is open. These jobs are then reported in the correct category per the length of time the blockage job took to be completed.

Because of this improvement in process, NI Water has been able to better distinguish between actual blockages, follow on jobs, cancelled jobs or repeat calls, and thus reduce the variance in the number of blockages reported on 'Ellipse' with those based on checked and paid contractor invoices (used to derive Line 12 and 13 data). For AIR18, 14,393 blockages were identified on 'Ellipse' compared to 14,332 blockages that were based on paid contractor invoices, confirming a variance of +/- 0.4%, a significant improvement on the +/- 25% variance reported for AIR15.

Intermittent Discharges (lines 16a to 17b)

For overflows and UIDs, the NI Water process does not allow overflows to be upgraded without approval from NIEA and so NI Water state that the reported numbers should be consistent with NIEA's expectations. There have been no new sites added to the list this year and there have only been removals. The number of CSOs has reduced by 8 from last year to this year, which is equivalent to the number of UIDs removed (the solution in each case was to remove the CSO). It does appear that NI Water work closely with NIEA to ensure the list of overflows and UIDs is transparent and agreed with no work taking place unless NIEA approval has been obtained.

For the area of surface water removed from combined collection, the area removed has approximately doubled compared to the AIR17 area. This relates to three very large schemes that have been completed this year (which are listed in the commentary). NI Water state that they have already achieved their targets for surface water removed in PC15.

Drainage Area Plans (lines 18 to 22)

There is a significant change in the number of completed DAPs from last year to this year. The increase does not represent the number of DAPs completed in the year, rather, the change reflects a correction of the reported number to reflect all DAPs completed since 2003 (all of which are listed in the commentary). Whilst this number has been produced using a clearer definition, previously reported numbers involved a subjective view on the quality of the DAPs and whether it was detailed enough (and so reported a lower number). This year's list also includes DAPs which NI Water know were completed (they have checked with the consultant) but the model does not exist anymore and they do not know exactly when it was completed. The new number is clearer to the strict definition of DAPs completed since 2003, however, the previously reported number appears to be more reflective of the number of potentially useful DAPs. In practice, NI Water note that none of the DAPs have been maintained historically and therefore only the six DAPs

completed in the last five years can be considered useful. NI Water stated that the process for creating and maintaining DAPS has now been changed and improved this year, so that models will now be maintained with changes as they occur keeping the DAPs up to date.

There has also been a significant increase in the percentage of population covered by completed DAPs, increasing from 50.2% at AIR17 to 84.4% this year. This Is in part because of the increased number of completed DAPs discussed above, but also because of updated PE data being used to calculate the percentage. The increase therefore represents a correction in the percentage, rather than an indication of improved coverage from new DAPs.

The number of DAPs currently in progress is much larger than last year and corresponds to increased funding because of the shellfish and bathing water directives. The DAPs may take up to 2 years to complete.

Nominated Sewerage Service Activities (lines 26 to 28)

During our audit of Tables 40 and 40a of AIR18 and associated interrogation of CPMR we were able to confirm the total number of nominated UID, WwTW and small WwTW improvements delivered during the year (line 26 to 28).

For AIR18, NI Water has delivered 11 nominated UID outputs against a PC15 target for Year 3 of 5 outputs, although none of the outputs were nominated PC15 Year 2 UIDs. Of the outputs delivered, 7 of the outputs were nominated PC15 Year 1 UIDs, delivered 2 years late. We found that an additional 4 outputs were claimed in the year, comprising 2 x PC13 carryover UIDs (Milford and Rugby Ave), and a further 2 new UIDs identified and delivered (Bleachgreen and Muckamore), although 2 of the outputs are still subject to a change protocol submission. NI Water advise there are 30 UID PC15 nominated outputs still outstanding for delivery over the final 3 years of PC15 – 13 in 2018/19 and 17 in 2019/20.

In terms of the WwTW nominated outputs (Line 27), 3 WwTW outputs (Clabby, Ballycastle and Mullans WwTWs) were delivered in 2017/18, against a PC15 Year 3 target of 4 outputs. As above, of the actual PC15 nominated Year 3 outputs, only 1 – Mullan WwTW, was delivered on schedule. Ballycastle and Clabby WwTWs were both Year 2 outputs, delivered slightly late. Of the nominated Year 3 outputs, Ballintoy, Dundrum and Moneyreagh WwTWs are forecast for delivery in Year 4, whereas Ballygowan WwTW has been deferred to Year 5 of PC15. NI Water now anticipate completing 14 WwTW improvements in the last 3 years of PC15.

A total of 4 small rural WwTW nominated outputs were delivered, against a forecast delivery profile for Year 3 of PC15 of 7 outputs. We found that 3 of the 2017/18 planned outputs were deferred in order to fund other programmes of work. We understand that a further 10 small WwTW outputs are forecast for delivery in 2018/19. We note that NIEA have full visibility of the programme and sign off individual outputs confirming delivery of the outputs reported in Lines 26 to 28.

Additional Sewerage Service Outputs (lines 29 to 31)

There have been no EDM installations yet (line 29). NI Water note that they are still prototyping the installations, surveys and SCADA setup. The process is being checked with NIEA to get their approval on how NI Water will report on this. They state that roll out should occur this year and they are confident of achieving the regulatory date (end of PC15) subject to receiving NIEA approval.

Additional Sewerage Service Activities (lines 32 to 33)

We confirm that 1 sustainable WwTW solutions was delivered during the year. Clabby WwTW, which was delivered during the year (as discussed above), is a newly added Pharmafilter with a maximum PE of 750.

4. Compliance Methodology and Process Controls

Asset Balance (lines 1-2 & 14-15)

The process of calculating these lines is completed using a standard MapBasic script which has been used to produce the numbers for previous years. The process is open, repeatable and self-describing making it very clear how the numbers have been generated. Once generated, the numbers and commentary are reviewed internally before being reported. The team use iStream to store documents which then controls the status and approval of the documents.

Changes during Report Year (lines 3 to 11a)

There is a mix of data sources for these lines, including CPMR (system holding all capital schemes), developer services, operations (ops contractor) and asset performance. Some of the data requires passing into a calculation sheet to generate the final numbers while other data is taken as-is from the source. Where the calculation sheet is used, there are standardised functions to sum up the required data to produce the outputs. We note that information from other sources is provided in standard templates (for example, the operations data on CCTV surveys). Once generated, the numbers and commentary are reviewed internally before being reported. The team use iStream to store documents which then controls the status and approval of the documents.

Sewer Collapses and Blockages (lines 12 to 13c)

The number of sewer collapses and blockages per 1000km is calculated based on other data as follows:

- line 12 (sewer collapses) = [table 46 line 32 (rising main failures) + table 46 line 33 (gravity sewer collapses)] / [table 16 line 14 (length of sewers at end of year)]
- line 13 (sewer blockages) = [table 46 line 36 (sewer blockages)] / [table 16 line 14 (length of sewers at end of year)]

Intermittent Discharges (lines 16a to 17b)

There is a mix of data sources for these lines, including CPMR (system holding all capital schemes), developer services, operations (ops contractor) and asset performance. Some of the data requires passing into a calculation sheet to generate the final numbers while other data is taken as-is from the source. Where the calculation sheet is used, there are standardised functions to sum up the required data to produce the outputs. We note that information from other sources is provided in standard templates (for example, the operations data on CCTV surveys). Once generated, the numbers and commentary are reviewed internally before being reported. The team use iStream to store documents which then controls the status and approval of the documents.

Drainage Area Plans (lines 18 and 22)

There is a mix of data sources for these lines, including CPMR (system holding all capital schemes), developer services, operations (ops contractor) and asset performance. Some of the data requires passing into a calculation sheet to generate the final numbers while other data is taken as-is from the source. Where the calculation sheet is used, there are standardised functions to sum up the required data to produce the outputs. We note that information from other sources is provided in standard templates (for example, the operations data on CCTV surveys). Once generated, the numbers and commentary are reviewed internally before being reported. The team use iStream to store documents which then controls the status and approval of the documents.

