# Data Table Commentaries
# 4 Costs Wholesale Wastewater

## Contents



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(we have added NA to cells to remove a Proteus error message)
CWW20a Transition and accelerated programme - Wastewater network+ - Sewage treatment works population capacity and network data.

These tables have been intentionally left blank. Dŵr Cymru has no transition, accelerated programme or cost adjustment claims.

We have amended the format of input cells in columns H-L and N-R of CWW15 to reflect the associated units and number of DPs In order to correctly register units of benefits associated with common performance commitments. For example, where a common performance commitment with an associated % unit is selected, we have changed the format to percentage so that 0.7% can be input. For consistency we have adopted this approach for all rows where we have input data into CWW15 and CWW16

# 1. Introduction

These tables are collecting companies' forecast costs and associated drivers from 2022-23 onwards. Some tables cover the period 2022-30 while others ask for longer-term forecasts. This reflects the approach to long-term delivery strategies.

This data will form the basis for setting cost allowances at PR24. It covers base, enhancement, developer services and best value data which are used in cost assessment models.

Where Confidence Grades are not detailed against line commentary, all forecasts have been produced from historical data with a confidence grade of B3 or better.

# 2. CWW1 Totex analysis - wastewater network+ and bioresources (post frontier shift and real price effects)

**Principal use- an explanation of the nature and extent of 'principal use' recharges between business units.**

Principal use applies where an asset is used by more than one service: it is reported in the service of principal use with recharges made to other services that use the asset, reflecting the proportion of usage by those other services. In 2022/23 we have applied the principal use rule as follows:

£8.5m of capex spend on shared assets in the year has been reported directly in the service of principal use (Treated water Distribution – water network +) and relates to IT and other 'management and general' items.

For the remaining years the following has been reported into the service of principal use:
2023/24 - £12.44m
2024/25 - £9.16m
2025/26 - £18.15m
2026/27 - £19.47m
2027/28 - £8.62m
2028/29 - £8.67m
2029/30 - £7.97m

Recharges made to the other services are reported in table CW2and CWW2 and are included in other operating expenditure. This recharge is based on the depreciation on these assets with no financing adjustment. The amount recharged in the year amounts to £12.5m.

Schedule of Principal use adjustment recharges for 2022/23

| Principal use recharge | Water Resources | Water network+ | Wastewater network+ | Bioresources | Retail | Total |
|---|---|---|---|---|---|---|
| | £m | £m | £m | £m | £m | £m |
| Recharges from | (1.0) | (1.4) | (7.5) | (2.1) | (0.5) | (12.5) |
| Recharges to | - | 12.1 | 0.4 | - | - | 12.5 |
| Net impact | (1.0) | 10.7 | (7.1) | (2.1) | (0.5) | - |

The recharges made to other services use FTE numbers as the cost driver as the assets are "management and general" in nature. The split between household and non-household has been based on customer numbers.

The recharge for 2023/24 ,2024/25 is based on the same principal as above and the amount recharged is as follows:

**Schedule of Principal use adjustment recharges for 2023/24, 2024/25 and AMP8**

| Principal use recharges | Water resources | Water network+ | Waste water network+ | Bioresources | Retail | Total |
|---|---|---|---|---|---|---|
| | £m | £m | £m | £m | £m | £m |
| **2025/26** | | | | | | |
| Recharges from | (0.9) | (2.9) | (7.6) | (2.0) | (0.6) | (14.0) |
| Recharges to | - | 13.8 | 0.2 | - | - | 14.0 |
| Net impact | (0.9) | 10.9 | (7.4) | (2.0) | (0.6) | - |
| **2026/27** | | | | | | |
| Recharges from | (0.9) | (3.5) | (7.5) | (1.9) | (0.5) | (14.3) |
| Recharges to | - | 14.1 | 0.2 | - | - | 14.3 |
| Net impact | (0.9) | 10.6 | (7.3) | (1.9) | (0.5) | - |
| **2027/28** | | | | | | |
| Recharges from | (0.8) | (3.9) | (7.1) | (1.7) | (0.5) | (14.0) |
| Recharges to | - | 13.9 | 0.1 | - | - | 14.0 |
| Net impact | (0.8) | 10.0 | (7.0) | (1.7) | (0.5) | - |
| **2028/29** | | | | | | |
| Recharges from | (0.7) | (3.7) | (6.6) | (1.5) | (0.4) | (12.9) |
| Recharges to | - | 12.8 | 0.1 | - | - | 12.9 |
| Net impact | (0.7) | 9.1 | (6.5) | (1.5) | (0.4) | - |
| **2029/30** | | | | | | |
| Recharges from | (0.6) | (3.5) | (6.3) | (1.3) | (0.4) | (12.1) |
| Recharges to | - | 12.1 | - | - | - | 12.1 |
| Net impact | (0.6) | 8.6 | (6.3) | (1.3) | (0.4) | - |

**A breakdown of which lines and business units any equity issuance costs (from table RR4 line 72) have been included in.**

There are no equity issuance costs in CWW1

## Operating expenditure

### *CWW1.1* *Base operating expenditure*

Over the AMP base operating expenditure reduces by £7m. A material increase in 2025/26 is a result of renewal expensed in the year (infrastructure) of £20m. The total spend on renewals expensed in the year ( infrastructure) and maintaining the long term capability of the asset infra remains relatively flat between 2024/25 and 2025/26 with a £1.4m increase. However, the allocation of the costs between base opex and base maintenance changes in 2025 as a result of a higher % being included as capital maintenance due to the costs including Return of Value schemes. The % allocation reduces in AMP8 where 23% of the costs are forecasted as having long term benefits.

The basis of forecasting the remaining operating expenditure in wastewater is by our governed financial budgetary process which covers DCWW business wide activities direct to price controls and indirect activities.

Budgeting is undertaken in financial period for the following financial year. The budget process in October 2022, which was signed off by our board of directors in Feb 2023, is the basis for the blind years table completion. We translate financial budgets into price controls using the 22/23 APR allocations to price controls to apportion costs to these areas.

Finance hold responsibility for completion of the overall Opex plan, however we place reliance on our energy, tax and developer services colleagues to provide a more detailed view of power (CWW2.1), income treated as negative expenditure (CWW2.2), Local authority and Cumulo rates (CWW2.7) and developer services expenditure (CWW1.3).

The start point for our AMP8 forecasts is our 2024/25 Opex. We are faced with 3 key cost pressures over AMP8 that increase Opex;

1. Regulatory/strategic – where costs relating to categorisation changes are included for example diversions were previously classed as enhancement, but now follow 22/23 APR and are shown as 3rd party opex.
2. Rates revaluations – changes in legislation have resulted in increases in both the size and scale of rates expenses by the business and
3. Enhancement Opex – an output of capital planning for AMP8 was to model the unit cost drivers for increased operating activity and unavoidable expenditure for example material, chemical and power costs.

Movements can be summarised as follows;

- Base Operating Costs increase by £7m per annum from 2024-25 to 2029-30. This is impacted by the following:
    - Net £5m reduction in the annual power costs by the end of AMP8 through a mixture of energy efficiency investment, and a forecast of lower electricity prices.
    - £1m increase in the annual power income (negative opex) figure by the end of AMP8 due to the increased quantity and value of biomethane, biohydrogen and $CO_2$ exported.
    - £19m increase in the annual IRE charge by the end of AMP8, because our forecast for the amount of infrastructure renewal expenditure having long term benefits has reduced due to lower return of Value schemes. The total infrastructure renewal expenditure for renewals expensed in the year and maintaining the long term capability of the assets – infra for 2029/30 is in line with the cost at 2024/25.
    - A £4m increase in rates, £0.8m per annum because of additions to wastewater treatment works planned over the period.
    - Offset by an operating cost efficiency programme delivering £11m of savings by 29-30. The programme will target end to end process efficiencies in our waste treatment cycle.

### *CWW1.2 Enhancement operating expenditure*

Enhancement Opex is allocated to the specific price controls implementing the investment, detailed reference to these schemes can be found in the asset management plan.

As per table guidance CWW1.2 reconciles to CWW3.194. For detailed commentary see commentary supporting CWW3.

*CWW1.3* *Developer services operating expenditure Confidence grade B3*

As per table guidance CWW1.3 reconciles to DS3.10 For detailed commentary see commentary supporting DS3.

*CWW1.4* *Total operating expenditure excluding third party services*

Sum of lines CWW1.1-CWW1.3

*CWW1.5* *Total third party services*

For detailed commentary see commentary supporting CWW11.

*CWW1.6* *Total operating expenditure*

Sum of CWW1.4+CWW1.5

**Developer services revenue**

*CWW1.7* *Grants and contributions - operating expenditure*

Wastewater network+ developer services and non-developer services opex element of grants and contributions. As per table guidance, CWW1.7 reconciles to DS1w.28 Fully recognised in income statement. For commentary, see DS1w.

**Capital expenditure**

*CWW1.8* *Base capital expenditure*

See commentary below relating to CWW2.15 and CWW2.16.

*CWW1.9* *Enhancement capital expenditure*

As per table guidance CWW1.9 reconciles to CWW3.195. For detailed commentary see commentary supporting CWW3.193.

*CWW1.10* *Developer services capital expenditure Confidence grade B3*

As per table guidance CWW1.10 reconciles to DS3.1 plus DS3.6 For detailed commentary see commentary supporting DS3.

*CWW1.11* *Total gross capital expenditure excluding third party services*

Calculated cells

*CWW1.12* *Third party services*

For detailed commentary see commentary supporting CWW11

*CWW1.13* *Total gross capital expenditure*

Calculated Cells

**Developer services revenue**

*CWW1.14* *Grants and contributions - capital expenditure*

Wastewater network+ developer services and non-developer services capex element of grants and contributions. As per table guidance, CWW1.14 reconciles to DS1w.28 Fully netted off capex. For detailed commentary, see DS1w.

*CWW1.15* *Net totex*

Calculated cells

**Cash expenditure**

*CWW1.16* *Pension deficit recovery payments*

There are no planned deficit recovery payments.

*CWW1.17* *Other cash items*

There are no other cash items forecasted.

*CWW1.18* *Totex including cash items*

Calculated sum

**Atypical expenditure**

*CWW1.19* *Item 1 Pension service cost Confidence Grade A1*

£6.5m of pensions service costs were reported as atypical in 2022-23 which related to an award of pension increases above a 5% cap. This is a one-off charge and was reported as an exceptional cost. We have not included any costs for future years. These costs were included in other operating expenditure.

*CWW1.20* *Item 2 Cost of living payment Confidence Grade A1*

£3m related to a cost of living payment paid to the employees during 2022-23. We have not included any costs for future years. These costs were included in other operating expenditure.

*CWW1.21* *Item 3 PSC claim Confidence Grade A1*

£0.9m related to settlement of personal search claims which is a one-off event. We have not included any costs for future years. These costs were included in other operating expenditure.

CWW1.22 -1.23 Item 4 and 5

These lines are intentionally left blank

*CWW1.24* *Total atypical expenditure*

Calculated cells

# 3. CWW1a Totex analysis - wastewater network+ and bioresources

Table CWW1 reports our Totex expenditure post frontier shift and RPEs. CWW1a is a copy of CWW1 but represents the costs pre frontier shift and RPEs. This section outlines our approach to the completion of CWW1 and CWW1a and the application of frontier shift and RPEs in table SUP11. SUP11 reports the frontier shift and RPEs for the main cost categories including energy, labour etc.

Our business plan has been developed from a bottom-up approach to complete CWW1 and a version of CWW2 and CWW3 post frontier and RPEs which have been submitted alongside the plan which have been labelled CWW2b and CWW3b. We have completed CWW1a by applying the assumptions in SUP11 to CWW1. An illustration of the calculation is provided in the table below.

| | Wholesale Wastewater Network+ | Bioresources | Total |
|---|---|---|---|
| CWW1.1- Base operating expenditure 2023-24 (£m) | 127.571 | 30.771 | 158.342 |
| Wholesale wastewater base net price effects | (2.27%) | 0.57% | |
| CWW1a.1- Base operating expenditure 2023-24 (£m) | 129.817 (CWW1/(1+SUP11.72)) | 30.667 (CWW1/(1+SUP11.73)) | 160.483 |

All opex costs have been uplifted using the base net price changes in SUP11 with the exception of third party services. No adjustment has been applied to third party services as the guidance outlines that CWW1a should equal the values reported in CW11. Base capital expenditure has been adjusted using the wholesale base net price effects in SUP11.72 and SUP11.73 for wholesale wastewater and bioresources respectively. The remaining capital expenditure lines have been uplifted using the enhancement net price effects outlined in SUP11.76 and SUP11.77.

# 4. CWW2 Base expenditure analysis wastewater network+ and bioresources

Our commentary for CWW1 outlines our approach for developing our plan and completing the table. Our business plan has been built bottom up for the completion of a version of CWW2 post frontier shift and RPEs, this table is included in our "PR24 additional table submission.xlsx" called CWW2b. In line with our approach for CWW1, we have used the frontier shift and RPEs in SUP11 to back solve for CWW2 pre frontier shift and RPEs.

***Energy Costs***

The lines CWW2.1 and CWW2.2 for Power and Income treated as negative expenditure are calculated by applying the energy net price effect reported in SUP11 to the energy costs reported in CW2b. The energy net price effect is calculated as the product of the real change in input price- Energy reported in lines SUP11.3 and the wholesale water base frontier shift assumption reported in SUP11.55.

***Other operating expenditure***

Total base operating expenditure reported in CWW2.14 is equal to the Base operating expenditure reported in CWW1a.1. The remaining lines making up the total operating expenditure are pro-rated based on CWW2b (post frontier shift and RPEs).

***Base capital maintenance***

Lines CWW2.15 and CWW2.16 are calculated by applying the net Price effect for wholesale water base (SUP11.75 and SUP11.76 for wholesale wastewater and bioresources) to CW2b (post frontier shift and RPEs).

All remaining commentary in this table reconciles to our base expenditure analysis reported in CWW2b.

## Operating expenditure

*CWW2.1* *Power Confidence grade B3*

Energy cost for waste water Network+ has a high level of uncertainty for AMP8 due to the uncertainty in wholesale electricity prices with a cost difference between high and low wholesale scenarios of approximately £8m a year. This is mitigated by advanced purchases in the blind years of AMP7.

The plan shows a cost reduction from £49m to £39m, a reduction of 21%, achieved through a mixture of energy efficiency investment, and a forecast of lower electricity prices.

*CWW2.2* *Income treated as negative expenditure Confidence grade B3*

Power related income is forecast to increase significantly from £9m in the base year to £13m by the end of AMP8, an increase of 36%. The increase is due to the increased quantity and value of biomethane, biohydrogen and $CO_2$ exported.

*CWW2.3* *Bulk Supply/Bulk discharge*

Zero costs are incurred for bulk supply in any wastewater price control

*CWW2.4* *Renewals expensed in year (infrastructure)*

£19m increase in the annual infrastructure renewal expenditure charge by the end of AMP8 compared to 2024/25 , as a result of the charge in allocation of infrastructure repairs between opex and capex.

The costs included in this line relate to infrastructure renewal expenditure that are maintenance schemes with no long term enhancement benefits and does not satisfy the IAS16 Property, Plant and Equipment standard to capitalise as fixed assets. The costs in this row as well as costs in CWW2.15 need to be considered in totality as this is the amounts that is forecasted to be spent on infrastructure assets and we have assumed, in line with previous years, a percentage of this spend can be capitalised as it delivers long term benefits. There is a higher proportion forecasted to be capitalised in 2024/25 due to the nature of the work undertaken. The forecasted total infrastructure expenditure at 2029/30 is in line with the total capital expenditure at 2024/25 of £53m

The AMP8 spend profile is relatively flat, with an increase in year 2 before tailing off slightly toward the end of AMP8.

The base maintenance Infra element of this profile is flat, except the Drainage and Wastewater Management Plan, which is front-end loaded. The overall annual values of AMP8 are an increase on the average of AMP7, mainly because of above-inflation cost pressures, for example, service contract costs, but also reflects increased asset age and deteriorated condition on the wastewater network.

*CWW2.5* *Renewals expensed in year (non-infrastructure)*

We have not expensed any non-infrastructure renewals in our business plan (or in 2022/23 actuals). Our treatment of non-infrastructure maintenance activity is capitalised under IFRS in the statutory accounts.

*CWW2.6* *Other operating expenditure*

Our approach to forecasting Other opex is set out in the commentary for CWW1.1

*CWW2.7* *Local authority and Cumulo rates Confidence grade A5*

A £3.8m increase in rates, £0.8m per annum because of additions to wastewater treatment works planned over the period. The rates charges are calculated in the CWW10 table. Please refer to the below commentary on CWW10 for more details on how local authority and Cumulo rates have been calculated.

**Service Charges**

*CWW2.8* *Canal & River Trust abstraction charges/ discharge consents*

The total cost of service charges by the Canal and River is forecast to remain flat in the absence of any information to suggest an increase in rates.

*CWW2.9* *EA / NRW abstraction charges/ discharge consents*

The total cost of service charges by the Environment Agency for discharge permits is forecast to increase over the first 3 years of AMP by £0.6m, where National Resources Wales and the Environment Agency have signalled their intention to implement increases to the price and scope of consents. These costs are assumed to flatten off at these higher rates for the last 2 year of AMP8 in the absence of any information to suggest an increase in rates after this time.

*CWW2.10* *Other abstraction charges/ discharge consents*

Zero costs are incurred for other abstraction charges/ discharge consents in any wastewater price control.

**Location specific costs & obligations**

*CWW2.11* *Costs associated with Traffic Management Act*

The total cost of service is forecast to remain flat in the absence of any information to suggest an increase in rates.

*CWW2.12* *Costs associated with lane rental schemes*

Zero costs are incurred for lane rental schemes in any wastewater price control.

*CWW2.13* *Cost associated with the Industrial Emissions Directive*

The total cost of the Industrial emissions directive is forecast to remain flat in the absence of any information to suggest an increase in rates.

*CWW2.14* *Total base operating expenditure*

Line is a sum, please refer to commentary per line above.

**Capital expenditure**

*CWW2.15* *Maintaining the long term capability of the assets – infra*

Details regarding the blind year movements are covered in the IN23/03 early submission document

The costs in this line needs to be considered with the costs reported in CWW2.4. where the method for forecasting these costs are reported. The costs in this line relate to the amount that satisfies the requirement of the IFRS standard IAS16 Property, Plant and Equipment and includes a long term enhancement benefit to the infrastructure renewal expenditure. The change in 2025/26 from 2024/25 is a result of a higher proportion in the year being allocated as costs for the long term benefit in 2024/25. The total amount incurred for infrastructure renewal expenditure has only increased by £1.4m.

*CWW2.16* *Maintaining the long term capability of the assets - non-infra*

Details regarding the blind year movements are covered in the IN23/03 early submission document.

