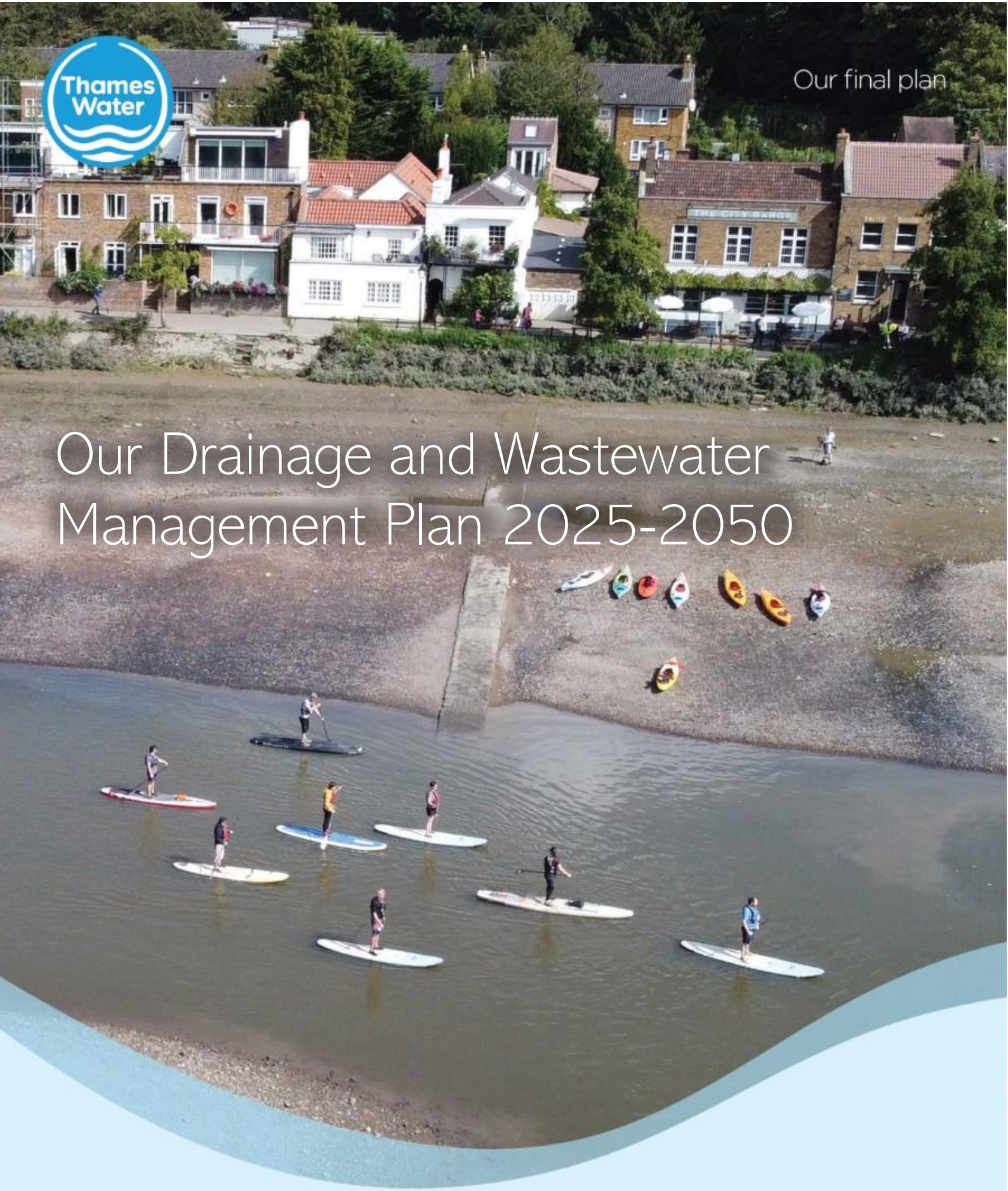


Our final plan

Our Drainage and Wastewater Management Plan 2025-2050

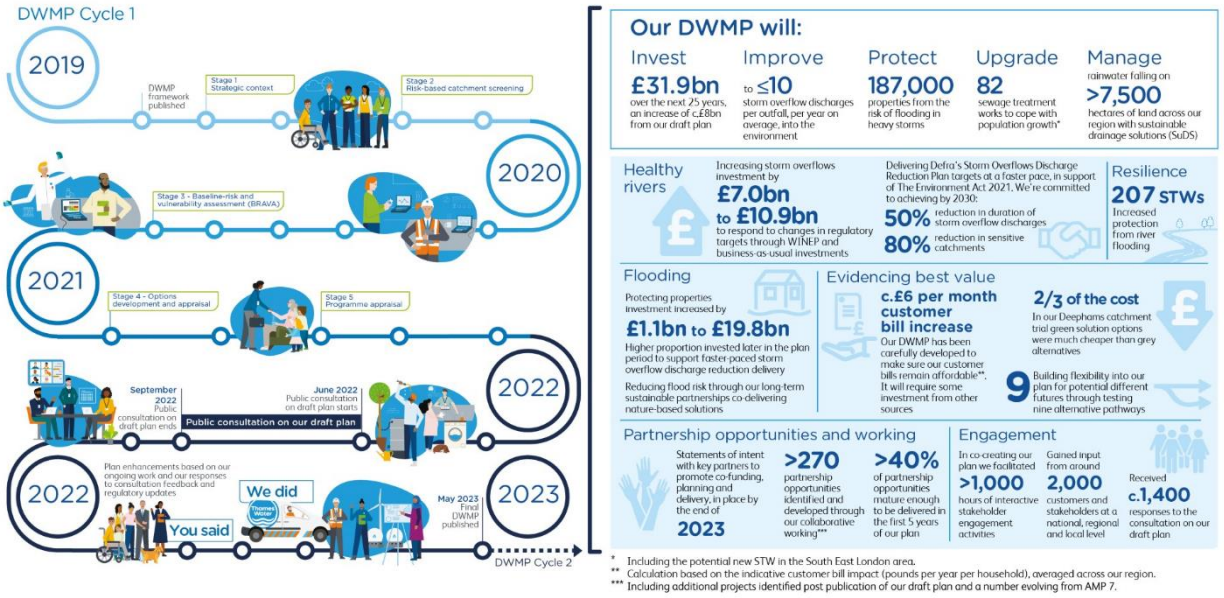
Data table commentary – separate submission to Ofwat

May 2023

Contents

Preface

We're proud to present our first Drainage and Wastewater Management Plan (DWMP) and encouraged by the level of positive feedback we've received. Over the last four years, we've engaged and worked collaboratively with around 2,000 of our customers and stakeholders, to deepen our shared understanding and develop new ways to manage drainage and wastewater across our region. We illustrate our DWMP Cycle 1 and its headlines below.



We've progressed and enhanced our DWMP since we published it for public consultation in June 2022. We were pleased to receive lots of positive comments and support on the quality and ambition of our draft plan as well as useful ideas for making our final DWMP even stronger.

We've updated our draft plan based on our ongoing DWMP work, regulatory updates and our responses to the consultation feedback wherever possible*. Our updates include providing more detail where you felt it was needed and creating new appendices to answer technical queries. For more details on how we've progressed our final plan and responded to the consultation feedback, please see our Non-technical summary and You said, We did Technical appendix.

* Some public consultation feedback didn't require further action or wasn't relevant to the DWMP process. Other feedback was relevant to future DWMP planning cycles and will be used to inform this work.

Progress signposts

We want to make it easy for you to see what's changed. You can spot all the places we've updated our draft plan with our 'progress signposts' which we've used across our final DWMP documents.

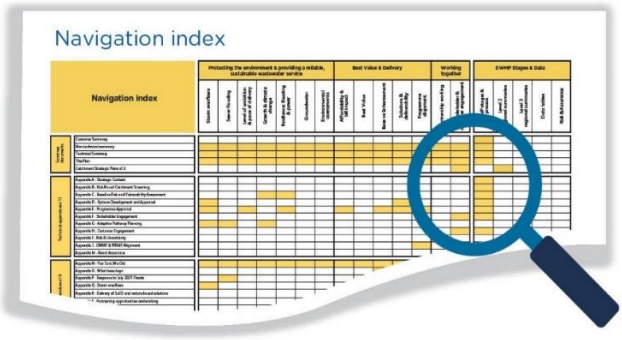
Key DWMP content

This document specifically includes the following key DWMP content:

- DWMP stages and data:
    - Assurance

Navigating our documents

To help you navigate around our final DWMP document suite and find where key DWMP content features, we've placed a Navigation index at the back of this document.



Executive Summary

As part of the final Drainage and Wastewater Management Plan (DWMP) submission we have completed data tables for our regulator Ofwat. These allow us to submit data in a consistent manner across all water companies in order to allow comparison.

The summary tables below provide a commentary on the data tables. The text gives an overview of any assumptions, clarifications and data derivation made or used in the population of the final DWMP data tables and should be read in in conjunction with the data tables.