Wastewater Compliance (lines 23 to 25)

The data for these lines is extracted from source with minimal filtering or processing. The majority of this processing is done in creating the BU Tracker sheet to reconcile incident numbers on the NIEA report back to the original LIMS (Laboratory Information Management System) data. The sheet can then be filtered to produce the necessary table data. Where data is processed, the

methods are well embedded and appear robust.

We located no evidence to contradict the methodology stated in the company's documentation and can confirm that there was very good evidence of management engagement.

Nominated & Additional Sewerage Service Activities (lines 26-28 & 32-33)

All relevant data is extracted directly from CPMR.

5. Summary of Audit Checks

Lines 1-2: Asset Balance

Lines 1 and 2 are a copy of the AIR17 reported lengths. We confirmed that the final numbers for lines 1 and 2 are consistent with the reported numbers last year at 15777.29.

Lines 3 and 5 to 11a: Asset changes (sewerage service)

The data for these lines is calculated from three sources: Asset Delivery (AD), Developer Services (DS) and Operations (CSD).

The AD numbers are sourced from the system CPMR. A report is generated from CPMR listing all capital schemes, however the report initially shows a total of 2.923km of new critical mains. This Is not the reported number (0.65km) because it includes new critical sewers, renovated and replaced sewers. Each scheme has a percentage value in CPMR which represents the proportion of the scheme which is new development and only this percentage represents newly laid main. The remainder of the length is then marked as replaced or renovated. These corrections are completed in a calculation sheet ("17-18 AIR Sewers figures - reconcilled.xlsx") and we confirmed that the calculations in the sheet are consistent with the stated method. This method produces all AD data for lines 3 to 11 and we confirmed that the reported lengths are the same as the lengths produced by the calculation sheet.

The reported DS numbers are consistent with the lengths quoted in the Quarterly Sewerage Adoption sign-off sheets and we confirmed that the split between critical and non-critical is consistent with the stated methodology.

We confirmed that the reported lengths of renovated sewers by CSD are consistent with the source data ("Statistics for WWBU -OCMC [X].xls").

We checked a sample of individual records to ensure correct attribution and reported lengths:

- AR605: Upper Newtownards Road Sewer Upgrade. Correctly marked in CPMR as Critical because of the depth and the criticality of the road (cost to dig it up is very high).
- KG212: Armagh Road, Portadown. Critical because it is a main road in Portadown. Reported length for this project is 0.163km of new critical and 0.11km of new non-critical. When viewed on CPMR, the lengths of new critical are 0.113 + 0.05 + 0 + 0 + 0 + 0 =0.163 which is as reported. Non- critical length is 0.05 + 0.06 + 0 + 0 = 0.11 which is as reported.
- KS952: Correctly showing in CPMR as abandoned.

Line 4: Critical Sewer CCTV Surveys

AD data for CCTV surveys comes from the same CPMR report as described above. The length of 19.47 was reviewed in the calculation sheet and the reported number should be 19.457. This error is very minor and well within the stated confidence grade. The operations data is logged only as CCTV and does not reference the criticality of the sewer. An assumption is made for the reported numbers that the length of critical sewer surveyed is 25% of the total length. The figure of 25% is the percentage of critical sewers to total length in the Asset Repository. This percentage is correct and does appear to be an appropriate assumption.

The survey length from Asset Performance (AP) is an aggregation of CCTV lengths from projects KI601 111, KI603 111, KI604 111 and KZ008 114. We checked the source data (project control spreadsheets) listing all the CCTV lengths and once the 2018/19 data is removed we confirmed that the length of AP surveys is 92.2km.

Lines 12-13c: Collapses and Blockages

We trailed the reported blockage and collapse data back to source on Ellipse, and as summarised in Section of our Table 3 commentary, reviewed a number of collapses and blockage incidents to confirm accuracy of the Company data

Line 14: Asset Balance

Line 14 is calculated by the MapBasic script, which when re-run during the audit generated the length of 15890.63 which is the same as the reported number. We checked the logic in the queries within the script and confirmed that the script queries for all NI Water sewers and excludes any not-In-service and abandoned sewers. The only assumption relates to a small number of sewers where ownership is unknown – these are included in the total length.

Historically it appears that the difference between the year start and year end totals (113.34km this year) do not necessarily match the total of asset changes (the intervening lines of data). These sets of numbers are extracted from different systems and so it is unlikely they will add up, but we recommend that in future the totals and changes are compared prior to audit and any differences can be reviewed and described in the commentary.

The length of critical sewers is calculated by the MapBasic script, however, sewers are assigned as critical using another process developed by Atkins. This process looks at the proximity of sewers to buildings, railways, traffic sensitive streets and watercourses. The process also takes account of size, material and depth to determine strategically important mains (using a rule-based approach e.g. >1500mm is a critical sewer). This process is run and assigns a criticality of A, B, C or U. Grades A and B are critical, C is non-critical and U is unclassified. The process was developed in 2009 but we confirmed that the data has been updated recently (Building polygons are 2017; Railways are 2016; Traffic sensitive streets are 2011; Watercourses are 2017).

The total length of critical sewers this year, does not equal total length from AIR17 (line 2) plus the asset changes. As above, we recommend that the totals and changes are reviewed prior to audit to describe any differences. However, we acknowledge that because the process defining criticality is redone each year with new data (as per description above), this means that sewers will get reclassified to critical as conditions change or their attributes get updated. The change in length of critical sewers is therefore comprised of critical sewers being laid or abandoned, plus any sewers which are reclassified as critical.

Line 16a to 17b: Unsatisfactory Intermittent discharges

NI Water have a master spreadsheet of overflows and unsatisfactory intermittent discharges (UID) which they will deliver solutions for and this has been agreed with NIEA. This is a locally held list which then forms the basis of the reported numbers for UIDs and overflows. We confirmed that the reported numbers are consistent with the source data.

It is likely that there are more CSOs and UIDs and therefore the current reporting process is the starting point (and consistent with the process used in previous years). NI Water have a plan to improve GIS data when DAPs are undertaken, however, it will take a long time to complete this work and it is unlikely to be funded until PC21. The team are currently working on understanding the scope of the work (review of the GIS data, permit data etc to identify gaps compared to the master spreadsheet) and potential costs to build up the case for funding. Work has also started to change the DAP studies so that they can support this planned process when it is implemented.

On balance, the decision to report numbers from the master spreadsheet seems appropriate, particularly to be consistent with previously reported numbers and NIEA expectations, however, we agree with the decision to start a new process to improve the data and recommend changing to this new process and reporting data for CSOs from the asset repository as soon as the process is started.

Lines 18 to 22: DAPs

We confirmed that the number of DAPs completed is 79 and the number in progress is 23, both of which are consistent with the lists provided in the commentary/methodology. The total number of sewerage drainage areas is consistent with the number reported last year.

The PE count has been updated to AIR17 numbers (the data used for previous submissions was from AIR13). The AIR13 numbers appear to be incorrect totalling 770,000 versus the total this year of 1.8m. In addition, when calculating the percentage previously, total connected properties was used as the divisor rather than total company wide PE of 2.1m. We confirmed that the total PE used, matches the final number from Table 15 line 6 for total company. The updated data and corrections both mean that the percentage has changed significantly from last year.

Lines 23-25: We confirmed that the data reported traced back to the NIEA table data which derives from the NIEA audit report for 2017. A site is deemed to have failed its consent if it exceeds the number of allowed fails or it exceeds the upper tier limit value (if specified) in accordance with NIEA definitions. The total number of consent failures is based on records of all samples taken and is recorded and extracted from LIMS. We confirmed that the data reported for these lines is consistent with the operational spreadsheet maintained by NI Water.