The spend profile in AMP8 is relatively flat except the Drainage and Wastewater Management Plan and one or two larger schemes, which are front-end loaded. The overall annual values of AMP8 are an increase on the average of the AMP7 years, mainly due to above-inflation cost pressures, for example, power and chemicals.

The change between AMP7 Yr5 and AMP8 Yr1 is due to the re-profiling of the remaining AMP7 spend which increases in Yr5. due to sewage network maintenance, sewer flooding, event duration models and Pass Forward Flow scheme

*CWW2.17* *Total base capital expenditure*

Calculated cells

**Traffic Management Act**

*CWW2.18* *Projects incurring costs associated with Traffic Management Act*

As per CWW2.11 we have assumed the unit rates remain flat over AMP 8, with a slight reduction in volumes forecast.

# 5. CWW3 Enhancement expenditure - wastewater network+ and bioresources

The table CWW3 reports the enhancement capital expenditure. Our PR24 business plan is built up using bottom-up detailed assessment of efficient costs. Our bottom-up assessment of enhancement schemes is reported in CWW3b in "*WSH201-Additional Business plan tables.xlsx*". CWW3 is the enhancement expenditure (pre frontier shift and real price effects), this table has been populated by applying the frontier shift and real price effects reported in SUP11 to our enhancement expenditure in CW3b. Capital expenditure has been adjusted by the cumulative net price effect- wholesale wastewater enhancement and bioresources (SUP11.75, 76) for the respective price controls. Enhancement operating expenditure has been adjusted by the cumulative net price effect- wholesale wastewater and bioresources base (SUP11.71, 72) for the respective price controls.

Table commentary for CW3 on enhancement schemes are in line with our CW3b reported values.

Example of the application of frontier shift and real price effects

| | CWW3b Reported Value, £m (2026-27) | Wholesale Water Enhancement Net Price Effects 2026-27 (SUP11.75) | CWW3 Reported Value, £m- Calculated (2026-27) |
|---|---|---|---|
| Event duration monitoring at intermittent discharges (WINEP/NEP) wastewater capex (CW3.1) | 2.420 | 1.18% | 2.392 (CW3/(1+SUP11.75)) |

Costs have not been proportionally allocated between base and enhancement; each contributing scheme (or element of a scheme) has been costed separately as wholly base or enhancement expenditure, as much of the enhancement expenditure is relating to quality drivers from the NEP/WINEP programmes, and the cost build up is on concept solutions. No inclusion of base maintenance requirements are included in these schemes (for example, for P-removal, the only costs are for the additional requirements to meet the new or tighter consent limits; if an old tank in poor condition needs refurbishment to make it successful, this is not included in the cost build up for the enhancement. However, if the same tank needed replacement with a larger tank to achieve the limit, this is included).

Costs have been apportioned between price control expenditure categories. In many cases this will be 100% to a single category, but where appropriate a split has been applied. E.g. Replacement of

the Gwent SECS main has been apportioned wholly to the Network+ sewage collection price control, but split between the multiple sub-categories; 57% foul, 28% surface water drainage, 15% highway drainage. The apportionment is based on models of previous actual investment for certain types of investment and asset classes. This is the same methodology and model used for previous periodic reviews and the APR.

The AMP8 spend profile is relatively flat, with an increase in year 2 before tailing off slightly toward the end of AMP8.

The base maintenance Infra element of this profile is flat, except the Drainage and Wastewater Management Plan, which is front-end loaded. The overall annual values of AMP8 are an increase on the average of AMP7, mainly because of above-inflation cost pressures, for example, service contract costs, but also reflects increased asset age and deteriorated condition on the wastewater network.

The base maintenance non-Infra element of this has a flat profile except the Drainage and Wastewater Management Plan and one or two larger schemes, which are front-end loaded. The overall annual values of AMP8 are an increase on the average of the AMP7 years, mainly due to above-inflation cost pressures, for example, power and chemicals.

The change between AMP7 Yr5 and AMP8 Yr1 is due to the re-profiling of the remaining AMP7 spend which increases in Yr5.

Growth data is provided from Developer Services, as the main dataset the business uses day to day for growth forecasting. Some of the smaller catchments are not included in this report so in the absence of specific data for those catchments, the average percentage of growth from the known sites was applied to the unknown sites. As these are the smaller sites, the relative error is generally immaterial.

An average of the last 5 years growth and the expected next 5 years growth, and data from the Local Development Plan growth annual average is taken to provide the final yearly growth number. This figure is added on to total PE each year- using 2022/23 as the base year- this is taken from the base PE data used in APR23 reporting.

This approach to growth utilises a common dataset, which also feeds tables CWW7a,b,c and some parts of CWW5.

### EA/NRW environmental programme wastewater (WINEP/NEP)

*CWW3.1-3* *Event duration monitoring at intermittent discharges (WINEP/NEP)*

New EDM monitors (11) under W_U_MON4 drivers in the NEP programme in AMP8 included in these lines. The compliance date is given as 31st May 2027 so all capex investment is in Year 1 and 2. All 11 of these monitors are in the simple meter installations category and there are none in the complex category. There are 351 permit changes only. Further information can be found in enhancement case WSH69-PE06.

*CWW3.4-6* *Flow monitoring at sewage treatment works (WINEP/NEP)*

Investment is to make existing monitors MCert compliant or increase monitoring frequency under W_U_MON3 drivers. The compliance date is given as 31st March 2027 so all capex investment is in Year 1 and 2. There are 26 WINEP "Move AMP7 U_MON4 driver output to 2-minute flow monitoring (U_MON4a)" actions, requiring permit changes only. There are 11 NEP STW flow monitoring schemes requiring simple meter installations and zero requiring complex installations. See the enhanced investment case WSH71-PE10.

*CWW3.7-9* *Continuous river water quality monitoring (WINEP/NEP)*

The EnvAct drivers do not apply in Wales but NRW have requested investigations and trials into the suitability and benefit of up and downstream river quality monitoring on priority assets. These are included under driver W_U_O_ MON1 driver in the NEP. The investment is in the first 2 years to inform the benefits of such monitoring and to assess any requirement for inclusion in PR29. See the enhanced investment case WSH70-PE01.

CWW3.10-12 *MCERTs monitoring at emergency sewage pumping station overflows (WINEP/NEP)*

Investment under W_U_MON6. Investment for WINEP includes for provision of MCerts flow monitor where a combined CSO/EO exists, as required by the driver specification, but in NEP this only includes for use of derived power or pump run signals to differentiate between a storm overflow and an emergency overflow. The request from the EA to consider phasing the installation of this programme is accounted for in these values, which reduced the original number in the WINEP from 54 to 24. NRW have not requested this investment to be phased so this included all assets in Wales that meet the driver specification. As per the updated guidance, the split of sub-categories has been included in a table below. See the enhanced investment case WSH71-PE10.

| CWW3 Line | CWW3 Line Description | Sub Category | Number of Schemes |
|---|---|---|---|
| 3.10 | MCERTs monitoring at emergency sewage pumping station overflows (WINEP/NEP) | | |
| | | (a) MCERTS EDM only | 807 |
| | | (b) MCERTS EDM and civils | 0 |
| | | (c) MCERTS EDM and pass forward flow monitor | 2 |
| | | (d) MCERTS EDM and pass forward flow monitor and civils | 4 |
| | | (e) Permit change only | 0 |

*Increase flow to full treatment; (WINEP/NEP)*

CWW3.13-15

Investment to increase forward passed flow at WwTWs under W_U_IMP5. Spend profile is higher in the first two years because the majority of schemes have a March 2027 compliance date. See the enhanced investment case WSH69-PE06.

CWW3.16-18 *Increase storm tank capacity at STWs - grey solution; (WINEP/NEP)*

Investment to increase storm storage capacity at wastewater treatment works which provide increase storage tank capacity, including any Bathing Water or Shellfish Water schemes (not always at a WwTW) that rely on additional storage tank requirements. See the enhanced investment cases WSH69-PE06 and WSH71-PE10.

CWW3.19-21 *Increase storm system attenuation / treatment on a STW - green solution; (WINEP/NEP)*

Investment to increase storm storage capacity at wastewater treatment works but addresses this through attenuation or removal of the equivalent capacity using green solutions, including any Bathing Water or Shellfish Water schemes (not always at a WwTW) addressed using a similar type of green solution. See the enhanced investment case WSH71-PE10.

CWW3.22-24 *Storage schemes to reduce spill frequency at CSOs etc - grey solution; (WINEP/NEP)*

Investment under the agreed approach to reducing CSO harm impact by providing online or offline storage capacity. As the programme in Wales is to address harm rather than spills, full impact assessments have not been completed yet which means specific individual asset design is not complete yet, and named sites are subject to re-prioritisation with agreement with NRW and EA. Only a small grouping of CSO with a calculated flow and storage requirement have a best

value solution which has a 70% grey and 30% green type of solution and the whole costings for these are included in CWW3.24-27. These actions are covered by the W_U_O_IMP1 driver for the NEP but are covered by the 25_YEP driver in the WINEP because the EnvAct drivers are not applicable for Welsh companies. See the enhanced investment case WSH70-PE01.

*CWW3.25-27* *Storage to reduce spill frequency at CSOs etc - green solution; (WINEP/NEP)*

Investment under the agreed approach to reducing CSO harm impact where the anticipated best value solution is a combination of providing a standard storage solution and a green type of solution. As the programme in Wales is to address harm rather than spills, full impact assessments have not been completed yet which means specific individual asset design is not complete yet, and named sites are subject to re-prioritisation with agreement with NRW and EA. The costs are based on a 70% grey and 30% green type of solution and the whole costings for these asset solutions are included in these lines. These actions are covered by the W_U_O_IMP1 driver for the NEP but are covered by the 25_YEP driver in the WINEP because the EnvAct drivers are not applicable for Welsh companies. See the enhanced investment case WSH70-PE01.

*CWW3.28-48* *Various Storm Overflow (WINEP/NEP) titles*

As the programme in Wales is to address harm rather than spills, full impact assessments have not been completed yet which means specific individual asset design is not complete yet, and named sites are subject to re-prioritisation with agreement with NRW and EA. The exact solution type cannot be determined at this time but it is likely that investment would eventually be spread across the categories in these lines. Currently, all costs associated with CSO harm improvement schemes are contained with CWW3.22-24 and CWW3.25-27.

*CWW3.49-51* *Treatment for chemical removal (WINEP/NEP)*

The are no IMP schemes for chemical removal in the NEP/WINEP for AMP8, only investigations and monitoring, which are included in CWW3.52-54

*CWW3.52-54* *Chemicals and emerging contaminants monitoring, investigations, options appraisals; (WINEP/NEP)*

This includes investigations and monitoring for emerging chemicals and microplastics, including DCWW contributions to national investigations. Chemical and Microplastics investigations in the NEP that come under a SUiAR_INV driver are excluded here and include in CWW3.149-151. The investment in CWW3.52-54 is expected to be made in the first two years of the AMP to inform PR29 requirements. See the enhanced investment case WSH71-PE10.

*CWW3.55-57* *Treatment for total nitrogen removal (chemical) (WINEP/NEP)*

The are no WINEP or NEP actions for Nitrogen removal in AMP8 so no costs on these lines.

*CWW3.58-60* *Treatment for total nitrogen removal (biological) (WINEP/NEP)*

The are no WINEP or NEP actions for Nitrogen removal in AMP8 so no costs on these lines.

*CWW3.61-63* *Nitrogen technically achievable limit monitoring, investigation or options appraisal; (WINEP/NEP)*

Investment under NEP for investigations and appraisals into technically achievable limits for Nitrogen on two WwTW which will be investigated in the first two years of AMP to inform PR29 should further investment be required in AMP9. See the enhanced investment case WSH71-PE10.

*CWW3.64-66* *Treatment for phosphorus removal (chemical) (WINEP/NEP)*

Investment under WINEP and NEP for new or tightened P-limits, under both WFD and HR (NRW only) drivers where the primary method for P-removal is chemical dosing. HR drivers includes both defined P permit limits and backstop limits. Where the scheme requirements require both P limits and Sanitary Dets limits, and the distinction between investment in process units cannot be specifically attributed to P or Sanitary Dets, all costs for the scheme are included here, but excluded from CWW3.73-75. Where specific additional process units are required to achieve other drivers, including growth, these costs have not been included here but included in the appropriate line for that cost driver. The phasing in investment is in line with various regulatory compliance dates and has been balanced across the AMP as much as possible. More detail on Phosphorus removal can be found in the CWW19 table and associated commentary. Also, see the enhanced investment case WSH68-PE05.

*CWW3.67-69* *Treatment for phosphorus removal (biological) (WINEP/NEP)*

Investment under WINEP and NEP for new or tightened P-limits, under both WFD and HR (NRW only) drivers where the primary method for P-removal is biological treatment. HR drivers includes both defined P permit limits and backstop limits. Where the scheme requirements require both P limits and Sanitary Dets limits, and the distinction between investment in process units cannot be specifically attributed to P or Sanitary Dets, all costs for the scheme are included here, but excluded from CWW3.73-75. Where specific additional process units are required to achieve other drivers, including growth, these costs have not been included here but included in the appropriate line for that cost driver. The phasing in investment is in line with various regulatory compliance dates and has been balanced across the AMP as much as possible. More detail on Phosphorus removal can be found in the CWW19 table and associated commentary. Also, see the enhanced investment case WSH69-PE05.

*CWW3.70-72* *Treatment for nutrients (N or P) and / or sanitary determinands, nature-based solution (WINEP/NEP)*

Investment under WINEP and NEP for new or tightened P or Sanitary Dets limits, under both WFD and HR (NRW only) drivers the method utilised is solely through a nature based solution or innovative permitting. We have included modular or aerated reedbed as a NBS for these purposes. Other investment in P-removal has also been included in this line as it does fit the guidance for the three categories included in the table. This includes abandonment of the existing works with a pump away solution, solids removal, and consequential costs of a new permit where the permit can be met through optimisation only, but provision of suitable and safe sampling facilities are required to meet guidelines for regulatory sampling that was previously not required and Opex for additional regulatory sampling and laboratory analysis. HR drivers includes both defined P permit limits and backstop limits. The phasing in investment is in line with various regulatory compliance dates and has been balanced across the AMP as much as

possible. More detail on Phosphorus removal can be found in the CWW19 table and associated commentary. Also, see the enhanced investment case WSH69-PE05.

*CWW3.73-75* *Treatment for tightening of sanitary parameters (WINEP/NEP)*

Investment under WINEP and NEP for new or tightened Sanitary Det limits, under both WFD and HR (NRW only) drivers, excluding those with a solely NBS solution (captured in CWW3.70-72), or where the scheme requirements require both P limits and Sanitary Dets limits, and the distinction between investment in process units cannot be specifically attributed to P or Sanitary Dets (captured in CWW3.64-66 or CWW3.67-69). The phasing in investment is in line with various regulatory compliance dates and has been balanced across the AMP as much as possible. For further information, see the enhanced investment case WSH69-PE05.

*CWW3.76-78* *Catchment management - chemicals source control; (WINEP/NEP)*

There are no actions identified in the NEP or WINEP under these lines in AMP8, hence no costs attributed.

*CWW3.79-81* *Catchment management – nutrient balancing; (WINEP/NEP)*

There are no actions identified in the NEP or WINEP under these lines in AMP8, hence no costs attributed.

*CWW3.82-84* *Catchment management – catchment permitting; (WINEP/NEP)*

There are no actions identified in the NEP or WINEP under these lines in AMP8, hence no costs attributed.

*CWW3.85-87* *Catchment management - habitat restoration; (WINEP/NEP)*

This includes the investment included under IMP drivers for SSSI, Biodiversity and Invasive Species in the NEP and WINEP. This includes a single large scheme in the NEP under W_SSSI_NDIMP1 to specifically reduce the risk of repeat pollution incidents causing harm to the Gwent Levels SSSI and which is proportionally more costly than typical SSSI IMP investment projects. Investigations are excluded here and included in the investigations lines CWW3.103-114. For further information, see the enhanced investment cases WSH64-PE02 and WSH71-PE10.

*CWW3.88-90* *Microbiological treatment - bathing waters, coastal and inland (WINEP/NEP)*

There are no new or tightened microbiological limits in the NEP or WINEP for AMP8 so there are no costs in these lines.

*CWW3.91-93* *Septic tank replacements - treatment solution; (WINEP/NEP)*

Investment under the appropriate treatment driver, W_U_IMP7 where the solution involves improving or replacing the treatment process. For further information, see the enhanced investment case WSH71-PE10.

*CWW3.94-96* *Septic tank replacements – flow diversion; (WINEP/NEP)*

Investment under the appropriate treatment driver, W_U_IMP7 where the solution involves diversion of flow to another treatment works by pumping and/or gravity. For further information, see the enhanced investment case WSH71-PE10.

*CWW3.97-99* *Fish outfall screens; (WINEP/NEP)*

There are no actions identified in the NEP or WINEP under these lines in AMP8, hence no costs attributed.

*CWW3.100-102* *25 year environment plan; (WINEP/NEP)*

This is not an driver used in NEP and there are no actions identified in the WINEP under this driver in AMP8. As agreed with EA, the CSO investment in the WINEP has been allocated to this driver code as no other appropriate driver exists as the EnvAct drivers are only applicable to English companies. The CSO costs linked to this driver have been accounted for in CWW3.22-27, hence no costs attributed to these lines.

*CWW3.103-114* *Investigations, other (WINEP/NEP)*

All investment under INV drivers in the NEP and WINEP with the exception of chemical and microplastics investigations (included in CWW3.52-54) and nitrogen technical achievable limits (included in CWW3.61-63). Investigation investment has been assigned to a category “desk-based studies only”, “survey, monitoring or simple modelling” and “multiple surveys, and/or monitoring locations, and/or complex modelling” and the cost for each type allocated to the appropriate lines within this group. For further information, see the enhanced investment cases WSH70-PE01, WSH69-PE05 and WSH71-PE10.

*CWW3.115-117* *Contribution to third party schemes under WINEP/NEP only (not covered elsewhere)*

There is no investment allocated to these lines from the NEP or WINEP in AMP8, hence no costs attributed.

*CWW3.118-120* *River connectivity (e.g. for fish passage); (WINEP/NEP)*

All investment in fish passage improvement schemes in the NEP and WINEP. This investment has been phased over multiple AMPs. For further information, see the enhanced investment case WSH71-PE10.

*CWW3.121-123* *Restoration management (marine conservation zones etc) (WINEP/NEP) -*

There are no proposed improvement actions under marine conservation zones.

*CWW3.124-126* *Access and amenity for WINEP/NEP only (not covered elsewhere)*

There are no actions identified in the NEP or WINEP under these lines in AMP8, hence no costs attributed.

*CWW3.127-3.129* *Advanced WINEP (not covered elsewhere)*

There were no actions submitted under the Advanced WINEP, hence no costs attributed to these lines.

