


# Water and Sewerage Service Price Control 2013-15

PC13 Final Determination Annex K  
PC13 Outputs

December 2012



# Water and Sewerage Revenue and Charges

## Price Control 2010-2013

PC13 Final Determination

Annex K – PC13 Outputs

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# 1 Introduction

1.1.1 In this introduction we provide an overview of the outputs for PC13 with more detailed information provided in the following sections:

Section 2 – Consumer service outputs

Section 3 – Water service outputs

Section 4 – Sewerage service outputs

Section 5 – Management and general investment

1.1.2 We also comment on the development of outputs for PC15 in Section 6.

1.1.3 The objective of investing in water and sewerage services is to maintain and improve the service delivered to consumers. Ultimately consumers experience service as a series of outcomes. For example:

- Whether tap water is safe to drink; is acceptable in taste, odour and appearance; and, the supply is reliable both in regular operation and in extreme conditions.
- Whether surface and foul wastewater is drained effectively and consumers are not affected directly by flooding or have a reasonable fear that they might be affected by flooding from sewers.
- Whether the impact of water and sewerage services on the environment is limited, including the impact of water abstraction and the pollution which can be caused by intermittent and continuous discharges of wastewater.
- Whether the company responds quickly when things go wrong and is able to resolve the underlying problem satisfactorily and keeps the consumer informed while doing so.

1.1.4 In practice, a water and sewerage company will deliver a series of outputs which aim to secure the outcomes consumers want. We have assessed the outputs for PC13 in line with the level of investment. These outputs form part of an overall package which the company must consider.

1.1.5 We categorise outputs under three headings:

- **Service level outputs:** service level outputs measure the impact of investment on the level of service experienced by consumers. For example the number and duration of interruptions to supply or the overall compliance with water quality parameters. This type of output is preferred as it maximises the freedom of the company to determine the best way to deliver the required level of service at minimum cost. It encourages innovation and cost savings which benefit consumers in the longer term.
- **Nominated outputs:** these are specific items, often those identified by quality regulators such as the improvement to a discharge standard to meet mandatory legislative requirements. We have also included a number of specific improvements identified by the company in its plan as nominated outputs such as trunk main schemes, or the provision of additional water storage capacity or major base maintenance upgrades to wastewater treatment works.

- **General activities:** we have included activities (such as the rate of replacement of water mains or the replacement of sewerage) as outputs where it was not possible to establish a clear link between activity and service level outputs in the short term. This ensures that the company will put forward robust plans for each Price Control period against which it can be monitored. Activity rates can be reviewed at subsequent Business Plans and increased or reduced to reflect experience and future levels of service required by consumers.
- 1.1.6 In addition to monitoring individual outputs we also assess the company's progress against a composite Overall Performance Assessment which combines a range of service measures. Further detailed information on the OPA is included in Annex E.
- 1.1.7 Under the three categories outlined above, the scope of outputs included in the final determination are:

### Service level outputs

- 1.1.8 Service level outputs can be grouped in broad categories which cover:
- **Direct services to consumers.** These include: pressure of water supplied, frequency of interruption to water supply and the risk of sewer flooding. An overall performance target is set to reduce interruptions to supply. We continue to set activity targets to reduce the number of properties subject to low pressure and at risk of flooding.
  - **Consumer contact measures.** For PC13, we agreed to continue to use a basket of consumer contact measures used in the SBP and PC10. These cover: the speed of response to billing contacts, consumer complaints, and telephone calls; whether metered bills are based on readings; and overall call handling satisfaction.
  - **Water quality compliance.** Three targets are set for water quality based on the regulatory sampling and testing programme for the DWI. The targets cover overall compliance (MZC), a quality compliance measure related to distribution mains (OPI[TIM]) and a measure of water quality at local service reservoirs.
  - **Wastewater quality compliance.** We have reduced the number of targets for wastewater quality against numeric consents to two and introduced a target for small wastewater treatment works compliance for the first time. A further service level output covers high and medium pollution incidents.
  - **Water resource.** We include targets for leakage and a 'security of supply index' which is a measure of the deficit between supply and demand.
- 1.1.9 For some service level outputs, the company is able to link future performance to the level of investment or changes in operational practice. But this is not the case for some key outputs. In particular:
- NI Water's consumers experience a higher level of interruptions to supply than those in England, Wales and Scotland. It is likely that the greater length of main per property contributes to this. The company has plans to achieve a further reduction in interruptions to supply in PC13, but has not provided any information linking the cause of interruptions to supply to potential solutions based on investment or changes in operational practice which would allow us to determine whether the proposed target is reasonable.

- The rate of medium and high pollution incidents in Northern Ireland is significantly higher than in England and Wales. The company has commented that water and sewerage companies in England and Wales have benefitted from higher levels of investment in their sewerage systems in recent years which has allowed them to reduce the frequency of pollution incidents. The company has proposed a modest reduction during PC13 but has not provided us with any information linking the cause of pollution incidents to potential solutions based on investment or changes in operational practice which would allow us to determine whether the proposed target is reasonable.
- The company has developed its flooding register to identify properties which are at risk of flooding. It has proposed a programme of work to alleviate property flooding based on a number of properties and a unit cost per property. However, the company has not completed the additional investigations, including hydraulic analysis required to confirm the risk and extent of flooding and the cost and prioritisation of solutions.

1.1.10 Our draft determination asked the company to either provide further information in these three areas for the final determination or to set out a clear programme of work which will allow it to set out challenging and realistic targets in its PC15 Business Plan which are linked to investment and improvements in operational practice. Details of the company's responses are dealt with under the relevant sections below.

### **Nominated outputs**

1.1.11 Individual nominated outputs have been identified for:

- construction of three water trunk mains to secure water supply;
- complete five major incident mitigation projects aimed at improving resilience within the distribution system;
- upgrades to two water treatment works to secure water quality compliance;
- expansion of the capacity of one service reservoir to secure water supply;
- improvements to 38 wastewater treatment works to comply with new and existing consents; and
- improvements to 84 unsatisfactory intermittent discharges from the sewerage system to improve receiving water quality and reduce pollution.

1.1.12 NI Water has provided lists of individual schemes and outline Business Cases providing a robust link between investment and outputs. We provided the company with feedback on these nominated outputs and our draft determination asked that some remaining issues be clarified for the final determination.

### **General activities**

1.1.13 General activities have been identified for:

- water mains rehabilitation as part of a planned programme of work;
- sewers replaced or relined; and

- a number of small water treatment works upgrades to be prioritised by NIEA and NI Water.

1.1.14 The company has been able to provide information linking the level of activity to investment based on current unit costs.

1.1.15 The company has proposed an increase in the unit cost of water mains rehabilitation to reflect a shift in work from rural to urban areas. We will monitor the level of delivery in rural and urban areas to confirm that the company delivers the activity proposed in its Business Plan.

### **NI Waters response to the PC13 draft determination**

1.1.16 The company responded to the draft determination on a number of issues. We had taken account of the company's response in our final determination. Where these relate to outputs, we have provided additional commentary under the relevant headings setting out our position.

### **PC13 Output Summary**

1.1.17 The summary outputs for PC13 are set out in Table 1.1 (Consumer service and water quality outputs for PC13) and Table 1.2 (Sewerage service outputs for PC13). The output tables include actual and projected performance in the PC10 period and show how the outputs planned for PC13 compare with the current period.