1 Approach

1.1 Our commentary is focused on data relevant to the DWMP planning period of 2025 to 2050. Where we comment on AMP7, it is by exception only.

1.2 Data has been assured in compliance with our Regulatory Reporting Framework for external publications. This has included information integrity declarations up to executive level and both internal and external independent assurance.

1.3 We have shown data to two decimal points.

1.4 Where appropriate, we signpost the relevant technical information from the draft DWMP June 2022 publication.

1.5 These tables differ from those submitted at the draft DWMP. This is due to both changes to the table requirements as well as the significant amendments to the preferred plan due to public consultation and statutory requirements.

1.6 Where final PR24 methodologies have been released, we have included them in the approach to complete these tables.

1.7 Data tables will be resubmitted in October 2023 as required by Ofwat to align with the PR24 submission.

1.8 The data table can be found using this link: https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/data-tables.xlsx

2 Table 1: Outcomes summary – Costs (general points)

2.1 All options were costed using the same Thames Water EES models, as such much of the commentary relevant to costs can be summarised here rather than repeating for each individual line. The table below provides the general cost commentary applicable for Table 1 of the data tables.

Line number Xci Outcome - GENERAL cost (capex)
For DWMP capex costs have been calculated on an AMP-by-AMP basis, and as such where an annual breakdown is provided we have used an indicative spending profile. The details of which are contained in the individual method statements for each line. All DWMP expenditure is considered enhancement cost. The conceptual designs for each option provided the basis for the cost assessment where we used a combination of our Engineering Estimation System (EES) and bottom-up costing (using market rates for new technologies) where costs were not present in EES. Costs within our EES are subject to routine review and updating to reflect current outturn cost data, and ongoing data and process quality assurance. EES costs include assessment of option uncertainties based on the level of design maturity / confidence we have at this stage. We have explored this further in Appendix I – Risk & Uncertainty[1]. The EES system is used for capex business plan pricing and is subject to quality assurance checks by external cost consultants. All options have been costed using a 2021-22 price base. However, in line with Ofwat's reporting requirement, all costs have had a price base adjustment applied to deflate from an average of 2021-22 to 2020-21. All costs will be reported to two decimal places.
Line number Xcii Outcome - GENERAL cost (opex)
For the DWMP, Opex costs have been calculated on an AMP-by-AMP basis, and as such where an annual breakdown is provided, we have used an indicative spending profile. The details of which are contained in the individual method statements for each line. Enhancement opex has been calculated as a percentage of capex, except where treatment options have been developed, where they have been defined in more detail in the individual cost breakdown of each option. The opex values captured can be considered both enhancement opex and base opex, we have made no distinction between the two, however recognizing that opex costs will transfer from

[1] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-i-risk-and-uncertainty.pdf

enhancement to base following the capex implementation. For this data table we have assumed that all opex is enhancement.

The data table calculation for the 25-year total is not representative as it sums each of the AMP totals. Each AMP total includes the opex for that AMP and prior AMPs. Each AMP total is an AMP total, but it includes the opex from the prior AMP. It is therefore not correct to sum all five AMP totals, but it would be more relevant to see the AMP12 total (which will include all opex for the prior 5 AMPs). We have not corrected this calculation error in the supplied table.

All options have been costing using a 2021-22 price base. However, in line with Ofwats' reporting requirement, all costs have had a price base adjustment applied to deflate from an average of 2021-22 to 2020-21 position.

All costs will be reported to two decimal places.

Line number Xciii Outcome - GENERAL cost (totex)
Capex and opex has been summated to calculate this line. This is as per the calculation in the cells as provided by Ofwat. NOTE: In the data table, the 25-year total for this line will not be reflective of the actual total as this would include the opex expenditure AMP total for each of the 5 AMPs (as noted above). We have not corrected this calculation error in the supplied table. All costs will be reported to two decimal places.

3 Table 1: Outcomes summary

3.1 Commentary for the Table 1 outcomes can be seen below, where a comment refers to all lines it is captured in the table above. This is relevant only to DWMP costs (capex, opex and totex).

Line number 1 **Outcome - Pollution incidents – GENERAL**
The values reported against this line are numbers of pollution incidents per 10,000km of wastewater network. Reported performance is the sum of separate forecasts for four asset classes (Sewage Treatment Works, Sewage Pumping Stations, Rising Mains, Gravity Networks). Our 2025 forecast is based on 2022 performance, adjusted for a) one-off impacts in 2022, b) benefits of AMP7 interventions, c) improved reporting of pollutions as our smart waste digital programme provides better visibility of Flow to Full Treatment (FtFT) compliance, d) increases in pollutions due to the need to provide environmental data for the categorisation of an incident. Impacts of other changes in reporting methodologies or guidance are treated as risks outside of our forecast. This includes a potential increase in reported pollutions as improved monitoring provides better visibility of spills in dry weather, which are expected to be treated as pollutions based on draft documentation from the EA.
Line number 1a **Outcome - Pollution incidents - baseline**
Our forecast includes improvements in performance from capital projects, and from continual efficiencies driven by improved targeting and new technology. These improvements are largely offset by the impact of asset deterioration, as current levels of spend are not sufficient to maintain asset health.
Line number 1b **Outcome - Pollution incidents - base**
Key assumptions are a) no pollutions from FtFT non-compliance by the end of AMP8, b) maintenance spend is sufficient to maintain asset health, c) a de-minimis level of pollutions in 2050 from events largely outside of company control or which are not possible to predict.
Line number 1c **Outcome - Pollution incidents – post enhancement**
There is no specific DWMP investment aimed at reducing numbers of pollution incidents. The post-enhancement forecast is therefore the same as the base forecast. Enhancement activities to resolve groundwater infiltration are expected to help mitigate a potential increase in reported pollutions from dry weather spills, however these are treated as a risk outside of the forecast.
Line number 1ci **Outcome - Pollution incidents - enhancement cost (capex)**
No specific investment is identified to maintain or reduce the level of pollution incidents; therefore,

capex will be reported as zero.
Line number 1cii Outcome - Pollution incidents - enhancement cost (opex)
No specific investment is identified to maintain or reduce the level of pollution incidents, therefore, opex will be reported as zero.
Line number 1ciii Outcome - Pollution incidents - enhancement cost (totex)
This is a calculation undertaken in the data table; therefore, it will also be reported as zero for this line.

Line number 2 Outcome - Compliance at STWs - GENERAL
In accordance with the line definitions treatment works compliance is aligned to the reporting guidance: Environment Agency water and sewerage company Environmental Performance Assessment (EPA) methodology (version 9).
Line number 2a Outcome - Compliance at STWs - baseline
This line shows the modelled deterioration in sewage treatment works compliance due to the impact of unmitigated growth and climate change on treatment capacity. Our process models assume that assets are maintained so this line reflects a deteriorating position as any existing headroom is eroded due to an increase in demand due to growth and climate change. At draft DWMP, only Y5 and AMP totals were required (AMP8, 9 and 12), all other cells were either optional (but recommended) or not required until final DWMP. NOTE: The unit for this line is %. The AMP 8 and AMP 9 totals for this line are a sum of the individual year. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 2b Outcome - Compliance at STWs - base
We have assumed that the base position will equal the baseline position for this line. At draft DWMP, only AMP7 annual percentages were required, all other cells were either optional (but recommended) or not required until final DWMP. NOTE: The unit for this line is %. The AMP 8 and AMP 9 totals for this line are a sum of the individual year. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 2c

Outcome - Compliance at STWs - post enhancement
This line shows the improvement in compliance as we continue to invest over 25 years on mitigating the impact of growth and climate change on treatment capacity. Our target is to ensure we are 100% compliant with permit conditions. We assume in AMP8 that we achieve 100% compliance at year end but may have one-off site failures in AMP8. As we go beyond AMP8 we expect to achieve 100% compliance year on year consistently due to investment and technology advances. At draft DWMP, only Y5 and AMP totals were required (AMP8, 9 and 12), all other cells were either optional (but recommended) or not required until final DWMP. NOTE: The unit for this line is %. The AMP 8 and AMP 9 totals for this line are a sum of the individual year. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 2ci Outcome - Compliance at STWs - enhancement cost (capex)
Our capex costs for this line will include sub items that may not be specific to treatment works compliance but are necessary for as part of the overall option development at the relevant treatment works.
Line number 2cii Outcome - Compliance at STWs - enhancement cost (opex)
We have not applied an opex expenditure profile for this line (distributing the AMP8 and AMP9 totals) as we have assumed that commissioning of treatment options will only occur in Y5, and therefore opex costs will only start to be incurred in the final year of the AMP. The change in opex has been derived based on an average actual opex per PE as a function of the type of works and whether or not the site is a sludge treatment center.
Line number 2ciii Outcome - Compliance at STWs - enhancement cost (totex)
See table in Section 0.