**EA/NRW environmental programme bioresources (WINEP/NEP)**

*CWW3.131-133* *Sludge storage -Tanks (pre-thickening, pre-dewatering or untreated); (WINEP/NEP)*

Investment for on site or imported liquid sludge storage tanks as a result of providing additional sludge processing capacity as a result of increased sludge volumes expected from other investment in the NEP and WINEP (i.e. for Phosphorus removal schemes and CSO improvement schemes). The split of costs between liquid sludges tanks, thickened sludges tanks and 'other' sludge treatment investment was calculated from the direct cost data. See the enhanced investment case WSH74-PE09.

*CWW3.134-136* *Sludge storage -Tanks (thickened/dewatered or treated); (WINEP/NEP)*

Investment for thickened sludge storage tanks as a result of providing additional sludge processing capacity as a result of increased sludge volumes expected from other investment in the NEP and WINEP (i.e. for Phosphorus removal schemes and CSO improvement schemes). The split of costs between liquid sludges tanks, thickened sludges tanks and 'other' sludge treatment investment was calculated from the direct cost data. See the enhanced investment case WSH74-PE09.

*CWW3.137-139* *Sludge storage - Cake pads / bays / other; (WINEP/NEP)*

Investment to increase cake storage capacity as required under SUiAR_IMP drivers. An allowance for the increased storage required due to growth, P-removal and CSO improvements has been included here. For further information, see the enhanced investment case WSH74-PE09.

*CWW3.140-142* *Sludge treatment - Anaerobic digestion and/or advanced anaerobic digestion; (WINEP/NEP)*

There are no actions identified in the NEP or WINEP for increased digestion, or enhanced digestion in AMP8, hence no costs attributed in these lines. However, the phase 2 of the North Wales Sludge Strategy scheme to provide additional advanced digestion capacity at Five Fords WwTW includes accommodation for growth as well as increased sludge volumes as a result of P-removal and CSO improvements, and associated works at Queensferry WwTW to transfer cake that is currently conventional digested cake to Five Fords WwTW to produce enhanced digested sludge cake, is included in Biosolids growth lines CWW3.162-164.

*CWW3.143-145* *Sludge treatment*

Thickening and/or dewatering; (WINEP/NEP) – Investment for additional sludge thickening and dewatering capacity as a result of other investment in the NEP and WINEP for Phosphorus removal schemes and CSO improvement schemes. For further information, see the enhanced investment case WSH74-PE09.

*CWW3.146-148* *Sludge treatment - Other; (WINEP/NEP)*

There is no investment planned in AMP other than included and described in the previous lines so there are no costs allocated to these lines.

*CWW3.149–151* *Sludge investigations and monitoring (NEP only)*

Includes investigations under SUiAR drivers in the NEP. This includes pilots and trials on sludge drying and nutrient removal to inform potential future AMP investment should there be a requirement to find alternative disposal routes in landbank availability is reduced. Investigations on microplastics in biosolids under SUiAR_INV are included here and excluded from CWW3.52-54. For further information, see the enhanced investment case WSH74-PE09.

*CWW3.153-155* *Growth at sewage treatment works (excluding sludge treatment)*

Includes investment at a prioritised list of WwTW which have insufficient capacity required to treat the current or expected increase in population equivalent. Investment is only planned in AMP8 at the highest priority sites. This includes a high profile and large scheme at Monmouth WwTW which is subject to significant external scrutiny, the growth element of the UWW P-removal scheme at Merlin's Bridge WwTW and 24 other priority WwTW.

*CWW3.156-158* *Reduce flooding Risk for properties*

Includes investment to reduce the risk of property flooding as a result of hydraulic overload. The proposed investment has been limited in AMP8 to worst served customers, resolution of new additions to the at-risk register, and minor mitigation measures. For further information, see the enhanced investment case WSH67-PE04.

*CWW3.159-161* *First Time Sewerage*

This includes investment for 6 schemes that have been assessed as DCWW having a duty to provide first time sewerage under S101a, with a total of 64 duty properties. This includes the second phase to a scheme at Red Wharf Bay that was a late inclusion in PR19. Subsequently, under appeal, 36 additional duty properties were identified in an adjoining area that were not included in the PR19 business case. The first phase of this scheme will be completed in AMP7. The most efficient way to delivery this scheme is as one design bridging AMP7 and AMP8. The costs included in PR24 are the total costs of the solution minus the costs allowed in PR19 final determination. An additional cost has been included to allow for an estimated 3 schemes that arise in the remainder of AMP7 and early AMP8 that will require implementation within the regulatory guidance, plus an allowance for the cost of carrying assessments of S101a applications.

*CWW3.162-164* *Sludge Enhancement (Growth)*

This includes a single scheme to increase the capacity of advanced anaerobic digestion at our Five Fords WwTW by providing an additional digester to manage increasing sludge volumes as a result of population growth and additional sludge volumes created by other investment in WINEP/NEP on Phosphorus removal and CSO spill reduction. This is the planned second phase of our investment in the North Wales Sludge Strategy (AMP6) and realises the full capacity of the current thermal hydrolysis plant that was built with the second phase planned. The cost includes for additional liquor treatment and the conversion of Queensferry WwTW from a conventional

digestion plant to dewatering, with the capacity provided at nearby Five Fords to accommodate the raw cake and produce an enhanced standard product. The investment also allows us to continue with accommodating liquid sludge from a neighbouring water company and allow the opportunity to increase sludge trading. For further information, see the enhanced investment case WSH74-PE09.

*CWW3.165-167* *Odour and other nuisance*

This includes investment in reducing odour nuisance and complaints. The majority of this investment is at Swansea Bay WwTW to upgrade the odour control unit to comply with local planning conditions. For further information, see the enhanced investment case WSH73-PE08.

*CWW3.168-170* *Resilience*

This investment is associated with a single scheme to address Laugharne WwTW which is situated on a coastal cliffside at significant risk of collapse. The solution pumps away to a neighbouring WwTW. See the enhanced investment case WSH72-PE07.

*CWW3.171-173* *Security SEMD*

There is no wastewater related investment in SEMD in AMP8 and therefore no costs are included on these lines for 2025/26 to 2029/30.

*CWW3.174-176* *Security Cyber*

This includes the wastewater allocation of the cross-services investment for cyber security. For further information, see the enhanced investment case WSH57-CS01

*CWW3.177-179* *Greenhouse gas reduction (net zero)*

This includes the wastewater allocation of the cross-services investment for greenhouse gas reduction. For further information, see the enhanced investment case WSH66-PE11.

*CWW3.181-186* *Additional lines 1-3*

These lines cover AMP7 enhancement. There is no AMP8 investment in these lines, therefore there are no cost included for 2025/26 to 2029/30.

*CWW3.187-188* *Additional Line 4 Enhancement programme to address increased risks of serious pollution incidents capex*

This includes investment for an enhancement programme to address the most significant risks of serious pollution incidents. Although this is not included in the NEP, this is widely supported and driven by Natural Resources Wales to reduce serious pollution incidents. This includes replacement/relocation of the highest risk rising mains which have resulted in previous serious or significant repeat incidents, and high priority large sewers that are located in riverbeds and in riverbanks susceptible to storm impact.
For further information, see the enhanced investment case WSH74-PE03.

| | |
|---|---|
| *CWW3.189-190* | *Additional Line 5 Other NEP related enhancement that does not match the definitions in lines above* |

This line captures investment from the NEP that is not covered in 1-152. This is generally due to driver discrepancies between the NEP and WINEP. This includes investment in two schemes to remove point source discharge from WwTWs that are negatively impacting on groundwater under W_WFD_GW_NDIMP1.

It also includes estimated costs associated with the application for new or varied permits as a result of NEP obligations. Previously theses costs were waived if as a result of a regulator-initiated variation (i.e. from NEP) but the NRW's strategic review of charging (SRoC) has recently been ratified by Welsh Government and has significant increased the cost associated with applications and variations and they are now charged for obligations under the NEP. For further information, see the enhanced investment case WSH71-PE10.

# 6. CWW4 Wastewater network+ Functional Expenditure

The data contained in this table is derived from tables CWW1 and CWW2.

Costs decrease between 2022/23 and 2023/24 mainly due to Cost efficiency targets derive from an assessment of the required Opex to be in line with industry bench based upon internal modelling. The efficiency savings are to be delivered across the duration of the AMP and are offset against gradually increasing Enhanced Opex resulting in total cost increase in 2029/30.

The underlying assumption is there are only minor changes in size bands where a small number of sites move to a higher size band, as expected in line with growth predictions and there are no changes to the reporting process.

There are no lines with any material year on year variation.

# 7. CWW5 Wastewater network+ - Large sewage treatment works

**Data Confidence Grade:**
Confidence in the data has been graded 'B2'. The reasons for minor shortcomings are:

- The AMP8 WINEP & NEP are not currently finalised, these documents are subject to change
- The Environmental Permit Database referenced in step 2 is a DCWW system and is not shared with the regulators. Whilst unlikely, Permit documentation on DCWW's system may differ from NRW's. DCWW's Permitting Procedure ensures this is avoided
- The NEP (AMP7 & AMP8) is not held on a shared system with NRW, there is room for human error when filing

The accuracy of the data is considered +/- 5% as there isn't a large quantity of data and it is considered accurate due to being present on a legal document (permit) and subject to a regulated investment programme (WI)NEP) but it is subject to change until the AMP8 WINEP & NEP are finalised.

## Sewage treatment works - Explanatory variables

*Works name (existing works)*

*CWW5.1* The site names populated for the APR table 7B in 2022/23 are checked against the Band 6 sites in the CWW7 table dataset to see if any future growth projections move additional sites from Band 5 to Band 6 in later years. It is confirmed there are no changes to the Band 6 sites up to 2029/2030.

*CWW5.1* *Works name (new works)*

*CWW5.1* *Works name*

There are no expected changes to works names or new works.

*CWW5.2* *Classification of treatment works Confidence grade A2*

There are no additional Band 6 WwTWs between 2022/23 and 2029/30 created through the investment programme or through growth in the catchment. There is only one works, Coslech WwTW, that has a change to the treatment type, due to the addition of tertiary treatment to achieve a new Phosphorus limit. The population equivalents increase year on year due to growth forecasts in the associated catchments. Growth forecasts are based on the company data which is based on a number of factors including historical growth and LDP information. As Rotherwas WwTW and Eign WwTW are interlinked, the growth in the Hereford catchment is applied to Eign WwTW.

*CWW5.3* *Population equivalent of total load received Confidence grade A2*

The PE is calculated using the Total PE but excludes any imported effluents. For CWW5.17, the Total PE uses the same data as CWW5.3, but excludes non-resident population.

*CWW5.4* *Suspended solids consent*

*CWW5.5* *$BOD_5$ consent*

*CWW5.6* *Ammonia consent*

*CWW5.7* *Phosphorus consent*

*CWW5.8* *UV consent*

**Lines 5.4 to 5.8** Confidence grade B2

This data presents consent information forecast for large treatment works (>25,000 PE) up 31/03/2030.

The basis for the forecast is:

1) Current information on environmental permits (used for 2022/23 data)
2) Predicted permit limit changes from the AMP 7 WINEP & NEP (used for 2023-2025 data)
3) Predicted permit limit changes from the draft AMP8 WINEP & NEP (used for 2025-2030 data)

Data summary:

- 2022/2023 consent information data matches the 2021/2022 APR submission
- it is predicted the 2023/2024 consent information data will also match the 2023 APR Submission
- In 2023/2024 Eign & Rotherwas treatment works P limits are forecast reduce from 1.00 to 0.40. The AMP7 WINEP states this will be delivered in 2025 but the Permit is being amended and scheme delivered early for environmental performance improvement purposes.
- In 2026/2027 Coslech treatment works P limit is forecast to reduce from 2.00 to 0.25
- In 2029/2030 Five Fords treatment works P limit is forecast to reduce from 1.00 to 0.70
- There were no changes for any other lines (CWW5.6, CWW5.7, CWW5.8, CWW5.10)

The list of treatment works with consent information provided should match the CWW7a.14 line.

*CWW5.9* *Load received by STW*

*CWW5.10* *Flow passed to full treatment Confidence grade B3*

The data presents average daily flow forecast figures for 2022/2023 to 2029/2030 for large Band 6 wastewater treatment works. This has used 2021/2022 measured average daily volumes for all assessed sites as a baseline and considered residential population change up to 2029/2030 to estimate daily flow changes.

Population change estimates are taken from the Drainage and Wastewater Management Plan (DWMP) 2030 estimates. 17 of the 22 catchments within the assessment are anticipated to see a marginal decrease in population up to 2030. As a result, the forecast average treated daily flow volume is estimated to see a ~2% fall by 2030.

The calculations have assumed surface water run-off and infiltration remain constant and only considers residential population change.

**Sewage treatment works - Functional expenditure**

*CWW5.11* *Service charges*

*CWW5.12* *Estimated terminal pumping expenditure*

*CWW5.13* *Other direct expenditure*

*CWW5.14* *Total direct expenditure*

*CWW5.15* *General and support expenditure*

*CWW5.16* *Functional expenditure*

**Lines 5.11- 5.16**
The data contained in this table is derived from tables CWW1 and CWW2.
Costs decrease between 2022/23 and 2023/24 mainly due to Cost efficiency targets derive from an assessment of the required Opex to be in line with industry bench based upon internal modelling. The efficiency savings are to be delivered across the duration of the AMP and are offset against gradually increasing Enhanced Opex resulting in total cost increase in 2029/30.

The underlying assumption is that no treatment works will be added or removed from the table, and there is no changes to the reporting process.

### Sewage treatment works - Functional expenditure

*CWW5.17* *Population equivalent of total load received (resident population and trade effluent) Confidence grade A2*

The data used is the same as in CWW5.3 but the PE calculation for this line is Total PE, minus Non-Resident PE, minus imported effluent PE, as defined in the guidance.

More detailed information on the calculation of growth forecasts applied to CWW5.3 and CWW5.17 can be found in the methodology for CWW7a/b/c.

# 8. CWW6 Wastewater network+ - Sewer and volume data

### Wastewater network

**C**onfidence grade at table level: B3

*CWW6.1-6.2* *Connectable properties served by s101A schemes completed in the report year.*
*Number of s101A schemes delivered in the report year*

**Lines 6.1 and 6.2**
This includes 5 confirmed duty schemes with 62 duty properties plus an estimation of a further 3 schemes serving 22 properties (based on average properties per scheme) for applications currently under assessment, or emerging schemes that will require delivery in AMP8 to meet regulatory guidelines for delivery timescales. One of the confirmed schemes is at Red Wharf Bay, which was partly funded in PR19 but a subsequent appeal identified a further 36 properties in an adjoining location that requires a 2nd phase of delivery.

*CWW6.3-6.4* *Total pumping station capacity.*
*Number of network pumping stations.*

**Lines 6.3 and 6.4**
The increase in the number of pumping stations is as a result of S101a schemes, Developer Services activity, and a number of WwTW abandonments and pump away schemes.

*CWW6.5* *Total number of sewer blockages Confidence grade B2*

We have reported blockage performance in 2022-23 as per APR 2022-23. For the remainder of AMP7, we have projected an annual 3% improvement, based on the rollout of smart network monitors and proactive maintenance. In AMP8, we are projecting blockage performance to remain stable from the level achieved in 2024-25.

*CWW6.6* *Total number of gravity sewer collapses*

Confidence grade B2

We have reported collapse performance in 2022-23 as per APR 2022-23. For the remainder of AMP7, we have projected achieving a stable level of 255 total collapse incidents. This has been split into sub-totals for gravity and rising main collapses, based on the historic proportional split over the last seven years.

In AMP8, we are projecting our collapse rates to remain largely stable, from the level achieved in 2024-25, however increased pro-active survey work is expected to provide opportunities to pro-actively mitigate a small number of collapses delivering a marginal improvement in numbers.

CWW6.7 *Total number of sewer rising main bursts*

The reduction is mainly due to the replacement of the Gwent Levels SECS main and rising main replacements aimed to reduce the risk of serious pollution incidents.

*CWW6.8-6.10*
*Number of combined sewer overflows.*
*Number of emergency overflows.*
*Number of settled storm overflows.*

**Lines 6.8- 6.10**
There are no schemes that add or abandon these types of assets in AMP8 so the 2024/25 figure is unchanged.

*CWW6.11* *Sewer age profile (constructed post 2001)*

This is a calculation. It takes the 2022/23 APR figure then adds the in-year values from CWW6.14 and CWW6.15 and the difference from the previous year in the total line of CWW6.21

*CWW6.12* *Volume of trade effluent*

A constant volume of trade effluent is assumed through AMP8, consistent with our assumption that the number of customer sites producing trade effluent will remain constant at the level forecast for 24/25.

*CWW6.13* *Volume of wastewater receiving treatment at sewage treatment works*

The data presents total annual flow estimate for 2022/2023 to 2029/2030 for all wastewater treatment works. It includes estimates based on measured MCERTS flow volumes. For small sites with <250 population a theoretical calculation is made considering population, infiltration, trade and storm water allowance.

For measured sites this has used 2022/2023 measured total daily volumes for all assessed sites as a baseline and considered residential population change up to 2029/2030 to estimate total flow changes. For small theoretically calculated sites it has considered residential population change up to 2030 to estimate total flow changes.

*CWW6.14* *Length of gravity sewers rehabilitated*

The blind year forecast figures for this line are based on our current planned sewer rehabilitation programme of works.

AMP8 values are mainly due to the replacement of the Gwent Levels SECS main and rising main replacements, or sewer rehabilitation or diversions, aimed to reduce the risk of serious pollution incidents. Other maintenance activity is negligible.

*CWW6.15* *Length of rising mains replaced or structurally refurbished*

Blind year forecast figures for this line are based on a combination of planned rising main replacements and estimates of reactive rising main repairs (using an average of annual reactive repair lengths from 2017-18 onwards).

AMP8 values are mainly due to the replacement of the Gwent Levels SECS main and rising main replacements, or sewer rehabilitation or diversions, aimed to reduce the risk of serious pollution incidents. Other maintenance activity is negligible.

*CWW6.16* *Length of foul (only) public sewers*

*CWW6.17* *Length of surface water (only) public sewers*

*CWW6.18* *Length of combined public sewers*

*CWW6.19-6.20* *Length of rising mains.*
*Length of other wastewater network pipework.*

**Lines 6.16 to 6.20**
There are small additions in length to various wastewater network pipework due to specific schemes (e.g. S101a schemes, and WwTW abandonment and pump-away schemes) but the majority is due to Developer Services activity.

*CWW6.21* *Total length of "legacy" public sewers as at 31 March*

Calculated cells

*CWW6.22* *Length of formerly private sewers and lateral drains (s105A sewers)* Confidence grade B3

The Total Length of Formerly Private sewers and Lateral Drains (s105a sewers) is reported as 17175 km in 2022-23 and has also been applied to years 2023-24 to 2029-30.

The Total Length of Formerly Private sewers and Lateral Drains utilises the estimated length of PST sewers as calculated via a WRC report which was concluded prior to the Private Sewer Transfer in October 2011.

