Environmental improvements across the Manchester Ship Canal catchment

United Utilities

Water for the North West

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2. Glossary of terms

Term	Reference	Explanation
AMP	Asset Management Plan (or Period)	An AMP is a water company's detailed description of its investment plans for its assets. AMP is often used as a shorthand name for the companies' business plans.
CSO	Combined Sewer Overflow	During heavy rainfall the capacity of sewer pipes can be exceeded, which means possible inundation of sewage works and the potential to back up and flood peoples' homes, roads and open spaces, unless it is allowed to spill elsewhere. Combined sewer overflows (CSOs) were developed as overflow valves to reduce the risk of sewage backing up during heavy rainfall.
FTFT	Flow to full treatment	Refers to the maximum flow passed to full treatment through a wastewater treatment works.
ODI	Outcome delivery incentive	Water companies outline a series of performance commitments as part of their business plans. These are underpinned by ODIs, which can provide financial reward or penalty as a means to ensure that commitments are realised and delivered within agreed timeframes.
WINEP	Water Industry National Environment Plan	5 yearly programme setting out environmental improvement obligations for water companies.
WFD	Water Framework Directive 2013	2000/60/EC adopted by the Council of Ministers in 2000. This Directive provides a co-ordinated approach to water management within the European Union (EU) by bringing together strands of EU water policy under one piece of framework legislation. Member States must produce River Basin Management Plans that set out a programme of measures aimed at protecting bodies of surface and groundwater. Each plan must include economic analyses of water use and move towards full cost recovery in water pricing. The Directive runs in six-yearly cycles (2009-15, 2015-21, 2021-27). It aims to return all water bodies to good ecological status by 2027. For heavily modified water bodies such as canals, the aim is to reach good ecological potential by the same date.
WwTW	Wastewater Treatment Works	A wastewater treatment works is a facility in which a combination of processes (e.g. physical, chemical and biological) are used to treat wastewater and remove pollutants.

3. Introduction

3.1. Purpose of this document

3.1.1. The Manchester Ship Canal is a canalised river. The features of the canal make it deep and slow moving and in summer months this can lead to a reduction in dissolved oxygen which is a barrier to a thriving fish population. The canal has failed to meet the requirements of the statutory Freshwater Fish Directive which were subsumed into the Water Framework Directive (WFD) in 2013. We have been working with both the Environment Agency and the Mersey Rivers Trust to drive the long-term strategy for this catchment and while it has been acknowledged that failure to meet water quality targets in the canal is not solely due to the discharges from our assets, a multi-AMP approach to discharge enhancements is a necessary element of this strategy.

3.1.2. Aeration of the canal to improve dissolved oxygen was the preferred initial approach to achieving the water quality targets. Following extensive modelling in AMP6 and input from expert consultants, this was widely recognised as being technically infeasible[1] due to the nature of the canal and the requirement for continued shipping access. Detailed strategic discussions then took place between United Utilities, the Environment Agency and Mersey Rivers Trust to agree the best alternative for the aeration. Ahead of the PR19 final determination it became clear that Bolton Wastewater Treatment Works (WwTW) would need significant improvements as one of the largest discharges in the upstream catchment. Additionally, we agreed to explore what further aeration could be done in proximity to the affected part of the canal. Following modelling of the Canal and upstream river system, a suite of measures was subsequently agreed which would deliver a significant improvement in dissolved oxygen.

3.1.3. This more detailed modelling highlighted that the key feeder river systems (Irwell and Mersey) would need to be brought up to Water Framework Directive standards. In the case of the River Irwell we have a mature understanding of the solutions required for this river system. Discharges from Bury WwTW Storm Tanks and Nuttall Hall Road Combined Sewer Overflow (CSO) (BRY0002) are verified in the United Utilities/Environment Agency agreed water quality model and impact both the River Irwell to which they discharge and the Manchester Ship Canal. We are certain of the impacts from these assets and the requirement to resolve them. Resolving them with the proposed schemes detailed in this document is part of the long-term strategy agreed with the Environment Agency and the Mersey Rivers Trust and will not impede any future integrated or innovative approaches for the rest of the catchment. This agreement has been reflected on the WINEP with AMP8 delivery dates for both of these schemes:

- WINEP reference 7UU200793 - Bury WwTW Storm Tanks WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia. WINEP regulatory date 31/03/2028.
- WINEP reference 7UU200802 - Nuttall Hall Road CSO (BRY0002) WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia. WINEP regulatory date 31/08/2027.

3.1.4. This case for green recovery is to bring these confirmed schemes forward from AMP8 for earlier delivery (forecast completion in 2025) for the benefit of the economy, environment and customers. The forecast capex for these schemes is £44.060m (in 2017/18 prices).

[1] Joint statement on Manchester Ship Canal Strategy June 2019 (Appendix 1)

3.1.5. This document sets out the background to why additional WINEP enhancement requirements relating to the Manchester Ship Canal will arise for United Utilities in AMP8. It explains why we have the certainty over the measures at Bury WwTW Storm tanks and Nuttall Hall Road CSO (BRY0002) and why these enhancements could be delivered sooner through green recovery for the benefit of customers and the environment. It also covers why these requirements are outside of management control, our approach to solution development the Manchester Ship Canal strategy and partnership approach and how we have ensured that costs are robust.

3.2. Structure of this document

3.2.1. Section 4 of this document provides the reasoning why we are proposing to accelerate these confirmed AMP8 schemes for early delivery.

3.2.2. Section 5 provides evidence supporting the need for these schemes and why they are good candidates for delivery through Green Recovery.

3.2.3. Section 6 gives details of the solutions proposed for these requirements, outlines discounted options and the proposed delivery schedule.

3.2.4. Section 7 sets out the proposed cost and expenditure profile of the Green Recovery investment at these sites and explains the development of the Manchester Ship Canal Partnership Forum

3.2.5. Section 8 summarises the level of customer support for these environmental improvements and includes detail on the job retention and creation of this investment.

3.2.6. Section 9 provides an overview how working in partnership with the Manchester Ship Canal Partnership Forum provides in-kind benefit within the Manchester Ship Canal catchment

3.2.7. Section 10 identifies the source of funding and presents the calculated impact of this investment on customers' bills.

3.2.8. Section 11 outlines the documents available in the Appendix confirming the requirements for these schemes.

3.2.9. Section 12 are the Appendix and provide supporting information to this submission.

3.3. Assurance of this submission

3.3.1. We have applied an overarching assurance framework to the green recovery programme. This framework was managed by a dedicated assurance workstream which defined and oversaw the implementation of the governance and assurance activity. The framework identified the key deliverable components of the business case and assigned accountable owners using a RACI matrix. Each key deliverable of the business case was risk assessed against the likelihood and consequence of potential errors. This informed the minimum level of assurance that was required for each deliverable. The assurance process assessed the narrative and evidence provided for each component area against the requirements of the Green recovery programme. Component parts identified as low have been assured by project teams, medium by the Economic regulation and corporate audit teams and medium-high and high have received independent specialist external assurance[2].

[2] Further details of our assurance framework can be found at the following url: https://www.unitedutilities.com/corporate/about-us/performance/Assuring-our-performance-2020-25/

4. The case for acceleration

4.1.1. The Manchester Ship Canal finished construction in 1894. It canalised the natural river to allow for the transportation of raw supplies for manufacturing in the booming city of Manchester and transporting goods to the port of Liverpool. The Ship Canal has been an important transport link over the past 127 years and continues to be used to this day. In more recent times the Ship Canal has been used for recreation. The turning basin area in Salford is a major area of development for Greater Manchester, providing key locations for the BBC, ITV and Lowry Theatre as well as water-front development focusing more interest in the canal and its water quality. The Manchester Ship Canal corridor in Salford and Trafford is a key focus area for growth in the North West and builds on the increased amenity value already delivered by improvements to UU's discharges over the last 30 years.

4.1.2. The need for the improvement schemes detailed in this document comes from the requirement to improve the dissolved oxygen in the canal that was originally required to comply with the statutory requirements of the Freshwater Fish Directive which were subsumed into the Water Framework Directive in 2013.

4.1.3. As the canal is deep and slow moving, during the summer months, flows are often low, and water is held back in the canal to ensure there is sufficient water for ship navigation. This slow-moving water leads to a risk of low concentrations of dissolved oxygen that natural, flowing rivers enjoy. The low level of dissolved oxygen is a barrier to a thriving fish population and limits the migration of fish to the upstream rivers which cover a large urban area including virtually all of Greater Manchester.

4.1.4. The below confirmed AMP8 requirements will satisfy the statutory driver. These are included in the WINEP as 'Green' schemes with delivery dates in AMP8:

(a) WINEP reference 7UU200793 - Bury WwTW Storm Tanks WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia. WINEP regulatory date 31/03/2028

(b) WINEP reference 7UU200802 - Nuttall Hall Road CSO (BRY0002) WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia. WINEP regulatory date 31/08/2027

4.1.5. Completion of the schemes at Bury WwTW storm tanks and Nuttall Hall Road CSO (BRY0002) have been modelled to contribute towards downstream improvements to dissolved oxygen in the Ship Canal and will also enable the River Irwell to meet ammonia and dissolved oxygen Water Framework Directive biological standards. Bringing these forwards to complete in 2025 will benefit the environment sooner.