Line 23 and 24a have not changed significantly from AIR17 while line 24 has improved from 93.9% to 98.1%.

Lines 25: is calculated as % Small WwTW discharges compliant and is the same as that reported and agreed with NIEA. The NIEA provided NI Water with the dataset having inspected all the small works on a rolling annual basis (process unchanged from AIR17).

To determine the number of works that are moved from failing to satisfactory an NIEA officer and NI Water meet to prioritise what happens under the following RWIP annual programme. Upgrades are agreed and then once completed they are treated as compliant.

We confirm these calculations for Table 16 have been completed appropriately.

Lines 29: Event Duration Monitoring

No EDM equipment has been installed to date.

Line 30: WwTW upgraded to comply with PPC Regulations Zero reported. Progress on this measure is still awaiting outcomes of odour model completion (see comments in AIR17 report), that are potentially programmed for 2019.

Line 31: Surface Water Removed

Three such schemes are listed in CPMR and these are sourced from CPMR using the same report as for the Asset Balance. We checked these schemes in the CPMR report and the number is correct, showing the three schemes quoted in the commentary.

6. Confidence Grades

Confidence grades for each set of lines appear reasonable, are appropriate and are largely consistent with those for the reported numbers last year.

For the asset balance (Lines 3 to 11a), NIW currently have less confidence and the confidence grade was revised down to C3 last year. This stays the same. The grading is subjective but look reasonable based on the mixed sources of data. Line 4 has a lower confidence grade due to the various sources of information and assumptions that are required to derive the final number..

The Company has assigned a confidence grade of B3 to lines 12 and 13, on the basis the data is derived from checked and paid invoices, and relies on the total length of main (L14 CG B3) in its calculation. On this basis we support a B3 confidence grade.

The Company has assigned a confidence grade of A1 for Line 13a, 13b & 13c, as the data is derived directly from Ellipse, reflecting the improved methodology.

The confidence grade for critical sewer length (Table 16, line 15) is C3. It is assigned a lower grade because it relies on third party data when assigning criticality to the sewers.

Lines 16a to 17b have a confidence grade of C2. NI Water are not confident in the overall total number, but are confident in the changes (which will be recognised by the NIEA). NI Water have plans to start improving this data which will subsequently improve confidence grades.

NI Water has reported a confidence grade of A2 for all nominated output related data, as it is derived directly from CPMR and the beneficial use date is embedded into CPMR to ensure output has been handed over to Operations.

All reported at A1 based on actual sample data and agreed with NIEA.

7. Recommendations

The reported numbers for the total length of sewers (lines 14 and 15) are calculated using a GIS process which is different to how the asset changes are calculated for lines 3 to 11a. In this and previous years, it appears that the difference between the year start and year end totals do not necessarily match the total of asset changes (new and abandoned). In future, we recommend that the process is updated to include a review of the totals compared to the changes (new length, abandoned length etc). if the change in totals does not match the calculated changes based on new and abandoned pipe, any differences can then be reviewed and described in the commentary.

SUMMARY OF AUDIT FINDINGS

Table 30 – Capital Investment and Nominated PC15 Outputs

PREPARED BY: [X]

DATE: 30 October 2018

1. Key Findings

RR18 Table Criteria	RAG	Assessment
Independent Review of Performance and Reporting	**Green**	Performance good. Reporting processes mature and well managed
Methodology	**Green**	No material changes to Methodology which is consistent with current process.
Assumptions	**Green**	Assumptions reasonable and appropriately applied
Source Data	**Green**	Financial information good. Outputs information utilises data from ORG (which adds rigour). Process tracks programme changes and output completion dates, ensuring 'beneficial use' is embedded into CPMR
Clarity of Audit Trails	**Green**	Financial information good. Outputs, as above.
Confidence Grades	**Green**	We concur with those stated for financial information. None required for Outputs information, but Outputs are subject to quarterly review by ORG
Governance	**Green**	Good governance applied to both financial and outputs information.

- We confirm that the expenditure and allocations are materially consistent with the information presented elsewhere in the AIR18 tables
- Methods for proportional allocation of expenditure are reasonable and are used across most capital programme areas, and our sample checks confirm no material concerns
- We continue to see evidence that the CIDA allocation of schemes are regularly reviewed by the NI Water Strategic Investment Planning Team.
- In terms of the delivery of the PC15 capital programme, NI Water is broadly at the completion of Year 3 in terms of the total number of outputs delivered for most programme areas, apart from the UID and WwTW programmes. Against, a Year 2 programme of 16 UID and 4 WwTW outputs, NI Water has delivered 11 UIDs and 2 WwTWs.

2. Audit Scope

- For AIR18, a Level 3 audit was completed for Table 30, which included:
  - Checks on key control points and QA procedures to ensure the Company methodology has been followed, to confirm completeness of data reported within Tables 32, 36, 36a, 40 & 40a.
  - A number of sample project checks to test that proportional allocation of current projects and future expenditure forecasts are reasonable across the overall capital programme.
- To complete our review and check on a sample basis, all reported AIR18 Table 30 related data, we undertook an audit with the key NI Water system holder on the 12th June 2018.

3. Performance and Significant Events

3.1 Changes to Processes

All the capital expenditure tables have been populated using project data extracted from CPMR (Capital Programme Monitoring and Reporting), as well as ORACLE (Financial management system).

As part of our AIR18 audit of the capital investment and outputs tables we sought an update on any changes made to the reporting processes during the year, and confirm that processes are largely unchanged from those reviewed previously, although the Company advised that they are currently looking to integrate CPMR into ORACLE in order to reduce the risk of manual inputting error.

We are also pleased to see that the formal change protocol process continues to be utilised to manage PC15 project changes and movements within the PC15 capital programme. All proposed programme changes, additions and removals are now managed entirely through CPMR, and the Company can track all changes in CPMR and use this as the basis for seeking approval of proposed changes with the ORG.

3.2 Proportional Allocation

NI Water's proportional allocation procedures are now well established and consistently applied. Whilst issues with allocation of expenditure to QBEG are still being identified, we see evidence that these are quickly being rectified, and we consider the impacts on allocations are not material in the context of the overall number of projects and expenditure.

In relation to the above, we continue to see evidence that the CIDA allocation of schemes are regularly reviewed by the NI Water's Strategic Investment Planning team. For AIR18 we reviewed the CIDA review undertaken for 2017/18, and note that the Capital Programme Manager reviewed the CIDA allocation for all schemes within the overall capital programme that had a change/update to its CIDA allocation during the year. In total, we found that the Capital Programme Manager has reviewed the CIDA allocation for 537 projects during the year and identified potential proportional allocation issues with 103 schemes. We understand that common issues identified during the review related to:

- New Development allocated to Growth
- First Time Service provision allocated to Base rather than New Development
- WwTW expenditure incurred to bring a failing WwTW up to required standard, allocated to Quality rather than Base
- Remaining asset life not considered in the QBEG allocation of expenditure

We note that although the number of CIDA allocation issues are not diminishing over time, we are confident that issues are being identified and satisfactorily resolved through the ongoing Capital Programme Manager reviews.

In their reporting guidance, the UR has also expressed interest in expenditure allocation of 4 capital programme areas, and we reconfirm that allocation methodologies for these programme areas are largely unchanged, as follows:

Leakage Programme - Proportional allocation of the leakage reduction programme is consistent with the principles set out in Table 3.25 of Annex N of the PC10 FD, whereby capex is primarily allocated to Base (B) with the exception of the following growth related elements – Trunk Main Studies; DMA Optimisation and Pressure Management which are all allocated to Supply Demand (G).