The total length remains static as the length is taken from a WRC report that estimated the total length of PST sewers within DCWW sewerage operating area. It is based on a WRc report estimate produced in July 2013 (WRc Ref: UC9623.02). The length comprises 4,224km of total length of lateral drains and 12,951km of total length of private sewer

This figure is used as the total length of PST sewers currently recorded in GIS is 4677 km, of which 72.3 km are Rising Mains, which represents just 27% of the total estimated by WRC. As all PST sewers were constructed prior to Oct 2011, the estimated length will not increase as new housing sites and developments are captured within GIS

# 9. CWW7a Wastewater network+ - Sewage treatment works data; size and consents

Combined commentary shown in table 7c

# 10. CWW7b Wastewater network+ - Sewage treatment works data; UV permits

Combined commentary shown in table 7c

# 11. CWW7c Wastewater network+ - Sewage treatment works data; treatment type

The commentary below covers 7a, 7,b and 7c. Confidence grade B2 for tables CWW7a, b and c

There are only minor changes in size bands and total load where a small number of sites move to a higher size band and total loads increase by 1.9% by the end of AMP8, as expected in line with growth predictions.

There are significant changes anticipated in AMP8 across these tables from the quantity of permit changes required by the WINEP and NEP, particularly around additional and tighter Phosphorus limits.

Natural Resources Wales have included default limits on all discharges into Special Area of Conservation waterbodies for sites >20m3 per day in the NEP. These are 5mg/l P, 40 mg/l BOD, and 60 mg/l Suspended Solids. They are included in the NEP and the investment is included in the PR24 submission for sites that require process intervention to meet these limits. However, they advise that they will be issuing these “backstop” permits this year (2023/24), hence the large increase in Phosphorus permits in 2023/24 and an increase in sites with sanitary parameter permits, where these have changed from descriptive permits. Because these permits are expected to be issued this year, but the investment is in AMP8, it is difficult to see the alignment of capital investment across AMP8 from the data in these tables. Sites under the HR_IMP driver where tighter than the default limits are required, will still have these “backstop” limits ahead of the investment to achieve the tighter limits. The tighter limits will all be in place by 2030.

Due to the significant number of additional and tighter permits discussed above, this also has an impact on the treatment type, with many more sites having to have additional tertiary treatment to meet the new limits.

There are no new, or changes to any, UV permits between 2022/23 and 2029/30 (with the exception of the abandonment of Laugharne STW). The variability across years for the weighted average number of days a UV permit applies is due to a number of seasonal permits. Some of these seasonal permits are related to the start of the Easter school holidays. Easter varies each year and some of the local authorities have different holiday start times. We have assumed in all cases, the Easter school holidays start on the Monday before Easter Sunday. Easter can fall either side of 1st April so some reporting years can have two Easter holidays, and others may have no Easter holiday. The UV permit data excludes three Settled Storm & Storm UV or Preliminary Treated Storm Sewage + UV

permits, as their inclusion can bring an individual site's effective dates to above 365 (or 366) days per year.

Over the period the number of WwTW is expected to decrease from 828 to 819. This is because the anticipated best value solution to address some of the actions in the investment plan is to abandon the existing treatment works and pump to a neighbouring one. This is included in new permit limits, septic tank replacement and removal of discharges to ground.

The volume of trade effluent, as shown in line CWW7c.8, remains constant at our forecast 24/25 level, consistent with our forecast profile for the volume of trade effluent shown in line CWW6.12.

# 12. CWW8 Wastewater network+ - Energy consumption and other data

### Other

*CWW8.1* *Total sewerage catchment area Confidence grade B2*

The gradual increase in sewered area between 2023-24 and 2029-30 is in line with the approx. 5.5 $km^2$ average increase observed between 2018-19 and 2022 -23. which has been reported over the previous submissions. These increases are expected due to the GIS catchment polygons being amended and expanded to accommodate New Housing Sites / Developments.

Utilising the Sewerage Catchment polygon layer from within GIS ensures that only DCWW sewered areas are included within the calculations as required by the Line definition and allows for the removal of NAV / Inset areas.

*CWW8.2* *Designated coastal bathing waters Confidence grade B3*

Number of EU designated coastal bathing waters within the operating area of the company. DCWW must look into a potential designation of bathing waters in the coastline regulated by the EA and not by NRW. As of 2023, every bathing water is within NRW operating area.

Inland bathing waters are excluded from CWW8.2 and shown only in CWW8.3.

Data is sourced from Welsh Government and NRW annual reports on bathing water performance. Information published on NRW website is used to cross check the numbers and written confirmation is also requested from NRW if required. New designated bathing waters must be included in the annual report.

Based on previous years, it is estimated that 1.5 new coastal bathing waters will be designated every year. This linear growth has been added to the estimate figures until 2030. The actual annual rate of bathing waters designations for the last three years is 1.33, but there is a clear desire to increase bathing waters by the Welsh community, which cannot be reflected by documentation. Therefore, based on our expert judgement, we believe that 1.5 is a more accurate estimate.

*CWW8.3* *Designated inland bathing waters Confidence grade B3*

Number of EU designated inland bathing waters within the operating area of the company. DCWW must look into a potential designation of a bathing waters in the inland area regulated by the EA

and not by NRW. As of 2023, the only inland bathing water is within NRW operating area. Coastal bathing waters are excluded from CWW8.3 and shown only in CWW8.2

Data is sourced from Welsh Government and NRW annual reports on bathing water performance. Information published on NRW website is used to cross check the numbers and written confirmation is also requested from NRW if required. New designated inland BWs must be included in the annual report.

Based on previous years and the current interest of the Welsh Government in increasing the number of designations for Inland Bathing Waters, we have estimated that 1 new inland BWs will be designated until 2025 and then this rate will increase up to 2 Inland Bathing Waters per year. This linear growth has been added to the estimated figures until 2030. Numbers might increase quicker depending on the Welsh Government legislation process.

*CWW8.4* *Number of intermittent discharge event duration monitors Confidence grade B2*

The profile submitted reflects the remaining EDM installations required to reach 100% EDM coverage of all known Storm overflows up to the end of 2024/25. As there will be 100% coverage by the end of AMP7, there are no additional EDM installations planned on storm overflows in AMP8.

For AMP8 we have included 813 additional monitors to be installed in network pumping stations to monitor emergency overflows, as required by W_U_MON6 drivers.

We were unclear from the guidance whether these should be included in this line but have included them at this stage and could remove them if required. If they have been included inappropriately, please regard all years from 2025-2030 as zero. The values include the reduction in the WINEP as a result of the EA instruction to phase a proportion into future AMPs (54 to 24) but include all installations (789) included in the NEP as NRW have not given the same instruction and require all delivering in AMP8.

*CWW8.5* *Number of monitors for flow monitoring at STWs Confidence grade B2*

The number entered in Line 13 of CWW 8.5 is the number of Wastewater Treatment Works that have had NEP / WINEP schemes to provide flow monitoring with MON4 / MON5 driver applied and outputs have been signed off by Natural Resources Wales (NRW) or Environment Agency (EA) in the reporting year. The number provided is not cumulative.

The increase to 332 in Yr 2024/25 reflects the phasing of the installation programme and the date the NEP/WINEP claims are required.

The numbers forecasted for future years (11 in 2026-2027) are the required NEP/WINEP output dates for flow monitoring required to be installed and claimed as contained in the final WINEP and Version 6 of the NEP, and also included in CWW20.

*CWW8.6* *Number of odour related complaints Confidence grade A2*

The rationale behind the forecasted increase in odour contacts is in line with the current trend and reflects a combination of environmental factors and changes within the business. Whilst investment into odour management has increased and the effectiveness of management has also

improved, a combination of rising global temperatures, rising populations and increased development is likely to result in more odours being created by hotter weather and a greater number of people living in closer proximity to DCWW assets. The business also expects increased sludge volumes/movement as a result of P schemes and the provision of increased strategic sludge storage due to farming rules and loss of landbank, meaning large storage areas of cake being implemented. The combination of these factors is likely to result in an increase in the number of odour contacts.

To adjust for the expected activity in AMP 8, the Swansea Odour scheme and low value Preventative Capital Maintenance (PCM) schemes were analysed.

Odour complaints within 1 NM of Swansea Bay WwTW
2019: 4 telephone, 2 web forms.
2020: 6 telephone, 9 web forms and 1 social media.
2021: 6 telephone, 3 web forms and 1 social media.

(4+2)+(6+9+1)+(6+3+1) = 32 in 3 years = 10.666 per year (rounded to 11 complaints per year)

This would be 53.3333 across the AMP, but the scheme CAPEX is phased yr2/3/4, so using full benefit effect in the year following completion, there would be a reduction of 11 complaints in yr5 for Swansea.

The other 6 complaints reduction was taken from the information available on the low value PCM. These represent schemes of a nature we might do, but not necessarily these exact schemes in practice, the phasing assumptions we have followed as per financial spread methods for other pieces of data.

**Energy consumption**

*CWW8.7* *Energy consumption - sewage collection*

*CWW8.8* *Energy consumption - sewage treatment*

*CWW8.9* *Energy consumption - wastewater network +* Confidence grade B4

**Lines 8.7 to 8.9**
Energy consumption for wastewater network+ is expected to reduce by 15% from 2022/23 to 2029/30. This reduction is primarily driven by energy efficiency measures to reduce electricity consumption but also supported by fleet electrification.

# 13. CWW9 Enhancement expenditure (cumulative) - wastewater network+ and bioresources

The values included in this table are from the same source and calculated in the same way as CWW3 but presented as the cumulative cost in the year that the investment results in beneficial use.

The contents of the PR24 tables are consistent with that already reported in the APR.

The forecast is based on our current AMP7 plan as presented to Board in June 2023 which is based on forecasts from the business delivery owners.

Cumulative wastewater spend increases through 23/24 and 24/25 with the completion of schemes focusing on reducing the frequency of CSO's, phosphorous removal and WINEP commitments.

The cumulative CapEx spend is incurred upon full completion of the proposed individual CapEx schemes or programmes captured by the line in the table. As all of our proposed AMP8 CapEx schemes or programmes start and end in AMP8, total AMP8 CapEx for each line in CWW9 aligns with total AMP8 CapEx for the equivalent line in CWW3 (and similarly, total AMP8 CapEx for each line in CWW9b aligns with total AMP8 CapEx for the equivalent line in CWW3b).

The AMP 8 OpEx spend mirrors CWW3b as the beneficial use of the OpEx expenditure is incurred in year. The AMP 7 OpEx spend is not aligned between CWW3 and CWW9.

## 14. CWW10 Wholesale wastewater local authority rates

Confidence grade for the whole table is A5
Business rates liabilities are calculated by applying the Uniform Business Rate (UBR) to the rateable value (RV) of the underlying asset. The current UBR is £0.535 in Wales. We have assumed that this will not change in calculating our business rates liabilities (in 22/23 prices) for the entire period from 31 March 2023 to 31 March 2030. As a result, our business rates costs for our existing asset base will automatically increase in line with CPIH inflation in accordance with the PR24 cost allowance methodology. This is aligned with the historical trend for the overall tax take that the government receives from business rates i.e. to increase by CPI.

The Government has announced that further business rates Revaluations will be carried out on the 1 April 2026 and 2029.

At each Revaluation, the RVs of wastewater assets are calculated by reference to their construction costs, which are published in the VOA's Cost Guide accompanying each new Rating List. It is difficult to know what the impact of future revaluations will be. We understand that the VOA has previously used price indices e.g. the RICS All-in Tender Price Index (TPI) to inflate the costs in their Cost Guide at a Revaluation. This would lead to an increase in RVs for wastewater treatment works which would feed-in to the overall 'pool' of rateable assets for the whole country. Assuming the value of that pool increases, then we would expect there to be a reduction to the UBR so that the overall tax-take the government receives from business rates increases by inflation. Whilst we could use a forecast TPI index to estimate the potential inflation of the Cost Guide, it is difficult to predict how the UBR might change at a Revaluation. Therefore, we have not assumed any overall adjustment from the Cost Guide increasing/UBR decreasing and have calculated the business rates costs of our existing asset base in 2022/23 prices. As a result, our business rates costs will automatically increase in line with CPIH inflation in accordance with the PR24 cost allowance methodology.

We have assumed that the decapitalisation rate will remain at 3.8% in Wales and 4.4% for sites in England. This could have a significant impact on RVs if it were to change at a future Revaluation.

The Government intends to introduce a new regime requiring ratepayers to inform the VOA of any physical changes to their properties and has prepared associated draft legislation. The "requirement to notify" is expected to apply from 1 April 2026 and will then enable the VOA to promptly update RVs for the relevant changes. We have identified the potential rateable costs due to the construction of new assets from our AMP 8 capital programme (in 2022/23 prices) with the assistance of our capital allowances advisers, ChandlerKBS. This has then been decapitalised at 3.8% (the current decapitalisation rate) to give the resultant RV. We have then multiplied the new assets' RVs by the

current UBR (in 2022/23 prices) to give the additional charge for each relevant year in 2022/23 prices.

In view of the considerable uncertainty associated with the two revaluations in AMP 8 and the new requirement to notify, an appropriate cost sharing mechanism is required when setting expenditure allowances. We believe this should be set at a rate of 10:90 in the Final Determination for wastewater business rates, reflecting the considerable associated risk for companies, which is in line with the Competition and Markets Authority's findings in relation to PR19 referrals.

### Rateable value

*CWW10.1* *Rateable value*

A detailed calculation of the rates charges has been prepared. These used the RV of each asset taken from the 2017 List for the year ended 31 March 2023 and from the 2023 List (published on 1 April 2023) for the years ended 31 March 2024 to 31 March 2030.

The effect of the revaluation on 1 April 2023 was to increase the overall RV of wastewater treatment works by approx. £2m from 1 April 2023, with a corresponding increase in business rates charges of £1.1m pa.

It is very difficult to predict future RVs at the new revaluation dates, but we would expect rates costs to generally increase by inflation over time. Therefore, we have not made any adjustments to the underlying RVs at the 2026 or 2029 Revaluations as business rates costs should automatically increase by CPIH under the PR24 methodology when setting expenditure allowances (as explained above).

### Wastewater wholesale local authority rates

*CWW10.2* *Wholesale wastewater business rates charge for current year before transitional relief*

Rates are payable on the rateable value (RV) of assets as calculated at CWW10.1 multiplied by the Uniform Business Rates (UBR). The current UBR is £0.535 in Wales and £0.512 in England (£0.499 for small properties in England), and we have assumed that this will not change in calculating our business rates liabilities (in 22/23 prices) for the entire period from 31 March 2023 to 31 March 2030. The RV of the properties have been multiplied by the appropriate UBR to arrive at the rates charge before transitional relief. As a result, our business rates costs for our existing asset base will automatically increase in line with CPIH inflation in accordance with the PR24 cost allowance methodology. This is aligned with the historical trend for the overall tax take the government receives from business rates i.e. to increase by CPI. Business rates charges arising from changes in asset stock are explained further at section 10.12 below.

*CWW10.3* *Wholesale wastewater business rates transitional relief*

Transitional Relief (TR) was introduced in Wales and England from 1 April 2023. We have included TR which was calculated on an asset-by-asset basis applying the TR rules. TR reduces the overall cost by £1.146m in 2023-2024, £0.527m in 2024-2025 and £0.009m in 2025-2026. As there has been no announcement by either the Welsh or English Governments regarding the availability of TR at the 2026 revaluation we have not factored this into the resultant rates liabilities. No TR has been entered after 2026 as there are no details to confirm whether it will be available.

*CWW10.4* *Wholesale wastewater business rates charge for current year after transitional relief*

This is the sum of CWW10.2 and CWW10.3

*CWW10.5* *Adjustments to wholesale wastewater business rates charge for prior years*

All years are nil as there are no adjustments for prior years.

*CWW10.6* *[Other wholesale wastewater business rates adjustments 1]*

In the year ended 31 March 2023, £396k of rates refunds were received following appeals made in relation to certain assets RV's. This work has largely been completed now and we do not expect any further material refunds, save for possibly the appeal in relation to Swansea WwTW which is ongoing.

*CWW10.7* *[Other wholesale wastewater business rates adjustments 2]*

Line CWW10.7 includes an adjustment to reallocate business rates costs relating to non-appointed expenditure. The cost reallocated is £0.085m for the years 2026-2030.

*CWW10.8* *[Other wholesale wastewater business rates adjustments 3]*

No entries in this row.

*CWW10.9* *Wholesale wastewater business rates forecast for Business Plan*

This row is the sum of CWW10.4 to CWW10.8.

**Analysis of change in charge before transitional relief**

*CWW10.10* *Change in wholesale wastewater business rates costs from prior year*

This row compares the year-on-year values on CW10.2 and returns the difference in the rates charge between years. The difference is then explained in rows CW10.11 to CW10.15.

*CWW10.11* *Change in wholesale wastewater business rates costs due to the impact of any revaluation*

The effect of the revaluation on 1 April 2023 was to increase the overall RV of wastewater treatment works by approx. £2m from 1 April 2023, with a corresponding increase in business rates charges of £1.1m pa. This increase was calculated by obtaining the RV published by VOA on their website for each individual asset and multiplying the new RV by the UBR.

For the 2026 and 2029 Rating Lists, the Cost Guide will be revised, and RVs will be calculated to reflect the updated costs, changes in land values and other factors pertinent to the calculation of RVs e.g. the 'decapitalisation rate'. As set out in CWW10.1 we have not made any increase to RV's for the 2026 and 2029 revaluation dates as business rates costs should automatically increase by CPIH under the PR24 methodology.

*CWW10.12* *Change in wholesale wastewater business rates costs due to change in asset stock*

We have identified the potential rateable costs due to the construction of new assets from our AMP 8 capital programme (in 2022/23 prices) with the assistance of our capital allowances advisers, ChandlerKBS. This has then been decapitalised at 3.8% (the current decapitalisation rate) to give the resultant RV. We have then multiplied the new assets' RVs by the current UBR (in

2022/23 prices) to give the additional charge for each relevant year in 2022/23 prices. As a result, we estimate the annual rates cost will increase by £741k per annum each year (from 2026/27 – 2029/30) in line with the advent of the requirement to notify.

*CWW10.13* *[Change in wholesale wastewater business rates costs due to other 1]*

This row has an adjustment to eliminate the check difference otherwise arising (as the table doesn't hold 21/22 data).

*CWW10.14* *[Change in wholesale wastewater business rates costs due to other 2]*

Insignificant other adjustments to the rates calculation for the blind years that net to £0.1m. All AMP 8 years are nil.

*CWW10.15* *[Change in wholesale wastewater business rates costs due to other 3]*

No entries in this row.

*CWW10.16* *Change in wholesale wastewater business rates charge before transitional relief*

This row is a sum of CWW10.11 to CWW10.15

*CWW10.17* *Check difference*

This row is a check of the amounts in CWW10.10 and CWW10.16.

## 15. CWW11 Third party costs by business unit for the wholesale wastewater service

An explanation of material year on year variances are included below.