4.1.6. It has been recognised that improving the Ship Canal to meet Water Framework Directive compliance and support migratory fish cannot be achieved by United Utilities investment alone. The establishment of the Mersey Rivers Trust hosted Manchester Ship Canal Partnership Forum, with support from the Environment Agency and other key catchment stakeholders, is intended to co-design and co-deliver a long term multi beneficial environmental improvement strategy for the Canal.

4.1.7. The accelerated completion of these schemes in Bury will result in an earlier improvement to the River Irwell, and are a stepping stone on the journey to the long-term strategy for the Manchester Ship Canal, which the Environment Agency and the Mersey Rivers Trust have signed up to.

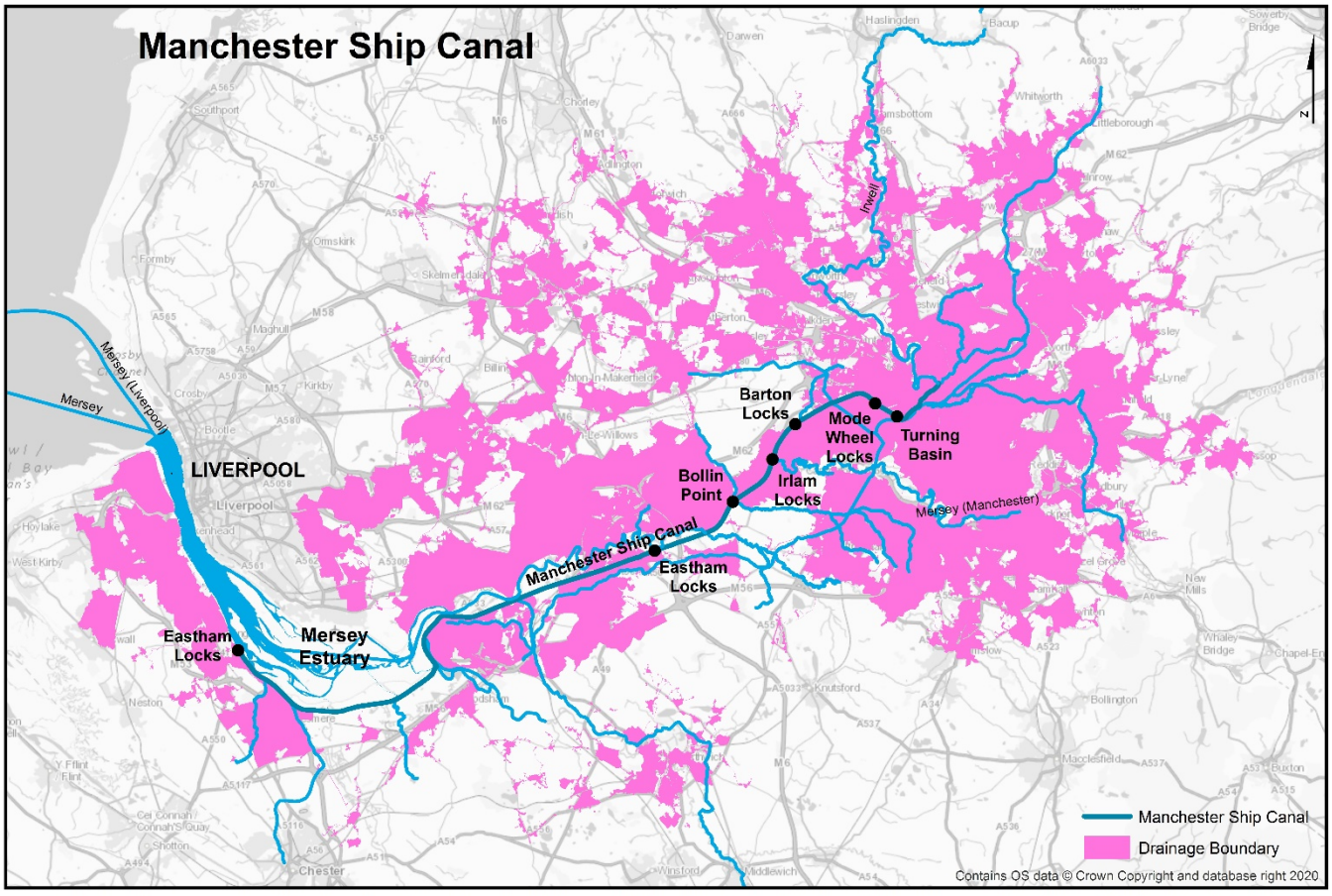
4.1.8. This project therefore accelerates AMP8 expenditure into AMP7.

5. Evidence of need

5.1. Introduction

5.1.1. The Manchester Ship Canal between Salford Quays and Bollin Point replaced the natural river system when constructed in 1894. This has resulted in effluent from a population equivalent of over 3.5 million in Greater Manchester draining into the Ship Canal catchment alongside storm sewage discharges. During the summer months, flows are often low, and water is held back in the canal to ensure there is sufficient water for ship navigation. This slow-moving water leads to a risk of low concentrations of dissolved oxygen that natural, flowing rivers enjoy. The low level of dissolved oxygen is a barrier to a thriving fish population.

Figure 1 - Area drained through the Manchester Ship Canal



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown. Crown copyright and database rights 2017 Ordnance Survey 100022432.

5.1.2. In AMP4, we developed a strategy to meet the dissolved oxygen standards required by the Freshwater Fish Directive following designation in December 2003, and latterly the Water Framework Directive in the Ship Canal. It was recognised that this was not straightforward for the Ship Canal, as it would behave very differently to a natural river. The three-dimensional model of the canal built during AMP4 demonstrated that full compliance with the standards was not possible without artificial aeration of the canal alongside improvements to some of our discharges.

5.1.3. This led to an innovative partnership trial of aeration in the Ship Canal turning basin area in AMP5. Match funding for the scheme from the North West Development Agency did not arise following the

disbanding of the Regional Development Agencies. It was then agreed with Healthy Waterways Trust to focus immediate efforts on the Ship Canal turning basin area due to the high amenity value of this area and the need to replace the existing temporary oxygenation equipment. Salford City Council contributed in kind by project managing the trial with UUW paying for the equipment and installation costs. This trial was successful, and the turning basin area of the canal now supports significant numbers of fish. The turning basin area continues to be a major focus of development for Greater Manchester with key locations for the BBC, ITV and Lowry Theatre as well as waterfront development on the back of the benefits delivered. We continue to support the operational costs so that this trial kit continues to benefit the environment.

5.1.4. Following the successful trial, we accepted a National Environment Programme (NEP) requirement in AMP6 to contribute to a partnership solution to aerate a long section of the canal to Bollin Point. Extensive survey work has established that the shape and form of the canal is very different to the turning basin where the trial took place, which means the original solution is not feasible due to significant conflicts with shipping. We brought in APEM, an external consultant with significant expertise in aeration to review all potential alternative options that led to the conclusion that there were significant technical, practical and legal barriers to implementation of all potential solutions[3]. We also undertook an extensive review of alternative aeration solutions that would meet the dissolved oxygen standards without the conflicts of the original solution. This concluded that it is not practically feasible to meet the original outcome target of the project.

5.1.5. In June 2019, we held a workshop with the Environment Agency and the Mersey Rivers Trust to explore these challenges, review and confirm the evidence, and explore the way forward in light of the issues. Ahead of this meeting we carried out additional modelling of the canal to feed into discussions. Following this workshop, a Joint Statement was signed confirming, amongst other things, that aeration of the Ship Canal is not practically feasible and that there is a need to develop an alternative strategy to aim to get as far as technically feasible towards complying with the dissolved oxygen standards (See Appendix 1: Joint Statement on Manchester Ship Canal Strategy).

5.1.6. Once it was recognised that aeration would be technically infeasible, we proceeded in AMP6 to explore alternative approaches to resolving the dissolved oxygen issue. As part of these discussions and the signed Environment Agency alteration form removing the aeration scheme from the WINEP, we agreed to install aeration in the final effluent outfall at Salford WwTW and to a further investigation into the feasibility and benefits of installing additional aeration, including an appraisal of the impacts of optimisation of aeration in the turning basin.

5.1.7. As part of this strategy and in addition to the above agreement with the Environment Agency it was agreed with EA that improvements to Bolton WwTW should be brought forward into AMP7 using the WINEP cost adjustment mechanism. Bolton WwTW was confirmed as discharging a large polluting load and it is relatively close to the head of the Ship Canal. We were highly confident that the improvements would be required. The detailed case for the addition of Bolton to the AMP7 programme was submitted as part of the Price Review process at PR19 and subsequently recognised in the WINEP cost adjustment mechanism. This scheme is currently being progressed for delivery in AMP7 and will contribute to the improvement of dissolved oxygen in the canal.