Water mains Rehabilitation Programme - Proportional allocation of the water mains rehabilitation programme is determined for each zone separately. Extensive spreadsheets are produced which provide details of: the works required in each street; the principal reason why the work is necessary; lengths; diameters; and materials of existing and proposed assets; and the technique for rehabilitation/replacement. The principal reason (justification) for the work in each street is taken to indicate the (prime) purpose category as follows:

- structural = base

- hydraulic = supply/demand balance (new development)
- operational = base
- water quality = quality

We have previously reviewed the analysis undertaken by NI Water to assess QBEG and found the systematic approach adopted to be both robust and appropriate and in contrast to the high-level assessments that were undertaken by E&W companies.

Treatment Works Programme - Proportional allocation of expenditure relating to the Water and Wastewater Treatment Works Programmes is assessed by the Project Manager on a project by project basis.

Whilst there had been some issues over the appropriateness of allocations historically, significant improvements have been made and our recent audits, including those for AIR17, show them to be broadly appropriate for all schemes reviewed – see Section 4 below for further detail.

We have found that the Company proportionally allocates expenditure for treatment works on the following basis:

- Like for like asset replacement – Base
- New assets/processes to meet a changing standard – Quality
- Increases in treatment capacity - Growth

UID Programme - For UIDs, the methodology for proportional allocation is the same as that used for the treatment work programme above, whereby, QBEG is assessed by the responsible PM on a project by project basis. As above, over recent years, we have found the QBEG to be appropriately applied.

As part of our review of the capital expenditure reported during 2017/18 and overall delivery of the PC15 Year 3 capital delivery programme, as summarised in Tables 36, 36a and 40, we undertook a desktop review of a sample of schemes to test allocation methodologies and assess expenditure projections and progress to date on individual schemes. Details of these are included in Section 4 below.

3.3 Reconciliation Checks

Total net expenditure (inclusive of capital contributions) is downloaded from Oracle through Business Objects as a cross check, to the download from CPMR that is used for the population of the CIDA worksheets. All expenditure reported in Table 36 is then derived from CPMR for Capital Works Programme expenditure and M&G and the Oracle AICC database for Operating Capital. For the purposes of AIR18, 3 separate CIDA worksheets are retained – E&P, Ops Cap and M&G.

As part of our review, we sought to reconcile individual AIR18 line totals back to Oracle, in order to verify the reported data. We satisfactorily confirmed consistency of T32, Line 26 with the 3 CIDA spreadsheets, and then trailed these costs, where appropriate, into the various programme expenditure reported in T36 and confirm that the totals reconcile.

3.4 Delivery of PC15 Nominated Outputs

We reviewed Table 40a and the associated Table 30 commentary which details the nominated outputs funded for delivery over the PC15 period, and confirm consistency between the 2 submissions.

We reviewed the nominated outputs delivered in Year 3 of PC15 (2017/18) and offer the following comments:

- Sub Programme 4 – WTW – No outputs delivered during the year, which is in accordance with FD. 3 ouputs still outstanding.
- Sub Programme 5 – Trunkmains – No outputs delivered during the year, which is in accordance with the FD. Carmoney to Strabane Strategic Link Watermain is still outstanding, pending WR&SR plan recommendations

- Sub Programme 6 – Service Reservoirs and Towers – 1 output delivered - Monaclough SR clearwater tank, which was added to the PC15 programme as a nominated output in 2016/17. The original 3 nominated PC15 outputs for sub programme 6 – Killyhelvin, Lough Fea and Drumaroad CWTs, are now forecast for completion in 2018/19, 2019/20 and 2020/21 respectively.
- Sub Programme 12 – UID – NI Water has delivered 11 nominated UID outputs in 2017/18 against a PC15 target for Year 3 of 5 outputs. Of the outputs delivered, 7 of the outputs were nominated PC15 Year 1 UIDs, delivered 2 years late. We found that an additional 4 outputs were claimed in the year, comprising 2 PC13 carryover UIDs (Milford and Rugby Ave), and a further 2 new UIDs identified and delivered (Bleachgreen and Muckamore), although 2 of the outputs are still subject to a change protocol submission. NI Water advise there are 30 UID PC15 nominated outputs still outstanding for delivery over the final 3 years of PC15 – 13 in 2018/19 and 17 in 2019/20.
- Sub Programme 15 & 16 – WwTW – 3 WwTW outputs (Clabby, Ballycastle and Mullans WwTWs) were delivered in 2017/18, against a PC15 Year 3 target of 4 outputs. As above, of the actual PC15 nominated Year 3 outputs, only 1 – Mullan WwTW, was delivered on schedule. Ballycastle and Clabby WwTWs were both Year 2 outputs, delivered slightly late. Of the nominated Year 3 outputs, Ballintoy, Dundrum and Moneyreagh WwTWs are forecast for delivery in Year 4, whereas Ballygowan WwTW has been deferred to Year 5 of PC15. NI Water now anticipate completing 14 WwTW improvements in the last 3 years of PC15.
- Sub Programme 17 – Small WwTW – 4 outputs were delivered in Year 3, against a forecast delivery profile for Year 3 of PC15 of 7 outputs. We found that 3 of the 2017/18 planned outputs were deferred in order to fund other programmes of work. We understand that a further 10 small WwTW outputs are forecast for delivery in 2018/19. Overall NI Water has undertaken to deliver 45 small WwTW outputs over PC15, of which 16 have been completed to date with 29 still outstanding. Assuming the Company can achieve the forecast 2018/19 programme (10 outputs) and sustain this for the remainder of PC15, they will be able to achieve their undertaking, although it appears that the small WwTW programme is of lower priority than other programmes and there is risk that outputs will continue to be deferred.

In addition to the above we also sought an update on what action is in place to ensure the following programmes are delivered by 31/3/21:

- Catchment Management Plans
- % Service Reservoirs sample taps assessed as meeting required standards – We found that 72% of the sample taps have been installed by the end of 2017/18, with the overall programme forecast for completion during the current year (2018/19)
- Nominated UIDs – Overall NI Water have committed to deliver 85 nominated UIDs over the PC15 period. To date NI Water have delivered 55 UID improvements, with a further 30 forecast for delivery over Years 4 and 5 of PC15. With no outputs forecast for delivery in the last year of PC15 - 2020/21, there is scope for some of the outputs to slip and still deliver the overall programme.
- Improvements to nominated WwTW – See above
- Small WwTW delivered from rural w/w investment programme – See above
- CSO's/EO's with event/duration monitoring equipment – We found that the Company has trialled monitoring at 28 WwPS and CSOs during the year. The results of which have been used to develop a programme of work. We were advised that 95 spill monitors are forecast for delivery during 2018/19. Whilst work is obviously ongoing, the Company highlighted a discrepancy in the FD as to whether spill monitoring should be provided to CSOs located within 2km or 3km of the shellfish/bathing water.

3.4 Expenditure Projections

Based on the sample of audits we have undertaken in this and in previous years, we consider that the expenditure projections for projects in progress are generally, at a programme level, realistic and achievable. We would also anticipate that the split of expenditure across the purpose categories and asset types will also be reasonably aligned with the given projections.

The exception to this relates to, where significant expenditure has been forecast after the forecast completion date.

4. Summary of Audit Checks

4.1 Proportional Allocation

Project Ref	Project Name	Spend to date (£m)	Latest Best Est (£m)	% Inf & Non Inf	QBEG Allocation on CIM				Reporter Agreement (✓/×)
					Q	B	E	G	
JA312	Dunore Point WTW Renewable Energy	7.227	7.788	0%/100%	0	0	100	0	✓
KR605	Upper Newtownards Rd - DG5.	2.672	3.550	100%/0%	13	5	82	0	✓
KG041	Maghaberry WwTW	2.253	4.484	0%/100%	0	88	0	12	✓
KR438	Glenmachan Street WWPS refurbishment	1.742	2.313	0%/100%	0	100	0	0	✓
KR417	Ormeau Ave Sewerage upgrade	1.478	6.604	89%/11%	60	12	25	3	✓
JI038	Service Reservoir Security Phase 1	3.363	3.645	0%/100%	100	0	0	0	✖
JN545	Alleyhill to Doochrock Watermain	0.607	1.204	100%/0%	0	39	0	61	✓
JN532	Belleek Meenacloybane Strategic Main.	1.498	1.491	78%/22%	0	84	0	16	✓
JN509	Derg WTW - Upgrade	1.038	4.217	0%/100%	38	51	0	11	✓

* For JI038 – Service Reservoir Security Phase 1, the scheme has been allocated 100% to Q. However, as work involves the replacement/upgrade to existing reservoir hatches, allocation to B is also required.