**Third party costs ~ price control (operating expenditure)**

*CWW11.1* *Rechargeable opex - third party damage Confidence grade B2*

This relates to rechargeable works and we have assumed the same activity as 2022-23 of £0.089m.

*CWW11.2* *Rechargeable opex - build over Confidence grade B3*

As with the forecasts for tables DSw.2 and DS3 the key assumption that underpins the modelling of costs is that the levels of work delivered across the different schemes, will be proportional to the level of total forecast work. The forecast has been based on the assumed change in volumes of new connections from historic levels within the draft water resource management plan (DWRMP). The assumption is that as the overall level of growth increases or decreases, this will have a knock-on effect on the overall profile of Developer Services work delivered. Whilst the amount spent may not directly correlate to the number of connections, it is assumed that more connections will indicate an overall increase in the level of activity we are seeing. Therefore, we would reasonably expect to see an increase in our spend in this area. There is a reasonably high degree of confidence in the methodology that underpins the forecast. We are however looking to

forecast across a significant time period, and there are inherent risks in doing this. The DWRMP is a forecast, and actual levels of service delivered may differ from this.

Overall, there are few significant year-on-year changes in the data. The forecasts are purely based on averages, with no attempts to forecast exceptional schemes. It is impossible to predict in anything other than the very short term as to if or when a significant scheme will be progressed. Recent experience shows that it is not uncommon for large schemes to be suddenly abandoned by developers, equally it is possible that a very large scheme may suddenly be required with very little warning. As such, the decision has been made to forecast on a flat basis. The reality is that the delivery of all schemes is likely to be far more variable year on year, however this is impossible to forecast accurately. The exception to the forecasting methodology laid out above is the data for 2022/23 which is based on actuals and varies significantly from the averages due to several large schemes being delivered in the year such as diversions associated with the Heads of the Valleys realignment scheme.

Despite there being limited year on year variances, there are several overall trends which should be noted. The DWRMP forecast across the period is between 94-102% of the historic 5-year average for new connections delivered. From this, we would not expect a significant change in the levels of expenditure across the entire forecasting period.

In line with the treatment of diversions as part of the APR, all the spend in these lines is considered Infrastructure renewal expenditure and is therefore reported against opex. There is therefore no capex forecast for these lines.

*CWW11.3* *Other rechargeable opex Confidence grade B2*

£0.4m in 2022/23 relates to the bad debt charge on third party income – this has been forecasted the same for the remainder of AMP7. For AMP8 we have assumed that there will not be a charge as the debt will be recovered.

*CWW11.4* *Third party wastewater price control opex excluding developer services*

Calculated cell

*CWW11.5* *Diversions - NRSWA – opex Confidence grade B3*

| | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | 28/29 | 29/30 |
|---|---|---|---|---|---|---|---|---|
| | £m | £m | £m | £m | £m | £m | £m | £m |
| Diversions NRSWA - opex | 3.716 | 1.494 | 1.489 | 1.48 | 1.446 | 1.438 | 1.413 | 1.39 |
| year on year movements | | -2.222 | -0.005 | -0.009 | -0.034 | -0.008 | -0.025 | -0.023 |

In 2022-23 there was increased costs mainly as a result of diversions associated with the Heads of the Valleys realignment scheme.

As with the forecasts for tables DSw.2 and DS3 the key assumption that underpins the modelling of costs is that the levels of work delivered across the different schemes, will be proportional to the level off total forecast work. The forecast has been based on the assumed change in volumes of new connections from historic levels within the draft water resource management plan (DWRMP). The assumption is that as the overall level of growth increases or decreases, this will

have a knock-on effect on the overall profile of Developer Services work delivered. Whilst the amount spent may not directly correlate to the number of connections, it is assumed that more connections increase the pressure on Highway Authorities to improve or adapt their network resulting in an increased requirement for diversions. Equally, we would expect an increase in house-building indicated by the growth in new water connections to be driving other developer activities that would necessitate the diversion of our existing network. Therefore we could reasonably expect to see an increase in our spend in this area. There is a reasonably high degree of confidence in the methodology that underpins the forecast. We are however looking to forecast across a significant time period, and there are inherent risks in doing this. The DWRMP is a forecast, and actual levels of service delivered may differ from this.

Overall, there are few significant year-on-year changes in the data. The forecasts are purely based on averages, with no attempts to forecast exceptional schemes. It is impossible to predict in anything other than the very short term as to if or when a significant scheme will be progressed. Recent experience shows that it is not uncommon for large schemes to be suddenly abandoned by developers, equally it is possible that a very large scheme may suddenly be required with very little warning. As such, the decision has been made to forecast on a flat basis. The reality is that the delivery of all schemes is likely to be far more variable year on year, however this is impossible to forecast accurately. The exception to the forecasting methodology laid out above is the data for 2022/23 which is based on actuals and varies significantly from the averages due to several large schemes being delivered in the year such as diversions associated with the Heads of the Valleys realignment scheme.

Despite there being limited year on year variances, there are several overall trends which should be noted. The DWRMP forecast across the period is between 94-102% of the historic 5-year average for new connections delivered. From this, we would not expect a significant change in the levels of expenditure across the entire forecasting period.

In line with the treatment of diversions as part of the APR, all the spend in these lines is considered IRE and is therefore reported against opex. There is therefore no capex forecast for these lines.

*CWW11.6* *Diversions - other non-section 185 diversions - opex*

No costs have been forecast against this line. This is due to there being no costs for this type of scheme within the historic profile, we therefore have no indication that this type of scheme will be delivered during the next AMP. Should any schemes which fall into this category be progressed by developer customers, we will report the costs accordingly.

*CWW11.7* *Total third party wastewater service costs ~ price control (operating expenditure)*

Calculated cell

**Third party costs ~ non price control (operating expenditure)**

*CWW11.8* *Bulk supplies (wastewater) opex*

*CWW11.9* *Reception and disposal of waste opex*

*CWW11.10* *Other excluded charge opex*

**Lines 11.8 to 11.10**
There are no costs for these activities

*CWW11.11* *Third party wastewater non-price control opex excluding developer services*

Calculated cell

*CWW11.12* *Diversions - s185 – opex Confidence grade B3*

In 2022-23 the amount incurred was £0.786m. The forecast has been based on the assumed change in volumes of new connections from historic levels within the draft water resource management plan (DWRMP) which results in an increase of £0.2m per annum from 2022-23.

*CWW11.13* *Total third party wastewater service costs ~ non price control (operating expenditure)*

Calculated cell

**Third party costs ~ price control (capital expenditure)**

*CWW11.14* *Rechargeable capex - third party damage*

*CWW11.15* *Rechargeable capex - build over Confidence grade B3*

*CWW11.16* *Other rechargeable capex*

*CWW11.17* *Third party wastewater price control capex excluding developer services*

*CWW11.18* *Diversions - NRSWA – capex Confidence grade B3*

*CWW11.19* *Diversions - other non-section 185 diversions – capex Confidence grade B3*

*CWW11.20* *Total third party wastewater service costs ~ price control (capital expenditure)*

**Lines 11.14 to 11.20**
There are no costs for these activities

**Third party costs ~ non price control (capital expenditure)**

*CWW11.21* *Bulk supplies (wastewater) capex*

*CWW11.22* *Reception and disposal of waste capex*

*CWW11.23* *Other excluded charge capex*

**Lines 11.21 to 11.23**
There are no costs for these activities

*CWW11.24* *Third party wastewater non-price control capex excluding developer services*

Calculated cell

*CWW11.25* *Diversions - s185 – capex Confidence grade B3*

In line with the treatment of diversions as part of the APR, all the spend in these lines is considered IRE and is therefore reported against opex. There is therefore no capex forecast for these lines.

*CWW11.26* *Total third party wastewater service costs ~ non price control (capital expenditure)*

Calculated cell

# 16. CWW13 Best value analysis; enhancement expenditure - wastewater network+ and bioresources

All figures in this table are post frontier shift and real price effects.

CWW13.1 – CWW13.172 **EA/NRW environmental programme wastewater**

CWW13.173 – CWW13.204 **EA/NRW environmental programme bioresources**

CWW13.205 – CWW13.264 **Other enhancement**

CWW13.265 – CWW13.268 **Total enhancement**

There are no third party financial or non financial contributions for any of these lines. The key assumptions for calculating the NPV for this area include:

- a useful asset life of 40 years;
- a WACC rate of 3.2%;
- and a discounted rate of 3.5%.

Due to no third party financial or non-financial contributions there is a low level of uncertainty and sensitivity associated with these elements. The uncertainty and sensitivity of the NPV data is low.

We have used the WACC and discount rate as specified by Ofwat in the final methodology. In addition, any repeat capital expenditure has been calculated using our unit cost data base, see the “Approach to Investment” document for further details.

An average asset life has been used which reflects the balance between civil structures, infrastructure assets and M&E assets.

An appraisal period of 30 years has been used for the calculation of the NPV values shown.

# 17. CWW14 Best value analysis of least cost option; enhancement expenditure - wastewater network+ and bioresources

All figures in this table are post frontier shift and real price effects.

CWW14.1 – CWW14.172 **EA/NRW environmental programme wastewater**

Within this category are multiple drivers which have a different least cost to best value range of schemes:

- Increase flow to full treatment; BVA (WINEP/NEP);
- Increase storm tank capacity - grey solution;
- Treatment for phosphorus removal (chemical);
- Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution;
- Septic tank replacements - treatment solution;
- Septic tank replacements - flow diversion;

CWW14.173 – CWW14.204 **EA/NRW environmental programme bioresources**

Within this category only one driver has a different least cost and best value programme.

- Sludge storage - Cake pads / bays / other

CWW14.205 – CWW14.264 **Other enhancement**

Two drivers have different least cost and best value programmes

- Growth at sewage treatment works (excluding sludge treatment);
- Resilience;

CWW14.265 – CWW14.268 **Total enhancement**

There are no third party financial or non financial contributions for any of these lines.

Key assumptions for calculating the NPV for this area include:

- a useful asset life of 40 years has been used;
- a WACC rate of 3.2%; and
- a discounted rate of 3.5%.

Due to no third party financial or non-financial contributions there is a low level of uncertainty and sensitivity associated with these elements. The uncertainty and sensitivity of the NPV data is low.

We have used the WACC and discount rate as specified by Ofwat in the final methodology.

In addition, any repeat capital expenditure has been calculated using our unit cost data base. An average asset life has been used which reflects the balance between civil structures, infrastructure assets and M&E assets.

An appraisal period of 30 years has been used for the calculation of the NPV values shown.

## 18. CWW15 Best value analysis; benefits - wastewater network+ and bioresources

All costs or cost savings in this table are post frontier shift and real price effects.

Table CWW 15 contains the annual benefit (both the number of units and the monetised benefit of changes to service measures) associated with the proposed enhancement programme for Waste-Water. This benefit has been calculated by analysing the impact that a project/investment will have in comparison to the pre investment position of relevant service measures.

The value of a service measure change is calculated using the DCWW multi capital framework which applies a unit cost value dependant on the particular service measure, considering Intellectual, Human, Social and Natural Capitals alongside the private cost of failure.

Where the projects to be delivered are forecast to have a direct impact on a Performance Commitment the benefit has been shown. Where there is a duplication of benefits the monetised value of those benefits associated with the Performance Commitment have not been included to avoid double counting.

**Application of Carbon**
The benefit or disbenefit of carbon is referred to as Greenhouse Gas Emission Reduction. Embedded Carbon has for the purpose of these tables is shown as the average annual impact over the cost benefit assessment period (30 years). This measure includes both the annual operational carbon and also the average annual embedded carbon calculated over 30 years.

**Profiling of benefits (Columns H-AH)**
Benefits have been profiled according to profile of the investment and the specific nature of the type of activity. Some schemes will only deliver benefit largely once the solution has been commissioned e.g., singular named non infrastructure schemes with some schemes delivering benefit part way through the project e.g., Multi Scheme Programmes of activity or infrastructure activity etc.

Benefit is calculated on an annual basis and then run forward for the entire period of the WLC exercise (30 years).

The annual benefits over time are discounted according to the discount factor of 3.5% as set out in the PR24 Final Methodology.

**Forecast of future benefits (Columns H-AH)**
Benefit is calculated on an annual basis and then run forward for the entire period of the WLC exercise (30 years).

**Present Value (Columns AJ-AL)**
The annual benefits over time are discounted according to the discount factor of 3.5% as set out in the PR24 Methodology.

The WACC applied is 3.23%.

| | |
|---|---|
| | **EA/NRW environmental programme wastewater** |
| *CWW15.1-CWW15.44* | Please note that for the purpose of this evaluation no benefit has been calculated for monitoring and investigation activities associated with mandated WINEP and NEP activities. |
| *CWW15 45-CWW15.55:* | *Increase flow to full treatment*<br><br>Increase FFT at WWTWs WINEP and NEP programme forecast benefit across multiple sites. |
| *CWW15.56-CWW15.66:* | *Increase storm tank capacity -grey solution*<br><br>Benefit forecast from increased storm capacity delivered as part of the WINEP/NEP programme (grey solutions). |
| *CWW15.67-CWW15.77* | *Increase storm tank capacity -green solution*<br><br>Forecast benefit is from Rainscape bathing water scheme for Jackson Bay. |
| *CWW15.78-CWW15.88:* | *Storage schemes to reduce spill frequency at CSOs etc - grey solution*<br><br>Forecast benefits from CSO Grey Solutions Programme. Performance Commitment benefits are shown against Storm Overflows and Total Pollution Incidents.<br><br>CWW 16.85 is the impact of CSO schemes shown as performance improvement against the PR24 Performance Commitment Storm Overflows.<br><br>The monetised benefit has not been calculated in order to avoid double counting of the benefit values calculated for lines 87-93 calculated from individual site benefit calculations.<br><br>It should also be noted as the performance commitment benefit has been shown against this driver as opposed to Storage to reduce spill frequency at CSOs etc - |

green solution due to low materiality of the green solution investment in comparison to grey schemes.

*CWW15.89 – CWW15.99* *Storage to reduce spill frequency at CSOs etc - green solution*

Forecast benefits from CSO green solutions.

*CWW15.232-CWW15.242:* *Treatment of Phosphorus (chemical)*

Forecast benefit from phosphorus removal schemes with chemical solutions. The impact of Phosphorus removal schemes on the PR24 Performance Commitment River Water Quality (phosphorus) has been shown.

Monetised benefit has not been calculated to avoid double counting with the site by site individual benefit assessment shown for lines 232-242.

There is also marginalPR24 Performance Commitment benefit for Discharge Compliance Benefit associated with this work however this is not shown due to the number of decimal places used by the table.

*CWW15.243-CWW15.253:* *Treatment of Phosphorus (Biological)*

Forecast benefit from phosphorus removal schemes with biological solutions. The impact of Phosphorus removal schemes on the PR24 Performance Commitment River water quality (phosphorus) has been shown.

Monetised benefit has not been calculated to avoid double counting with the site by site individual benefit assessment shown for lines 243-253. There is also marginal Discharge Compliance Benefit associated with this work however this is not shown due to the number of decimal places used by the table.

*CWW15.254-CWW15.264:* *Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution*

Forecast benefit from nature based solutions. The impact of Phosphorus removal schemes on the PR24 Performance Commitment River water quality (phosphorus) has been shown.

Monetised benefit has not been calculated to avoid double counting with the site by site individual benefit assessment shown for lines 254-264.

There is also marginal Discharge Compliance Benefit associated with this work however this is not shown due to the number of decimal places used by the table.

*CWW15.265-CWW15.275:* *Treatment for tightening of sanitary parameters*

Forecast benefits from treatment for tightening sanitary parameters programme.

*CWW15.309 - CWW15.319:* *Catchment management - habitat restoration*

Benefits shown are associated with the planned investment for Secs Main with the primary driver being the avoidance of serious pollution events in a environmentally sensitive area.

*CWW15.331- CWW15.341:* *Septic Tank Replacements - Treatment Solution*

Forecast benefit for WINEP/NEP septic tank programme (treatment solutions).

*CWW15.342- CWW15.352:* *Septic Tank Replacements - Flow diversion*

Forecast benefit for WINEP/NEP septic tank programme (Flow diversion).

*CWW15.464 – CWW15.541* **EA/NRW environmental programme bioresources**

*CWW15.486 – CWW15.496:* *Sludge storage - Cake pads / bays*

Benefits from NEP sludge storage schemes.

*CWW15.542. – CWW15.696.* **Other enhancement**

*CWW15.542 – CWW15.552* *Growth at sewage treatment works (excluding sludge treatment)*

Forecast benefit from WWTW growth schemes, the ten most material benefits or disbenefit areas shown.

*CWW15.553- CWW15.563:* *Reduce flooding risk for properties*

Benefit is forecast from the following schemes:

- Reducing Worst Served Customers
- Resolution of New Additions to the ARR (Plus Linked Properties / Areas)
- Flooding Register - Mitigations PRIORITY (PLAN A)
- Emerging Scheme

*CWW15.557:* *PR24 Internal Sewer Flooding*

Hydraulic overloading is being addressed via enhancement investment (which will avoid an additional fourteen incidents over the AMP).

*CWW15.558:* *PR24_ ESF*

There is some benefit on external flooding incidents achieved (an additional forty-two incidents avoided over the AMP) by the enhancement investment in hydraulic overloading which is specifically targeting internal flooding incidents.

| | |
|---|---|
| *CWW15.564-CWW15. 574* | *First Time Sewerage* |
| *CWW15. 575-CWW.15.585* | *Sludge enhancement (growth)*<br><br>Benefit is forecast from the scheme: Additional Digester at Five Fords and conversion of Queensferry to dewatering. |
| *CWW15.586-CWW15.596:* | *Odour and Nuisance*<br><br>Forecast Benefit from Swansea Odour Mitigation scheme. |
| *CWW15.597-CWW15.607* | *Resilience*<br><br>Forecast benefit from Laugharne landslip scheme, ten most material benefit types included. |
| *CWW15.619-CWW15.629:* | *Security Cyber*<br><br>Forecast benefit from cyber security programme. |
| *CWW15.630-CWW15.640* | *Greenhouse gas reduction (net zero)*<br><br>Benefit forecast from waste water net zero strategy initiatives. Forecast benefit has been shown against the Performance Commitment Operational greenhouse gas emissions (wastewater). |
| *CWW15.674-CWW15.684* | *Additional line 4; Enhancement programme to address increased risks of serious pollution incidents.*<br><br>This investment is forecast to provide improvement to the PR24 Performance Commitment Serious pollution incidents with a reduction of 3 serious pollution events in AMP 8. |
| *CWW15.685-CWW15.695* | *Additional Line 5; Other NEP related enhancement Discharges to ground from WW assets (NEP)*<br><br>NRW costs associated with permit applications and variations for NEP actions. Reassigned NEP investment: Allocation still being negotiated with NRW. |
| *CWW15. 697* | **Total enhancement**<br><br>Calculated cells |

## 19. CWW16 Best value analysis of least cost option; benefits - wastewater network+ and bioresources

All costs or cost savings in this table are post frontier shift and real price effects.