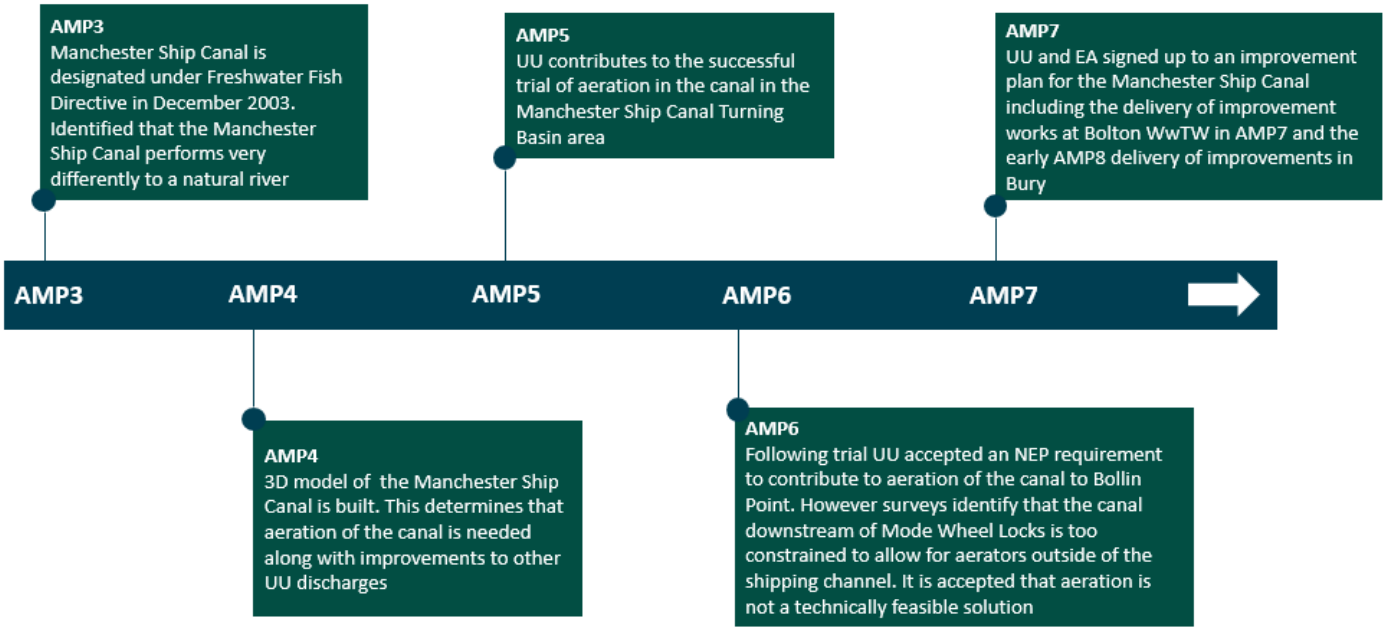
5.1.8. Subsequent modelling and work with the Environment Agency has concluded that the River Irwell would also need to comply with the Water Framework Directive standards as part of the overall

[3] Manchester Ship Canal Aeration Project PR14 Solution Technical Constraints Report December 2017

dissolved oxygen solution. This confirms the need for investment at Bury WwTW Storm Tanks and Nuttall Hall Road CSO (BRY0002). Enhancement at these locations forms part of the long-term dissolved oxygen strategy agreed with both the EA and the Mersey Rivers Trust and is reflected on the WINEP with AMP8 delivery dates for both of these schemes:

- WINEP reference 7UU200793 - Bury WwTW Storm Tanks WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia
- WINEP reference 7UU200802 - Nuttall Hall Road CSO (BRY0002) WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia.

Figure 2 - History of the Manchester Ship Canal strategy, which continues to evolve in conjunction with the Environment Agency and Mersey Rivers Trust



5.2. Need for investment

5.2.1. The need for investment comes from the revised strategy to address the dissolved oxygen issue in the Manchester Ship Canal following agreement by the Environment Agency that in-Canal aeration as required by previous AMP6 NEP requirement is not practically feasible, as described above. The need to invest to achieve either new or tighter permit limits in AMP7 is driven by the Water Framework Directive. In this case, the key issue is addressing the dissolved oxygen concentrations in the Ship Canal identified when it was designated in 2003 under the original Freshwater Fish Directive as a cyprinid fishery. The Freshwater Fish Directive has been subsumed into modern regulation in the form of the Water Framework Directive. Due to this designated waterbody being a protected area under the Water Framework Directive, interventions are not subject to the disproportionate cost test.

5.2.2. A significant amount of optioneering work has already been done to understand this long-term strategy for the Ship Canal which gives us a good insight into the most significant discharges that are required to be upgraded. The most significant intermittent discharges after Bolton WwTW Storm Tanks are Bury WwTW storm tanks and Davyhulme WwTW Storm Tanks. The Nuttall Hall Road CSO (BRY0002) is hydraulically linked with Bury WwTW storm tanks, so there is the need for improvement to both assets to achieve the outcome. These Bury overflows are also located upstream of Bolton WwTW which we intend to deliver under the WINEP uncertainty mechanism and therefore they

complement that scheme. Following the EA/UU sign-off of the Manchester Ship Canal aeration change form, the requirement to deliver a solution at Bury Storm Tanks and Nuttall Hall Road CSO (BRY0002) is clear. This document signed by UU and the EA confirms the requirement and timescale for delivery (31st March 2028 for Bury Storm Tanks and 31st August 2027 for BRY0002.) This is reflected in the WINEP, where both outputs are green, and dates are based on the availability of suitable allowances for 'transitional investment' as part of PR24.

5.2.3. This Green Recovery investment will therefore bring forward a confirmed AMP8 requirement satisfying a statutory driver benefiting the environment sooner.

5.2.4. Both of these schemes were assessed as part of the improvements to meet Water Framework Directive requirements for the upstream River Irwell at PR19, however they were previously assessed as disproportionately expensive to resolve. However, this earlier WFD assessment was performed prior to the need to also include dissolved oxygen benefits. The disproportionate cost test does not apply to the dissolved oxygen issue, as the Ship Canal is a protected area for cyprinid fish. Therefore, with dis-application of the disproportionate cost test, these schemes are now confirmed as green certainty on our WINEP for delivery in AMP8. The added benefit therefore of these schemes is the contribution to the improvement of the River Irwell to move towards Good Water Framework Directive status.

5.2.5. Bury WwTW storm tanks have a high spill frequency and contribute one of the highest polluting loads to the River Irwell, which flows to the Ship Canal, of all overflows. Nuttall Hall Road CSO, as hydraulically linked to the Storm Tank overflow, is also a key contributor. This has been demonstrated through river quality modelling to be a key reason for the River Irwell not meeting Water Framework Directive standards. The lack of aeration in the canal means these frequently spilling overflows are also causing an impact on dissolved oxygen in the Ship Canal. The below Table 1 shows the baseline model results for overflows contributing to the Water Framework Directive failure in the River Irwell. The 'solution' column shows the frequency, duration and volume of discharge once the solution is in place. Rossendale WwTW Storm Tanks and Bolton WwTW Storm Tanks are included in the current WINEP and are due for delivery by the end of AMP7.

Environmental improvements across the Manchester Ship Canal catchment

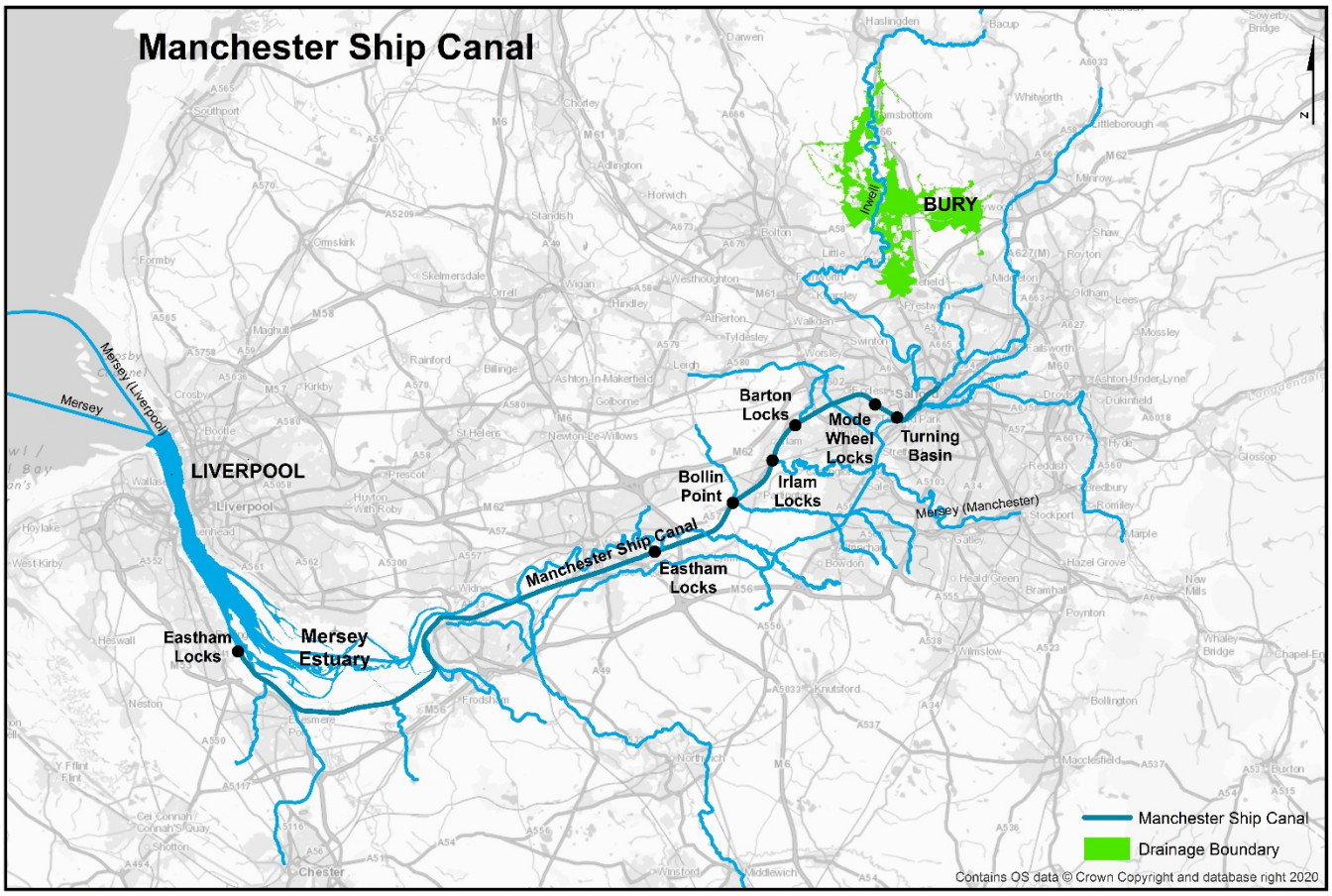
Table 1 - PR19 - Irwell ICM Baseline Updates & PR19 Level 1 Solution