**Table 1.1 – Customer service and water quality outputs for PC13**

Line description				PC10			PC13	
				2010-11	2011-12	2012-13	2013-14	2014-15
<b>A</b>	<b>Consumer Service</b>							
1	DG2 Properties at risk of low pressure removed from the risk register by company action	nr		283	262	255	118	170
3	DG3 Supply interruptions > 12hrs (unplanned and unwarned)	%		26.57	0.09	0.20	0.19	0.19
4	DG3 Supply interruptions (overall performance score)	nr		95.79	0.97	1.16	1.12	1.08
5	DG6 % billing contacts dealt with within 5 working days	%		98.87	99.97	99.90	99.90	99.90
6	DG7 % written complaints dealt with within 10 working days	%		99.51	99.27	99.00	99.25	99.50
7	DG8 % metered customers received bill based on a meter reading	%		96.11	97.88	98.50	98.50	99.00
8	Call Handling Satisfaction score (1-5)	nr		4.59	4.57	4.70	4.70	4.75
9	DG9 % calls not abandoned	%		88.19	99.15	99.00	99.00	99.00
10	DG9 % calls not receiving the engaged tone	%		32.77	100.0	99.90	99.90	99.90
11	Overall Performance Assessment (OPA) score (11 Measures)	nr		131	184	184	202	215
12	Total Leakage	Mld		177	168	165 <sup>1</sup>	169	165 <sup>2</sup>
13	Security of supply index	nr		97	100	97	97	100
15	Percentage of NI Water's power usage derived from renewable sources	%		13.5	14.4	17.0	18.5	20.0
<b>B</b>	<b>Quality Water</b>							
16	% mean zonal compliance with drinking water regulations	%		99.82	99.83	99.80	99.70	99.70
17	Operational Performance Index (Turbidity, Iron & Manganese)	nr		99.08	99.31	99.00	99.10	99.10
18	% Service Reservoirs with coliforms in >5% samples	%		0.00	0.00	0.00	0.00	0.00
<b>C</b>	<b>Water Outputs</b>							
19	Water mains activity - Length of new, renewed or relined mains	km		204	510	311	214	231
20	Completion of nominated trunk main schemes	nr		2	0	2	0	3
21	Completion of nominated water treatment works schemes	nr		2	0	0	0	2
22	Completion of nominated improvements to increase the capacity of service reservoirs and clear water tanks	nr		5	3	1	0	1
22a	Completion of nominated Major Incident Mitigation schemes	nr		-	-	-	3	2
<b>D</b>	<b>Serviceability</b>							
23	Water infrastructure serviceability			Stable	Stable	Stable	Stable	Stable
24	Water non-infrastructure serviceability			Stable	Stable	Stable	Stable	Stable

<sup>1</sup> PC10 actuals and targets are based on the current leakage management software method of measurement.<sup>2</sup> PC13 targets are based on the new leakage management software method of measurement. This will be introduced in the 2013-14 year and will report figures which are around 8Mld higher than the current system.

Table 1.2 – Sewerage service outputs for PC13

Line description				PC10			PC13	
				2010-11	2011-12	2012-13	2013-14	2014-15
<b>A</b>	<b>Consumer Service Sewerage</b>							
<b>1</b>	DG5 Properties at risk of flooding - number removed from the at risk register by company action	nr		4	14	42	23	44
<b>B</b>	<b>Quality Sewerage</b>							
<b>3</b>	% of WWTWs discharges compliant with numeric consents	%		88.3	92.5	88.2	88.6	91.0
<b>4</b>	% of total p.e. served by WWTWs compliant with numeric consents	%		95.6	96.5	96.5	97.2	97.8
<b>6</b>	Number of high and medium pollution incidents attributable to NI Water	nr		46	44	48	46	44
<b>C</b>	<b>Sewerage Outputs<sup>3</sup></b>							
<b>7</b>	Sewerage activity - Length of sewers replaced or renovated	km		27	13	15	9	14
<b>8</b>	Delivery of improvements to nominated UIDs as part of a defined programme of work	nr		20	44	30	12	72
<b>9</b>	Delivery of improvements to nominated WwTWs as part of a defined programme of work	nr		32	7	9	19	19
<b>10</b>	Small wastewater treatment works delivered as part of the rural wastewater investment programme	nr		21	28	5	18	7
<b>D</b>	<b>Serviceability</b>							
<b>11</b>	Sewerage infrastructure serviceability	Text		Stable	Stable	Stable	Stable	Stable
<b>12</b>	Sewerage non-infrastructure serviceability	Text		Stable	Stable	Stable	Stable	Stable

<sup>3</sup> PC10 nominated outputs will be subject to review and agreement by the quality regulators.



## 2 Consumer Outputs

- 2.1.1 For PC13 we have agreed to continue to use the basket of consumer contact measures used in the SBP period and PC10. These cover: the speed of response to billing contacts, consumer complaints, and telephone calls; whether metered bills are based on readings; and overall call handling satisfaction.
- 2.1.2 NI Water performance for the majority of these measures is already high and comparable to the average performance in England and Wales in recent years. The company plans to deliver some further improvements by the end of PC13 which will move the performance of the basket as a whole closer to the England and Wales average. The proposed targets for PC13 have been accepted on this basis.
- 2.1.3 For PC15 we will work with CCNI, the company and other stakeholders to consider whether other measures should be introduced to help NI Water focus improvements on the issues that are most important to consumers. The company's consultation response notes that it looks forward to engaging with stakeholders to develop the consumer response measures.

## 3 Water Service Outputs

- 3.1.1 In this section we provide more detailed information on water service outputs covering:
- Properties at Risk of Low Pressure (DG2)
  - Properties Experiencing Interruptions to Supply (DG3)
  - Leakage
  - Security of Supply
  - Mean Zonal Compliance with Drinking Water Regulations
  - Operational Performance Index (Turbidity, Iron and Manganese)
  - Water Quality at Service Reservoirs
  - Nominated Outputs and Activities

### 3.2 Properties at Risk of Low Pressure (DG2)

- 3.2.1 Over the course of the SBP period and PC10, NI Water has developed and validated a register of properties which are at risk of low pressure. At the end of the PC10 period it is estimated that this will contain around 1,500 properties.
- 3.2.2 NI Water plans to remove a further 288 properties from this register by company action during PC13. The company has provided information which links the proposed annual reductions directly to planned watermain rehabilitation work packages and the projections have been accepted on this basis.

- 3.2.3 The percentage of properties that are at risk of low pressure at the end of PC13 will however still be much higher than the average performance in England Wales over the past ten to fifteen years.
- 3.2.4 Low pressure is an issue which has an ongoing impact on the consumers affected. NI Water undertakes work to improve supply pressure as part of its planned programme of mains rehabilitation which prioritises work on the basis of a range of issues – including burst frequency and water quality. In our draft determination we noted that NI Water should include an assessment of the work needed to provide water at target pressure to all properties in its plans for PC15. The company has confirmed that the assessment is underway.