Line number 3 Outcome - Risk of Sewer flooding in a 1 in 50 storm - GENERAL
Within the Data table and supporting definitions there is some confusion over the definition of this line:

- The Ofwat line definition (as per the "Line Definitions" sheet) states this should be "percentage of the region's population at risk of sewer flooding",
- The Ofwat line definition (as per the description "1. Outcomes" sheet) states this should be "percentage of properties at risk of sewer flooding".
- The DWMP Framework (Table 4-1 on page 28[2]) refers to "population" not properties.

At draft DWMP we reported properties at risk of sewer flooding in a 1 in 50 storm. For the final DWMP we have now interpreted this line to be reported as the % of population at risk of sewer flooding for a 1 in 50 storm.

This line now reflects the annual return (AR) lines reported in AMP7.

Note: this funding line focuses on addressing 1 in 50-year storm event, it is not scoped to fully account for all the flooding that occurred during the London July 2021 storm event[3]. For further details see Appendix P Response to the July 2021 floods[4].

Line number 3a

Outcome - Risk of Sewer flooding in a 1 in 50 storm – baseline

3a line shows the deterioration in performance due to unmitigated population growth and climate change. Modelling is based on maximum available system capacity; therefore, it is considered that there is no opportunity for capital maintenance alone to improve the baseline performance forecasts.

At draft DWMP, only Y5 and AMP totals were required (AMP8, 9 and 12), all other cells were either optional (but recommended) or not required until final DWMP.

NOTE: The unit for this line is %. The AMP 8 and AMP 9 totals for this line are a sum of the individual year. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.

Line number 3b

Outcome - Risk of Sewer flooding in a 1 in 50 storm – base

We have assumed that the base position will equal the baseline position for this line.

At draft DWMP, only AMP7 annual percentages were required, all other cells were either optional (but recommended) or not required until final DWMP.

NOTE: The unit for this line is %. The AMP 8 and AMP 9 totals for this line are a sum of the individual year. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.

[2] https://www.water.org.uk/wp-content/uploads/2021/10/DWMP_Framework_Report_Main_Report_September_2021.pdf
[3] https://www.thameswater.co.uk/about-us/investing-in-our-region/london-flooding-response
[4] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-p-response-to-july-2021-floods.pdf

Line number 3c Outcome - Risk of Sewer flooding in a 1 in 50 storm - post enhancement
This line shows the impact of investment for population growth and climate change reducing the percentage of population at risk to virtually zero in Thames Valley and circa 5% for London. For more details, please see our DWMP non-technical summary[5]. DWMP modelling reports a property count, these property counts have been multiplied by a population multiplier per property to give an overall population protected. At draft DWMP, only Y5 and AMP totals were required (AMP8, 9 and 12), all other cells were either optional (but recommended) or not required until final DWMP. NOTE: The unit for this line is %. The AMP 8 and AMP 9 totals for this line are a sum of the individual year. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 3ci Outcome - Risk of Sewer flooding in a 1 in 50 storm - enhancement cost (capex)
Capex to address sewer flooding risks will generate multiple benefits across the various sewer flooding categories; we have split sewer flooding capex as follows: • For London catchments, equally (33%) between risk of sewer flooding in a 1 in 50 storm, internal and external sewer flooding. • For Thames Valley catchments, 30% to risk of sewer flooding in a 1 in 50 storm, 30% to internal sewer flooding, and 40% to external sewer. We have applied an expenditure profile for as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.
Line number 3cii Outcome - Risk of Sewer flooding in a 1 in 50 storm - enhancement cost (opex)

[5] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/non-technical-summary.pdf

Opex to address sewer flooding risks will generate multiple benefits across the various sewer flooding categories; we have split sewer flooding opex as follows:

- For London catchments, equally between risk of sewer flooding in a 1 in 50 storm, internal and external sewer flooding.
- For Thames Valley catchments, 30% to risk of sewer flooding in a 1 in 50 storm, 30% to internal sewer flooding, and 40% to external sewer flooding.

We have applied an opex expenditure profile (which presents a % of the AMP total on a year on year basis - AMP8 total only recognised fully in year 1 of AMP9) as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.

NOTE: The data table calculation for AMP8 and AMP9 total is not representative as it sums the individual years. Additionally, the 25-year total is not representative as it sums the AMPs. Each AMP total includes the opex for that AMP and prior AMPs, it is therefore not correct to sum the individual years for AMP 8 and AMP9 or is it correct to SUM all five AMP totals. We have not corrected this calculation.

Line number 3ciii

Outcome - Risk of Sewer flooding in a 1 in 50 storm - enhancement cost (totex)

See table in Section 0.

Line number 4

Outcome - Storm overflows - more than 10 spills per year - GENERAL

This line represents those storm overflow assets that operate greater than ten times during a typical year (WINEP IMP4 driver).

It is highlighted that there is a significant change between draft DWMP and final DWMP arising due to a larger number of sites being included for the latter. This is due to alignment with WINEP, the impact of the Environment Act[6] and Storm Overflow Evidence Project (SOEP)[7].

The Environment Act requirements include 75% reduction in high priority IMP2 sites by 2035, with 100% by 2045, and all assets by 2050. Also 38% of high priority IMP2 sites by 2030, and 14% of all IMP4 sites by 2030. These are met by the PR24 WINEP plan and the longer term final DWMP.

Better definition is noted in the "Additional line definitions" of the latest data table, which removed the ambiguity of if this line is to report the number of storm overflows with more than 10 spills per year, or if it was to report the "average number of spills per storm overflow". For clarity we are reporting the number of storm overflows assets that operate as per our draft submission.

[6] https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[7] https://www.gov.uk/government/publications/storm-overflows-evidence-project

Further details of our storm overflows discharge reduction plan can be found in Appendix Q Storm overflows of our DWMP Plan[8]. Our DWMP fully aligns with our WINEP submission to the Environment Agency on storm overflows, which was completed on 23 January 2023
Line number 4a Outcome - Storm overflows - more than 10 spills per year - baseline
In this line we give a forecast of risk using hydraulic models and show a deterioration in performance due to growth and climate change. Therefore, this is a forecast of the impact of unmitigated growth and climate change on the number of storm overflow locations operating at a rate of greater than ten per calendar year due to hydraulic incapacity. End of AMP position will align with PR24 WINEP assumptions. The remaining data is taken from EDM2021 out to 2035 when it is extrapolated out to our modelled 2050 position. Additional benefit due to the completion of Thames Tideway Tunnel in AMP7 is also reflected in the AMP 8 position. No enhancement expenditure has been claimed for end AMP7. Note that Thames Tideway Tunnel (TTT) is excluded from AMP7 expenditure. Also, that there were no WINEP schemes delivering the specific benefit of overflows spills reduction. At draft DWMP, only Y5 and AMP totals were required (AMP8, 9 and 12), all other cells were either optional (but recommended) or not required until final DWMP. NOTE: The AMP 8 and AMP 9 totals for this line are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 4b Outcome - Storm overflows - more than 10 spills per year - base
We have assumed that the base position will equal the baseline position for this line. At draft DWMP, only AMP7 annual percentages were required, all other cells were either optional (but recommended) or not required until final DWMP. NOTE: The AMP 8 and AMP 9 totals for this line are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 4c Outcome - Storm overflows - more than 10 spills per year - post enhancement

[8] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-q-storm-overflows.pdf

Output is a count of storm overflows continuing to operate following implementation of DWMP schemes.

This line is not directly comparable to line 4b. Line 4b is based on Event Duration Monitoring out to 2035 and then interpolated out to the 2050 modelled position, whereas line 4c we have used WINEP options for AMP8, then a SOEP algorithm for AMP9+ solutions.

This is a forecast from hydraulic modelling of the reduction in number of storm overflows operating at a rate of greater than 10 per calendar year. To align to the latest Defra consultation, we will invest to ensure that zero storm overflow locations have an annual operation count greater than ten by the end of the DWMP planning period.

Investment during AMP8-AMP11 will bring each asset in line with Environment Act requirements. Additional benefit due to the completion of Thames Tideway Tunnel in AMP8 is also reflected in this line.

At draft DWMP, only Y5 and AMP totals were required (AMP8, 9 and 12), all other cells were either optional (but recommended) or not required until final DWMP.

NOTE: The AMP 8 and AMP 9 totals for this line are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.

Line number 4ci

Outcome - Storm overflows - more than 10 spills per year - enhancement cost (capex)

Where no suitable EES cost model was available; an appropriate cost curve has been determined by the EES team to allocate to the required assets. For some sites added into DWMP at a later stage following the March Defra consultation[9], the storage volume has been derived using the Water UK SOEP[10] algorithm based on modelled spill performance.

The unit costs per overflow differs AMP on AMP. Our DWMP optimiser has front end loaded the most cost-efficient schemes to reduce spills in AMP8. Our flooding programmes will also show some secondary benefit here, however due to the approach adopted, the additional storage will not have been included in the models when addressing flooding schemes.