4.2 Expenditure Projections

Project Ref	Project Name	Pre - PC15 Spend (£m)	2015/16 (£m)	2016/17 (£m)	2017/18 (£m)	2018/19 (£m)	2019/20 (£m)	2020/21 (£m)	BIU Date	Reporter Agreement (✓/×)
JA312	Dunore Point WTW Renewable Energy	0	0	0.169	7.058	0.561	0	0	18/19	✓
KR605	Upper Newtownards Rd - DG5.	0.011	0.059	0.178	2.424	0.878	0	0	18/19	✓*

Project Ref	Project Name	Pre - PC15 Spend (£m)	2015/ 16 (£m)	2016/ 17 (£m)	2017/ 18 (£m)	2018/ 19 (£m)	2019/ 20 (£m)	2020/ 21 (£m)	BIU Date	Reporter Agreement (✓/×)
KG041	Maghaberry WwTW	0.096	0.029	0.076	2.074	1.742	0.467	0	19/20	✓
KR438	Glenmachan Street WWPS refurbishment	0.132	0	0.238	1.322	0.188	0.393	0	19/20	✘*
KR417	Ormeau Ave Sewerage upgrade	0.169	0.254	1.055	2.856	2.270	0	0	19/20	✓
JI038	Service Reservoir Security Phase 1	0.531	0.492	1.356	0.984	0.282	0	0	18/19	✓
JN545	Alleyhill to Doochrock Watermain	0	0	0.002	0.605	0.597	0	0	18/19	✓
JN532	Belleek Meenacloybane Strategic Main.	0	0	0.903	0.588	0	0	0	17/18	✓
JN509	Derg WTW - Upgrade	0.026	0.471	0.045	0.496	0.326	0.6	2.251	20/21	✓***

* For KR605 – Upper Newtonards Road – DG5 scheme, significant expenditure (circa 25%) is forecast for expenditure in 2018/19, however, the majority of this relates to allocated project contingency. NI Water only anticipate £30k actual expenditure in 2018/19

** For KR438 -Glenmachan WwPS, the delivery programme has been brought forward, with BIU 2018/19 and no expenditure anticipated post 2018/19, meaning the current expenditure profile is incorrect.

*** For JN509 – Derg WTW, whilst the scheme is substantively complete, NI Water are unsure as to whether the filter upgrade will deliver the necessary improvements to ensure compliance. As a result, an additional £2.851m has been allocated to 2019/20 and 2020/21 to enable additional work should it be required. As a result, this scheme may be subject to significant scope creep.

5. Confidence Grades

Capex totals reconciles very closely with that reported from Oracle. NI Water has previously assigned a B2 confidence grade for most capex lines, reflecting the reliance on the accuracy of the QBEG analysis undertaken. However, for AIR18, NI Water has reported a B3 confidence grade, reflecting the allocation issues identified in previous years, through the QBEG checks completed by the Company. Confidence grades do not apply to nominated output data.

6. Recommendations

We recommend that the Company considers the issues identified during the audit and summarised in Section 4 above, amending as appropriate.

Table 42 – PPP Reporting

1. Introduction

The purpose of the table is to collect information on the cost, performance, and other explanatory variables of the PPP concession, together with assessment of NIW and PPP relative efficiency.

2. Key findings

Based on satisfactory findings in previous years audits, no material changes and cursory checks in 2017/18:

Criteria	RAG	Assessment
Independent review of performance and reporting	**Green**	Performance good. Reporting process well managed.
Methodology	**Green**	Methodology well documented
Assumptions	**BLUE**	Assumptions reasonable and appropriately applied. APH calculations need review in 2018/19.
Source data	**Green**	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of audit trails	**Green**	Detailed and comprehensive audit trail to all numbers available
Confidence grades	**Green**	The confidence grades included are deemed to remain appropriate.
Governance	**Green**	Responsibilities for integrity of data and commentary clearly defined. Good evidence of engagement of senior staff. Some table data and minor corrections to commentary to complete. Final Sign-off confirmed.

- Based on our audit of selected sample data we believe that the data reported in this table is materially consistent with the reporting requirements.
- More granular Unitary Charge information is supported by invoices from the PPP concessionaires, either split down by site where shown or at PPP level as shown.
- More granular information on other lines is extracted from the PPP models which were established at the outset of each concession. Line 14 (Maintenance) for Alpha uses an average.
- We audited the reported data and challenged the processes on a sample basis, generally informed by the materiality of the data and variances from the previous year. We consider the data reported in the table is robustly prepared using systems and process that are appropriate and in line with the reporting requirements and which are properly implemented with effective quality control and governance arrangements.

3. Audit approach

To verify the data reported our audit consisted of an interview with the NIW system holders during which the methodologies were reviewed, data and trends considered and tested where not as expected or where explanations were not deemed sufficiently comprehensive, and a selection of data reported in the table was audited back to example source data (e.g. to concessionaire invoices).

4. Audit findings

4.1 Block A – Project Description

No changes have been made to this data. No changes were expected. We requested that NI Water add some detail on their purchase of the Alpha PPP and its impact on AIR reporting. This has been provided in their commentary.

4.2 Block B – Payment to PPP concessionaire (Lines 7 to 20)

Line 7 – Unitary Charge Capacity Charge

This charge applies to Alpha sites only.

NIW has previously demonstrated that the data is based on actual invoices from the concessionaires. The costs are based on the payment mechanism as set out in the contract.

On average, the Alpha capacity charges have risen only nominally ([X]) and in line with expectations since last year.

Line 8 – Unitary Charge Variable Charge

This charge is identifiable at site level for all PPPs.

As for the capacity charge, NI Water has previously successfully demonstrated that the data is based on actual invoices received for each of the sites each month.

In total, across the Alpha sites, the Variable charges have risen by 6.4%. This reflects the rise in Distribution Input of 4.8%, but is not fully proportionate owing to the charge escalation mechanism which applies.

Kinnegar charges have fallen by 4%. Flows and loads have fallen by 11%.

The variable charges for the Omega sites have risen by 6% whilst the loads received at the STWs (line 31) have fallen by almost 5%. However, as noted in NIW's commentary, the flows received have risen by 19.2% (due to higher levels of rainfall), which has been demonstrated using data at a good sample of PPP and NIW sites.

For AIR16, we specifically checked the audit trail for the Sludge Services entry. This checked back satisfactorily via a spreadsheet containing a monthly summary of invoices by site and through to the invoices for Omega and Ballynacor TDS. The Omega invoices are monthly and show that they carry ongoing credit for overpayments where necessary. The Ballynacor TDS is accrued and billed 6-monthly, then spread across the months. The audit check fully reconciled. As the methodologies remain the same, a similar check was not undertaken for AIR17, nor for AIR18.

Line 9 – Unitary Charge Deductions

These deductions are identifiable at site level for Alpha only.

NI Water makes performance deductions for both capacity and quality failures. The data is extracted from the invoices (which have previously been satisfactorily demonstrated) and the payment calculation mechanisms.

Performance deductions have been reported in the company commentary for Alpha only.

No deductions were made for Omega or Kinnegar.