This table contains the annual benefit (both the number of units and the monetised benefit of changes to service measures) associated with the proposed enhancement programme for Waste-Water. This benefit has been calculated by analysing the impact that a project/investment will have

in comparison to the pre investment position of relevant service measures. The value of a service measure change is calculated using the DCWW multi capital framework which applies a unit cost value dependant on the particular service measure, considering Intellectual, Human, Social and Natural Capitals alongside the private cost of failure.

Where the projects to be delivered are forecast to have a direct impact on a Performance Commitment the benefit has been shown. Where there is a duplication of benefits the monetised value of those benefits associated with the Performance Commitment have not been included to avoid double counting.

**Application of Carbon**
The benefit or disbenefit of carbon is referred to as Greenhouse Gas Emission Reduction. Embedded Carbon has for the purpose of these tables is shown as the average annual impact over the cost benefit assessment period (30 years). This measure includes both the annual operational carbon and also the average annual embedded carbon calculated over 30 years.

**Profiling of benefits (Columns H-AH)**
Benefits have been profiled according to profile of the investment and the specific nature of the type of activity. Some schemes will only deliver benefit largely once the solution has been commissioned e.g., singular named non infrastructure schemes with some schemes delivering benefit part way through the project e.g., Multi Scheme Programmes of activity or infrastructure activity etc.

Benefit is calculated on an annual basis and then run forward for the entire period of the WLC exercise (30 years).

The annual benefits over time are discounted according to the discount factor of 3.5% as set out in the PR24 Final Methodology.

**Forecast of future benefits (Columns H-AH)**

Benefit is calculated on an annual basis and then run forward for the entire period of the WLC exercise (30 years).

**Present Value (Columns AJ-AL)**

The annual benefits over time are discounted according to the discount factor of 3.5% as set out in the PR24 Methodology.

The WACC applied is 3.23%.

**Selection of least cost programme**

Where at least one or more of the schemes within an enhancement driver investment area have a least cost option (which is not also the best value) the Least cost programme has been presented with supporting narrative. Where a least cost option is available this has been used instead of the best value option.

All other lines do not contain data as a result of either no planned investment (please see table CWW 15) or because the best value option is also the least cost option for all schemes within the driver definition.

| | |
|---|---|
| *CWW16.1 – CWW16.463* | **EA/NRW environmental programme wastewater** |
| *CWW16.232-CWW16.242:* | *Treatment of Phosphorus (chemical)*<br>Forecast benefit from phosphorus removal schemes with chemical solutions. |
| *CWW16.243-CWW16.253:* | *Treatment of Phosphorus (Biological)*<br>Forecast benefit from phosphorus removal schemes with biological solutions. |
| *CWW16.254-CWW16.264:* | *Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution*<br>Forecast benefit from nature based solutions. |
| *CWW16.331-CWW16.341:* | *Septic Tank Replacements - Treatment Solution* |
| *CWW16.342-CWW16.352:* | *Septic Tank Replacements - Flow diversion*<br>Forecast benefit for WINEP/NEP septic tank programme (Flow diversion). |
| *CWW16.464 – CWW16.541* | **EA/NRW environmental programme bioresources** |
| *CWW16.486-CWW16.496* | *Sludge storage - Cake pads / bays* |
| *CWW16.542. – CWW16.969.* | **Other enhancement** |
| *CWW16.542 – CWW16.552* | *Growth at sewage treatment works (excluding sludge treatment)*<br>Forecast benefit from WWTW growth schemes |
| *CWW16.564-CWW16.574* | *First time sewerage*<br>Benefit is forecast from first time sewerage investment |
| *CWW16.685-CWW16.695* | *Additional Line 5; Other NEP related enhancement that does not match the definitions in lines.*<br>Forecast benefit from:<br>• Discharges to ground from WW assets (NEP).<br>• NRW costs associated with permit applications and variations for NEP actions.<br>• Reassigned NEP investment: Allocation still being negotiated with NRW. |
| *CWW16. 697* | **Total enhancement**<br>Calculated cells |

# 20. CWW19 Wastewater network+ - WINEP phosphorus removal scheme costs and cost drivers

CapEx and OpEx figures in this table are post frontier shift and real price effects.

**Column Heading**

**Capex phasing** – The capital investment has been phased across AMP8 with consideration for the compliance date required by the WINEP or NEP and also to balance investment as much as possible each year across the Phosphorus removal programme and the wider investment plan to aid with a balanced and achievable delivery programme.

**Opex Impacts**
The opex effect associated with power, chemicals due to Phosphorous schemes has been phased across AMP8 with consideration for the compliance date required by the WINEP or NEP with opex for each scheme having a full year effect in the year following scheme completion.

**Population Equivalent Served 2024/25 – 2029/2030**
Population Equivalent forecasts have been taken from the same base dataset used to populate CWW7a and CWW7c, using population equivalent data reported in APR 2022/2023 and adjusted for estimated growth forecasts. In the absence of specific guidance for CWW19, the population equivalent uses the same principle as that used in CWW7 to calculate load, i.e., total population equivalent, including Non-Resident PE, but excluding imported septic tank or cess pool effluents. In the absence of specific guidance, the population equivalent figures are reported as actual numbers to zero decimal places.

**Scheme Design Population Equivalent**
The intervention for Phosphorus removal is designed to accommodate estimated growth for the WwTW up to 2040. The costs do not include for other investment needs to increase capacity to accommodate growth or for other maintenance requirements. Where applicable, costs are included in growth or non-infrastructure base maintenance. In the absence of specific guidance, the population equivalent figures are reported as actual numbers to zero decimal places.

**Costs where schemes cover new or tightened Sanitary Determinands limits as well as new or tighten Phosphorus limits**
It is very difficult to separate costs with any degree of certainty where a scheme is designed to deliver an improvement in Sanitary Determinands as well as Phosphorus reduction. In many cases the investment to reduce Phosphorus in treated effluents also delivers a reduction in Solids and BOD. Tightened Sanitary Determinands limits have been considered in the preferred option selected for P removal. Only where a specific additional process unit has been included to specifically meet a tighter Sanitary Determinands limit has the cost been separated out and included elsewhere in the investment plan.

| | |
|---|---|
| *CWW19.1 - CWW19.16* | This includes all actions (16) in the WINEP with a new or tightened Phosphorus limit under the WFD_IMP driver. There are no additional actions for Phosphorus limits under any other drivers in WINEP. |
| CWW19.17 - CWW19.30 | This includes all actions (14) in the NEP with a new or tightened Phosphorus limit under the WFD_IMP drivers |

| | |
|---|---|
| CWW19.31 - CWW19.57 | This includes all actions (27) in the NEP with a new or tightened defined Phosphorus limit for discharges to waterbodies in Special Areas of Conservation under the W_HR_P_IMP driver. A default "backstop" limit of 5mg/l for Phosphorus and 60mg/l BOD and 40mg/l of Suspended Solids, unless a tighter limit for each determinand is already in place, will be applied prior to the required compliance data of the defined limit. |
| CWW19.58 - CWW19.131 | This includes all actions (74) in the NEP where process investment is required to meet a new "backstop" limit of 5mg/l for Phosphorus and 60mg/l BOD and 40mg/l of Suspended Solids, for discharges to waterbodies in Special Areas of Conservation under the W_HR_P_ND_IMP driver, unless a tighter limit for each determinand is already in place. NRW intend to issue these permits in 2023/24 under the review of permits programme despite the investment not being accounted for until the start of AMP8. For this reason, the investment profile does not fully align with the same year in the lines in CWW20 for number of new or tightened permits, or with the permit data in CWW7a, which are based on the anticipated issue of the permits in 2023/2024 as advised by NRW. |
| CWW19.132 - CWW19.149 | This includes all actions (18) in the NEP where there is a requirement to meet a new "backstop" limit of 5mg/l for Phosphorus and 60mg/l BOD and 40mg/l of Suspended Solids, for discharges to waterbodies in Special Areas of Conservation under the W_HR_P_ND_IMP driver, but through initial seasonal sampling we have determined that the site can meet the requirements with no process improvement or minor optimisation of the processes. However, these are mainly on smaller sites that have previously had minimal sampling. Therefore, we have included a small nominal Capex cost for each of the sites to provide a safe and serviceable sampling facility that meets current requirements (using costs taken from the unit cost database), and a small increase in Opex for additional regulatory sample collection and laboratory analysis. |
| CWW19.150 - | This includes one (1) action in the NEP with a new or tightened Phosphorus limit for Urban Wastewater Sensitive Areas under the W_U_IMP driver for Milford Haven waterbody. The Phosphorus reduction applies to Merlin's Bridge WwTW, there is an anticipated future limit of 10mg/l for Nitrogen and the scheme considers "no regrets" investment for the anticipated limit but does not include any specific investment to achieve this standard in AMP8. There is also growth driver for this site and although there is some degree of overlap in process unit requirements, costs have been allocated proportionally with growth and separated in table CWW3b. The costs in this table are only the proportion allocated to Phosphorus removal. |

# 21. CWW20 Wastewater network+ - Sewage treatment works population data

In July 2023, OFWAT clarified that surface water separation refers to the drainage area removed from the foul / combined network, regardless of where it goes (i.e. surface water removed from the foul/combined network but reconnected to a separate surface water sewer is to be included).

Following published clarification of line definitions by OFWAT in August 2023, we have interpreted the line definitions as requiring any figures for surface water separation activities to only be eligible for reporting in Line 41 or 42 if they are under a named WINEP/NEP storm overflow driver.

We reported a figure of 11,500m$^2$ for 'Surface water separation drainage area removed' at APR 22-23 in Table 7E Line 21. This scheme was not under a WINEP/NEP driver, so following line definition clarification it has not been included in CWW20 41 or 42.

Blind year forecasts for 2023-24 and 2024-25 for this line are based on the programme / opportunities tracker for our AMP7 performance commitment Ft4. Our submitted figures are for AMP7 surface water separation schemes with a WINEP/NEP driver only, of which there are none

**Sewage treatment data**

*CWW20.1* *Current population equivalent served by STWs. Confidence grade B3*

This is calculated with the same data used to populate CWW7a and CWW7c. The PE is reported as Total PE minus Non-Resident PE as described in the guidance. The increase reflects anticipated growth as described in the methodology and commentary of CWW7.

*CWW20.2* *Current population equivalent served by STWs with tightened/new P permits. Confidence grade B3*

This uses the same dataset used to populate CWW7a and CWW7c for all new or tightened Phosphorus limits in the NEP/WINEP and reports the PE in the year of the permit coming into effect. The PE is calculated as Total PE minus imported PE in line with the PE used to calculate load in the CWW7 tables.

*CWW20.3* *Current population equivalent served by STWs with tightened/new N permits.*

There are no Nitrogen permit changes in AMP8 in the NEP or WINEP so this is reported as zero.

*CWW20.4* *Current population equivalent served by STWs with tightened/new sanitary parameter permits. Confidence grade B3*

This uses the same dataset used to populate CWW7a and CWW7c for all new or tightened Sanitary Determinand limits in the NEP/WINEP and reports the PE in the year of the permit coming into effect. The PE is calculated as Total PE minus imported PE in line with the PE used to calculate load in the CWW7 tables.

*CWW20.5* *Current population equivalent served by STWs with tightened/new microbiological standards.*

There are no microbiological standards permit changes in AMP8 in the NEP or WINEP so this is reported as zero.

*CWW20.6* *Population equivalent served by STWs with enhanced treatment capacity. Confidence grade B3*

This includes the increase in capacity, expressed as PE for schemes in NEP associated with increasing flow passed forward, and schemes included in WwTW Growth. The baseline PE

uses the same dataset used to populate CWW7a and CWW7c for the year before the enhancement investment and is calculated as Total PE minus imported PE in line with the PE used to calculate load in the CWW7 tables.

*CWW20.7* *Current population equivalent served by STWs with tightened/new permits for chemicals / hazardous substances.*

There are no permit changes for chemicals / hazardous substances in AMP8 in the NEP or WINEP so this is reported as zero.

*CWW20.8* *Current population equivalent served by septic tank replacement projects. Confidence grade B3*

This uses the same dataset used to populate CWW7a and CWW7c for schemes to replace existing septic tanks, including abandonment and pump away solutions, in NEP/WINEP and reports the PE in the year of expected implementation. The PE is calculated as Total PE minus imported PE in line with the PE used to calculate load in the CWW7 tables.

*CWW20.9* *Number of new wetland treatment solutions for tightened sanitary or nutrient (N or P) permits. Confidence grade B3*

There are no constructed wetland solutions proposed in the NEP/WINEP at present but we are committed to continue to explore and deliver these type of options in the detailed design phase if they offer better value or can be part of a collaborative approach. However, we have included other nature-based type solutions here, including modular reedbeds. In the matching category in CWW3, we have included the costs of other non-chemical/biological solutions, such as pump away solutions (3no) or “monitoring” solutions (18no), but these have not been included in this line. The high number of modular reedbeds included are because they are the best value solution for the large number of new “backstop” limits (60mg/l BOD and 40mg/l Suspended Solids) from the W_HR_P_NDIMP1 driver.

*CWW20.10* *Total area of new wetlands for tightened sanitary or nutrient (N or P) permits. Confidence grade B3*

There are no constructed wetland solutions proposed in the NEP/WINEP at present, but we are committed to continue to explore and deliver these types of options in the detailed design phase if they offer better value or can be part of a collaborative approach. However, we have included other nature-based type solutions here, including modular reedbeds. In the matching category in CWW3, we have included the costs of other non-chemical/biological solutions, such as pump away solutions (3no) or “monitoring” solutions (18no), In the matching category in CWW3, we have included the costs of other non-chemical/biological solutions, such as pump away solutions (3no) or “monitoring” solutions (18no), but these have not been included in this line.

*CWW20.11* *Total number of septic tank replacement projects. Confidence grade B3*

This includes replacement of septic tanks included in the NEP/WINEP with appropriate treatment, or where a pump away option has been selected.

*CWW20.12* *Total number of STW outfall screens.*

There are no actions in the NEP or WINEP so this is reported as zero.

*CWW20.13* *Cumulative shortfall in FFT addressed by WINEP / NEP schemes to increase STW capacity. Confidence grade B3*

This is reported as the total increase from current permitted flow pass forward to the new permitted flow pass forward requirements for all schemes in the NEP It is not clear what is meant by "cumulative" shortfall and whether this should accumulated flow increase delivered in year 1 in Years 2 to 5, and if this is the case whether the baseline should be 2025/26 or 2022/23. If the assumption is incorrect this can be re-calculated.

*CWW20.14* *Additional storm tank capacity provided at STWs - grey infrastructure. Confidence grade B3*

This includes the additional volume provided by all schemes under U_IMP6 driver. All proposed solutions in U_IMP6 are based on additional storage tank capacity hence there is no inclusion in CWW20.15

*CWW20.15* *Additional volume of effective storm storage at STWs - nature based/green solution. Confidence grade B3*

All solutions proposed under the U_IMP6 driver are based on additional storm storage capacity and included in CWW20.14, hence this is reported as zero.

*CWW20.16* *Total number of STW sites where additional storage has been delivered. Confidence grade B3*

This includes the total number of schemes delivered in WINEP/NEP under U_IMP6 driver.

*CWW20.17* *Number of STW sites where additional storage has been delivered with pumping. Confidence grade B3*

We have assumed that all schemes included in CWW20.16 above have an element of pumping, either to the storm tank, or for storm return, and have not included these as the number would be repeated. There are no schemes that rely on pumping to remote storage facilities, hence we have reported zero. If this assumption is incorrect, this can be amended.

*CWW20.18* *Number of STW sites benefitting from green infrastructure replacing the need for storm tank storage.*

There are no schemes of this type proposed in the NEP or WINEP so this is reported as zero.

*CWW20.19* *Total number of schemes with tightened / new P permits (met by biological treatment). Confidence grade B3*

This includes schemes in WINEP/NEP to meet new or tighter Phosphorus limits by enhanced biological Phosphorus removal. This also includes schemes that utilise aerated reedbeds (which are excluded from CWW20.9) where that is the primary method employed to achieve Phosphorus compliance. If an aerated reedbed is supplementary to chemical dosing as the primary methos of Phosphorus removal, it is not included in these figures and included in CWW20.20 to avoid double counting.

*CWW20.20* *Total number of schemes with tightened / new P permits (met by chemical treatment). Confidence grade B3*

This includes schemes in WINEP/NEP to meet new or tighter Phosphorus limits where the primary method of treatment employees chemical dosing and precipitation.

*CWW20.21* *Total number of schemes with tightened / new N permits (met by biological treatment).*

There are no actions in NEP or WINEP for new or tightened Nitrogen permits so this line is reported as zero.

*CWW20.22* *Total number of schemes with tightened / new N permits (met by chemical treatment). Confidence grade B2.*

There are no actions in NEP or WINEP for new or tightened Nitrogen permits so this line is reported as zero.

*CWW20.23* *Total number of schemes with tightened/new sanitary parameter permits. Confidence grade B3*

This includes schemes in NEP & WINEP with new or tightened Sanitary Determinands limits, including those that also have a new or tightened Phosphorus limit in addition. Where a scheme that addresses both P and Sanitary Determinands cannot be specifically apportioned, the costs in CWW3 have been included in the appropriate line for P-removal. The additional default “backstop” limits (40mg/l BOD and 60mg/l Suspended Solids) in the W_HR_P_NDIMP1 or interim W_HR_P_IMP1 drivers have not been included in this line in as it is expected these will be met consequentially by achieving a 5mg/l Phosphorus limit.

*CWW20.24* *Total number of schemes with tightened/new microbiological standards (UV, ozone etc).*

There are no actions in NEP or WINEP for new or tightened microbiological standards so this line is reported as zero.

*CWW20.25* *Total number of STWs with microbiological treatment - new and existing (UV, ozone etc).*

There are no actions in NEP or WINEP for new or tightened microbiological standards so this line is reported as zero.

*CWW20.26* *Total number of schemes with tightened/new chemicals/hazardous substances permits.*

There are no actions in NEP or WINEP for new or tightened chemical or hazardous substances permit limits so this line is reported as zero. This assumes that Iron or Aluminium limits associated with chemical dosing solutions for P-removal are excluded.

*CWW20.27* *Total number of schemes with new chemical dosing installations. Confidence grade B3*

This includes all schemes in NEP or WINEP that require new or additional chemical dosing.

*CWW20.28* *Volume of chemical dosing storage installed (m3). Confidence grade B3*

This includes all schemes in NEP or WINEP that require new or additional chemical storage as part of a chemical dosing solution for P-removal. This includes, for example, Ferric Sulphate for precipitation and Sodium (Bi)Carbonate/Sodium Hydroxide for alkalinity or pH correction.