Data table entry was optional at draft DWMP.

Where, in a very limited number of cases, there is a primary driver other than SOP e.g. STW compliance, the capex associated with this is not included in the SOP but is included in the STW compliance line.

We have applied an expenditure profile for as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the

[9] https://consult.defra.gov.uk/water-industry/storm-overflows-discharge-reduction-plan/
[10] https://www.gov.uk/government/publications/storm-overflows-evidence-project

benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.
Line number 4cii **Outcome - Storm overflows - more than 10 spills per year - enhancement cost (opex)**
Where opex is required on an annual basis for AMP8 and AMP9 this is assumed to occur in the final year of the AMP only, to align with when benefit is realised. All AMP8 opex is presented in Y5. In AMP9, spend in Y1-4 is 20% of the AMP8 total in each year, with any additional opex from AMP9 added to the final AMP8 20% in Y5. Data table entry was optional at draft DWMP.
Line number 4ciii **Outcome - Storm overflows - more than 10 spills per year - enhancement cost (totex)**
See table in Section 0.

Line number 5 **Outcome - Storm overflows (high priority) - ecological harm - GENERAL**
This line represents those overflow assets that operate greater than ten times during a typical year (IMP2 proxy driver and high priority). A proxy of greater than operations in a typical year has been used by the WINEP team to determine the enhancement required to achieve 'no ecological harm'. Therefore, any overflow asset identified with an Environment Act IMP2 driver (causing ecological harm), and high priority is considered in this block. The assessment of the IMP 2 driver and priority has been made under our WINEP submission. Further details of our storm overflows discharge reduction plan can be found in Appendix Q Storm overflows of our DWMP Plan[11]. Our DWMP fully aligns with our WINEP submission to the Environment Agency on storm overflows, which was completed on 23 January 2023. Data table completion was optional at draft DWMP, the method statement has been developed specifically for the final DWMP.
Line number 5a **Outcome - Storm overflows (high priority) - ecological harm - baseline**
End of AMP position will align with PR24 WINEP assumptions. Position is taken from EDM2021 data. EDM2021 is assumed to not deteriorate or improve up to 2035 unless an AMP7 scheme or Thames Tideway Tunnel (TTT) scheme is identified.

[11] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-q-storm-overflows.pdf

Baseline 2035 to 2050 position reflects a straight-line deterioration from EDM2021 position at 2035 to SOEP (modelled) 2050. No enhancement expenditure has been claimed for end AMP7. Note that Thames Tideway Tunnel (TTT) is excluded from AMP7 expenditure. Also, that there were no WINEP schemes delivering the specific benefit of overflows spills reduction. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 5b **Outcome - Storm overflows (high priority) - ecological harm - base**
We have assumed that the base position will equal the baseline position for this line. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 5c **Outcome - Storm overflows (high priority) - ecological harm - post enhancement**
Output is a count of overflows continuing to operate following implementation of the DWMP scheme. This line is not directly comparable to line 5b. Line 5b is based on Event Duration Monitoring out to 2035 and then interpolated out to the 2050 modelled position, whereas line 5c we have used WINEP options for AMP8, then a SOEP algorithm for AMP9+ solutions. Investment during AMP8-AMP11 will bring each asset in line with Environment Act requirements. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 5ci **Outcome - Storm overflows (high priority) - ecological harm - enhancement cost (capex)**
Where no suitable EES cost model was available; an appropriate cost curve has been determined by the EES team to allocate to the required assets. For some sites added into DWMP at a later stage following the March Defra consultation[12], the storage volume has been derived using the Water UK SOEP[13] algorithm based on modelled spill performance. The unit costs per overflow differs AMP on AMP. Our DWMP optimiser has front end loaded the most cost-efficient schemes to reduce spills in AMP8. Our flooding programmes will also show some

[12] https://consult.defra.gov.uk/water-industry/storm-overflows-discharge-reduction-plan/
[13] https://www.gov.uk/government/publications/storm-overflows-evidence-project

secondary benefit here, however due to the approach adopted, the additional storage will not have been included in the models when addressing flooding schemes.

Where, in a very limited number of cases, there is a primary driver other than SOP e.g. STW compliance, the capex associated with this is not included in the SOP but is included in the STW compliance line.

We have applied an expenditure profile for as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.

Line number 5cii

Outcome - Storm overflows (high priority) - ecological harm - enhancement cost (opex)

Where opex is required on an annual basis for AMP8 and AMP9 this is assumed to occur in the final year of the AMP only, to align with when benefit is realized. All AMP8 opex is presented in Y5. In AMP9, spend in Y1-4 is 20% of the AMP8 total in each year, with any additional opex from AMP9 added to the final AMP8 20% in Y5.

Line number 5ciii

Outcome - Storm overflows (high priority) - ecological harm - enhancement cost (totex)

Capex and opex has been summated to calculate this line.

Line number 6

Outcome - Storm overflows (all) - ecological harm - GENERAL

This line represents those overflow assets that operate greater than ten times during a typical year (IMP2 proxy driver).

A proxy of less than or equal to ten operations in a typical year has been used by the WINEP team to determine the enhancement required to achieve 'no ecological harm'. Therefore, any overflow asset identified with an Environment Act IMP2 driver (causing ecological harm) and high priority is considered in this block.

It is highlighted that there is a significant change between draft DWMP and final DWMP arising due to a larger number of sites being included for the latter. This is due to alignment with WINEP, the impact of the Environment Act[14] and Storm Overflow Evidence Project (SOEP)[15]. It is highlighted that the Environment Act legislation was introduced during the consultation phase of the dDWMP.

The Environment Act requirements include 75% reduction in high priority IMP2 sites by 2035, with 100% by 2045, and all assets by 2050. Also 38% of high priority IMP2 sites by 2030, and 14% of all IMP4 sites by 2030. These are met by the PR24 WINEP plan and the longer term fDWMP.

Data table completion was optional at draft DWMP, the method statement has been developed

[14] https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[15] https://www.gov.uk/government/publications/storm-overflows-evidence-project

specifically for final DWMP.

Further details of our storm overflows discharge reduction plan can be found in Appendix Q Storm overflows of our DWMP Plan[16].

Our DWMP fully aligns with our WINEP submission to the Environment Agency on storm overflows, which was completed on 23 January 2023.

Line number 6a

Outcome - Storm overflows (all) - ecological harm - baseline

In this line we give a forecast of risk using hydraulic models and show a deterioration in performance due to growth and climate change. Therefore, this is a forecast of the impact of unmitigated population growth and climate change on the number of storm overflow locations operating at a rate of greater than ten per calendar year due to hydraulic incapacity.

End of AMP position will align with PR24 WINEP assumptions. The remaining data is taken from EDM2021 out to 2035 when it is extrapolated out to our modelled 2050 position.

Additional benefit due to the completion of Thames Tideway Tunnel in AMP7 is also reflected in the AMP 8 position.

No enhancement expenditure has been claimed for end AMP7. Note that Thames Tideway Tunnel (TTT) is excluded from AMP7 expenditure. Also, that there were no WINEP schemes delivering the specific benefit of overflows spills reduction.

NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.

Line number 6b

Outcome - Storm overflows (all) - ecological harm - base

We have assumed that the base position will equal the baseline position for this line.

NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.

Line number 6c

Outcome - Storm overflows (all) - ecological harm - post enhancement

Output is a count of overflows continuing to operate following implementation of the DWMP scheme.

This line is not directly comparable to line 6b. Line 6b is based on Event Duration Monitoring out to 2035 and then interpolated out to the 2050 modelled position, whereas line 6c we have used WINEP

[16] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-q-storm-overflows.pdf

options for AMP8, then a SOEP algorithm for AMP9+ solutions.

This is a forecast from hydraulic modelling of the reduction in number of storm overflows operating at a rate of greater than 10 per calendar year. To align to the latest Defra consultation, we will invest to ensure that zero storm overflow locations have an annual operation count greater than ten by the end of the DWMP planning period.

Investment during AMP8-AMP11 will bring each asset in line with Environment Act requirements. Additional benefit due to the completion of Thames Tideway Tunnel in AMP8 is also reflected in this line.

NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.

Line number 6ci

Outcome - Storm overflows (all) - ecological harm - enhancement cost (capex)

Where no suitable EES cost model was available; an appropriate cost curve has been determined by the EES team to allocate to the required assets. For some sites added into DWMP at a later stage following the March Defra consultation[17], the storage volume has been derived using the Water UK SOEP[18] algorithm based on modelled spill performance.

The unit costs per overflow differs AMP on AMP. Our DWMP optimiser has front end loaded the most cost-efficient schemes to reduce spills in AMP8. Our flooding programmes will also show some secondary benefit here, however due to the approach adopted, the additional storage will not have been included in the models when addressing flooding schemes.

Data table entry was optional at draft DWMP.

Where, in a very limited number of cases, there is a primary driver other than SOP e.g. STW compliance, the capex associated with this is not included in the SOP but is included in the STW compliance line.