Note - there is a difference between the way in which Alpha PPP and Omega PPP deductions are treated:

- For Alpha, the deductions are generally agreed quickly and are identified in, and consistent with, the monthly invoices. Supporting information confirmed the figure.
- For Omega, the performance deductions are recognised through credit notes, some of these are not resolved for some time and may be reported in subsequent years. The log of unresolved issues for Omega has dropped over the year from circa [X] to [X].

Line 10 – Atypical Expenditure

Only Alpha and Omega have atypical expenditure reported, at PPP level only.

The atypical expenditure reported includes any payments or credits agreed in monthly invoices. It also includes provisions for claims, which may not necessarily be site specific.

NIW has provided detail on the relevant items in their commentary.

Line 11 – Efficiency Gains included in lines 7 - 10

This information is generally reportable at PPP level, as is the case this year.

As NIW has stated, the only legitimate efficiency gains that can be used are those that arise from a change in levels of service. The company commentary identifies the initiatives which have yielded the savings (these are consistently included in the figures and commentary for line 10).

Line 13 – 14 – Capital Repayments and Maintenance

These lines relate to Alpha only and are materially similar to both 2015/16 and 2016/17.

The capital maintenance charge (line 14) for the Alpha PPP has been allocated as a straight line based on the total amounts in the original financial model. This is different to the approach adopted prior to 2013/14 where the value was provided by Dalriada Water and could vary markedly between years. The values in the financial model were split by site and the totals across the full concession period have been used to pro rate the straight line ([X]) between the sites.

The financial lease model gives (by site) the capacity charge (line 7), from which the capital maintenance charge (line 14) is deducted. These values were used to pro rate the total Interest (line 19) and total Capital Repayments (line 13) and derive charges per site. The values are tabulated in the company's commentary.

It should also be noted that in 2013/14, the financial lease model was revised. This is because it was noted that a discrepancy was present between the financial lease repayment term and the contract term. The Company now also allocates a proportion of the capacity charge to Opex ([X]). We have not reviewed the detail behind the model or the appropriateness of the amount allocated to Opex. We understand that this approach was suggested/supported by the financial auditors.

Line 15 – Residual Interest

This relates to Kinnegar and Omega only (which are off balance sheet) as reported in the company's commentary.

The figures are taken from the Residual Interest Models and are not divisible by site. An annual increase of 2.5% is assumed in the model, as reported in the table.

Line 16 – Atypical Payments Capitalised

The Company has reported a nil return for this line.

Lines 17 & 18 – Totals from other lines

No comment

Line 19 – Interest

This relates to Alpha only (which is on-balance sheet). There is a nominal reduction on 2016/17 as the lease is being repaid.

Line 20 – Total PPP Opex

Calculated correctly from other lines. No further comment.

4.2 Block C – Water distribution data (Lines 21 and 22)

Line 21 – Distribution Input

This line represents the water utilised by the PPP companies. The methodology mirrors that of Table 10 Line 26 to provide a calculated volume for each site and a cumulative figure for the Alpha contract.

The volume reported at Ballinress and Mayola are similar to 2015/16. Castor Bay is down by 4% and Dunore Point show significant increase of 17%, but given that the overall rise in DI is less than 4%, this was deemed to be within reasonably expected variances and not of material concern. We did however challenge the figure for Ballinrees which is reported as exactly the same as 2016/17, but NIW has demonstrated (and commented) that the actual difference between the two years is too small to show at two decimal places.

Line 21a – WTW Capacity

There has been no change to the minimum required capacity of the Alpha WTW under the contract. The capacities are based on Functional Design Specifications. As per the reporting guidance the volume is 'Q_{minreq}' for each facility and this aligns with the Alpha Contract requirement.

Line 22 – Length of Mains

This line represents the length of main under the contract which links Castor Bay to Forked Bridge. This 16.42 km main is operated and controlled by the contractor and information has not changed from previous reports and correlates with totals reported in other tables.

4.3 Block D – Water resource and treatment data (Lines 23 to 27)

Lines 23&24 – Turbidity 95%-ile greater or equal to 0.5NTU

The status reported in these lines is the same as in 2014/15, when we fully checked back to source data. The data source is the LIMS system which is an Oracle database. We re-ran the SQL queries to replicate the reported data and confirmed the reported information was correct. We also noted that NIW had appropriate quality checks in place within the Environmental Regulation function.

Lines 25-26 – Treatment Source/Type

There are no changes to these lines from the previous year.

Data is consistent with the methodology and summary data in Table 12. However, as Ballinrees WTW has three sources (impounded reservoirs at Ballinrees and Altikerragh as well as an intake from River Bann), the overall classification is more complex.

Line 27 – Average Pumping Head

The Company uses the PPP Distribution Input as the denominator.

The AIR18 aggregated value is 155.9m compared to 157.4m in AIR17. The drop is particularly noticeable at Ballinrees, which has fallen from 147.2m to 131.6m despite no material change in average DI. NI Water confirmed that this was due to this site having a mix of pumped and gravity flow and whilst the total DI from the site was almost identical to the 2016/17 figure, more of this was gravity, hence the reduced lift in the APH calculation.

We also observed that the DI from Dunore Point has risen by 17%, but the APH remained at 173.0m. We discussed this with NI Water who advised (see commentary) that due to the Alpha acquisition, they have not undertaken the same pump tests and calculations as previously and used last year's APH figure in lieu. We note however that it is also the same as reported in 2015/16. We recommend that this is checked for 2018/19 but note that it is possible for the APH to remain the same for different DI flows if for example the pumps are fixed speed, pumping at the same flow rate from level A to level B for different periods of time. NIW has confirmed their intention to review their calculations of APH in 2018/19.

4.4 Block E – Sewerage data (Lines 28 and 29)

Lines 28-29 – Total Length of Sewer

As all the sewers reported are classified as critical (as defined by WRc), the length is unchanged from last year. Each PPP facility has collective lengths of sewer which are supported by record drawings for each site.

4.5 Block F – Sewage treatment and disposal data (Lines 30 to 38)

Line 30 – PE of load received

No noteworthy changes.

The PE has been derived satisfactorily from total loads (line 31) received from the contractors using the industry standard factor of 60g BOD per person per day.

Line 31- Load received

The total load is based on analytical data derived from samples taken from the inlet of all the PPP wastewater treatment works. General falls in loads are observed at both Kinnegar and Omega sites.

Lines 32-36 - Consents

Information is unchanged and is derived from Water Order Consents which are held by the Contractors and supplied by the Environment Agency. These are legal documents with unequivocal limits. Consents are based on lower and upper tier limits with pass/fail being based on look up tables, a breach of the upper tier limits being classed as a failure.

The Phosphate consents which are applicable to Armagh and Ballynacor are based on annual average consent figures <1mg/l as set out in the Water Order Consent.

Line 37 – Classification of works

The treatment type has followed guidelines as per methodologies reported in Table 17b Line 8 and is unchanged from previous years.

Line 38 – Size Band of works

Following a clarification from the UR, this now mirrors the requirements associated with size banding and there is no change from last year.

4.6 Block G – Sludge treatment and disposal data (Lines 39 to 52)

Line 39 – Sludge imported

Sludge imported from NI Water is only either transferred to the belt press at Ballynacor or to the incineration plant at Duncrue Street, the sum of the two values reported in Line 39 is consistent with the total value reported in Table 15 Line 16. The minor difference is due to the volumes of grit and screenings.

An error was noted in the 2016/17 figure in the NI Water commentary. The correction has been made.

Line 40 – Sludge produced by the PPP facility

The values reported in Line 40 are consistent with Table 15 (PPP) line 15, the difference between the figures being the grit and screenings arising at the Omega and Kinnegar sites (as shown in the table in the company commentary) and which are disposed of to landfill.

Sludge produced at North Down Ards, Ballyrickard, Richhill and Armagh are transferred to either the caking, belt press facility at Ballynacor or sent directly to Duncrue Street incineration plant and are measured by on-site 'Slogger' sludge monitoring systems. The 'Slogger' system has the capability of recording volume as well as dry solids content to provide accurate ttds. In conjunction with NI Water, consistent sampling and measuring of sludge cake imports is also in place.