River	Site location	CSO Group	Baseline (Revised models)			Solution			Additional storage volume required (m3)
			Frequency	Duration (Hours)	Spill Volume (m3)	Frequency	Duration (Hours)	Spill Volume (m3)	
Irwell	Rossendale WwTW Storm Tanks*	CS018c	52	731	1,192,607	31	474	360,122	10,500
	BRY0002	CS020b	96	971	1,469,333	50	558	1,101,033	5,800
	BRY0023	CS021d	89	488	212,101	-	-	-	-
	BRY0081	CS021d	15	102	59,094	-	-	-	-
	Bury WwTW Inlet CSO	CS021e	16	52	80,670	-	-	-	-
	Bury WwTW Storm Tanks	CS021e	48	705	2,779,965	33	529	2,201,016	18,000
	Bolton WwTW Storm Tanks**	CS026b	62	1106	6,562,552	26	414	2,837,924	63,500

* Additional WINEP sites

** linked to 575 l/s FTFT increase at Bolton WwTW+ BOD permit charge

Figure 3 - The Bury WwTW drainage area



5.2.6. There is an additional AMP7 WINEP driver for Bury WwTW Storm Tanks and Nuttall Hall Road CSO (BRY0002), to carry out a storm overflow assessment framework investigation to understand the costs and benefits of reducing spills further from these assets. The initial assessment for these sites has been completed and initial conclusion is that reducing spills further than the Water Framework Directive targets would not be cost beneficial and therefore progressing with the scheme proposed in this document represents the long-term solution at these sites.

6. Evidence of optimised option

6.1.1. We had originally developed a solution for these overflows as part of our PR19 preparation process; this and the schedule for delivery have now been reviewed for the Green Recovery submission. The estimated cost for both sites is a capex of £44.060m and is deliverable in FY26.

6.1.2. The project scope for Bury WwTW Storm tanks and Nuttall Hall Road CSO (BRY0002) as part of a long-term catchment-based strategy is construction of 18,000m3 of additional storm tank storage at Bury WwTW and 5,800m3 at Nuttall Hall Road CSO (BRY0002).

6.1.3. We have worked closely with the Environment Agency to confirm that the option of aerating the Ship Canal is not practically feasible and alternatives are required to address the dissolved oxygen issue. Whilst doing this, we are carefully focusing to avoid drawing in schemes which are not going to make a significant contribution to meeting this objective. Where interventions need more planning because of interaction with other requirements and considering the dynamic growth of the catchment, we will work with the Environment Agency, Mersey Rivers Trust and Manchester Ship Canal Forum to understand potential requirements for delivery in AMP8 and the longer term so that the optimal solution across the system can be delivered for customers at lowest possible cost and best value.

6.1.4. Table 2 indicates the expected AMP7 costs for these schemes. This expenditure covers the enhancement costs associated with meeting the WINEP requirements at Bury WwTW Storm Tanks and Nuttall Hall Road CSO (BRY0002).

Table 2 - Estimated capex and opex costs of these schemes

WINEP requirement	Indicative storage volume required to meet the driver	Capex cost (£m) (17/18)	Opex cost per annum (£m) (17/18)
WFD 99%ile intermittent standards for Dissolved Oxygen and Ammonia to contribute towards achieving good status in the River Irwell	Increase in storm tank storage at Bury WwTW Storm Tanks by 18,000m3	[✂]	[✂]
	Construction of 5,800m3 detention tank storage at Nuttall Hall Road CSO (BRY0002)	[✂]	
Total		44.060	[✂]

6.1.5. Water quality modelling scenarios undertaken have forecast that the proposed improvements at Bury WwTW Storm Tanks and Nuttall Hall Road CSO (BRY0002) will improve water quality in the downstream Manchester Ship Canal and move water quality towards required dissolved oxygen standards as part of a long-term catchment strategy. As part of the water quality modelling, we have carried out an options review looking at how the storage could be balanced across the catchment to minimise cost whilst achieving the required water quality standards in the River Irwell and Manchester Ship Canal.

6.1.6. When assessing the option for these overflows, the following generic high-level solutions were considered:

(a) Do nothing

(b) Operations and Maintenance

(c) Optimise Asset

(d) Partnership/catchment solution

(e) Refurbish asset

(f) New asset

6.1.7. In the case of these overflows, the requirements for reducing spill frequency, duration and volume are significant and therefore a catchment solution, while making some small improvement, is not viable to achieve the required standards. Table 3 summarises the optioneering assessment that we have performed.

Table 3 - Summary of optioneering assessment for Bury WwTW Storm Tanks and Nuttall Hall Road CSO (BRY0002)

Option	Description	Reason for choice
1	Surface water separation of the Bury Catchment	**Discounted** The length of combined sewer which would need to be separated into foul only and surface water is considerable. A modelled total of 14 hectares for BRY0002 and 340 hectares for Bury WwTW storm tanks with an estimated cost of c£300m. Carrying this out would be significantly more expensive than the proposed solution, cause major disruption of the catchment and take much longer to complete.
2	Increased Flow to full treatment at Bury	**Discounted at this stage** Expected to be more costly than current preferred option, further detail is included below and in the customer protection section of this document
3	Additional storm Tank capacity at Bury WwTW (18,000m3) and detention tank at Nuttall Hall Road CSO (BRY0002) (5,800m3)	**Preferred Option** Storm storage at both WwTW and BRY0002. Land is available on site for the storm tank, additional land purchase required around BRY0002. Meets the Water Framework Directive environmental standard

6.1.8. A modelling assessment has been undertaken to seek alternative locations and sizes of tanks for the Nuttall Hall Road CSO (BRY0002), however an alternative location or size was not taken forward as an option for pricing due to network constraints. The detention tank needs to be located at the convergence of two sewers, one from the west and one from the north, which limits the locations at which additional storage would be effective. Surface water separation was also considered, but the quantity required to achieve Water Framework Directive compliance was significant and factors more expensive than a storage option.

6.1.9. A modelling assessment has also been undertaken for Bury WwTW Storm Tanks to seek alternatives locations and sizes of tanks. An alternative location or size of tank has not been taken forward as an option due to the interaction with existing overflows and storm tank volumes. Any storage introduced upstream of Bury WwTW Storm Tanks results in a larger storage volume than would be required at Bury WwTW. This is due to the drain-down of the tank having to be limited to not increase spills at the existing storm tanks.

6.1.10. An alternative solution to increase the flow to full treatment at Bury WwTW Storm Tanks has not been fully discounted. This will be carried forward as a potential opportunity. The probability of this

solution out turning at a lower totex cost than the storage solution is low, based on experience for similar projects and the detailed level and volume of engineering design required. As there is no requirement to tighten final effluent permit standards at Bury WwTW to achieve Water Framework Directive compliance, this option would have to pass enough flow forward to eliminate the storage requirement, balanced against a storage only option. Increasing flow to full treatment would also impact the existing treatment process both hydraulically and for permit compliance. If this option were to become the preferred option with a lower cost during project development, this would be included in the proposed Green Recovery adjustment.

6.1.11. United Utilities' engineering disciplines (Civil, Mechanical, Electrical, Environmental, Geotechnical, Construction, Hydraulics, Network Modelling and Process Engineering) have assessed in further detail the significant time or cost risks and technical feasibility. This recent engineering discipline assessment concluded that the confidence in the solution, considering associated risks and opportunities, is of at least equal robustness compared with United Utilities' PR19 business plan.