### 3.3 Properties Experiencing Interruptions to Supply (DG3)

- 3.3.1 Our final determination for PC10 noted that the link between DG3 improvements and investment was weak and stated that we expected the company to improve its understanding of interruptions to supply in order to develop a more robust plan for PC13. The company has advised that it is working to improve its methodology for targeting investment in water mains but has not completed this work yet.
- 3.3.2 In our draft determination we asked the company to either provide further information detailing how investment or improvements in operational practice were linked to DG3 improvements for the final determination, or to set out a clear programme of work which would allow it to set out challenging and realistic targets in its PC15 Business Plan.
- 3.3.3 The company is still unable to detail how investment or improvements in operational practice were linked to DG3 improvements for the final determination. The company has confirmed that its revised approach to identifying and prioritising water mains will be available to inform the development of the PC15 Business Plan and that this revised approach will provide clear linkages between investment and beneficial outputs.
- 3.3.4 Our PC10 determination noted the potential impact that NI Water's relatively high length of mains per property was having on DG3 performance. We expect the company to consider the interaction between length of main per property, burst rates and interruptions to supply when developing proposals for PC15.

### 3.4 Leakage

- 3.4.1 During PC10, the company has improved the quality of information and methodology used to estimate leakage. These improvements have affected the level of leakage reported and this must be taken into account when assessing performance over the period on a like for like basis. They do not change the amount of leakage but simply provide a better estimate of what is already there.

- 3.4.2 In our draft determination we took account of the changes described above and considered leakage on a like for like basis over the period 2008-09 to 2011-12. Our proposed target of 5 Mld per annum recognised that reductions become more difficult to deliver as leakage reduces as well as the unusual nature of the intervening years.
- 3.4.3 In its response to the draft determination the company proposed a lower target of 4Mld. It highlighted the fact that the exceptionally mild winter in 2011-12 provided significant opportunities to maximise leakage reduction. We have considered the representations made by the company and the supplementary information provided. We extended our analysis leakage reduction over a longer period, excluding the significant outperformance in 2011-12. This indicates that the company reduced leakage by roughly 5Mld per annum between 2006-07 and 2010-11. Noting that further reductions in leakage become harder as leakage reduces and the supplementary information provided by the company, we have concluded that a target of 4Mld per annum reduction is unreasonable.
- 3.4.4 In our draft determination we noted that NI Water's is in the process of introducing new leakage management software. We understand that the introduction of new leakage software is the final major planned change to the company's leakage management systems. We support this development which will improve the quality of information management and analysis and assist NI Water in targeting leakage reduction. The new software uses a different methodology to estimate minimum night flows and will report a slightly higher level of leakage as a result. Give that this change introduced some uncertainty in the absolute level of leakage which would be reported in PC13, our draft determination set a target for leakage reduction rather than an absolute level of leakage.
- 3.4.5 We asked the company to provide an estimate of the change in reported leakage based on data for the first six months of 2012-13. It has completed this work which indicates that the reported level of leakage will rise by around 8Mld. The Reporter has reviewed the company's assessment on our behalf and has confirmed that the figure represents a reasonable estimate which has been determined using a reasonable approach. Taking account of this work, we are now in a position to set leakage targets for PC13 which are set out in Table 3.1 below. The revised target aligns with the assumptions of the recently completed Water Resources Management Plan.

**Table 3.1 - PC13 leakage target (Mld)**

	2011-12	2012-13	2013-14	2014-15
Reported level of Leakage (Mld) – existing software	168			
Adjusted for the introduction of new software (+8Mld)	176			
PC10 2012-13 outturn – (assumes PC10 target reduction of 3Mld reduction is delivered)		173		
PC13 Targets (4Mld reduction per annum)			169	165

3.4.6 The level of capital funding included in the final determination remains consistent with that in PC10. In addition to Leakage reduction, this also allows funding for the company to:

- Update its assessment of the sustainable economic level of leakage. This new sustainable level of leakage assessment should take account of any further changes in methodology or key assumptions which the company has identified during PC13.
- Continue to optimise DMAs and undertake further studies of trunk-mains and DMAs.
- Maintain existing pressure reduction valves and continue to install pressure management to help reduce leakage.
- Maintain and improve meters thus improving flow data collection.

3.4.7 Our assessment of leakage targets is based on an analysis of historic performance. For PC15 we expect the company to demonstrate how leakage reduction targets link to the proposed investment.

3.4.8 We are conscious that changes in methodology and corrections to underlying data make it difficult to assess the improvements delivered against targets on a like for like basis. We expect the company to report leakage through PC13 using the same methodology and key assumptions used to determine the leakage targets. The movement in reported leakage over the period will then reflect real improvements. If the company identifies any further changes to methodology or assumptions these should not be implemented until PC15, unless the company can demonstrate, and the Utility Regulator agrees, that the change makes a material improvement to the leakage estimate. Before any change is made, the company should provide a detailed assessment of how the change would have impacted on leakage reported in prior years of PC13 and demonstrate how the change would alter the leakage targets for PC13. The company has noted this requirement in its consultation response.

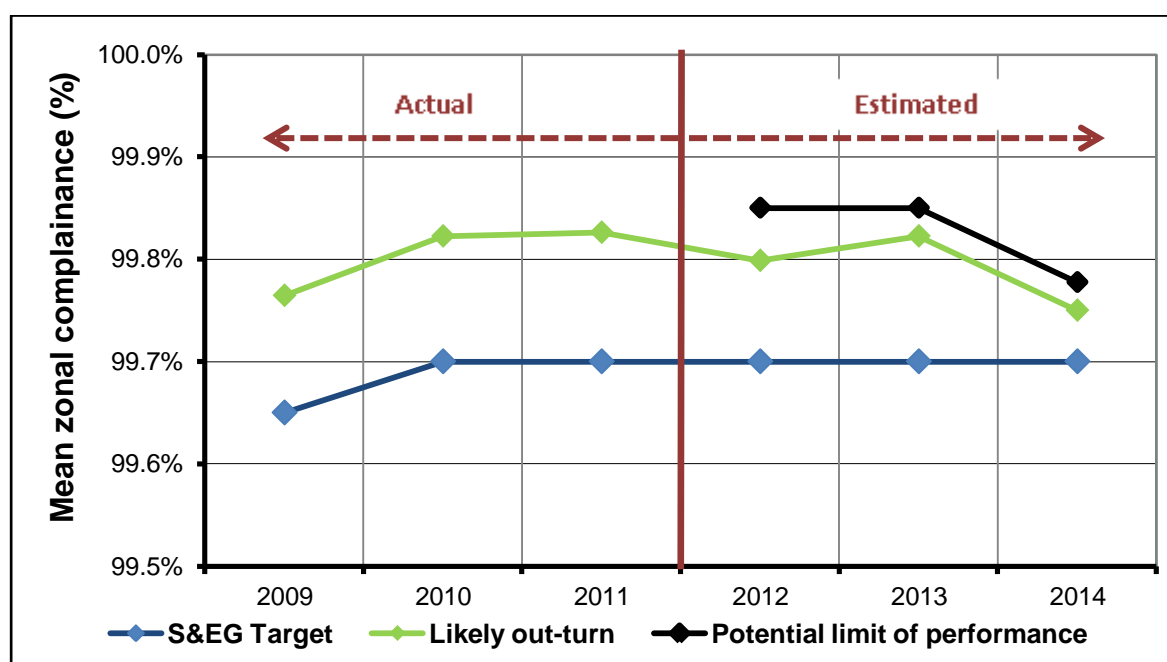
## 3.5 Security of Supply

3.5.1 The company's security of supply index has increased significantly since the SBP period. In addition to capital investment, the improved assessment undertaken for the revision of the company's Water Resource Management Plan in 2011 will have made a major contribution to this improvement. NI Water plans to deliver a maximum security of supply score by the end of PC13.