At Ballynacor the indigenous sludge is calculated by subtracting the input logger data (which records both inputs from NI Water and PPP facilities at North Down Ards, Ballyrickard, Richhill and Armagh) from the cake transferred to Duncrue Street.

To avoid double counting of sludges produced at NI Water facilities or Kinnegar, but transferred and treated at either Ballynacor or Duncrue Street PPP Sludge facilities, zeros have been entered at these PPP sites, which do not produce their own sludges.

Kinnegar sludge is transferred to the incineration plant at Duncrue Street. Prior to discharge at this facility the sludge from Kinnegar is monitored by weighbridge at Duncrue Street. This system involves weighing the vehicles entering and leaving the facility to ascertain the exact tier weight.

NI Water has incorporated an analysis of the sludge production trends by PPP site in their commentary.

The main noteworthy change in sludge volumes is Kinnegar where the belt-presses are being replaced with centrifuges. See the footnote in the NI Water commentary.

Line 41 – Sludge exported to Duncrue Incinerator

Due to all PPP sites transferring sludge to Duncrue Street and mixing with sludge from NI Water, it is impractical to determine where any discrete PPP wastewater treatment sludge was ultimately disposed of to any of the eight disposal options.

All sludge from PPP facilities is measured irrespective of whether it was thickened at Ballynacor only on receipt at Duncrue Street. At Duncrue Street the sludge is either incinerated or disposed of by alternative disposal routes.

The line confirms exports from only PPP Facilities to Duncrue Street. NIW's sludges are not included in this line, but are captured in Table 42 Line 39 instead.

The numbers reported exclude grit and screenings, which are sent to landfill.

Line 42 – Sludge exported to Other PPP facilities

N/A and zeros are reported as expected.

Line 43 – Sludge exported to NI Water

N/A - the Omega sludge PPP contract has no provision regarding return of sludge to NI Water for disposal.

Line 44 to 51 – Sludge Disposed

The figures for alternative disposal are based on the total ttds excluding incinerated sludge, split in accordance with the proportion of m3 of cake sent by each disposal route. All information is based on contractor reports detailing disposal route and the disposal site. The transfers are cross-referenced by waste management notes and weighbridge reports as well as being calibrated using on-board weighing systems on plant and road haulage vehicles. Information is collated (in wet tonnes) and submitted monthly to NI Water. The wet tonnes volumes are converted to ttds by assuming a 21% dry solids content, based upon long-term monitoring.

Line	Disposal Route	AIR18 (ttds)	AIR17 (ttds)	AIR16 (ttds)	AIR15 (ttds)	AIR14 (ttds)
46	Farmland Advanced (Lime treatment)	0.788	2.714	2.019	1.559	0.384
47	Incineration	39.618	39.085	36.199	37.497	36.545
48	Land fill	0.268	0.264	0.132	0.140	0.880
49	Composted	0	0	0	0	0
50	Land Reclamation	0.183	0.225	0.290	0.084	0.409
51	Other (Willow Coppicing)	0	0	0	0	0.657
52	**Totals**	**40.357**	**42.288**	**38.640**	**39.280**	**38.875**

Line 46, Farmland Advanced (Lime Treatment) - The amounts are supported by Contractor's dockets which are processed monthly.

Note - **line 47** (Incineration) is calculated as the total sludge received at the Duncrue Street site minus the total sludge recorded as disposed of off-site. Line 47 needs completing in 'Omega All' and 'Sewerage Service Total' columns. NIW confirmed this was completed.

The disposal route to landfill (line 48) is primarily for grit and screenings. This has the most uncertainty (although it is only a small volume) as the % dry solids are not measured for all skip loads. The volume reported is all grit and screenings from both Kinnegar and Omega.

Line 52 is calculated from the sums of Lines 41 and 44 to 51. This differs from the guidance (44 to 51) as line 41 reports the Sludge exported to Duncrue Street and thus, the line 52 totals for Sludge exported from each site are correct.

5. Assumptions

Except where noted above we do not believe there are any material assumptions to report.

6. Confidence grades

We have no reason to reconsider the confidence grades as previously agreed.

7. Reconciliation checks

Line 21 is consistent with methodology and figures used for Table 10, line 26 Confirmed

Line 22 = Table 12/13. Confirmed

Line 25 = Table 12 (PPP)/A. Confirmed.

Line 26 = Table 12 (PPP)/B. Confirmed.

Line 27 = 155.9 = Table 12 (PPP)/5. Incorrect Value in T12 L5 = 154.3. NIW advised this would be corrected to 155.9m

Line 30 = Table 15 (PPP)/6. Confirmed.

Line 31 = Table 17d. Confirmed.

Line 35 = Table 17c/9. Confirmed.

Line 38 = Table 17c. Confirmed.

Line 39 = Table 15. Confirmed.

Line 52 = 35.869; Table 15/17=40.857. NIW advised Table 42/52 would be corrected to 40.857ttds which is consistent with our audit of table 42.

Table 43 – PPP Reporting – Operational Costs

1. Introduction

The purpose of the table is to collect information on the cost, performance, and other explanatory variables of the PPP concessions, to assist with the assessment of NIW and PPP relative efficiency.

2. Key findings

Based on satisfactory findings in previous years audits, no material changes and cursory checks in 2017/18:

Criteria	RAG	Assessment
Independent review of performance and reporting	**Green**	Performance good. Reporting process well managed.
Methodology	**Green**	Methodology consistent with current and previous processes, control points identified and understood
Assumptions	**Green**	Assumptions reasonable and appropriately applied
Source data	**Green**	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of audit trails	**Green**	Detailed and comprehensive audit trail to all numbers available.
Confidence grades	**Green**	Confidence grades are not applicable for this table, but data is deemed robust
Governance	**Green**	Responsibilities for integrity of data and commentary clearly defined. Good evidence of engagement and of final sign-off.

- Wherever relevant, the line entries are consistent with Table 42 entries.
- We consider that where the company has needed to make assumptions on cost apportionment to each site, the assumptions are generally reasonable to within material tolerances. We have not identified any material concerns.

3. Audit approach

We have reviewed the data in this table and compared it with that audited in previous years. Where changes are material, we have sought explanation/commentary from NIW and/or included comment below.

To verify the data reported our audit consisted of an interview with the NI Water system holders during which the methodologies were reviewed and a selection of data reported in the table was audited back to example source data (e.g. to concessionaire invoices) .

4. Company methodology

Line entries are based on paid invoices and exclude any capital investment as per the reporting requirements. The values are consistent with entries in Table 42.

Other, more specific findings are given in section 5 below.

5. Audit findings

Lines 1 to 3 – Project Description

No changes expected. None made. All as previously confirmed. No further comment.

Line 4 – Payment to Concessionaire
This represents the total unitary charge (both opex and capex) paid by NI Water. Efficiencies (table 42, line 11 have not been deducted).

Line 5 - Payment by Concessionaire to Operating Company
There have been no changes to the methodology for calculating this line and the totals are very similar to the previous year.

The data relating to payment by concessionaire to operating Company is provided to NI Water by the PPP contractors. We have previously been able to satisfactorily trace all the numbers given in the table to the information provided by the Concessionaires (Kelda, Coastal Clearwater and Laing O'Rourke). This was not checked in 2017/18.

The values are consistent with the totals presented in T21 L22a and T22 L21a - Confirmed.

Line 6 - Power
We note that Alpha PPP power costs have increased by 16.7% whilst flows have increased by 4.8% (mainly influenced by Dunore Point (up 35%)). This is also impacted by an increase in electricity unit cost of circa 10% because the previous contract ended and the supplier has been changed and new charges apply. Omega power costs have increased by 20% across the board, including Duncrue, and flows have also increased. The Company continues not to estimate power costs for Kinnegar as it has no mechanism for doing so.