6.2. Delivery schedule

6.2.1. We are committed to the delivery of these schemes by the regulatory dates (31st March 2028 for Bury Storm Tanks and 31st August 2027 for BRY0002.) Based on agreement to commence with these schemes in late September 2021 we will endeavour to deliver these schemes as early as possible ahead of these dates. Our current expectation is that this would be before the end of the 2025/26 financial year.

6.2.2. Completion by this date is subject to land purchase and planning consent.

6.3. Management control

6.3.1. Despite considerable effort to deliver an innovative aeration solution in the Manchester Ship Canal it has not been feasible and therefore the only management option left is to address the individual discharges to the canal and its catchment. The Environment Agency has now signed a joint statement, along with the Mersey Rivers Trust and United Utilities (following a workshop on 21st June 2019), confirming this position.

7. Evidence of efficient delivery

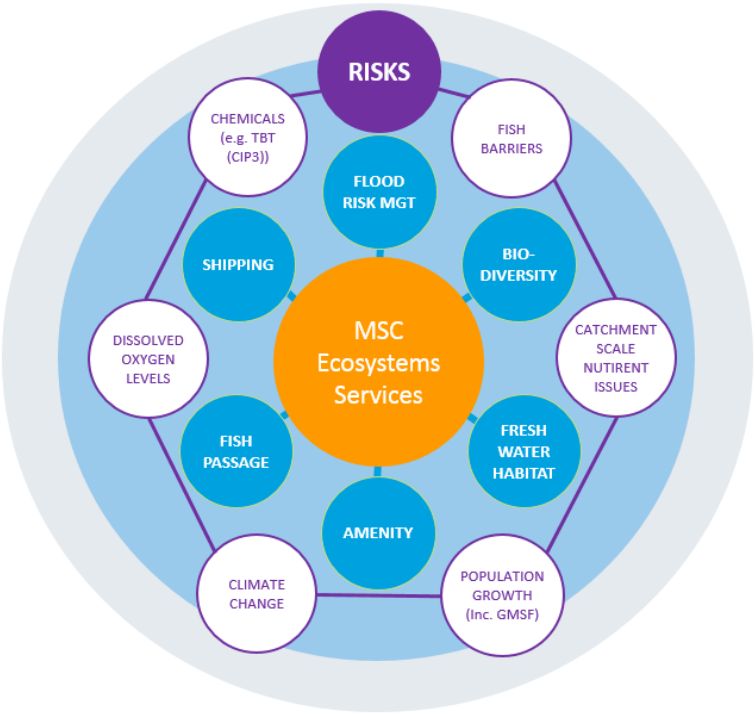
7.1. United Utilities' contribution to delivery

7.1.1. Delivery of these schemes ahead of the AMP8 WINEP dates will require time and resources from United Utilities which we are committed to provide. We are also committed to finance these schemes without recourse to customer bills until AMP8, in the interests of delivering as soon as practicable our contribution to improvements in the Manchester Ship Canal.

7.2. Contributions from external sources

7.2.1. It has been recognised that a partnership-led catchment systems thinking approach to resolve the Manchester Ship Canal water quality and ecological issues is required in addition to United Utilities asset-based improvement works. Improvements to our assets alone will not achieve Water Framework Directive compliance for dissolved oxygen which is acting as a primary driver for water quality improvements in the canal. To lead on the development of a catchment systems thinking approach the Mersey Rivers Trust (with UU funding) are establishing the Manchester Ship Canal Partnership Forum. The partnership forum will provide a focus for development and implementation of an environmental improvement strategy. This is based on partnership working opportunities to deliver both in-canal and catchment management activities. These will positively contribute to the quality of the Manchester Ship Canal for the benefit of local communities and the local economy, whilst ensuring continued navigation and other existing uses of the canal and its waterside.

Figure 4 - Risks and constraints in the wider Manchester Ship Canal catchment



7.2.2. The above figure shows the risks and constraints in the wider Manchester Ship Canal catchment, one of which is dissolved oxygen. To form a fully integrated multi-AMP and partnership approach the Manchester Ship Canal Partnership Forum hosted by the Mersey Rivers Trust will include United

Utilities, Environment Agency, Local Authorities, Catchment Based Approach representatives, recreation and private sector representatives and academic experts. Private sector support is critical to success of Partnership Forum particularly support from the owners and operators of the Canal, The Manchester Ship Canal Company Limited, who have also been invited to join the partnership. The catchment-based strategy will complement our asset-based strategy, with this catchment-wide strategy being co-designed and co-delivered through the Manchester Ship Canal Partnership Forum. The aim being to deliver multiple benefits and explore innovative and co-funding opportunities to deliver prioritised interventions. Partners in this forum will benefit from the expertise of members, for example Local Authorities gaining access to expert advice and guidance on operation of assets and support managing the Canal as a flood risk asset. Improvements in water quality increase the amenity value of the area, improving the local economy and desirability of waterfront properties. The Environment Agency, who recognise that achieving the Water Framework Directive requirements in the canal are not due to UU assets alone, see the strategic opportunities of bringing together this group. As a key strategic waterway the partnership also provides a key link between the Manchester and Liverpool city regions.

7.3. Cost Estimates

7.3.1. Rather than assessing efficiency simplistically by reference to a single model result, it is more appropriate to benchmark at a programme level in line with the approach that Ofwat took at PR19 where it assessed 'WINEP in the round'. Making a programme level assessment better accounts for the limitations of simple models to accurately predict individual schemes (or drivers) and recognises that at a programme level, limitations (for under and over estimations) will even themselves out to give an efficient allowance in aggregate. As part of our Final Determination, Ofwat made possible an adjustment through the WNIEP cost adjustment mechanism for a 'red' scheme at Bolton WwTW, where it set a unit rate based on the actual (UU predicted) cost of the scheme as it was the lower of our proposed cost versus the assumed modelled allowance. Whilst our proposed intervention at Bury might appear to be higher cost than a single model result, it is more appropriate to consider both the Bury and Bolton schemes together, in the round, as they both pertain to the same need. The aggregate nature of the benchmarking would mean that the under and over estimations would net each other off (see Table 5 below).

Table 4 - Estimated expenditure for Ofwat models, WINEP unit rates and UUW estimate

Scheme	UUW estimate (17/18 Price base) (£m)	Ofwat Models (17/18 price base) (£m)	Ofwat Models – post efficiency (£m)
18,000m3 storage at Bury WwTW Storm Tanks	[✂]	[✂]	
5,800m3 at Nuttall Hall Road CSO (BRY0002)	[✂]	[✂]	
Total	**44.060**	**40.41**	**36.54**

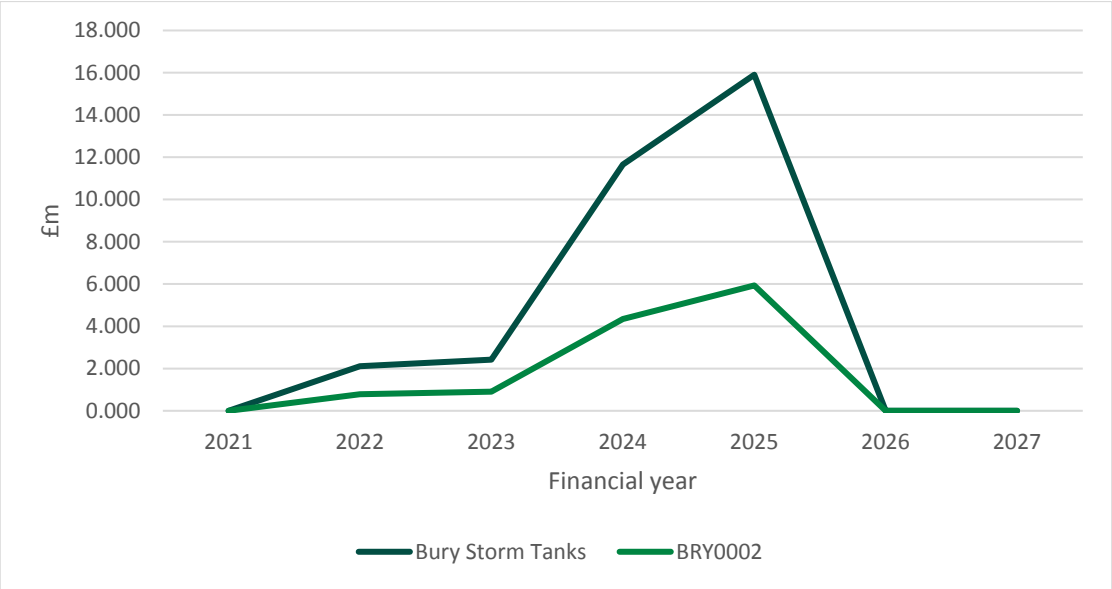
Table 5 - Estimated expenditure for Ofwat models, WINEP unit rates and UUW estimate in programme context

Scheme	UUW estimate (17/18 Price base) (£m)	Ofwat Models (17/18 price base) (£m)	Ofwat Models – post efficiency (£m)
18,000m3 storage at Bury WwTW Storm Tanks	[✂]	[✂]	
5,800m3 at Nuttall Hall Road CSO (BRY0002)	[✂]	[✂]	
Bolton WwTW Phosphorus 0.4mg/l		[✂]	
Bolton WwTW Ammonia 2mg/l, Bolton WwTW BOD5 15mg/l	[✂]		
Increase in FTFT 50Ml/d		[✂]	
Increase in storm storage 63.5 Ml	[✂]	[✂]	
Total	**122.36**	**153.24**	**135.55**

7.3.2. Given that, in combination, the Bury and Bolton schemes fall below the modelled value, and that Bolton is already allowed in the WINEP mechanism based on the forecast actual cost (and not the modelled cost) it would therefore be efficient for Ofwat to also allow for the full expected cost for Bury of £44m. This demonstrates that this is delivering an efficient overall outcome for customers for these schemes, both of which arise from the same need.