## 3.6 Mean Zonal Compliance with Drinking Water Regulations

3.6.1 Mean zonal compliance (MZC) is a composite score based on 39 water quality standards measured through a statutory programme of random samples taken mainly at consumers' taps. It is a measure which is used to assess the overall quality of the water that consumers receive.

- 3.6.2 The quality of drinking water at consumer taps is determined by:
- The quality of treated water which NI Water puts into the distribution system.
  - Any subsequent deterioration of water quality in the distribution system.
- 3.6.3 NI Water's water treatment works have benefitted from significant investment over recent years and are generally capable of producing treated water which meets current safety standards. On-going investment is included in the determination to deal with known water quality issues and maintain the performance of treatment works.
- 3.6.4 Some deterioration in water quality occurs in the distribution system. For example, iron can be picked up from corrosion products and lead can be dissolved from supply pipes, fittings and plumbing. The determination includes funding for mains rehabilitation which will allow the company to continue to address mains water quality issues and at least maintain water quality performance.
- 3.6.5 MZC will reduce in PC13 as a result of a significant change to the water quality standard for lead. The Prescribed Concentration or Value (PCV) for lead will move from 25 µg/l to 10 µg/l on 25 December 2013. It is estimated that this tighter lead standard will cause MZC to fall by around 0.07% in 2014 compared to 2013. Further information on the work the company will carry out in PC13 to improve lead compliance is given in Section 3.11.
- 3.6.6 NI Water has proposed a target of 99.70% for MZC in PC13, which reflects the Social & Environmental Guidance requirement that MZC is sustained at a level greater than 99.7%. This compares to performance in 2011 of 99.83%. We expect compliance to fall from current levels to around 99.75% in 2014 following the introduction of the new lead standard. The target proposed by the company is therefore one which we expect it to exceed in almost all circumstances. Taking account of current performance, changes in quality standards and the impact of proposed investment, we expect MZC to be in the range indicated in Figure 1.

**Figure 1 – PC13 - Mean zonal compliance range**

### 3.7 Operational Performance Index (Turbidity, Iron and Manganese)

- 3.7.1 The Operational Performance Index for Turbidity, Iron and Manganese (OPI[TIM]) provides an indicative measure of the deterioration of water quality in the distribution system due to corrosion products and long term precipitation of treatment products.
- 3.7.2 While some mains replacement in PC13 will target water quality issues, the extent of work planned is not sufficient to make a material improvement in performance. We have continued the PC10 target of 99.1% for OPI(TIM) into PC13.
- 3.7.3 OPI(TIM) provides a weak surrogate for the appearance of water at the consumer tap. The company is working on a new system for identifying and prioritising work on water mains which will take account of consumer feedback on the acceptability of water including taste, odour and appearance. We expect the company to reflect the outcome of this work in its Business Plan for PC15. The work should be informed by historic rates of emerging defects, effective pre and post project evaluation of water main rehabilitation benefits, ongoing review of the company's drinking water safety plans and ongoing consultation with the Drinking Water Inspectorate and other stakeholders.

## 3.8 Water Quality at Service Reservoirs

- 3.8.1 NI Water is not predicting any non-compliance with the measure for assessing water quality at service reservoirs in PC13 (% service reservoirs with coliforms in >5% samples).
- 3.8.2 We expect the company to continue to prioritise investment to maintain compliance during PC13 in consultation with the Drinking Water Inspectorate and to develop its methodology for prioritising investment for PC15.

## 3.9 Nominated Outputs and Activities

- 3.9.1 In its Business Plan the company identified specific activities or investment. These are summarised below along with our views of the company's submission.

### **Water mains activity.**

- 3.9.2 The company plans to deliver 445km of new and renewed water mains through its water mains rehabilitation programme. Our target for PC13 is the delivery of this programme of planned upgrades.
- 3.9.3 Proposed activity levels have been estimated from the available funding rather than a detailed assessment of the level of activity required to maintain performance and are slightly lower than in PC10. They have been accepted on the basis that serviceability appears to have been maintained during PC10 and because PC13 is a short duration price control period. For PC15, we expect the company to move from the current top-down approach to investment planning to a risk based bottom up approach for identifying appropriate levels of activity. This will allow the company to demonstrate the reasonable long term rate of key activities such as water mains rehabilitation and demonstrate that it can target asset maintenance expenditure to maintain and improve service levels.
- 3.9.4 The company's estimated that the work it will carry out in PC13 will be split 50:50 between urban and rural areas. Our assessment of activity output length is based on this split. We will ask the company to report the actual urban/rural split to us annually during PC13 and will expect these proportions to be broadly maintained. If there is a material change, we will expect the company to adjust its overall output length accordingly. The Northern Ireland Statistics and Research Agency classification of urban and rural areas will be used for monitoring purposes during PC13.
- 3.9.5 In addition to its work on water mains rehabilitation, the company estimates that it will deliver a further 54km of water mains through its new and renew sub-programme. Much of this work is linked to development including connections, mains requisitions and mains laid in new developments.
- 3.9.6 The water mains rehabilitation programme for PC13 includes significant investment in five specific Major Incident Mitigation (MIMP) Projects aimed at improving resilience



within the distribution system. These schemes were developed to address specific weaknesses identified following the freeze/thaw events in 2009-10 and 2010-11. As well as including the length of mains in the activity target we have identified these schemes as nominated outputs.

### **Trunk main schemes.**

3.9.7 The final determination for PC13 includes three nominated trunk mains outputs:

- Ballydugan to Newry trunk main Phase 2b. This scheme will allow water to be transferred from Castor Bay WTW at Lough Neagh to secure supplies in the Newry area. Phase 1 and Phase 2a of this scheme are already in construction.
- Gravity II McVeigh's Well to Oldpark SR. This scheme allows water from Dunore Point WTW at Lough Neagh and Dorisland WTW to be transferred across Belfast from north to south, improving the security of supply in this area.
- Castor Bay to Belfast Trunk Main. This scheme will allow water from Castor Bay WTW at Lough Neagh to be fed to south Belfast by connecting to the Aquarius trunk main which is currently supplied from the Mournes. It addresses an emerging supply demand deficit in Belfast linked to development and improves both security and flexibility of supply. The scheme includes for upgrading the pumping station at Castor Bay WTW.

3.9.8 The company has decided not to replace an existing strategic crossing of the M1 motorway which was originally included in its PC13 Business Plan. It has been listed as one of the company's additional priority outputs for PC13. The company may therefore still commence the scheme during PC13 period if additional funding becomes available and deliverability issues can be addressed.

### **Water treatment works schemes.**

3.9.9 The determination includes two nominated water treatment works outputs in PC13:

- Upgrade to Killyhevlin WTW. The work is covered by a Consideration of Provisional Enforcement Order to address taste and odour which was issued to NI Water by the Drinking Water Inspectorate.
- Improvements to Killylane WTW to secure water quality compliance. The planned work generally consists of replacement and improvement of existing plant and will be delivered through the capital maintenance budget.