*CWW20.29* *Total number of schemes with new tertiary solids removal. Confidence grade B3*

This includes all tertiary solids removal for schemes to reduce Phosphorus and/or Sanitary Determinands and reedbeds, and modular reedbeds, are included in these values.

*CWW20.30* *Volume to water treated through tertiary solids removal (m3/day). Confidence grade B3*

This includes all tertiary solids removal for schemes to reduce Phosphorus and/or Sanitary Determinands and reedbeds, and modular reedbeds, are included in these values.

*CWW20.31* *Total number of N-TAL trials. Confidence grade B3*

This includes two trials included in the NEP.

*CWW20.32* *Number of STW flow monitors installed. Confidence grade B3*

This includes new flow monitor requirements in NEP/WINEP under U_MON4 driver. The number provided is based on expected programme delivery dates.

*CWW20.33* *Number of STW flow monitoring schemes requiring permit changes only. Confidence grade B3*

The WINEP has 26No. “move AMP7 U_MON4 driver output to 2-minute flow monitoring (U_MON4a)” actions. For AMP7 delivery the sites include those U_MON4 sites where existing monitoring was MCERT certified only and permits updated for new Flow Passed Forward (FPF) conditions.

*CWW20.34* *Number of STW flow monitoring schemes requiring simple meter installations Confidence grade B3*

This includes all schemes included in CWW20.32 which are assumed to be “simple” installations. In this instance this was deemed to be flow meter installation only.

*CWW20.35* *Number of STW flow monitoring schemes requiring complex civils installations.*

There are no new flow monitors required that are assumed to be "complex", so this line is reported as zero. For AMP7 there are a number of sites where new chambers, flumes and other relevant gauging structures have been installed.

**Network / Storm overflow data**

*CWW20.36* *Additional volume of network storage at CSOs etc to reduce spill frequency - grey infrastructure. Confidence grade B3*

This includes all storage provided from CSO harm reduction schemes in the NEP and WINEP from 100% "grey" solutions and the proportion of "grey" storage of combined "grey/green" solutions. This also includes 10,935m3 as part of Shellfish Water driver schemes.

*CWW20.37* *Additional volume of effective network storage to reduce CSO spill frequency - nature based/green solution. Confidence grade B3*

This includes the storage that would be provided from CSO harm reduction schemes in the NEP and WINEP by an equivalent "grey" solution on a combined "grey/green" solution which is estimated at 30% "green" and 70% "grey". This also includes 535.2m3 as part of a Bathing Water driver scheme.

*CWW20.38* *Number of individual sites delivering additional network storage - grey infrastructure. Confidence grade B3*

This is the total number of CSO Harm reduction schemes in the NEP and WINEP with concept solutions of all Types where the best value solutions are based on online (Type 1 and 2) or offline (Types 3 and above) storage where the solution is non-green.

*CWW20.39* *Number of individual sites delivering additional network storage - grey infrastructure - which include pumping. Confidence grade B3*

This is the total number of CSO Harm reduction schemes in the NEP and WINEP with concept solutions of Type 3 and above, where the best value solutions are based on offline storage. This also includes 3 schemes from Shellfish Water drivers.

*CWW20.40* *Number of individual sites delivering additional network storage through green infrastructure. Confidence grade B3*

This is the total number of CSO Harm reduction schemes in the NEP and WINEP with concept solutions of Type 2, where the best value solutions are partial "green" solutions. As these are combined "grey/green" solutions there are 10 that also include the "grey" element in CWW20.38 above. This also includes 5 "green" solutions to address 1 bathing water driver.

*CWW20.41* *Surface water separation drainage area removed.*

There are no storm overflow actions in NEP or WINEP for removal/disconnection of impermeable area, so this line is reported as zero.

*CWW20.42* *Total number of surface water separation schemes to reduce storm overflows.*

There are no schemes of this type currently proposed in CSO Harm Reduction. However, this could be dependent on the solution following detailed design when considering the best value solution to address harm. For now, we are reporting as zero.

*CWW20.43* *Sustainable drainage / attenuation schemes (green) area removed / attenuated. Confidence grade B3*

This is the estimated area removed/attenuated from CSO Harm reduction schemes in the NEP and WINEP with concept solutions that consist of partial "green" solutions, and 5 "green" solutions to address 1 bathing water driver. This is based on the schemes reported in CWW20.40 and CWW20.44.

*CWW20.44* *Total number of sustainable drainage / attenuation schemes. Confidence grade B3*

This is the total number of CSO Harm reduction schemes in the NEP and WINEP with concept solutions that consist of partial "green" solutions. This also includes 5 "green" solutions to address 1 bathing water driver. This is the same number reported in CWW20.40.

*CWW20.45* *Flow rate diverted to reduce storm overflow spills.*

There are no schemes of this type currently proposed in NEP or WINEP under storm overflow drivers, therefore this is reported as zero. Our interpretation of the guidance is this should only include surface water separation schemes so there is no inclusion of sustainable drainage solutions.

*CWW20.46* *Total number of sewer flow management / control schemes to reduce storm overflow spills.*

There are no schemes of this type currently proposed in CSO Harm Reduction. However, this could be dependent on the solution following detailed design when considering the best value solution to address harm. For now, we are reporting as zero.

*CWW20.47* *Total storm overflow spill volume avoided. Confidence grade B3*

This includes the estimate volume of spills reduced under investment in CSO Harm Reduction, Bathing Water and Shellfish Water Drivers. This is based on estimated spill number reduction on the initial list of prioritised assets, based on the actual or equivalent storage volumes provided, and reduction to a nominal 10 spills per year. This is likely to vary based on the final list of assets and the actual spill reduction required to reduce from "Severe Harm" to "Low/No Impact".

*CWW20.48* *Total number of new storm overflow screens installed. Confidence grade B3*

This assumes that all 109 schemes under the CSO Harm driver will require a new or upgraded screen. It also includes 2 new screens from CSO improvement schemes under Shellfish Water drivers.

*CWW20.49* *Number of continuous water quality monitor installations. Confidence grade B3*

This is not the same driver as the EnvAct driver in England, which does not apply to DCWW. Although the principle agreed with NRW is similar, this is based on a pilot of different types of monitors, which will consider a broad range of parameters and different types of installation, and across a sample of different areas/water quality concerns. As with all CSO investment in Wales, it will be prioritised on harm and harm reduction. The costings are based on 14 sites, each with an upstream and downstream monitor but this could be variable dependent on the level of investigation and research involved and agreed with NRW.

*CWW20.50* *Number of new MCERTs event duration monitors installed at SPS emergency overflows. Confidence grade B3*

This includes all new and replacement monitors required under the U_MON6 driver in the WINEP/NEP. It is expected that any existing monitors will need to be replaced to comply with new MCerts standards. These values include the proposed reduction of the AMP8 programme under WINEP due to the phasing instruction. The proposed phasing reduces the original 54 in WINEP to 24, although the final list of sites and phasing proposals have not been signed off by the EA at this time. There is no similar guidance from NRW so the number of monitors in the NEP remains cover all qualifying Emergency Overflows.

*CWW20.51* *Number of new MCERTs flow monitors (PFF) installed at SPSs with combined emergency and storm overflows. Confidence grade B3*

This is not an AMP8 requirement in the NEP so only includes 7 emergency overflows in the WINEP under the U_MON6c and U_MON6d drivers. These values include the proposed reduction of the AMP8 programme under WINEP due to the phasing instruction.

*CWW20.52* *Number of event duration monitors installed (to include at STWs and in network). Confidence grade B3*

We will complete full storm overflow EDM coverage in AMP7 so there are no additional network monitors in the AMP8 plan. There are 11 actions in the NEP associated with installation of new MCERTS certified monitors associated with flow passed forward requirement at WwTW under U_MON3 drivers in the NEP and WINEP.

*CWW20.53* *Number of event duration monitoring schemes requiring permit changes only (at STWs and in network). Confidence grade B3*

This includes the number of monitors that require MCerts certification or adjustments to recording frequency, including any required remedial work, included in the U_MON3 drivers in WINEP and NEP.

*CWW20.54* *Number of event duration monitoring schemes requiring simple meter installations (at STWs and in network). Confidence grade B3*

All new installation included in CWW20.52 are assumed to be simple installations.

*CWW20.55* *Number of event duration monitoring schemes requiring complex civils installations (at STWs and in network). Confidence grade B3*

We are assuming all installations are of the simple category, so this line is reported as zero.

*CWW20.56* *Total number of storm overflow discharge relocation schemes.*

There are no schemes of this type currently proposed in CSO Harm Reduction. However, this could be dependent on the solution following detailed design when considering the best value solution to address harm. For now, we are reporting as zero.

*CWW20.57* *Total number of schemes to increase combined or trunk sewer capacity to reduce storm overflow spills. Confidence grade B3*

We have currently assumed this includes online storage solutions, of which there are 36 proposed. This figure is also included in CWW20.38. If this assumption is incorrect, it can be amended to avoid double counting.

*CWW20.58* *Total number of infiltration management schemes to reduce storm overflow spills.*

There are no schemes of this type currently proposed in CSO Harm Reduction. However, this could be dependent on the solution following detailed design when considering the best value solution to address harm. For now, we are reporting as zero.

*CWW20.59* *Length of new rising main installed to reduce storm overflow spills (km). Confidence grade B3*

This includes the length of pumped main for return of flows from off-line storage. The are no schemes planned that pump away flows to reduce storm overflow spills at a specific asset.

*CWW20.60* *Total length of sewer installed to reduce storm overflow spills (km). Confidence grade B3*

This includes the length of gravity pipework for return of flows from off-line storage. The are no schemes planned that divert gravity flows to reduce storm overflow spills at a specific asset.

**Other data**

*CWW20.61* *Number of WINEP/NEP investigations - desk-based studies only. Confidence grade B3*

This includes all investigations included in the NEP and WINEP that are deemed to be desktop type studies only. This includes a large number of studies for fish passages (366) and septic tanks/primary only treatment (417). There is now a requirement to split the WINEP/NEP investigations costs by driver. Number of AMP8 WINEP/NEP investigations, split by driver has been included in a table below.

*CWW20.62* *Number of WINEP/NEP investigations - survey, monitoring or simple modelling. Confidence grade B3*

This includes all investigations included in the NEP and WINEP that are deemed to consist of a survey, monitoring or simple modelling. This includes 907 CSO classification investigation to support the multi-AMP CSO harm reduction programme. There is now a requirement to split the WINEP/NEP investigations costs by driver. Number of AMP8 WINEP/NEP investigations, split by driver has been included in a table below.

*CWW20.63* *Number of WINEP/NEP investigations - multiple surveys and/or monitoring locations, and/or complex modelling. Confidence grade B3*

This includes all investigations included in the NEP and WINEP that are deemed to consist of multiple surveys and/or monitoring locations, and/or complex modelling.

There is now a requirement to split the WINEP/NEP investigations costs by driver.

Number of AMP8 WINEP/NEP investigations, split by driver has been included in a table overleaf.

| Line | Driver Code | Driver Description | Nr of Investigations |
|---|---|---|---|
| **20.61** | **Desk Studies** | | |
| | W_U_INV7 | Septic Tanks | 417 |
| | W_FISH_INV1 | Barriers to Fish Passage - NEP | 355 |
| | W_WFD_WRHMEB_INV1 | Barriers to Fish Passage - NEP | 11 |
| | W_WFD_CHEM_INV1 | Chemical removal | 2 |
| | SAC_INV | NEP SAC | 9 |
| | WFD_INV | WFD Disproportionate Costs | 45 |
| | WFD_INV | NEP SAGIS modelling | 4 |
| **20.62** | **Simple Models** | | |
| | W_U_O_INV1 | Storm Overflow Classification NEP | 794 |
| | 25YEP_INV | Storm Overflow Classification WINEP | 113 |
| | W_BW_INV3 | Bathing Waters Coastal | 19 |
| | W_BW_INV1 | Bathing Waters Coastal | 12 |
| | W_BW_NDINV1 | Bathing Waters Coastal | 1 |
| | BW_INV5 | Bathing Inland Waters NRW | 1 |
| | BW_INV4 | Bathing Inland Waters WINEP | 14 |
| | W_WFD_NTal_INV | Nitrogen TAL | 2 |
| | W_WFD_MP_INV1 | Microplastics NEP | 4 |
| | W_WFD_CHEM_INV1 | Chemical Removal NRW | 3 |
| | WFD_INV_CHEM | Chemical Removal WINEP | 2 |
| | W_SW_INV1 | Shellfish NRW | 1 |
| | SW_INV | Shellfish WINEP | 1 |
| **20.63** | **Complex Models** | | |
| | INNS_INV1 | SSSI biodiversity INNS NRW | 6 |
| | SSSI_NDINV1 and SSSI_INV | SSSI biodiversity INNS WINEP | 6 |
| | W_WFD_CHEM_INV1 | Chemical Removal NRW | 6 |
| | WFD_INV_CHEM | Chemical Removal WINEP | 1 |
| | W_HR_MWQ_INV1 | Marine conservation zones | 6 |

*CWW20.64* *Total number of WINEP/NEP investigations.*

**AMP7**

The data included within these reporting tables reflect our requirements in AMP 7 for investigations set out in the Water Industry National Environment Programmes (WI(NEP), prescribed by DCWW environmental regulators, the Environment Agency (EA) and Natural Resources Wales (NRW

DCWW has a total of **690 investigations** set out in 58 specific obligations. Please note that some individual WI(NEP) obligations are set to manage a programme of investigations, this is specified in the ''outcome'' data field within the WI(NEP). An example being DCWW AMP 7 Strom overflow assessment programme set out in PR19,

this is reflected by a single obligation (ID 7cdc0436) in the WI(NEP) although with a regulatory requirement to deliver an outcome of 605 individual investigations.

| Driver | December 2022 | March 2022 | March 2023 | March 2024 | March 2025 |
|---|---|---|---|---|---|
| **Bathing water** | | **1** | | | |
| W_BW_INV2 | | 1 | | | |
| **Benthic invertebrates** | | | **2** | | |
| W_WFD_INV_E | | | 2 | | |
| **Biodiversity & INNS** | **2** | **1** | **2** | **3** | **1** |
| INNS_INV | 2 | | | | |
| NERC_INV1 | | | 1 | | |
| SSSI_INV | | 1 | | | |
| W_BIOD1_INV | | | | | 1 |
| W_BIOD2_INV | | | | 3 | |
| W_INNS_INV | | | 1 | | |
| **Chemicals** | | **26** | | | **2** |
| W_WFD_INV_CHEM1 | | 1 | | | |
| W_WFD_INV_CHEM11 | | 4 | | | |
| W_WFD_INV_CHEM12 | | 1 | | | |
| W_WFD_INV_CHEM13 | | 5 | | | |
| W_WFD_INV_CHEM14 | | 3 | | | |
| W_WFD_INV_CHEM2 | | 2 | | | |
| W_WFD_INV_CHEM3 | | 1 | | | |
| W_WFD_INV_CHEM4 | | 2 | | | |
| W_WFD_INV_CHEM5 | | 1 | | | |
| W_WFD_INV_CHEM6 | | 3 | | | |
| W_WFD_INV_CHEM7 | | 1 | | | |
| W_WFD_INV_CHEM8 | | 1 | | | |
| W_WFD_INV_CHEM9 | | 1 | | | |
| W_WFD_ND2_INV_CHEM | | | | | 2 |
| **Fish Pass** | | **31** | | | |
| W_WFD_FP_INV | | 31 | | | |
| **SAC** | | | **9** | | |
| W_CSM_INV | | | 9 | | |
| **Shellfish** | | | **1** | | |
| W_SW_INV | | | 1 | | |
| **Storm overflow** | | | | | **608** |
| U_INV | | | | | 2 |
| W_U_INV | | | | | 606 |
| **WFD** | | **1** | | | |
| WFD_INV | | 1 | | | |
| **Total** | **2** | **60** | **14** | **3** | **611** |

**AMP8**

Number of AMP8 WINEP/NEP investigations, split by driver has been included in a table below.

CWW20.62 includes 907 CSO classification investigation to support the multi-AMP CSO harm reduction programme.

| Line | Driver Code | Driver Description | Nr of Investigations |
|---|---|---|---|
| **20.61** | **Desk Studies** | | |
| | W_U_INV7 | Septic Tanks | 417 |
| | W_FISH_INV1 | Barriers to Fish Passage - NEP | 355 |
| | W_WFD_WRHMEB_INV1 | Barriers to Fish Passage - NEP | 11 |
| | W_WFD_CHEM_INV1 | Chemical removal | 2 |
| | SAC_INV | NEP SAC | 9 |
| | WFD_INV | WFD Disproportionate Costs | 45 |
| | WFD_INV | NEP SAGIS modelling | 4 |
| **20.62** | **Simple Models** | | |
| | W_U_O_INV1 | Storm Overflow Classification NEP | 794 |
| | 25YEP_INV | Storm Overflow Classification WINEP | 113 |
| | W_BW_INV3 | Bathing Waters Coastal | 19 |
| | W_BW_INV1 | Bathing Waters Coastal | 12 |
| | W_BW_NDINV1 | Bathing Waters Coastal | 1 |
| | BW_INV5 | Bathing Inland Waters NRW | 1 |
| | BW_INV4 | Bathing Inland Waters WINEP | 14 |
| | W_WFD_NTal_INV | Nitrogen TAL | 2 |
| | W_WFD_MP_INV1 | Microplastics NEP | 4 |
| | W_WFD_CHEM_INV1 | Chemical Removal NRW | 3 |
| | WFD_INV_CHEM | Chemical Removal WINEP | 2 |
| | W_SW_INV1 | Shellfish NRW | 1 |
| | SW_INV | Shellfish WINEP | 1 |
| **20.63** | **Complex Models** | | |
| | INNS_INV1 | SSSI biodiversity INNS NRW | 6 |
| | SSSI_NDINV1 and SSSI_INV | SSSI biodiversity INNS WINEP | 6 |
| | W_WFD_CHEM_INV1 | Chemical Removal NRW | 6 |
| | WFD_INV_CHEM | Chemical Removal WINEP | 1 |
| | W_HR_MWQ_INV1 | Marine conservation zones | 6 |

*CWW20.65* *Total number of catchment management chemical source control schemes.*

There are no actions/schemes of this type in NEP or WINEP so this line is reported as zero.

*CWW20.66* *Total number of catchment management nutrient balancing schemes.*

There are no actions/schemes of this type in NEP or WINEP so this line is reported as zero.

*CWW20.67* *Total number of catchment management catchment permitting schemes.*

There are no actions/schemes of this type in NEP or WINEP so this line is reported as zero.

*CWW20.68* *Total number of catchment management habitat restoration schemes. Confidence grade B3*

This includes improvement schemes under SSSI, INNS, NERC, or BIOD drivers in the NEP and NEP. This includes one large scheme under W_SSSI_NDIMP1 included in the NEP to protect the Gwent Levels SSSI.