We have applied an expenditure profile for as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.

Line number 6cii

Outcome - Storm overflows (all) - ecological harm - enhancement cost (opex)

Where opex is required on an annual basis for AMP8 and AMP9 this is assumed to occur in the final year of the AMP only, to align with when benefit is realised. All AMP8 opex is presented in Y5. In AMP9, spend in Y1-4 is 20% of the AMP8 total in each year, with any additional opex from AMP9 added to the final AMP8 20% in Y5.

[17] https://consult.defra.gov.uk/water-industry/storm-overflows-discharge-reduction-plan/
[18] https://www.gov.uk/government/publications/storm-overflows-evidence-project

Line number 6ciii Outcome - Storm overflows (all) - ecological harm - enhancement cost (totex)
See table in Section 0.

Line number 7 Outcome - Storm overflows - designated bathing waters (coastal and inland) - GENERAL
This line represents those overflow assets that operate greater than three times during a typical year (IMP3 driver). It is highlighted that there is a significant change between draft DWMP and final DWMP arising due to a larger number of sites being included for the latter. This is due to alignment with WINEP, the impact of the Environment Act[19] and Storm Overflow Evidence Project (SOEP)[20]. It is highlighted that the Environment Act legislation was introduced during the consultation phase of the dDWMP. The Environment Act requirements include 75% reduction in high priority IMP2 sites by 2035, with 100% by 2045, and all assets by 2050. Also 38% of high priority IMP2 sites by 2030, and 14% of all IMP4 sites by 2030. These are met by the PR24 WINEP plan and the longer term fDWMP. Further details of our storm overflows discharge reduction plan can be found in Appendix Q Storm overflows of our DWMP Plan[21]. Our DWMP fully aligns with our WINEP submission to the Environment Agency on storm overflows, which was completed on 23 January 2023. Data table completion was optional at draft DWMP, the method statement has been developed specifically for final DWMP.
Line number 7a **Outcome - Storm overflows - designated bathing waters (coastal and inland) - baseline**
In this line we give a forecast of risk using hydraulic models and show a deterioration in performance due to growth and climate change. Therefore, this is a forecast of the impact of unmitigated growth and climate change on the number of storm overflow locations operating at a rate of greater than three per calendar year due to hydraulic incapacity. End of AMP position will align with PR24 WINEP assumptions. The remaining data is taken from EDM2021 out to 2035 when it is extrapolated out to our modelled 2050 position. Additional benefit due to the completion of Thames Tideway Tunnel in AMP7 is also reflected in the AMP 8 position. No enhancement expenditure has been claimed for end AMP7. Note that Thames Tideway Tunnel

[19] https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[20] https://www.gov.uk/government/publications/storm-overflows-evidence-project
[21] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-q-storm-overflows.pdf

(TTT) is excluded from AMP7 expenditure. Also, that there were no WINEP schemes delivering the specific benefit of overflows spills reduction. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 7b **Outcome - Storm overflows - designated bathing waters (coastal and inland) - base**
We have assumed that the base position will equal the baseline position for this line. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 7c **Outcome - Storm overflows - designated bathing waters (coastal and inland) - post enhancement**
Output is a count of storm overflows continuing to operate following implementation of DWMP schemes. This line is not directly comparable to line 4b. Line 4b is based on Event Duration Monitoring out to 2035 and then interpolated out to the 2050 modelled position, whereas line 4c we have used WINEP options for AMP8, then a SOEP algorithm for AMP9+ solutions. This is a forecast from hydraulic modelling of the reduction in number of storm overflows operating at a rate of greater than 10 per calendar year. To align to the latest Defra consultation we will invest to ensure that zero storm overflow locations have an annual operation count greater than ten by the end of the DWMP planning period. Investment during AMP8-AMP11 will bring each asset in line with Environment Act requirements. Additional benefit due to the completion of Thames Tideway Tunnel in AMP8 is also reflected in this line. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 7ci **Outcome - Storm overflows - designated bathing waters - enhancement cost (capex)**
Where no suitable EES cost model was available; an appropriate cost curve has been determined by the EES team to allocate to the required assets. For some sites added into DWMP at a later stage following the March Defra consultation[22], the storage volume has been derived using the Water UK

[22] https://consult.defra.gov.uk/water-industry/storm-overflows-discharge-reduction-plan/

SOEP[23] algorithm based on modelled spill performance. The unit costs per overflow differs AMP on AMP. Our DWMP optimiser has front end loaded the most cost-efficient schemes to reduce spills in AMP8. Our flooding programmes will also show some secondary benefit here, however due to the approach adopted, the additional storage will not have been included in the models when addressing flooding schemes. Data table entry was optional at dDWMP. Where, in a very limited number of cases, there is a primary driver other than SOP e.g. STW compliance, the capex associated with this is not included in the SOP but is included in the STW compliance line. We have applied an expenditure profile for as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.
Line number 7cii Outcome - Storm overflows - designated bathing waters - enhancement cost (opex)
Where opex is required on an annual basis for AMP8 and AMP9 this is assumed to occur in the final year of the AMP only, to align with when benefit is realised. All AMP8 opex is presented in Y5. In AMP9, spend in Y1-4 is 20% of the AMP8 total in each year, with any additional opex from AMP9 added to the final AMP8 20% in Y5.
Line number 7ciii Outcome - Storm overflows - designated bathing waters - enhancement cost (totex)
See table in Section 0.

Line number 8 Outcome - Sewer collapses – GENERAL
This line reports sewer collapses normalised per 1000km of sewer. It should be noted that no DWMP activities were aimed at targeting sewer collapses. Data table completion was optional at draft DWMP, and only included line 8a. All other lines at final DWMP were not requested (or even optional). The method statement for this line has been developed specifically for final DWMP. Reported performance is the sum of separate forecasts for rising mains and gravity sewers.
Line number 8a Outcome - Sewer collapses - baseline
Our forecast is based on extrapolation of historical trends from 2011/12 to 2021/22. Collapse rates are forecast to remain stable for gravity sewers, and to increase for rising mains driven by

[23] https://www.gov.uk/government/publications/storm-overflows-evidence-project

deteriorating asset health.
Line number 8b Outcome - Sewer collapses - base
Rising mains collapse rates are forecast to improve over AMPs 8 and 9 as a result of investment to improve asset health.
Line number 8ci Outcome - Sewer collapses - base costs (capex)
No specific investment is identified to maintain the collapse rate; therefore, capex will be reported as zero.
Line number 8cii Outcome - Sewer collapses - base costs (opex)
No specific investment is identified to maintain the collapse rate; therefore, opex will be reported as zero.
Line number 8ciii Outcome - Sewer collapses - base costs (totex)
No specific investment is identified to maintain the collapse rate; therefore, totex will be reported as zero.

Line number 9 Outcome - Internal sewer flooding - GENERAL
This line reports the number of internal incidents or escapes per 10,000 connections. At draft DWMP we only reported the number of hydraulic incidents. At final DWMP we are now including hydraulic and other cause flooding, including incidents due to severe weather. Reported performance is the sum of separate forecasts for hydraulic and other cause flooding. Forecasts include one year every AMP with extreme levels of hydraulic flooding due to the impact of severe weather. This is in line with historical performance from 2010/11 to 2021/22.
Line number 9a Outcome - Internal sewer flooding – baseline
Hydraulic flooding is forecast to increase due to the impact of population growth and climate change. Forecasts were calculated by uplifting current performance, using uplift factors derived from BRAVA modelling of the number of properties at risk of flooding internally in 2030, 2035 and 2050. Other cause flooding is forecast to be reduced due to continued capex interventions (e.g. removing interceptors), investment of efficiency into increased activity volumes, and improved intervention targeting and effectiveness. NOTE: The AMP totals for AMP8 and AMP8 in the data table template provided are Incorrect as they sum the individual years, whereas they should probably be the average. Similarly, the 25-year totals sums the AMPs totals which again is not reflective of the intended calculation.