3.9.10 In our draft determination we asked NI Water to provide a summary of the scope of work planned for these nominated outputs to help us monitor delivery. This information was provided as part of the company's consultation response.

3.9.11 In its response to the draft determination, the Drinking Water Inspectorate noted on-going non-compliance with pesticide standards at Dorisland WTW. The Drinking Water Inspectorate anticipates that additional treatment will be required at the site and that it may be necessary to include this work in PC13. NI Water is currently undertaking a feasibility study to determine what remedial action is necessary and is due to report its findings at the end of December 2012. We have not included this



works as a nominated output in the final determination as the conclusions of NI Water's study are still pending. Once the investigations are complete, there is the option of incorporating the scheme into the PC13 programme through the change control process and adjusting the number of nominated outputs accordingly.

### **Service reservoirs and clear water tanks.**

- 3.9.12 The company will increase the capacity of one service reservoir in PC13. This delivers an output re-profiled from PC10 as a consequence of the PC10 change control process.
- 3.9.13 Since the draft determination, the company has identified an additional project in this sub-programme. This is for a pumping station and pumping main (rather than a service reservoir) and is intended to reinforce supplies to the area served by Altnahinch WTW.

### **Other general investment**

- 3.9.14 In addition to the nominated outputs, funding in the determination will allow NI Water to:
- Complete the 'Metering and Treatment of WTW Effluents' project which commenced in PC10. This involves installation of meters to monitor water treatment effluent discharges to satisfy NIEA requirements.
  - Make improvements to secure the safety of impounding reservoirs identified by the Panel Engineer in 2006.
  - Carry out work to improve the security of service reservoirs and water treatment works.
  - Continue to rehabilitate service reservoirs.
  - Invest in project development, design and procurement to secure continuity of investment into PC15.

## **3.10 Connection of Services**

- 3.10.1 The PC13 determination provides funding for the company to continue to make new connections to the water supply system. This includes service connections and requisitions as well as laying new water mains within new developments.

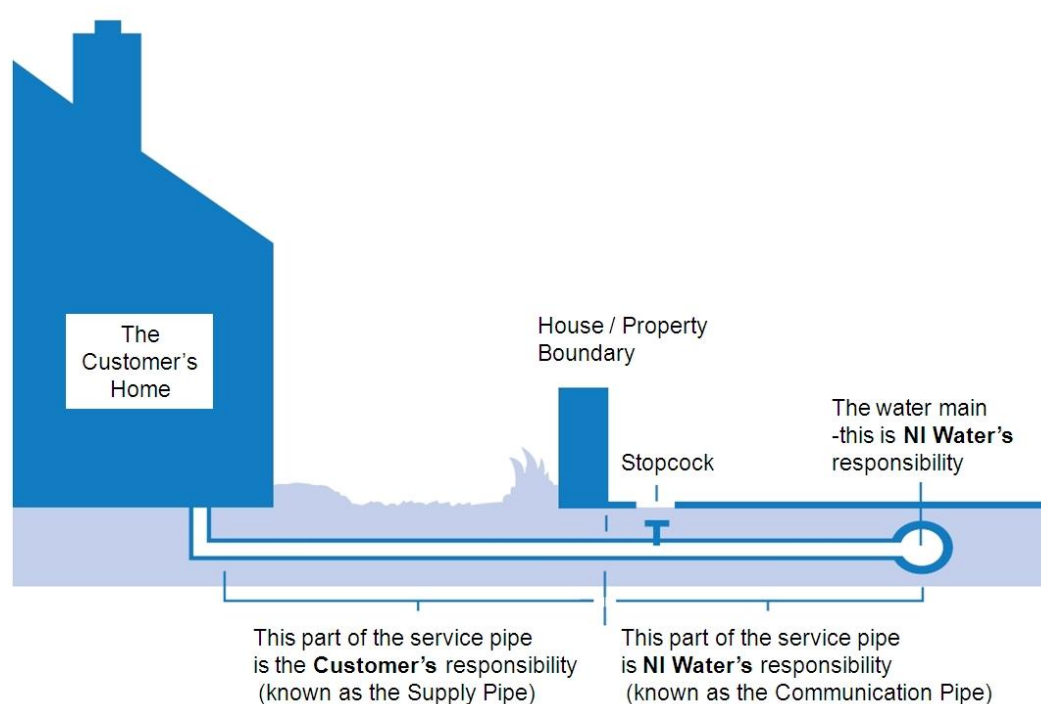
## **3.11 Water Quality – Lead Compliance**

- 3.11.1 The medium term average for water quality failures for lead at consumers' taps is 0.8% against the current standard of 25µg/l. In December 2013, the PCV for lead will reduce to 10µg/l. As a result, the average level of failures is likely to increase to around 3.2%. While the failure rate is established by limited sampling (about 400 properties selected at random each year), the long term average rate of failure could

suggest that between 20,000 and 25,000 domestic properties would fail the new lead standard.

- 3.11.2 The quantity of lead in treated water put into distribution is almost zero. However, lead can be dissolved from lead pipes and fittings in the distribution system and domestic plumbing, causing the quality of drinking water to deteriorate. Recent regulation and practice means that lead is no longer used in either the water industry or in domestic plumbing, but there remains a legacy issue affecting older distribution systems and older properties.
- 3.11.3 The most common use of lead was in smaller pipes used in domestic plumbing and the 'service pipe' which connects a property to the water main. NI Water is responsible for the pipe from the water main to the boundary of the property (the "communication pipe" - see Figure 2). The property owner is responsible for the length of pipe from the property boundary to the property (the "supply pipe") and any internal plumbing. Lead dissolved from consumer supply pipes and plumbing can continue to generate compliance failures after NI Water has removed lead from its section of the distribution system.

**Figure 2 – Service pipe responsibility**



3.11.4 NI Water will take the following action to reduce water quality lead failures in PC13:

- Continue dosing ortho-phosphoric acid to drinking water supplies to reduce the rate at which lead dissolves into the water supply.
- Replace lead communication pipes on mains replaced by its water main rehabilitation programme.

- Replace lead communication pipes where a water quality test carried out as part of NI Water's normal operations, or at the specific request of a consumer, reveals a lead failure.

3.11.5 The company also proposes to invest £500k per annum in a proactive programme of communication pipe replacement targeting high risk areas. We allowed this funding in the draft determination, but asked that the company expand on its proposal and demonstrate how the funding will be targeted for the final determination.

3.11.6 The company's response to the draft determination expanded on the its developing policy in respect of lead as follows:

- NI Water is developing a methodology for prioritising lead replacement, which includes consideration of failure 'hotspots', prioritisation based on sample results, prioritisation of vulnerable/priority customers etc. This is not yet finalised but will be in place to support its PC15 proposals. It will also help to inform work undertaken in PC13.
- The company will have defined its yearly PC13 replacement programmes by the end of March 2013.
- NI Water is exploring opportunities for collaborative working with organisations such as the Northern Ireland Housing Executive. Proposals include undertaking pilot studies with the Housing Executive to test the benefits of a collaborative approach.