7.3.3. Figure 5 below shows the anticipated expenditure profile for Bury WwTW Storm Tanks and Nuttall Hall CSO (BRY0002). Although the majority of the expenditure is predicted toward the end of AMP7 it is estimated that £6.2m of expenditure will occur in FY22 and FY23. We have included all costs within the AMP7 period, although scheme completion is expected in FY26. Expenditure required post AMP7 will form part of the AMP7 carryover and will be excluded from PR24 funding, with no additional cost allowance in AMP8.

Figure 5 - Anticipated expenditure profile Bury WwTW Storm Tanks and BRY0002



7.4. Cost Assurance

7.4.1. Engineering estimates used align to the same processes followed for PR19, utilising cost information from similar completed works. The approach taken is therefore set out in Chapter 7 of our PR19 business plan, and includes:

- Embracing the totex and outcomes approach, delivering significant improvements from innovative approaches and technologies;
- Use of our Market Engagement Methodology (MEM) through which we have improved the basis on which we engage with markets to deliver more efficient solutions and services; and
- Improving our approach to totex, by better challenging both needs and solutions.

7.4.2. The introduction of a risk and value (R&V) assessment across all our major projects has supported better challenge of our expenditure requirements, including enhancements. This ensures that when we decide projects are necessary, we only do what we need to do, that our decisions are based on strong evidence, and the value to both the environment and customers is clear. The process ensures that we keep challenging and validating both the need for our projects and the way we deliver them.

7.4.3. In addition to following our assured PR19 process for scoping and costing the scheme for Bolton WwTW we have tested the scope of the preferred option in detail as part of process in working together with the Environment Agency and Mersey Rivers Trust. This involved investigating the options and testing the preferred option with UU Engineering discipline leads to ensure the approach and scope was robust.

8. Evidence of customer support

8.1.1. Through PR19 research customers have shown a strong preference to protect the environment from deterioration and 54% surveyed also support improvements in service to enhance river quality, one of the highest of any service area in our choice experiment (PR19 Chapter 5, Great Service to Customers - UUW105). Due to the statutory nature of this driver, there will be a requirement to deliver these schemes for the environmental outcome in AMP8. This submission is focusing on the acceleration of the scheme into AMP7 delivering the environmental outcome sooner.

8.1.2. Further research into customer support for this scheme has been carried out as part of the Green Recovery process. Results from this research from 2,054 customers shows support for this improvement with 78% supportive of the Bury schemes, with only 2% of those surveyed opposing it. 66% of respondents were willing to accept a 70p increase on their annual bill from 2025 to complete this proposal. From this research we conclude that there is clear customer support for these environmental improvements.

8.1.3. Delivery of these schemes within AMP7 will ensure earlier water quality benefits to both the River Irwell and the Manchester Ship Canal. Investment in this clearly defined statutory requirement will help to smooth the profile of expenditure on Manchester Ship Canal improvements as there are potentially other large investment required in the catchment in AMP8 this will ensure we can keep key resources employed and engaged in the water industry, providing that consistency of employment sooner for Green Recovery and also through the transition from AMP7 to AMP8.

8.1.4. These schemes will actively support the UK economic recovery post Covid-19. We anticipate that 151 jobs, of various durations and skill sets, will be created from this investment.

9. Sources of funding

9.1. Introduction

9.1.1. The delivery of the improvements at Bury WwTW Storm Tanks and Nuttall Hall CSO (BRY0002) are a statutory requirement which would be included in the enhancement funding case at PR24. This is an acceleration of this requirement. We have looked into surface water removal as an alternative to the construction of storage tanks, however this would have a substantial cost.

9.2. Actual or anticipated sources of third-party funding

9.2.1. As part of the solution development for these schemes we have looked at surface water removal as an alternative to building storage tanks. The benefit of the surface water removal would be the reduction in surface water entering the combined system and the opportunity for sustainable urban drainage solution options which could potentially be joint funded. Opportunities for sustainable green solutions for phosphorus removal for the catchment are proposed to be explored in the Catchment Solutions Green Recovery submission.

9.2.2. The volume of surface water that was modelled to be required to be removed to achieve the water quality standards for these overflows would be significant and have a considerable cost associated with it. The details of this are included in Table 3 above. Separation of the foul and surface water sewers to achieve the required improvements would also result in extensive highways disruption.

9.2.3. Delivery of this programme reflects a statutory requirement and in this context the opportunities to secure third party funding or partnerships is relatively limited. We will, however, ensure that where UUW's activity is part of a series of contributions required to deliver an environmental improvement that the scale and nature of the contribution is appropriate and that other partners and organisations also play their part. Furthermore, we recognise that there are a number of other ways in which engagement with other partners and participants can help ensure that the reliance on bill payer funding is minimised. In this case, the development of the Manchester Ship Canal Partnership (further detailed in section 7.2) will provide benefit in-kind from members. This establishment of a formal partnership will ensure that there are ongoing strategic plans to understand and implement opportunities across the catchment. Detail of other catchment opportunities across the Manchester Ship Canal catchment are included within the 'Accelerating Partnerships to deliver Natural Solutions' business case.

9.2.4. This investment will actively support the UK economic recovery post Covid-19. We anticipate that 151 jobs, of various durations and skill sets, will be created from this investment. These will be located within United Utilities and with our construction contractor partners in Bury.

9.3. Customer funding and bill impact

9.3.1. Customer funding and bill impact for this Green Recovery proposal is discussed in the Green Recovery Overview document.

10. Customer protection

10.1.1. Delivery of the two Bury schemes within AMP7, along with now confirmed 'green' AMP7 scheme at Bolton WwTW will allow progress to be made on the Manchester Ship Canal Strategy. We propose that this investment will not be reflected in customer bills in AMP7 but will instead be rolled up into an adjustment for bills in AMP8 on an NPV neutral basis reflecting inflation and the regulated rate of return. Customers will therefore be protected in the event that work is deferred until AMP8 as no costs will have been recovered in AMP7. Reasons for potential deferral would be if significant issues were found with the planned delivery of these schemes such as – for example – significant planning or unresolved land issues which would present accelerated delivery. In these circumstances, we would not progress the scheme as part of the Green Recovery programme and instead look to include it in PR24 as part of our AMP8 enhancement programme.

10.1.2. We have also assumed that this scheme will not contribute towards our 'Improving River Water Quality' Performance Commitment and that the PC will retain its original definition. This ensures that there is no double counting of benefits and customers are protected.

10.1.3. Current estimates are based on the storage solution at the two sites. In the event that an alternative solution was ultimately progressed (eg: an increase in flow to full treatment at Bury WwTW as described in section 6.1.10) then the cost savings compared to our cost estimates would be passed through in their entirety to customers.

10.1.4. The requirements of these schemes are a regulatory commitment to the Environment Agency. If we were to not deliver them as part of Green Recovery, we would be required to do so in AMP8 by the agreed WINEP regulatory date. Accelerating these schemes will result in earlier environmental improvement to the River Irwell and the Manchester Ship Canal.

11. Third party funding or other support

11.1.1. The need to deliver the environmental improvements at Bury WwTW Storm Tanks and Nuttall Hall Road CSO (BRY0002) have been discussed and formally agreed through the signing of the Manchester Ship Canal Joint Statement (Appendix 1) and the endorsement that these schemes are required is confirmed within the Manchester Ship Canal Change form signed by the Environment Agency (Appendix 2). This change has also been reflected on the WINEP which shows these requirements as 'green' certainty confirming that they are a statutory requirement and including the AMP8 output dates.

12. References

12.1. Appendix 1

Joint Statement on Manchester Ship Canal Strategy June 2019

Manchester Ship Canal Catchment System Strategy
Workshop 1 (21/06/19) Joint Statement

United Utilities helping life flow smoothly — Environment Agency — Mersey Rivers Trust

1. All parties considered that the workshop was successful in exploring the issues around addressing dissolved oxygen in the Manchester Ship Canal (MSC) and identifying next steps.

2. All parties acknowledge that there is a dissolved oxygen issue in the MSC.

3. All parties are bought into the principles of a long term strategy for improvements to the MSC built around the solution for addressing the dissolved oxygen issue in the shorter term and acknowledge the benefits of a wider strategy linked to the Defra 25 year plan.