*CWW20.69* *Number of river connectivity schemes (fish passes etc). Confidence grade B3*

The table for CWW20.69 has been populated to show all river connectivity schemes, this includes in-river fish barrier mitigation only (eel passes are covered under a separate line-RES1 )

The basis for forecast and explanation for variability of future delivered schemes per year, is grounded on anticipated feasibility lead in times, geographic batching and specialistic consultant availability.

DCWW has not formally undertaken Fish Barriers in previous AMPs, so there is no historic performance or year on year delivery numbers to compare to / align with.

Until Yr 2 of AMP7, DCWW managed delivery sign off with NRW/EA via email. As of Yr 4 onwards, DCWW is using a Delivery proforma and evidence sign off process instead. To support with future sign off governance.

*CWW20.70* *Number of marine conservation zones (new and existing).*

There are no new marine conservation zones in AMP8 (Investigations only – included in CWW20.63). The company has 1no. existing marine conservation zone, so this line is reported as the same as the 2024/25 value (1 each year).

*CWW20.71* *Total number of contribution to 3rd party WINEP/NEP schemes.*

There are no actions/schemes of this type in NEP or WINEP so this line is reported as zero.

*CWW20.72* *Total number of 25 yr Environment Plan schemes.*

There are no actions/schemes of this type in the WINEP, and this is not a NEP driver, so this line is reported as zero.

*CWW20.73* *Additional line 1; wastewater network+ cost driver.*

*CWW20.74* *Additional line 2; wastewater network+ cost driver.*

*CWW20.75* *Additional line 3; wastewater network+ cost driver.*

*CWW20.76* *Additional line 4; wastewater network+ cost driver.*

*CWW20.77* *Additional line 5; wastewater network+ cost driver.*

**Lines 20.73 to 20.77** These have been left intentionally blank

# 22. CWW21 Wastewater network+ - Asset Condition Grade

The cohort analysis has been completed to the best of our ability within the allowable timeframe, using industry-leading techniques. Please refer to *WSH302-Supplementary cohort tables (CWW21).xlsx* for the cohort results.

To be consistent with water infrastructure methodology across water and wastewater (where water would generate ~1,600 cohorts), it was found to be impractical to assemble all the cohorts manually. For this reason, we appointed ICS Consulting Ltd to carry out the cohort analysis, using SQL commands to automatically create cohort bins. ICS were already engaged to carry out asset deterioration modelling for us and already held all the required asset and event data in their Asset Data Manager (ADM) database. Our collapse modelling work (part of deterioration modelling to support PR24) had identified a hierarchy of 'predictor variables' i.e. the pipe attributes with the strongest influence on failures. We incorporated this information into selection of pipe attributes for this cohort analysis. We used a sequential approach, starting with all the selected attributes and removing one at a time in each run stage. At each stage, cohorts are flagged as either Pass/Over/Under depending on their average collapses/year compared to the criteria in the table guidance. The order of the attributes was subject to review, to identify the highest pass rate for the cohort size groupings.

In order to reconcile the lengths and collapses to match exactly with the APR, scalars were applied to the cohort lengths and the collapses within those cohorts. The length reconciliation was required due to the difference in the date the GIS data was collected for the deterioration modelling and the APR, giving a 2% difference in overall wastewater infrastructure length. The collapses also required a reconciliation factor. The process of linking a collapse to an asset length is not always possible:

- Some assets that have collapsed within the last 5 years have been replaced, and therefore the collapses cannot be assigned to a current asset in our GIS system.
- Some collapses have conflicting data about the asset that has failed and therefore cannot be satisfactorily assigned to an asset.
- Some collapses have occurred on assets that we had not yet digitised at the time of this GIS data cut, in 2021.

Once the reconciliation was completed, the Condition Gradings were then assigned as laid out in the Guidance. We worked closely with ICS throughout the process to obtain the best outcome.

For all asset types, apart from Formerly-Private Sewers, we have used the last 5 years of data to assign collapses to individual sewer assets, and then used the attribute data to create cohorts, as described in the Guidance.

For Formerly-Private Sewers, we have used the estimated Average Annual Collapses per year, based on our detailed deterioration modelling. Formerly-Private Sewers are not yet fully digitised in our asset data, but we have accounted for this within deterioration modelling by estimating the locations and therefore, ages of the undigitised assets. By using our known asset base, we can make best estimates on the likelihood of our unmapped assets failing. To confirm our assumption that we should use the deterioration modelling results for formerly-private sewers, we compared the Condition Grading lengths from the cohort analysis and the condition grading lengths from the deterioration modelling. This shows the two methods are comparable for understanding condition grading, as the source data is the same.

The sewer collapse numbers and definition align to the average annual collapses over the last 5 years, as described in the APR. Table 1 shows the collapse performance over the past five years. Table 2 shows how these collapses are spread between the condition grades. Table 2 also includes the average collapses/1000km for gravity and rising mains, which align to the condition grade definitions.

*Table 1: Sewer and rising mains collapse performance for last 5 years, as described in the Annual Performance Report in Table OUT 5.79*

| | Shadow APR figures | | APR figures | | | Average annual collapses over last 5 years |
|---|---|---|---|---|---|---|
| | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | |
| Total collapses | 264 | 265 | 283 | 248 | 248 | 261.6 |
| **Gravity sewer collapses** | 190 | 184 | 188 | 162 | 151 | **175** |
| **Rising main collapses** | 74 | 81 | 95 | 86 | 97 | **86.6** |

*Table 2: Summation of the collapses assigned to cohorts within each grade, showing the collapses/1000km for gravity sewers and rising mains. Note, the rising mains collapses/1000km aligns to the water infrastructure grading definitions, as requested in the CWW21 Guidance Document.*

| Average annual collapses/year | Condition Grade | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Gravity sewers | 119.3 | 50.6 | 1.7 | 3.3 | | 175.0 |
| Sewage pumping mains | 44.2 | 14.5 | 8.3 | 12.9 | 6.7 | 86.6 |
| **Total** | **163.5** | **65.2** | **10.0** | **16.2** | **6.7** | **261.5** |
| **Collapses/1000km for gravity sewers** | 4 | 14 | 44 | 82 | - | |
| **Collapses/1000km for rising mains** | 37 | 161 | 336 | 786 | 2134 | |

The results of the cohort analysis are shown below.

*Table 3: Results of Cohort Analysis for 2022/23*

| Length (km) | Condition Grade | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| 21.1 Foul sewers | 5113.2 | 498.7 | | | | 5612.0 |
| 21.2 Combined sewers | 6466.3 | 2353.7 | 38.2 | 40.7 | | 8899.0 |
| 21.3 Surface water sewers | 3674.0 | | | | | 3674.0 |
| 21.4 Other wastewater network pipes | 442.0 | | | | | 442.0 |
| 21.6 Formerly private sewers and lateral drains (s105A sewers) | 16530.1 | 645.2 | | | | 17175.2 |
| 21.7 Sewage pumping mains | 1188.6 | 90.1 | 24.8 | 16.4 | 3.1 | 1323.0 |
| **Total length (km)** | **33414.3** | **3587.7** | **63.0** | **57.1** | **3.1** | **37125.2** |
| **Percentage of length in each condition grade** | **90.0%** | **9.7%** | **0.2%** | **0.2%** | **0.01%** | |

Out of 110 cohorts, we have 92 that are within 50% tolerance range. We attempted several different approaches and combinations of attributes before finding this optimum solution. Note that by length, 82.5% were within tolerance – (30,639 km out of 37,125 km). Of the 18 cohorts that were outside of tolerance, 14 were greater than the nominal expected collapses plus 50%, and 4 were less than the nominal expected collapses minus 50%.

*Table 4: The average cohort collapses/year*

| Average annual collapses/cohort | Cohorts targeting 1 collapse/cohort | Cohorts targeting 2.5 collapses/cohort |
|---|---|---|
| 21.1 Foul sewers | | 2.8 |
| 21.2 Combined sewers | | 2.5 |
| 21.3 Surface water sewers | | 2.2 |
| 21.4 Other wastewater network pipes | | 1.0 |
| 21.6 Formerly private sewers and lateral drains (s105A sewers) | | 2.3 |
| 21.7 Sewage pumping mains | 1.1 | 2.5 |

Averaged over all cohorts the expected number of collapses is within a tolerance on +/- 10% of the nominal size shown. Overall, we consider this approach has given a high percentage of compliant cohorts, whilst still using a practical, repeatable process.

In PR09, the definition of collapse was wider, incorporating a greater number of asset failures. The change in definition for the gravity sewers has therefore greatly increased the number of sewers at Grade 1 and 2. Due to this difference in definition of collapse, it is not possible to make a meaningful comparison to PR09.

Figure 1 describes the profile of collapses against sewer length, and Figure 2 shows the same data as a percentage of total collapses and total length.

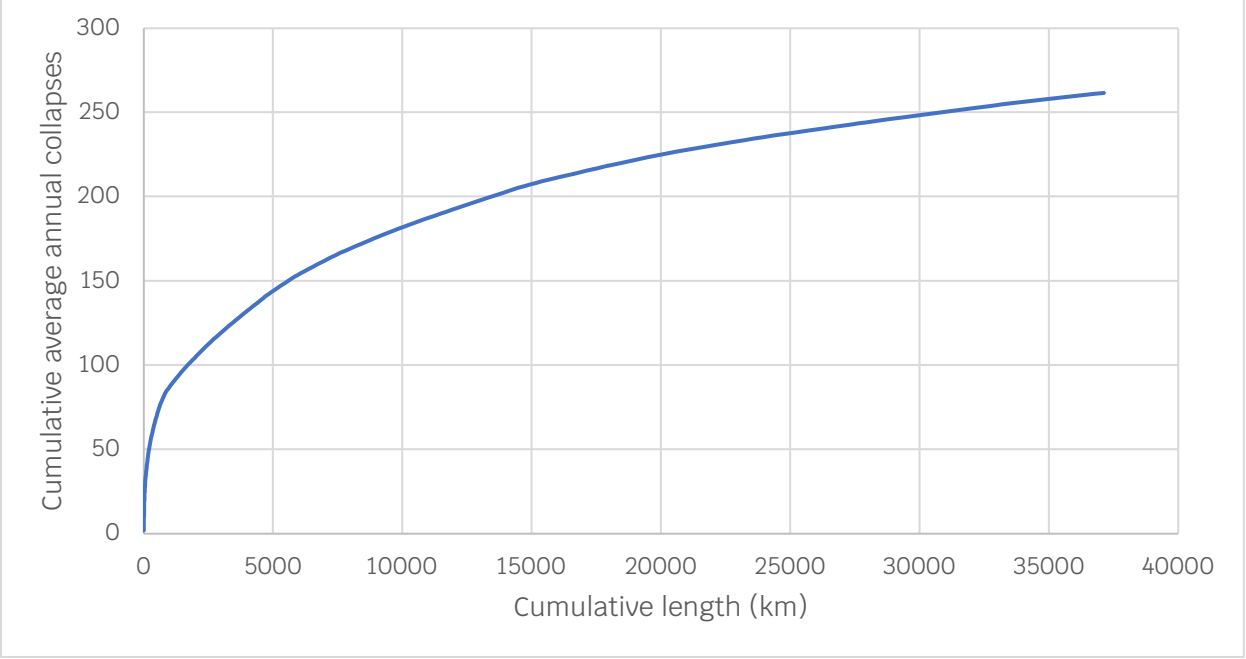


*Figure 1:Cumulative Average Annual Collapses vs Cumulative Mains Length (km)*

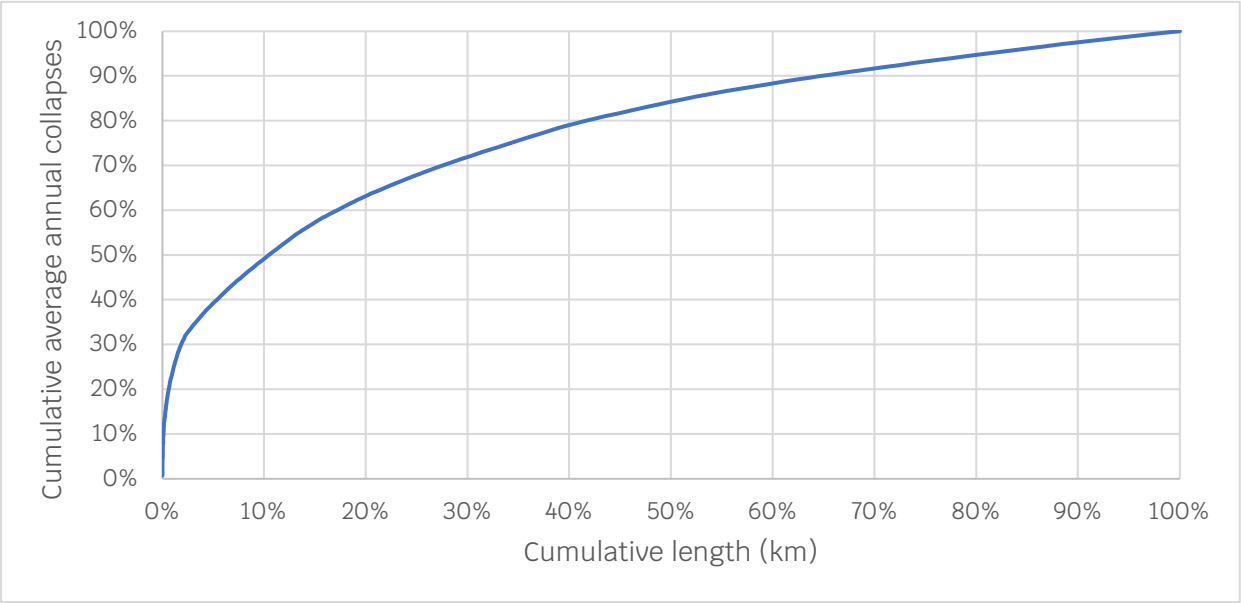


*Figure 2: Cumulative Average Annual Collapses vs Cumulative Mains Length, as percentage of total*

We are confident that the data provided is of high quality and the condition grading system is in line with the guidance, taking into account the specific issues described below against individual lines, in particular our desire to have a process that was practical and readily repeatable.

Supporting file *WSH302-Supplementary cohort tables (CWW21).xlsx* includes a cohort table, as suggested in Ofwat's 'CWW21-Additional-Cohort-Table-Guidance.xlsx'.

### Length of sewer by Condition Grade

*CW21.1* *Foul sewers*

Total length of foul sewer (km) aligns to CWW6.16 (Length of foul (only) public sewers) for 2022/23. This total length is then split between the condition grades using the cohort method, based on the associated linked collapses. (See CWW21.5 Line description for how the collapses are aligned.)

*CW21.2* *Combined sewers*

Total length of combined sewer (km) aligns to CWW6.18 (Length of combined public sewers) for 2022/23. This total length is then split between the condition grades using the cohort method, based on the associated linked collapses. (See CWW21.5 Line description for how the collapses are aligned.)

*CWW21.3* *Surface water sewers*

Total length of surface water sewers (km) aligns to CWW6.17 (Length of surface water sewers) for 2022/23. This total length is then split between the condition grades using the cohort method, based on the associated linked collapses. (See CWW21.5 Line description for how the collapses are aligned.)

*CWW21.4* *Other wastewater network pipes*

Total length of 'other wastewater network pipes' (km) aligns to CWW6.20 (Length of other wastewater network pipework) for 2022/23. This total length is then split between the condition grades using the cohort method, based on the associated linked collapses. (See CWW21.5 Line description for how the collapses are aligned.)

*CWW21.5* *"legacy" public sewers as at 31 March*

Total length of all 'legacy' public sewers as at 31 March = the sum of total lengths in CWW21.1 to 21.4, described above.
The total 5-year average number of gravity sewer collapses is detailed in Table 1, and covers all gravity assets, including 'legacy' sewers and formerly-private sewers.

*CWW21.6* *Formerly private sewers and lateral drains (s105A sewers)*

Total length of formerly private sewers and lateral drains (s105 sewers) aligns to CWW6.22 (Length of formerly private sewers and lateral drains (s105A sewers).
The total 5-year average number of gravity sewer collapses is detailed in Table 1, and covers all gravity assets, including 'legacy' sewers and formerly-private sewers.

*CWW21.7* *Sewage pumping mains*

Total length of sewage pumping mains (km) aligns to CWW6.19 (Length of rising mains) in 2022/23. This total length is then split between the condition grades using the cohort method, based on the associated linked collapses.
The total number of sewer rising main bursts aligns to the average number of rising mains bursts over the previous 5 years as described in Table 1.

## 23. CWW22 – Net zero enhancement schemes

Confidence grade C5

All costs or cost savings in this table are post frontier shift and real price effects.

CWW22_1 and CWW22_2 build on the foundations of our AMP6 and AMP7 Net Zero Carbon investments. The assets/systems/functionality delivered in the previous and current AMPs must be maintained to enable the successful delivery of benefits from the AMP8 schemes. The costs of this maintenance activity are not included in the figures reported in CWW22.

*CWW22_1* *Net Zero Carbon Strategy: Network Control Systems (Wastewater)*

This scheme is part of our National Environment Programme (NEP) under the Net Zero driver paper. It will deliver a new Network Control System for Wastewater to reduce energy consumption by using factors such as weather and demand patterns to predict optimum set points, and as a result, control and optimise pumping regimes.

The scheme OpEx represents the in-AMP8 OpEx savings as a benefit of the CapEx investment. For further information, see the enhanced investment case WSH66-PE11.

***Calculation of carbon impact and benefits of schemes***
In order to calculate the forecast Greenhouse Gas savings, forecast kWh electricity savings were multiplied by the relevant BEIS Greenhouse gas reporting conversion factors 2022 to give the annual tonnes of CO2 equivalent (tCO2e) saving. For electricity, the emissions factor used is the BEIS consumption based, long-run marginal emission factor for the commercial sector.

### *CWW22_2 Net Zero Carbon Strategy: Reduction of Process Emissions*

This scheme is part of our National Environment Programme (NEP) under the Net Zero driver paper. It is for the implementation of new controls for wastewater treatment processes to reduce emissions of methane and nitrous oxide.

The scheme OpEx represents the in-AMP8 OpEx savings as a benefit of the CapEx investment.

CWW22_2 requires, as a critical enabler, the replacement of current blowers and diffusers at our wastewater treatment works. However, these current assets need to be replaced well ahead of their otherwise useful life. That is, if it were not for CWW22_2, there would be no need for Welsh Water to replace these blowers or diffusers in AMP8 as it would not be a “low-regrets” base maintenance investment. As such, the cost of replacing the blowers and diffusers is not covered by base allowance and is therefore included in the scheme’s enhancement CapEx figures. For further information, see the enhanced investment case WSH66-PE11.

***Calculation of carbon impact and benefits of schemes***
In order to calculate the forecast Greenhouse Gas savings for CWW22_2, forecast $N_2O$ emissions savings were multiplied by the relevant UKWIR Carbon Accounting Workbook conversion factor to give the annual tonnes of CO2 equivalent (tCO2e) saving.