3.11.7 The Drinking Water Inspectorate highlighted the implementation of an effective lead strategy as a key issue in its response on our draft determination for PC13. We expect the company to continue to progress these initiatives in PC13 and to continue to develop its lead reduction strategy in consultation with the Drinking Water Inspectorate and other stakeholders. This should include:

- Effective prioritisation and targeting to maximise benefits.
- Consideration of further opportunities for collaborative working.
- Developing proposals for demonstrating how progress is being made against the strategy for discussion and agreement with the wider stakeholder group.
- Consideration of how historic sample data can be used to help target lead replacement against the new lead standard under the company's prioritisation methodology.
- Maintaining effective drinking water safety plans to help inform the development of the strategy.

3.11.8 For PC15 we expect NI Water to have fully developed its approach and to be able to present a clear plan for addressing lead non-compliance which as far as possible quantifies the benefits it expects to achieve for the investment proposed.

3.11.9 NI Water's programme of work in PC13 will only have a limited impact on lead compliance. The ortho-phosphoric acid dosing programme means that a proportion of lead communication pipes removed will not currently result in a water quality failure. In addition, lead sample failures may continue after the company has replaced the communication pipe because of lead supply pipes and internal plumbing

on consumer premises. As a result we have not assumed any material improvement in lead compliance in the MZC targets outlined in Section 3.6. Broader action to address lead pipes and fittings on consumers' premises will be necessary if full compliance with the water quality standards for lead is to be achieved. This should be subject to consideration under the Long Term Water Strategy.

## 3.12 Maintaining Serviceability

3.12.1 An overall allocation of base maintenance funding has been provided to maintain stable serviceability across all assets during PC13. We will introduce formal serviceability monitoring in PC13 based on the following parameters:

- Number of mains bursts.
- % properties at risk of receiving low pressure (DG2)
- % properties affected by interruptions >12 hrs
- % mean zonal non-compliance - iron
- OPI(TIM)
- Customer contacts per 1000 population (Discoloured water)
- Pipe bursts resulting in interruptions to supply greater than 3 hours
- Distribution losses
- % Water Treatment Works samples containing coliforms
- % Service reservoirs with coliforms in >5% samples
- % coliform failures in samples taken from service reservoirs
- % Water Treatment Works with turbidity samples 95%ile >0.5NTU
- Events at Water Treatment Works affecting drinking water quality
- Unplanned (reactive) maintenance at water non-infrastructure sites

3.12.2 In its response to the draft determination the company acknowledged the positive engagement on the development of serviceability indicators to date and indicated that it hoped to build on this to agree a basket of indicators for each service area. It also stated that it would welcome further engagement on the processes for determining trends and triggers for serviceability assessment.

## 4 Sewerage Service Outputs

### 4.1 Sewer Flooding

- 4.1.1 The need to reduce the risk of sewer flooding is consistently identified by consumers as a high priority.
- 4.1.2 We asked NI Water to develop a register of properties which are at risk of internal flooding. Initially the company was not able to populate this register from the limited records maintained by its predecessor DRD Water Service. By the start of PC10, the company had assembled records of historic flooding incidents and identified over 2,000 properties which might have been affected by flooding in the past. The company has since completed an initial assessment of these properties, and by March 2012 identified 213 properties which are at risk of flooding more frequently than 1 in 20 years due to limited hydraulic capacity in the sewerage system.
- 4.1.3 For PC13, the company has proposed to address risk of flooding at 67 properties which are confirmed as at risk of flooding more frequently than once in 20 years. Of these 67 properties to be removed, we understand that 8 properties will be removed from the higher risk 1 in 10 and 2 in 10 registers.
- 4.1.4 While significant progress has been made, the company has not identified a clear set of prioritised flooding outputs for PC13. The company has yet to complete the feasibility studies necessary to confirm the scope and cost of flood alleviation work and has not been able to provide the delivery programme we asked for in the draft determination. In view of this, we expect NI Water to provide us with regular progress reports as the outputs are developed and delivered. This work will also inform the continuity of work to alleviate flooding into PC15. We will also ask NI Water to keep us and other stakeholders informed on the prioritisation of outputs and the development of the 'at risk of flooding' register.
- 4.1.5 Severe flooding across Belfast in June 2012 reinforced the distress and disruption which is caused when extreme storm events exceed the capacity of the sewerage system, flooding houses, businesses and transport infrastructure. However, it also provides an opportunity to review and confirm broader expectations on how a sewerage system should perform in extreme events. Current practice is to design the sewerage system for a 30 year storm event. As the company develops designs to upgrade the sewerage system, we would expect it to demonstrate what will happen when the design capacity of the sewerage system is exceeded. We also expect the company to work with other agencies responsible for land and road drainage and demonstrate that schemes it intends to deliver fit within an integrated approach to resolving drainage problems in an area.
- 4.1.6 During PC10, the company has often allocated historic flooding schemes to at-risk categories on the basis of the number of recorded flooding events and the return period for the associated rainfall event. The additional investigations, including

hydraulic modelling, which the company will carry out as part of its on-going feasibility studies should confirm the risk of flooding and allow interventions to be prioritised. As new flooding events occur, we expect the company to complete further investigations, including hydraulic analysis, to confirm the risk of flooding as part of its assessment of the flooding incident. This will ensure that the at-risk categorisation provides a robust assessment of risk and a sound basis for the prioritisation of interventions.

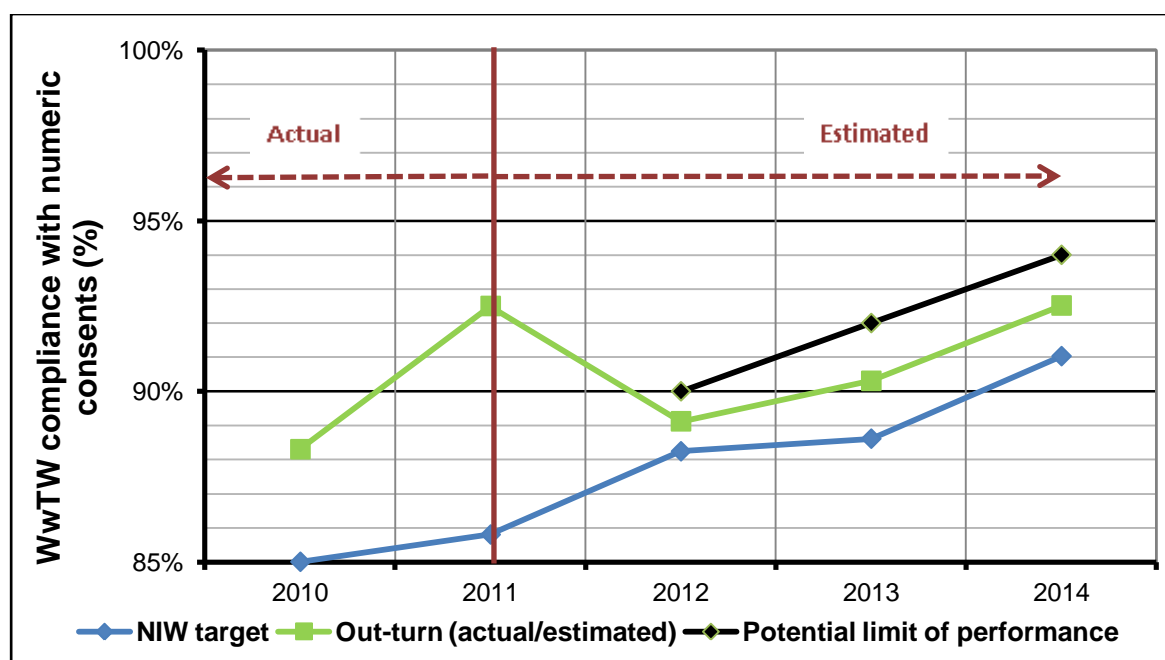
## 4.2 Wastewater Treatment Works Compliance