4. Modelling actions have been agreed to demonstrate current dissolved oxygen levels and the improvements and therefore benefits that can be delivered by further interventions.

5. It was acknowledged that there is a conflict between the standards being considered in that the Fundamental Intermittent Standards (FIS) allow failures of the 4mg/l FWF standard.

6. All parties acknowledge the practical infeasibility of delivering aeration over the full length of the canal required by the AMP6 NEP.

7. All parties agreed that the strategy should now focus on development of solutions which focus on what can be achieved in terms of technical feasibility and benefits. This will include consideration of how compliance is measured. The aim is to get as close to the standards as is technically feasible.

8. It was agreed that a limited number of scenarios for interventions need to be reviewed through the model to determine how far we can feasibly go if an answer is to be arrived at in time for a submission to Defra. The focus therefore needs to be on identifying options that are likely to lead to significant changes in the DO concentrations in the canal. There was acknowledgement of the benefit of water quality improvements being followed by physical changes (habitat enhancements) to improve the sustainability of cyprinid fish populations.

9. Natural capital needs to be applied to the consideration of a matrix of interventions and wider environmental aspirations. This includes the aim to restore a salmon fishery in the Irwell catchment dependent on the construction of fish passes with seasonal dissolved oxygen needs being met.

10. A submission to Defra regarding the obligation currently on the AMP6 National Environment Programme (NEP) needs to be made by the end of October at the latest and a draft version

needs to be circulated ahead of submission. A timeline needs to be developed for this and there is a need to confirm what information is required to put this proposal to Defra to change the NEP obligation. An outline of what should be included was raised:-

- A schedule of actions to address the dissolved oxygen issue against the key dates of the
  - end of AMP6 (March 2020)
  - end of the 2nd RBMP (December 2021)
  - end of AMP7 (March 2025)
  - AMP8

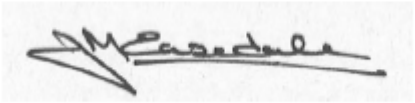
- Confirmation of the funding mechanism

11. It was noted that UU have made representations to Ofwat on their draft determination (DD) as the way their WINEP uncertainty mechanism is written in the DD only allows schemes to be removed from their AMP7 business plan. Whilst UU have asked for early feedback from Ofwat because this issue is important to the Manchester Ship Canal Strategy there is a risk that this does not materialise until the final determination is published by Ofwat in December 2019. This may leave a challenge in terms of timescales for getting Defra approval to an alternative strategy for the Manchester Ship Canal. UU are continuing to try to influence this issue.

12. A SWOT analysis of measures that in the main could be implemented before March 2020 was undertaken. The output is to be considered further.

13. Further meetings:
    a. Next workshop scheduled for 3rd September 2019 which will focus on options and the 25 year objective for the Canal.
    b. Further modelling technical review meetings to be held on 27th June and 25th July 2019.

Endorsement for this Joint Statement is provided by:

	**Mark Garth** United Utilities Wastewater Area Business Manager – South Area
	**Mark Easedale** Environment Agency Area Environment Manager
	**Keith Hendry** Chairman, Mersey Rivers Trust

Joint Statement on Manchester Ship Canal Strategy September 2019

Manchester Ship Canal Catchment System Strategy Workshop 2 (03/09/19) Joint Statement

United Utilities helping life flow smoothly | Environment Agency | Mersey Rivers Trust

Work completed to date:

- All parties believe that they are presented with an exciting opportunity to build on the improvements tha have been achieved over the last 25 years by the development of a vision for the future with the aim of seeing a sustainable coarse fish population in the canal and salmon in the upper reaches of the catchmen goal on which wider catchment measures could be based.
- All parties acknowledge that the modelling completed to date is of value, and will be vital in informing the strategy going forward.
- All parties acknowledge that further refinements and additional modelling will be of value.

UU's proposals for an alternative to MSC Aeration:

Summary

- UU proposed a draft strategy for improvements of (or in support of) UU assets, as an alternative to aeration of the MSC:
  - Completion of short term mitigation actions in AMP6
  - Completion of improvements at Bolton WwTW in AMP7 (dependent on funding)
  - Support the inclusion of multiple site improvement (as determined by the strategy) items in to the PR24 submission and subsequent price reviews for delivery in AMP8+.

AMP6

- All parties agreed with UU's proposal on the potential extent of short term measures to be delivered in AMP6, which will be confirmed following assessment of feasibility and delivery timescales. Specifically these measures are:

a) Further refinement, and additional modelling to inform the strategy

b) Aeration of Salford WwTW outfall.

c) Optimising and improving aeration in the Turning Basin (subject to further modelling and technical review in conjunction with APEM, and Salford City Council)

d) Development of fish refuge strategy, under the guidance of MRT.

AMP7

- UU informed the workshop that a submission has been made to Ofwat for the inclusion of improvements to Bolton WwTW in the AMP7 WINEP uncertainty mechanism as if Bolton were an amber certainty WINEP scheme. This would allow UU to access funding for the scheme if Ofwat agree to the change. The outcome of this is unlikely to be known until final determination in December 2019. The proposed investment would amount to £78m in AMP7. Bolton was selected by UU on the grounds that it is one of the largest influencing factors on ammonia and DO within the MSC; is an

existing "red" scheme; and has a robustly costed plan which takes account of value for UU's customers. It will also deliver a significant improvement in the River Irwell and offer the opportunity for other additional WFD measures to be included in the cost beneficial bundle for the Croal Irwell Operational Catchment

- UU's position is that a commitment cannot be given to any further schemes in AMP7 because there is still a significant amount of modelling to complete, to inform the final full "long list", which will be confirmed following review of impact and value to customers. Current understanding is that the schemes on the River Tame will not be included.

- UU re-stated the current feedback on the WINEP uncertainty mechanism and the position taken by Ofwat that a 2-way mechanism will not be allowed. This will not permit "red" schemes to be funded in the WINEP if they turn "green".

Yet to be agreed

- All parties acknowledge the likely extent of the full strategy will be the completion of the "long list", plus other additions, as informed by the modelling. However, all parties do not, at this stage, agree on the extent to which the long term strategy should be delivered in AMP7 and the extent to which it should be delivered in AMP8 and beyond. UU's proposal is to deliver the agreed AMP6 improvements, followed by major improvements at Bolton WwTW in AMP7 if funding is allowed, with the remaining strategy to be delivered in AMP8 and beyond. The EA expressed an initial expectation for more of the strategy to be delivered in AMP7. The EA are to consider the proposals, and to respond in w/c 16th September.

- The EA provided guidance that any submission to Defra to change the AMP6 NEP, should take the form of a list of proposed work to be delivered (along with benefits), together with a schedule of delivery dates. UU confirmed they are still working towards the original timeline – of producing this schedule of works by early October.

Future wider strategy development:

- All parties endorse the Mersey Rivers Trust proposals for formation of Manchester Ship Canal Partnership (MSC) Forum to chair, co-create and co-deliver a long term (30 year) strategy for improving the quality of the MSC. We will adopt a catchment-based and systems thinking approach and work across partners to encourage and leverage grant funding for Third Sector, 'in-kind' support, volunteering and research activities.

Mark Garth
United Utilities
Wastewater Area Business Manager – South Area

31 01 2020

Mark Easedale
Environment Agency
Area Environment Manager

31 01 2020

Keith Hendry
Chairman, Mersey Rivers Trust

12.2. Appendix 2: Manchester Ship Canal Change form

NEP alteration form

NEP Alteration Form	
Outline type of change: Major change	
Area: Greater Manchester, Merseyside and Cheshire	
Water Company: United Utilities (UU)	
Scheme/ Measure Name: Manchester Ship Canal (Salford Quays to Bollin Point) – completion of the UU contribution to in-waterbody aeration along the canal	
Unique ID: 6UU0379	NGR/Licence number(WR):
Drivers: F1a	NEP completion date: 31/03/20
Proposed NEP permit/licence conditions:	
Proposed alterations (including new permit conditions, completion date): This alteration is to replace the AMP6 PR14 Manchester Ship Canal aeration scheme with a package of alternative measures developed as part of a long-term strategy that will deliver a similar level of improvement to oxygen levels in the canal. The alternative measures will be delivered across AMP6, AMP7 and AMP8 subject to funding. These measures are listed in the 'Alternative Programme of Measures' attached below. The first two measures are an investigation into opportunities to optimise existing Turning Basin aeration and aeration of Salford WwTW outfall, the first of which will be added to the AMP6 NEP with a delivery date of 31st March 2020 and the second will be delivered by 31st May 2020. Where optimisation of the existing aeration is identified this will be delivered within AMP7. By 31st March 2022, an investigation into the benefits and feasibility of installing additional aeration will be completed. This will be added to the PR19 WINEP3 with a delivery date of 31st March 2022. An assessment of the effectiveness of the optimisation of the existing equipment will be part of this. By 31st March 2025, improvements to the discharges in the Irwell catchment at Bolton WwTW, will be delivered in AMP7. These measures were developed through PR19 for WFD improvement in the River Irwell. The certainty status of these measures will be changed from Red to Green with a delivery date of March 2025 added to the PR19 WINEP3. Ofwat have confirmed funding for these measures in their PR19 final determination. During AMP8, improvements to Bury Storm Tanks and BRY0002 will be delivered by 31st March 2028 and 31st August 2027 respectively subject to transitional funding in PR24. Should this funding not be available the delivery dates will be 31st March 2029 and 31st August 2028. The certainty status of these measures will be changed from Red to Green with provisional delivery dates of 31st March 2028 and 31st August 2027 added to the PR19 WINEP3. Also during AMP8, improvements to discharges in the Mersey catchment will be delivered subject to PR24 funding and subject to confirming deliverability following additional modelling and solution development. Previous modelling has identified these as measures for WFD improvement in the River Mersey. The certainty status of these measures will be changed from Red to Green with a provisional delivery date of December 2027 added to the PR19 WINEP3. The solutions for these discharges are less advanced and will be refined by UU using their	

Drainage and Wastewater Management Plan. PR24 transition funding will be sought to allow work on delivering these measures to begin in AMP7.