Line number 9b Outcome - Internal sewer flooding – base
Hydraulic flooding is set equal to the baseline forecast Other cause flooding is forecast to be reduced further and faster than in the baseline forecast, as a result of increased activity volumes (e.g. removing interceptors, depth monitors, planned cleaning). NOTE: The AMP totals for AMP8 and AMP8 in the data table template provided are Incorrect as they sum the individual years, whereas they should probably be the average. Similarly, the 25-year totals sums the AMPs totals which again is not reflective of the intended calculation.
Line number 9c Outcome - Internal sewer flooding - post enhancement
Hydraulic flooding is reduced due to the impact of DWMP investment. • The impact of DWMP investment on flooding in <1:30 and 1:30-1:50 return periods was derived from hydraulic modelling outputs. DWMP investment was assumed to have no impact on flooding in storms with return periods greater than 1:50. • We have assumed that DWMP activities will translate into a phased reduction in L1 outcomes given that storms will occur randomly and so outcome benefit will be non-linear to properties with reduced risk due to DWMP spend. We record the main benefit later on in the planning period to account for this. Other cause flooding is set equal to the base forecast. NOTE: The AMP totals for AMP8 and AMP8 in the data table template provided are Incorrect as they sum the individual years, whereas they should probably be the average. Similarly, the 25-year totals sums the AMPs totals which again is not reflective of the intended calculation.
Line number 9ci Outcome - Internal sewer flooding - enhancement cost (capex)
Capex to address sewer flooding risks will generate multiple benefits across the various sewer flooding categories; we have split sewer flooding capex as follows: For London catchments, equally between risk of sewer flooding in a 1 in 50 storm, internal and external sewer flooding. For Thames Valley catchments, 30% to risk of sewer flooding in a 1 in 50 storm, 30% to internal sewer flooding, and 40% to external sewer flooding (in recognition of the prevalence of external sewer flooding risks).
Line number 9cii Outcome - Internal sewer flooding - enhancement cost (opex)

Opex to address sewer flooding risks will generate multiple benefits across the various sewer flooding categories; we have split sewer flooding opex as follows:

- For London catchments, equally between risk of sewer flooding in a 1 in 50 storm, internal and external sewer flooding.
- For Thames Valley catchments, 30% to risk of sewer flooding in a 1 in 50 storm, 30% to internal sewer flooding, and 40% to external sewer flooding (in recognition of the prevalence of external sewer flooding risks).

We have applied an opex expenditure profile (which presents a % of the AMP total on a year on year basis - AMP8 total only recognised fully in year 1 of AMP9) as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP.

NOTE: The data table calculation for AMP8 and AMP9 total in the data table is not representative as it sums the individual years. Additionally, the 25-year total is not representative as it sums the AMPs. Each AMP total includes the opex for that AMP and prior AMPs, it is therefore not correct to sum the individual years for AMP 8 and AMP9 or is it correct to SUM all five AMP totals. We have not corrected this calculation.

Line number 9ciii

Outcome - Internal sewer flooding - enhancement cost (totex)

See table in Section 0.

Line number 10a

Outcome - Screening storm overflow - GENERAL

New screen required as enhancement (IMP5 driver). All IMP5 drivers identified from WINEP relate to enhancement.

DWMP only identifies those where screening will be required. Enhancement only, exclude e.g. where permit requires screen but no screen/screen requires replacement. Forecast number of overflows that require screening based on spill characteristics defined in the WaPUG Guide - The Design of CSO Chambers to Incorporate Screens.

Further details of our storm overflows discharge reduction plan can be found in Appendix Q Storm overflows of our DWMP Plan[24].

Our DWMP fully aligns with our WINEP submission to the Environment Agency on storm overflows, which was completed on 23 January 2023.

This line was reported as Line 16 at draft DWMP.

Line number 10a

[24] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-q-storm-overflows.pdf

Outcome - Screening storm overflow - baseline
The AMP7 position output will reflect the PR19 outcome performance commitment for screening. All IMP5 drivers identified from WINEP relate to enhancement. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 10a Outcome - Screening storm overflow – baseline
The output will reflect the PR19 outcome performance commitment for screening. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 10b Outcome - Screening storm overflow – base
We have assumed that the base position will equal the baseline position for this line. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 10c Outcome - Screening storm overflow - post enhancement
Enhancement equates to provision of screen where it is not currently a statutory requirement. Any screen identified as required from WINEP will be considered as enhancement as the assumption is that each site is in compliance with its permit. NOTE: The AMP 8 and AMP 9 totals for this line in the data table are a sum of the individual years. As a result, the totals will not be reflective and should perhaps be an average of the five years. In addition to this, the 25-year total is also not representative as it sums the AMP totals. We have not altered the original cell calculation in the data table.
Line number 10ci Outcome - Screening storm overflow - enhancement cost (capex)
Where no suitable EES cost model was available; an appropriate cost curve has been determined by the EES team to allocate to the required assets. For some sites added into DWMP at a later stage following the March Defra consultation[25], the storage volume has been derived using the

[25] https://consult.defra.gov.uk/water-industry/storm-overflows-discharge-reduction-plan/

Water UK SOEP[26] algorithm based on modelled spill performance.

The unit costs per overflow differs AMP on AMP. Our DWMP optimiser has front end loaded the most cost-efficient schemes to reduce spills in AMP8. Our flooding programmes will also show some secondary benefit here, however due to the approach adopted, the additional storage will not have been included in the models when addressing flooding schemes.

Where, in a very limited number of cases, there is a primary driver other than SOP e.g. STW compliance, the capex associated with this is not included in the SOP but is included in the STW compliance line.

We have applied an expenditure profile for as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. The profile is detailed in the method statement.

Line number 10cii

Outcome - Screening storm overflow - enhancement cost (opex)

Where opex is required on an annual basis for AMP8 and AMP9 this is assumed to occur in the final year of the AMP only, to align with when benefit is realised. All AMP8 opex is presented in Y5. In AMP9, spend in Y1-4 is 20% of the AMP8 total in each year, with any additional opex from AMP9 added to the final AMP8 20% in Y5.

Line number 10ciii

Outcome - Screening storm overflow - enhancement cost (totex)

See table in Section 0.

Line number 11

Outcome - External sewer flooding - GENERAL

This line reports the number of external incidents or escapes per 10,000 connections. At draft DWMP we only reported the number of hydraulic incidents. At final DWMP we are now including hydraulic and other cause flooding, including incidents due to severe weather.

Reported performance is the sum of separate forecasts for hydraulic and other cause flooding.

Line number 11a

Outcome - External sewer flooding – baseline

Hydraulic flooding is forecast to increase due to the impact of population growth and climate change. Forecasts were calculated by uplifting current performance, using uplift factors derived from BRAVA modelling of the number of properties at risk of flooding in 2030, 2035 and 2050.

Other cause flooding is forecast to be reduced due to continued capex interventions (e.g. removing interceptors), investment of efficiency into increased activity volumes, and improved intervention

[26] https://www.gov.uk/government/publications/storm-overflows-evidence-project

targeting and effectiveness.

NOTE: The AMP totals for AMP8 and AMP8 in the data table template provided are Incorrect as they sum the individual years, whereas they should probably be the average. Similarly, the 25-year totals sums the AMPs totals which again is not reflective of the intended calculation.

Line number 11b

Outcome - External sewer flooding - base

Hydraulic flooding is set equal to the baseline forecast.

Other Cause flooding is forecast to be reduced further and faster than in the baseline forecast, as a result of increased activity volumes (e.g. removing interceptors, depth monitors, planned cleaning).

NOTE: The AMP totals for AMP8 and AMP8 in the data table template provided are incorrect as they sum the individual years, whereas they should probably be the average. Similarly, the 25-year totals sums the AMPs totals which again is not reflective of the intended calculation.

Line number 11c

Outcome - External sewer flooding - post enhancement

Hydraulic flooding is reduced due to the impact of DWMP investment.

- The impact of DWMP investment on external hydraulic flooding, is derived from the impact calculated for internal flooding
- We have assumed that DWMP activities will translate into a phased reduction in L1 outcomes given that storms will occur randomly and so outcome benefit will be non-linear to properties with reduced risk due to DWMP spend. We record the main benefit later on in the planning period to account for this.

Other cause flooding is set equal to the base forecast.

NOTE: The AMP totals for AMP8 and AMP8 in the data table template provided are Incorrect as they sum the individual years, whereas they should probably be the average. Similarly, the 25-year totals sums the AMPs totals which again is not reflective of the intended calculation.

Line number 11ci

Outcome - External sewer flooding - enhancement cost (capex)

Capex to address sewer flooding risks will generate multiple benefits across the various sewer flooding categories; we have split sewer flooding capex as follows:

- For London catchments, equally between risk of sewer flooding in a 1 in 50 storm, internal and external sewer flooding.
- For Thames Valley catchments, 30% to risk of sewer flooding in a 1 in 50 storm, 30% to internal sewer flooding, and 40% to external sewer flooding (in recognition of the prevalence of external sewer flooding risks).

Line number 11cii

Outcome - External sewer flooding - enhancement cost (opex)
Opex to address sewer flooding risks will generate multiple benefits across the various sewer flooding categories; we have split sewer flooding opex as follows: • For London catchments, equally between risk of sewer flooding in a 1 in 50 storm, internal and external sewer flooding. • For Thames Valley catchments, 30% to risk of sewer flooding in a 1 in 50 storm, 30% to internal sewer flooding, and 40% to external sewer flooding (in recognition of the prevalence of external sewer flooding risks). We have applied an opex expenditure profile (which presents a % of the AMP total on a year on year basis - AMP8 total only recognised fully in year 1 of AMP9) as the delivery of flooding prevention schemes will consist of a range in scale and complexity, it is assumed that some will be delivered early and therefore the benefit will be realised early in each AMP, unlike some reported lines where benefit realisation is not until the final year of the AMP. NOTE: The data table calculation for AMP8 and AMP9 total in the data table is not representative as it sums the individual years. Additionally, the 25-year total is not representative as it sums the AMPs. Each AMP total includes the opex for that AMP and prior AMPs, it is therefore not correct to sum the individual years for AMP 8 and AMP9 or is it correct to SUM all five AMP totals. We have not corrected this calculation.
Line number 11ciii Outcome - External sewer flooding - enhancement cost (totex)
See table in Section 0.