NB - 3 small metering points have been identified and included for pumping stations feeding into Omega; these account for a small addition in volumes of circa 0.4%.

This data is extracted from the Company's general ledger system on a site by site basis and hence no apportionment of data to derive these figures is required.

Duncrue self-generation has dropped due to an outage which has lasted for most of the year. This accounted for a need for a 10% increase in grid power and for which the unit cost rose by 14%.

For Duncrue Street, NIW's methodology indicates that one electricity meter covers both the Belfast WwTW and the PPP Incinerators. 56% of these costs are allocated to the PPP Incinerators, a small change from 54% in the previous year. This is reasonably consistent with the shutdown of the generation plant.

The increases in power costs reflect:
a) Higher tariffs due to expiry of previous electricity contact.
b) More pumping from lower level (Alpha) sources.
c) Wetter year requiring more sewerage pumping and treatment.

Line 7 – Other Direct Costs
These costs relate to the cost of abstraction licenses for the Alpha sites only, for which there has been a nominal increase.

Line 9 – General and Support Expenditure
General and support costs are a combination of consultancy costs and time costs of staff employed by NI Water to manage these contracts.

Consultancy costs are taken directly from the general ledger and are specifically costed against the relevant PPP, then split approximately equally across the sites within the PPP.

For staff costs, NI Water has a team who allocate some or all of their time between the PPPs. A 'P101' cost centre report is run which shows the relevant payroll costs. Once the total costs per PPP have been established, the general and support costs are allocated evenly across each of the sites in each PPP. The differences by site in each PPP are only to prevent rounding from producing an incorrect PPP total.

Line 11 – Scientific Services

Alpha PPP – related costs are included in the Unitary Charge. Zeros have therefore been entered for each site as in previous years.

Kinnegar PPP and Omega PPP - The Company has determined the gross costs relating to scientific services and allocated these costs across PPP sites based on the assessed percentage of samples attributed to each PPP site, an allocation of staff costs and operational contractor costs per site visit. The numbers of samples counted includes a large volume of 'Uncharged' samples which are included in the apportionment exercise of the gross costs. NI Water advised that the 'Uncharged' samples at Kinnegar relate to the costs of influent and effluent sampling and are borne directly by NI Water rather than recharged by the concessionaire. On this basis, we accept that the 'Uncharged' sample costs should be included in the calculations and the apportionment between the sites as given by NI Water seems reasonable.

The monetary sums are not material and therefore have not been challenged.

Line 12 – Rates

Alpha PPP – the total rates bill for water supply sites is based on volumes. NI Water has apportioned the total cost by site according to the proportion of Distribution Input that each contributes. The total for the Alpha sites is reasonably proportionate to the DI that they contribute. The total NIW rates costs include an element of allocation of the Company's administrative properties. In the calculation of the rates attributable to the PPP WTW sites, only the cumulo (ie WTW) element of the overall NI Water charge is included. The increases are reasonably consistent with changes in DI.

Kinnegar PPP and Omega PPP - Wastewater sites each receive separate rates bills and hence the data can be attributed directly and accurately.

As previously, for the Ballynacor site, the Company has split the costs 65%:35% wastewater to sludge respectively on the basis of the site area split between wastewater and sludge facilities.

Duncrue has also been allocated between NIW and PPP, but on the basis of site area covered, with the Incinerators covering 15% of the site. This also remains consistent with previous submissions.

Line 13 – Estimated Terminal Pumping Costs

The Company has reported power costs related to the pumping stations listed in their commentary. NIW advises that this follows the direction of NIAUR.

Three small sites have been identified and added in 2017/18 with immaterial impact, all of which feed into North Down Ards.

The increase of 35% in these costs is reasonably consistent with the other rises in electricity cost and due to higher levels of rainfall noted.

Line 14 – Estimated Sludge Costs
The cost here is the: payment by concessionaire, functional expenditure, scientific services costs and rates (lines 5, 10, 11 and 12 respectively) for Ballynacor and Duncrue only. The change from the previous year is a nominal reduction. Costs at both sites reduced, largely due to lower sludge volumes.

Line 15 – Total PPP operating expenditure
As required, these correctly state the sums of lines 5, 10, 11 and 12.

6. Confidence grades

Not applicable to this table but the data is considered to be well supported by suitable cost allocation systems and appropriate apportionment processes where required.

Prepared by: [X]
Date: June 2018

SUMMARY OF AUDIT FINDINGS

Table 46 Lines 13, 14 and 25 Serviceability Return – Discoloured Water & Events at WTW

PREPARED BY: [X]

DATE: 21st June 2018

1. Key Findings

AIR18 Table Criteria	RAG	Assessment
Independent Review of Performance and Reporting	**Green**	Performance good. Reporting process well managed
Methodology	**Green**	Methodology consistent with current process, control points identified and understood.
Assumptions	**Green**	Assumptions reasonable and appropriately applied
Source Data	**Green**	Source data is clearly identified, complete beyond material concern, well managed through to accurate systems input
Clarity of Audit Trails	**Green**	Detailed and comprehensive audit trail to all numbers available
Confidence Grades	**Green**	Confidence grade appropriate and rationale clearly documented
Governance	**Green**	Responsibilities clearly defined. Reasonably good evidence of engagement and sign-off process reviewed and considered sufficient.

- No material issues located

2. Audit Scope

The scope of this audit was the discoloured water data and events at WTW resulting from treatment difficulties, which is part of the serviceability return. The data comprises Table 46 lines 13-14 and line 25.

3. Performance and Significant Events

We note that Line 13 has continued its downward trend (decreased from the AIR17 value of 3,029 contacts to 2,632 contacts) and is now below the 2,744 contacts reported in AIR15.

Line 25 is has also continued the downward trend in AIR18 with 12 events reported compared to 15 last year.

There is one event currently without classification and still in discussion with the DWI. This event is linked to significant weather conditions. This single event will not however impact the improving trend in contacts.

4. Compliance Methodology and Process Controls

The data reported for these lines is directly traceable back to the source system Rapid and undergoes minimal processing.

5. Summary of Audit Checks

We have reviewed the procedures utilised by NI Water and have traced the data successfully back to source.

Line 13 – Customer contacts (Discoloured water)
We have checked the consistency of the table entry to the source data. The number of contacts regarding water quality are provided by customer services and analysed by the Environmental Regulation team. This analysis identifies those contacts directly attributable to discoloured water. No customer contact data was excluded from the calculations.

We reviewed the process for sub-characterising into types (e.g. Blue/Green etc.) and consider that the Company has reported accurately and consistent with the reporting to the DWI.

Line 14 – Customer contacts per 1000 population (Discoloured water)
We have checked the consistency of the table entry. The calculation for Line 14 is based on a division of Line 13 by the population served (000s). The population figure used in the calculation was provided by Network Water.

Line 25 - Events at WTW resulting from treatment difficulties or ineffective treatment categorised as 'significant' or higher
The data reported in this line is based on NI Water's interaction with the DWI and the DWI's attribution of severity to events. This process is well embedded. The full audit trails including access to the DWI reports was available for review. We have previously reviewed the DWI's classification process when assessing reported water quality events.

The DWI is ultimately responsible for categorising events.

We consider methodology to be robust and that NI Water have correctly reported the data and demonstrated their audit trails.

6. Confidence Grades

No confidence grades are attached to the lines reported in Table 46.

7. Recommendations

The continued trend downwards in lines 13 and 25 is positive and it was discussed at the audit that customer complaints are used in the process of prioritising work by the mains rehabilitation teams etc. However, this "good news" of sharing information to improve outcomes from NI investments isn't brought out in the commentary and the positive link couldn't be demonstrated. If this linkage isn't available in other audits it would be of value to consider for future audits.