A further seven measures, mainly directly into the Canal, have been identified for improvement in AMP8. These measures were not considered in relation to WFD Improvements through PR19. More work is required to optimise the solutions for these discharges. They will be added to the PR19 WINEP3 as Red Indicative Measures and delivery will be confirmed through PR24 planning.

Reasons for alteration:

The installation of aeration along the whole of the Manchester Ship Canal has now been recognised as being practically infeasible. A UU report entitled "Manchester Ship Canal Aeration Project – PR14 Solution Technical Constraints Report" dated December 2017 is available on request.

The alternative package of measures has been developed jointly between the EA and UU using a detailed integrated modelling approach. Full details are contained in the 'Manchester Ship Canal Modelling Report Options Strategy 11th November 2019' attached.

The alternative measures for addressing the dissolved oxygen issue in the Canal form part of a wider strategy and proposed Manchester Ship Canal Partnership Forum that has been developed by UU and the EA with the Mersey Rivers Trust and will link to the Defra 25 year plan.

Impact on water company outcomes (information provided by water company):

The Manchester Ship Canal Aeration scheme has 6.44km of river improved assigned to it under the "Contribution to rivers improved" outcome delivery incentive (ODI) mechanism. The revised AMP6 measures deliver 0.68km of river improved under the "contribution to rivers improved" ODI.

Summary of environmental issue to be addressed:

Compliance with the Freshwater Fish Directive standards and Water Framework Directive improvements in the Manchester Ship Canal (Salford Quays to Bollin Point).

The in canal aeration scheme that is being replaced would have delivered significant improvements to oxygen levels by March 2020 in the Canal and, following significant improvements already made to other discharges (particularly CSOs) to the canal, would have :

- Achieved almost full compliance with the design standard appropriate to the Fish Directive
- Improved 2 waterbodies from Bad status to moderate status

The alternative package of measures has been designed to deliver a similar level of environmental improvements within the constraints of technical feasibility.

The phasing of the alternative package of measures is as follows:

AMP6 March 2020 – 4.25 %

AMP7 May 2020 – 8.5%
AMP7 March 2022 – 13%
AMP7 March 2025 – 21.7 %
AMP8 December 2027 – 65%
AMP8 March 2028 – 70%
AMP8 March 2030 – 100%

This phased implementation of the alternative package of measures is considered to provide a proportionate approach with the larger proportion of the work to be completed in AMP8. This phasing is essential, as the scale of work required is equivalent in size to the whole of UU's existing AMP7 WINEP programme.

Supporting information:
The AMP7 measures at Bolton WwTW will also include a phosphorus driver in the updated WINEP. UU have requested that this driver be added to the WINEP so that delivery of all the required improvements can be delivered together.
The WINEP already includes an investigation at Bolton WwTW, looking at the option of using the Rhodes Farm area to provide a natural capital treatment solution. UU have already made significant progress with this investigation and on completion could use the conclusions from the investigation to inform the delivery of the Bolton WwTW scheme, in addition to wider application of the approach and natural capital enhancement

UU have provided a supplementary report 'Manchester Ship Canal AMP6 NEP United Utilities Aeration Requirement Amendment Proposals October 2019' which provides further background information.

UU have provided a supplementary report 'Bury AMP8 Programmes', supporting the delivery schedule for the improvements at the two Bury discharges

Measure alteration rating (please tick):	Company	Environment Agency	Contentious
	☑	☐	☐

Environment Agency lead officer Signature: Matt Harris, Integrated Environment Planning, Greater Manchester Merseyside and Cheshire

M Harris

Date: 30th March 2020

Environment Agency OCS water company account manager[3] Signature:

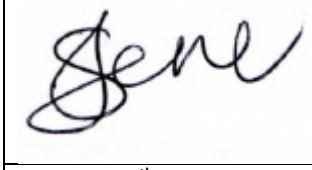
Claire Hunter

Date: 30 March 2020

Environment Agency Environment and Business Signature: Keith Davis

Date: 30th March 2020

Water company Signature: Sarah Jenner



Date: 24th March 2020

Environmental improvements across the Manchester Ship Canal catchment

United Utilities
Water for the North West

Manchester Ship Canal – Alternative Programme of Measures

Catchment	Measure	Proposed Delivery Date	AMP7 WINEP Unique ID
MSC Direct	Investigation into opportunities to optimise existing Turning Basin aeration	March 2020	AMP6
MSC Direct	Aeration of Salford WwTW Final Effluent	May 2020	New AMP7
MSC Direct	Report on the benefits and feasibility of installing additional aeration, including an appraisal of the impact of optimisation of aeration in the Turning Basin	March 2022	New AMP7
Irwell	Bolton WwTW Final Effluent – BOD, Ammonia and Phosphorus Reduction	March 2025	7UU200790 7UU300118 7UU200730
Irwell	Bolton WwTW Storm Tanks - Spill Reduction	March 2025	7UU200791
Mersey	Stockport WwTW Final Effluent - BOD Reduction	Dec 2027	7UU200785
Mersey	Stockport WwTW Inlet CSO - Spill Reduction	Dec 2027	7UU200786
Mersey	Stockport WwTW Storm Tanks - Spill Reduction	Dec 2027	7UU200787
Mersey	Barlow Moor Road/Rowsley Avenue CSO MAN0244 - Spill Reduction	Dec 2027	7UU200780
Mersey	Withington Pumping Station CSO MAN0250 - Spill Reduction	Dec 2027	7UU200788
Mersey	Princess Parkway/M60 CSO MAN0020 - Spill Reduction	Dec 2027	7UU300117
Mersey	Sale WwTW Final Effluent - BOD Reduction	Dec 2027	7UU200781
Mersey	Sale WwTW Inlet CSO - Spill Reduction	Dec 2027	7UU200783
Mersey	Sale WwTW Storm Tanks - Spill Reduction	Dec 2027	7UU200784

Environmental improvements across the Manchester Ship Canal catchment

Catchment	Measure	Proposed Delivery Date	AMP7 WINEP Unique ID
Irwell	Nuttall CSO BRY0002 - Spill Reduction	August 2027*	7UU200802
Irwell	Bury WwTW Storm Tanks - Spill Reduction	March 2028*	7UU200793
MSC Direct	Improved Dispersion of Salford WwTW Final Effluent through outfall modification (TBC)	Tbc	AMP8
MSC Direct	Salford WwTW Final Effluent - BOD and Ammonia Reduction	Tbc	AMP8
MSC Direct	Eccles WwTW Final Effluent - BOD and Ammonia Reduction	Tbc	AMP8
MSC Direct	Davyhulme WwTW Final Effluent - BOD Reduction (ammonia reduction completed in AMP6)	Tbc	AMP8
MSC Direct	Davyhulme WwTW Storm Tanks - Spill Reduction or Discharge Aeration	Tbc	AMP8
MSC Direct	Urmston WwTW Final Effluent - Ammonia Reduction	Tbc	AMP8
MSC Direct	Stretford WwTW Final Effluent - Ammonia Reduction	Tbc	AMP8

*Dependent on Transitional funding

12.3. Appendix 3: Environment Agency WINEP traffic light definitions

Table 6 - Environment agency WINEP traffic light definitions

Traffic light	Evidence	Certainty	Status of measure	Justification
Green	Available and confirmed	High	Certain	Evidence that water company action is needed, there is clarity on the required measure, the measure is considered cost beneficial and affordable (where this assessment is applicable). Affordability is a ministerial decision.
Amber		Medium	Indicative	In the business plan 2015-2020 this was called the uncertainty programme. Evidence that water company action is needed, there is a clarity of a developing clarity on the required measure, the measure is considered cost beneficial, but awaiting ministerial decision on affordability (2021 River Basin Management Plan sign off). Schemes may move to green during the business plan period 2020-2025.
Red		Low	Unconfirmed	Evidence that water company action is needed but the measure is not yet clarified, may turn amber or green during the business plan period 2020-2025.
Purple	Needs gathering	Minimal	Provides a direction of travel	The Environment Agency know that the water company will need to do work in the future.