4 Table 2: Enhancement Expenditure Analysis - General commentary

4.1 Table 2 Lines 1 to 3 include data for Planning Objectives delivered by the option types reported for those lines. There is some commonality in the commentary for all three lines, and this is detailed in the table below.

4.2 All options were costed using the same Thames Water EES models, as such much of the commentary relevant to costs can be summarised here rather than repeating for each individual line. As with the Table 1 lines, the table below provides the general cost commentary applicable for Table 2 of the data tables.

Planning Objectives delivered by ALL tables
Planning Objectives delivered by tables 1A, 1B, 2A, 2B and 3 were "optional but recommended" for entry in the draft DWMP data tables. We did not report on these at draft DWMP. There are some differences in the way planning objectives are to be reported between draft DWMP and final DWMP which are outlined in the relevant method statements (not published). Where there are nuances about the interpretation of the requirement, these are detailed below.
Line number A1, 1B, 2A, 2B, 3 & 4 2. Expenditure – Projected spend on – capex
For DWMP capex costs have been calculated on an AMP-by-AMP basis, and as such where an annual breakdown is provided, we have used an indicative spending profile. The details of which are contained in the individual method statements for each line (not published). All DWMP expenditure is considered enhancement cost. The conceptual designs for each option provided the basis for the cost assessment where we used a combination of our Engineering Estimation System (EES) and bottom-up costing (using market rates for new technologies) where costs were not present in EES. Costs within our EES are subject to routine review and updating to reflect current outturn cost data, and ongoing data and process quality assurance. EES costs include assessment of option uncertainties based on the level of design maturity / confidence we have at this stage. We have explored this further in Appendix I – Risk & Uncertainty[27]. The EES system is used for capex business plan pricing and is subject to significant quality assurance checks by external cost consultants. All options have been costed using a 2021-22 price base. However, in line with Ofwat reporting requirement, all costs have had a price base adjustment applied to deflate from an average of 2021-22 to 2020-21. All costs will be reported to two decimal places.
Line number A1, 1B, 2A, 2B, 3 & 4

[27] https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-i-risk-and-uncertainty.pdf

2. Expenditure – Projected spend on - opex
For DWMP opex costs have been calculated on an AMP-by-AMP basis, and as such where an annual breakdown is provided we have used an indicative spending profile. The details of which are contained in the individual method statements for each line (not published). In addition to this, option opex was not calculated to a sub option level, but rather a generic option level. Where, in the case of lines 1, 2 and 3 under the Expenditure tables those generic options are broken down and reported in a sub option level, we have assigned the percentage of opex that is relevant to the percentage of capex for that sub option. The opex values captured can be considered both enhancement opex and base opex, we have made no distinction between the two, however recognizing that opex costs will transfer from enhancement to base following the capex implementation. For this data table we have assumed that all opex is enhancement. The data table calculation for the 25-year total is not representative as it sums each of the AMP totals. Each AMP total includes the opex for that AMP and prior AMPs. Each AMP total is an AMP total, but it includes the opex from the prior AMP. It is therefore not correct to sum all five AMP totals, but it would be more relevant to see the AMP12 total (which will include all opex for the prior 5 AMPs). We have not corrected this calculation. All options have been costing using a 2021-22 price base. However, in line with Ofwat reporting requirement, all costs have had a price base adjustment applied to deflate from an average of 2021-22 to 2020-21 position. All costs will be reported to two decimal places.
Line number A1, 1B, 2A, 2B, 3 & 4 2. Expenditure – Projected spend on - totex
Capex and opex has been summated to calculate this line. This is as per the calculation in the cells as provided by Ofwat. All costs will be reported to two decimal places. Note: As the data table calculation for opex AMP totals for is incorrect as it sums the AMP, and then sums the 25-year total. As such it will result in the totex being incorrect also. We have not corrected these calculations.

5 Table 2: Enhancement expenditure analysis

5.1 Commentary for the Table 1 outcomes in Table 2 can be seen below, where a comment refers to all lines it is captured in the table above.

Line 1A - Additional network storage / conveyance / containment TRADITIONAL GREY INTERVENTIONS - NETWORK	
Additional grey storage / containment volume to be delivered in the network (enhancement)	This shows a steady increase in storage volume in the near to mid-term (up to 2040) and then a tapering off due to a transition from managing flows within foul/combined networks, to surface water management schemes, over the duration of the DWMP. Storage addresses both sewer flooding and storm overflow spills. For London catchments: quantities per catchment (where this line item was selected within the preferred plan) have been derived from both: • options developed using computerised hydraulic models - scope directly taken from option models, and • storage assessed using algorithms as determined by the Storm Overflow Evidence Project[28] Quantities per catchment have been pro-rated (where applicable) and allocated to respective AMP(s) in line with capex allocation across AMPs. These have been summated for presentation as an overall total per AMP. An AMP8 and AMP9 yearly profile has been assumed, based on judgement of a typical AMP profile. For Thames Valley: a 'reference option' approach has been utilised - see Option Development and Appraisal Technical Appendix D[29] for more details (costing based on network storage to address DWMP targets). This has addressed flooding and storm overflow spills through a blend of storage provision and surface water removal using SuDS (70%/30% split by end 2050). Volumes reported will be to two decimal places.
Number of individual schemes	The count of schemes will refer directly to those sub options relate to additional grey storage.
Projected spend on grey network storage - capex	The projected spend relates only to those sub options relate to additional grey storage.
Projected spend on grey network storage - opex	The projected spend relates only to those sub options relate to additional grey storage.

28 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1030980/storm-overflows-evidence-project.pdf

29 https://www.thameswater.co.uk/media-library/home/about-us/regulation/drainage-and-wastewater/appendix-d-options-development-and-appraisal.pdf

	Where opex is required on an annual basis for AMP8 and AMP9 a distribution profile has been applied. This distribution profile is applied for this line in AMP 8 and AMP9 only. For AMP10, 11 and 12 we apply the AMP total only. It is acknowledged that AMP9 will only total 90% of opex in year 5, but the AMP total for AMP10 will be inclusive of AMP9 opex costs. Further details can be found in the method statement.
Projected spend on grey network storage - totex	See table in Section 0.

Line 1B - Upstream surface water separation / removal or other network storage BLUE / GREEN SEPARATION & STORAGE - NETWORK	
Permeable area inflow removed from entering the network or stored in environment (enhancement)	NOTE: The intervention description refers to "*permeable* area inflow removed". We believe that this should read "*impermeable* area inflow removed". We have therefore included the *impermeable* area removed. This is the total hectarage of impermeable area removed from entering the network. Only those option types specified as area removal will be captured here that is not otherwise accounted for in Expenditure Lines 2 or 3. The data shows a steep ramp up towards the end of the planning period in storage volume generated via green solutions. Values are dominated by the roll out of a transformational SuDS programme in London. For London, hectare removal (to represent installation of SuDS features that discharge attenuated flows back to the surface water system / watercourse) has been assessed using catchment hydraulic models, with removal areas assessed from outputs from a SuDS opportunity mapping tool. Beckton and Crossness have both combined and separate systems, therefore attenuated flows, in some risks zones, will need to be returned to the combined system for treatment (allocation assessed using extent of system types present as determined from our corporate GIS). All other London catchments are served by separate systems / predominantly separate systems, therefore allocation has been made to 1B. For Thames Valley, catchments are served by separate systems / predominantly separate systems, therefore allocation has been made to 1B. Green/NBS (nature-based solutions): we have assessed on the basis of inclusion of all types of features associated with SuDS options

	included within the Preferred Plan (e.g. including features such as permeable block paving with underground geocellular storage, downpipe disconnection to underground geocellular storage). Additional effective (green) storage volume to be delivered in the network (enhancement) has been determined by multiplying the area removed by the design rainfall depth for the SuDS features. The AMP8 yearly profile has been assumed from the overall estimated AMP total, using a profile that represents the need to undertake investigations at the start of the AMP to increase our understanding of surface water systems and devise detailed surface water management proposals. Hectares removed will be to two decimal places.
Number of individual schemes	The count of schemes will refer directly to those sub options relate to impermeable area removal that is not otherwise accounted for in Expenditure Lines 2 or 3.
Projected spend on green network schemes - capex	The projected spend relates only to those sub options relate to impermeable area removal that is not otherwise accounted for in Expenditure Lines 2 or 3.
Projected spend on green network schemes - opex	The projected spend relates only to those sub options relate to impermeable area removal that is not otherwise accounted for in Expenditure Lines 2 or 3. Where opex is required on an annual basis for AMP8 and AMP9 we have applied a distribution profile. This distribution profile is applied for this line in AMP 8 and AMP9 only. For AMP10, 11 and 12 we apply the AMP total only. It is acknowledged that AMP9 will only total 90% of opex in year 5, but the AMP total for AMP10 will be inclusive of AMP9 opex costs. Further details can be found in the method statement.
Projected spend on green network schemes - totex	See table in Section 0.