- 4.2.1 For PC13 we have reduced the number of performance targets we will monitor for numeric consents to cover:
- % WwTW's compliant with numeric consents; and,
  - % population served WwTW compliant with numeric consents (excluding upper tier compliance).
- 4.2.2 Since the draft determination we have agreed revised reporting requirements with NI Water and NIEA to ensure that performance targets in the final determination align with NIEA's assessment and reports of statutory compliance. The company has revised its forecast for the calendar years 2013 (2013-14) and 2014 (2014-15) taking into account these recently agreed data sets, and we have taken this into consideration in our final determination.
- 4.2.3 We are aware that the performance of WwTW can be affected by conditions which the company cannot control. Cold weather can affect the biological processes used in wastewater treatment and can result in reduced plant performance, thereby increasing the risk of non-compliance. Long periods of hot dry weather will reduce the irrigation of biological filter processes which may reduce performance. This is a particular issue for NI Water where further investment is required at some treatment works which are in poor condition or are overloaded by development which occurred in the past. Whether these works meet their consent conditions in any one year will depend not only on the skill of operations staff, but whether climatic conditions are favourable.
- 4.2.4 The effect of this can be seen in targets proposed by NI Water for percent works compliant with numeric consents:

**Table 2 – PC13 – WwTW compliance with numeric consents**

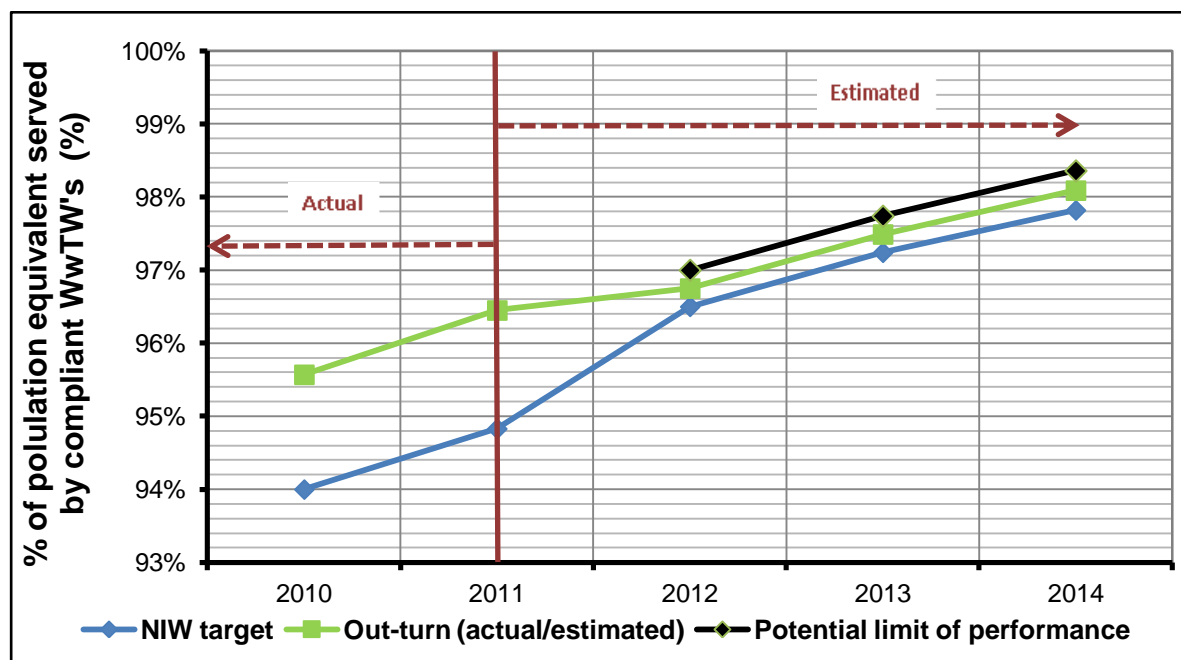
	Actual		Target		
	2010-11	2011-12	2012-13	2013-14	2014-15
% WwTW compliant with numeric consents	88.3	92.5	88.2	88.6	91.0
PC10 target	85.0	85.8	88.2		

- 4.2.5 The company attributes the reduction of 5% from actual performance in 2011-12 to target for 2012-13 to advantageous climatic conditions in 2011-12. The company proposed a target of 88.2% in 2012-13, consistent with the PC10 target, notwithstanding the fact that it has delivered better performance than this in the two preceding years.
- 4.2.6 We have concluded that the company has proposed targets at the lower end of the range of potential outcomes for these compliance standards. We have accepted this as appropriate – it would be unreasonable to set a target based on average levels of compliance which the company is likely to fail 50% of the time. However we would expect the company to exceed these targets in almost all circumstances. Taking account of current performance, changes in quality standards and the impact of proposed investment we expect that WwTW compliance will be in the range indicated in Figure 3 in all but the exceptional circumstances which the company reports for 2011.

**Figure 3 – PC13 – WwTW compliance with numeric consents**

4.2.7 Similarly, we forecast that the company will deliver an improved performance in the percentage of population equivalent served by compliant works (excluding upper tier failures). Figure 4 shows the potential operating range.

**Figure 4 – PC13 – % of population equivalent (p.e.) served by compliant WwTW's**



4.2.8 NIEA has recently developed a more comprehensive assessment of the performance of small WwTW's. As a result, we have been able to establish targets for the compliance of small works serving populations of between 50 and 250, which are excluded from the compliance targets stated above.

### 4.3 Pollution Incidents

4.3.1 The level of high and medium pollution incidents attributed to NI Water is higher than the level of pollution incidents attributed to water and sewerage companies in England and Wales. The company has noted a low level of investment in the sewerage system in Northern Ireland compared to investment in England & Wales over the last 20 years as a significant cause of its relatively low level of performance.

4.3.2 The company has also commented on the impact which rainfall has on pollution incidents. For example, the number of medium and high pollution incidents in the first half of 2012 is significantly lower than in previous years and the company attributes this to lower levels of rainfall. As a result there is a chance that the company will out-perform its target for 2012 by a significant margin.

4.3.3 The company has targeted a small reduction in high and medium pollution incidents of two per annum over PC13. This target is based on an extension of historic trends.



The company has outlined a series of initiatives it has put in place to reduce the frequency and severity of pollution incidents. However, the company has not been able to quantify the impact that these will have. Nor has it quantified the impact which the investment it has made, or proposes to make, will have on pollution incidents. It is not clear how the gap in performance with England and Wales will be closed and what level of investment will be required to achieve this. In its response to the draft determination we requested data and calculations from the company to support the target level of performance proposed. The company has not submitted any data to support its target.

- 4.3.4 In PC13, we expect the company to develop its strategy for reducing high and medium pollution incidents and demonstrate a clear link between performance and the capital and operational interventions proposed. We expect the company to provide us with regular updates on its methodology and progress on this work. The work should be completed to inform the PC15 Business Plan and future targets for reducing pollution incidents. The success of this work to develop a clearly targeted plan to reduce pollution incidents is a key output for PC13.

## 4.4 Nominated Outputs and Activities

- 4.4.1 Nominated outputs and activities have been identified for:

- the length of sewer replaced or relined;
- improvements to unsatisfactory intermittent discharges;
- improvements to wastewater treatment works; and,
- improvements to small wastewater treatment works.

- 4.4.2 These nominated improvements deliver specific quality improvements required by NIEA and form an integral part of the outputs to be delivered. They also contribute to the improvement in overall wastewater compliance targets described in Section 4.2.

### **Sewers replaced or relined.**

- 4.4.3 We have reviewed the target for renovation and renewal of new sewers in light of the revised investment programme and reduced the target to 23 km over three years. In addition the company plans to deliver some 70km of new sewers in PC13, much of this related to adoption of sewers in new developments. The outputs relates to the renovation and replacement of sewers in an urban environment.
- 4.4.4 The rate at which sewers are renewed or replaced is remarkably low when compared to the 14,000 km of existing sewers. While this rate may reflect the age profile of the existing sewerage stock and the long life of sewerage assets, it is not supported by a robust assessment of need. For PC15 we expect the company to move from the current top-down approach to investment planning to a risk based bottom up approach for identifying appropriate levels of activity This would require the company

to develop a better understanding of asset performance and deterioration and establish clearer links between investment and outputs.

### **Nominated improvement to unsatisfactory intermittent discharges**

- 4.4.5 The final determination allows for improvement to 84 unsatisfactory intermittent discharges (UIDs) to meet standards set by NIEA.
- 4.4.6 Since the draft determination work by NIEA, the Utility Regulator and NIEA has allowed an agreed list of UID's outputs to be developed, along with additional information to clarify the scope of individual schemes.

### **Nominated improvements to wastewater treatment works**

- 4.4.7 The final determination allows for improvement to 35 wastewater treatment works with a population equivalent greater than 250 to meet discharge consent standards set by NIEA.
- 4.4.8 Since the draft determination work by NIEA, NI Water and the Utility Regulator has allowed an agreed list of wastewater treatment works outputs be developed, along with detailed information on design flows and loads and consent conditions.
- 4.4.9 In addition to the 35 nominated outputs related to new consent conditions, the company has identified substantial investment in the maintenance of three major treatment works which we will monitor as base maintenance nominated outputs.

### **Small wastewater treatment works upgrades**

- 4.4.10 The level of investment included in the final determination allows the company to upgrade a further 25 small wastewater treatment works serving a population equivalent between 50 and 250, with the individual works to be prioritised by agreement between NIEA and NI Water.

## **4.5 Connection of Services**

- 4.5.1 The PC13 determination provides funding for the company to continue to make new connections to the water supply system including service connections and requisitions and laying new water mains within new developments.

## 4.6 Serviceability

- 4.6.1 An overall allocation of base maintenance funding has been provided to maintain stable serviceability across all assets during PC13. We will introduce formal serviceability monitoring in PC13 based on the following parameters:
- Number of sewer collapses
  - Number of pollution incidents from sewer network (CSOs, rising mains and foul sewers)
  - Number of sewer blockages
  - Number of properties flooded due to other causes
  - Number of equipment failures
  - Areas flooded externally (other causes)
  - Number of road openings for reactive investigations and repairs
  - Number of Pumping Station emergency overflows triggered by equipment failure
  - % Wastewater Treatment Works failing numeric consents
  - % population equivalent served by non-compliant Wastewater Treatment Works
  - % of Wastewater Treatment Works samples not meeting 95%-ile consent value
  - Number of Wastewater Treatment Works with one or more sample failure
  - Number of 'nuisance' small Wastewater Treatment Works
  - Unplanned reactive maintenance at sewerage non-infrastructure sites

## 5 Management & General Investment and Outputs

- 5.1.1 Management & General investment covers a broad range of activities which the company must undertake to maintain or enhance the general facilities required to manage its business. For example, it includes: the provision and replacement of software; the provision of vehicles; and, collecting information and preparing and updating asset plans to support future operational planning and capital investment.
- 5.1.2 NI Water Business Plan includes investment of £24.7m under the heading of 'Management & General' over two years (nominal). The investment is allocated between base maintenance 59% allocated to base maintenance to replace and maintain existing facilities and 41% allocated to enhancing capability and the service provided to consumers.
- 5.1.3 We have reviewed the overall quantum of investment proposed against historic levels of investment in England and Wales. For PC10, we undertook an econometric comparison with Management and General expenditure in England & Wales support the level of investment proposed by NI Water. This analysis suggests that NI Water should invest of the order of £11m per annum in Management and General assets. On this basis, the level of investment proposed by NI Water appears to be reasonable. However, the company is committing almost half this investment to enhancement. We note the need for NI Water to assess the long term demand for base maintenance investment in Management and General assets to ensure that medium term investment proposed for PC15 is adequate.
- 5.1.4 NI Water has proposed a range of Management & General investment to enhance capability and services provided to consumers. The company submitted outline business cases to support this investment. The type and scope of the of activities proposed by the company generally appear to be beneficial. However, the company has not been able to quantify the benefits and opex savings which would provide the economic justification for the investment. Many of the business cases recognise this weakness and note that this information on KPI improvements and opex savings will be provided when a detailed Business Case is prepared. We have included the proposed investment in the final determination however, we expect the company to provide information on the scope of the costs of this investment and the benefits it will deliver in advance of committing the investment.

## 6 Preparing for PC15

6.1.1 In our information requirements for PC13 we asked the company to include the following information in its Business Plan in respect of the PC15 period:

- Estimates for projects which will carry over to PC15.
- Estimates of expenditure on rolling programmes expected to carry on into PC15.
- Indicative estimates of discrete projects expected to start in the first two years of PC15.
- Estimates of any preparatory work which should be carried out in PC13 to facilitate the start of construction in PC15.

6.1.2 The company's revised capital submission:

- Identifies a wide range of projects planned to start in PC15 start.
- Identifies £5.8m in PC13 preparatory work.

6.1.3 In its response to the draft determination, the company has provided an list of committed activities in respect of strategic studies and feasibility studies which will inform the development of PC15 and will provide the basis for further project development in the short term to manage the continuity of investment into PC15 or provide alternative investment if planned projects are delayed or the level of funding is increased in PC13. The company has now identified strategic feasibility and pilot trials which will be carried out in PC13 to develop the evidence base for the sustainable development of water services and its plans in PC13 including:

- Catchment Management (SCAMP);
- Impounding Reservoir Future Use Assessment;
- Flood Resilience;
- Water Use efficiency;
- Water and Wastewater Pumping Stations - Pump Efficiency;
- Aeration optimisation;
- Water and wastewater Treatment Works Sites – Regulation and Energy Efficiency;
- Shellfish Waters Directive; and
- Revised Bathing Water Directive

6.1.4 The company has been able to confirm that it has allocated adequate funding in PC13 to undertake the assessments and pilot projects necessary to plan the sustainable delivery of water and sewerage services in PC15. We would expect the company to use the experience and evidence base that this initial work provides to develop a case for further, possibly increased, activity in these areas in PC15.