Planning Objectives delivered by Tables 1A and 1B (multiple benefits)	
Reduced number of category 1-3 pollution incidents	The options selected in Tables 1A and 1B will not reduce the number of category 1-3 pollution incidents as the grey storage options (Table 1A) and the Blue / Green separation and storage options will not impact the structural integrity of the sewers. As seen in Table 1 Line 1, a reduction in pollution incidents is driven by a reduction in sewer collapses (Table 1 line 8) which is being delivered by a large programme of sewer lining.

	Therefore, the impact that interventions at delivered by tables 1A and 1B will be 0 across all AMPs.
Improvement in WwTW compliance	The options selected in Tables 1A and 1B will not directly Improve WwTW compliance as the grey storage options (Table 1A) and the Blue / Green separation and storage options have been developed to protect properties from flooding and improve overflow performance. It is noted that some network interventions may reduce pass forward flow to the works or provide additional storage capacity at the network, however the impact this will have on internal flooding benefits has not been assessed as part of the DWMP. WwTW compliance is improved by the options captured in Table 2 Line 2 (interventions at WwTW). Therefore, the impact that interventions at delivered by tables 1a and 1B will be 0 across all AMPs.
Percentage of properties at risk of sewer flooding in a 1 in 50 storm	NOTE: The additional line definition states: "forecast reduction in the number of flooding incidents as a result of DWMP intervention(s) delivered by Tables 1A and 1B", whereas the description sates "Percentage of properties at risk of sewer flooding in a 1 in 50 storm". The two definitions do not correlate. NOTE: As per Table 1 Line 3 we are reporting the percentage of population at risk of sewer flooding and not the percentage of properties at risk of sewer flooding. We will report on the percentage of population affected by a 1 in 50 storm and NOT the percentage of properties. For more details see commentary for Table 1 (outcomes) Line 3. We have interpreted this to mean the forecast reduction in percentage reduction in population at risk of sewer flooding from a 1:50 storm.
Storm overflow average spill reduction	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated.
Reduced number of overflows spilling 10 or more per year	NOTE: There is a discrepancy in the definitions here. The description refers to "the reduced number of overflows spilling 10 or more per year", while the Additional line definition refers to the "forecast reduction of overflows operating more than 10 times per year". In line with Table 1 line 4 we have interpreted this to mean the "forecast reduction of overflows operating ***more*** than 10 times per year".

	Whereas Table 1 reported the "Number of", this planning objective is looking to report the reduced number of, we therefore will report the differences between AMPs that are calculated.
Reduction in high priority overflows causing ecological harm per year	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated.
Reduction in overflows causing ecological harm per year	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated.
Reduction in sewer collapses	The Network options delivered by Tables 1A and 1B do not directly impact upon the number of sewer collapses, as these are all derived from network interventions (sewer lining in GISMP catchments). Therefore, the reduced number of sewer collapses for interventions at WwTW will be 0 across all AMPs.
Reduction in households with internal sewer flooding	NOTE: The additional line definition states: "Forecast reduction of internal flooding *incidents* as a result of DWMP intervention(s) delivered by Tables 1A and 1B". The main description refers to the "reduction in *households* with internal sewer flooding". We have interpreted this to mean the "reduction in households with internal sewer flooding" rather than a reduction in incidents.
Bespoke outcomes - Reduction in households with external sewer flooding	As with the internal flooding planning objective, we have reported the reduction in households (properties) with external sewer flooding, rather than a reduction in incidents.

Line 2A - Additional WwTW storage TRADITIONAL GREY INTERVENTIONS - WwTW	
Additional grey storage volume required at WwTW (enhancement)	This line captures the additional grey storage required to replace/retrofit/expand existing primary/secondary treatment processes using existing process types or more intensive processes on existing sites. The method used to calculate this line is different from draft DWMP in that we presented an allocation of overall grey storage as developed using the 1A methodology. For final DWMP we have selected a specific sub option type that provides a storage volume for this line. It is assumed that delivery of storage will only be in Y5 of the AMP, this is on the basis that delivering and commissioning of storage options at WwTWs can be more complicated and will likely be delivered in the final year of the AMP.
Number of individual schemes	The count of schemes will refer directly to those sub options relating to grey storage options at WwTWs.

	It is assumed that delivery of storage will only be in Y5 of the AMP, this is on the basis that delivering and commissioning of storage options at WwTWs can be more complicated and will likely be commissioned in the final year of the AMP.
Projected spend on grey WwTW storage - capex	The projected spend relates only to those sub options relate to additional grey storage at WwTWs. We have assumed a spend profile which covers all years of the AMP as, while delivery and commissioning may be in the final year, capex will be incurred in all years. Details of which can be found in the method statement.
Projected spend on grey WwTW storage - opex	The projected spend relates only to those sub options relate to additional grey storage at WwTWs. We have assumed that opex will only be incurred in the final year of the AMP in line with the scheme commissioning.
Projected spend on grey WwTW storage - totex	See table in Section 0.

Line 2B - Interventions at WwTWs BLUE / GREEN - WwTW	
Number of individual blue/green interventions (schemes) required at WwTW to increase storm storage/reduce need for storm tanks on site	This line captures the additional blue / green interventions required to replace/retrofit/expand existing primary/secondary treatment processes using existing process types or more intensive processes on existing sites. It is assumed that delivery of the blue/green interventions will only be in Y5 of the AMP, this is on the basis that delivering and commissioning of options at WwTWs can be more complicated and will likely be commissioned in the final year of the AMP.
Projected spend on green WwTW interventions - capex	The projected spend relates only to those sub options relate to additional blue/green interventions at WwTWs. We have assumed a spend profile which covers all years of the AMP as, while delivery and commissioning may be in the final year, capex will be incurred in all years.
Projected spend on green WwTW interventions- opex	The projected spend relates only to those sub options relate to additional blue/green interventions at WwTWs. We have assumed that opex will only be incurred in the final year of the AMP in line with the scheme commissioning.
Projected spend on green WwTW interventions - totex	See table in Section 0.

Planning Objectives delivered by Tables 2A and 2B (multiple benefits)	
Reduced number of category 1-3 pollution incidents	The treatment related options do not directly impact upon the number of category 1-3 pollution incidents, as these are all derived from network interventions (sewer lining in GISMP catchments) in the reduction of sewer collapses. Therefore, the reduced number of category 1-3 pollution incidents for interventions at WwTW will be 0 across all AMPs.
Improvement in WwTW compliance	Forecast percentage change in WwTW compliance as a result of DWMP intervention(s) delivered by Tables 2A and 2B. The Additional Line definition refers to "Forecast percentage change in WwTW compliance as a result of DWMP intervention(s) delivered by Table 3", so for this line we report the percentage change, and not the overall percentage of compliance achieved at WwTWs.
Percentage of properties at risk of sewer flooding in a 1 in 50 storm	NOTE: The additional line definition states: "forecast reduction in the number of flooding incidents as a result of DWMP intervention(s) delivered by Tables 1A and 1B", whereas the description sates "Percentage of properties at risk of sewer flooding in a 1 in 50 storm". The two definitions do not correlate. NOTE: As per Table 1 Line 3 we are reporting the percentage of population at risk of sewer flooding and not the percentage of properties at risk of sewer flooding. We will report on the percentage of population affected by a 1 in 50 storm and NOT the percentage of properties. For more details see commentary for Table 1 (outcomes) Line 3. We have interpreted this to mean the forecast reduction in percentage reduction in population at risk of sewer flooding from a 1:50 storm.
Storm overflow average spill reduction	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduced number of overflows spilling 10 or more per year	NOTE: There is a discrepancy in the definitions here. The description refers to "the reduced number of overflows spilling 10 or more per year", while the Additional line definition refers to the "forecast reduction of overflows operating more than 10 times per year".

	In line with Table 1 line 4 we have interpreted this to mean the "forecast reduction of overflows operating ***more*** than 10 times per year". Whereas Table 1 reported the "Number of", this planning objective is looking to report the reduced number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduction in high priority overflows causing ecological harm per year	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduction in overflows causing ecological harm per year	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduction in sewer collapses	The Network options delivered by Tables 1A and 1B do not directly impact upon the number of sewer collapses, as these are all derived from network interventions (sewer lining in GISMP catchments). Therefore, the reduced number of sewer collapses for interventions at WwTW will be **0** across all AMPs.
Reduction in households with internal sewer flooding	NOTE: The additional line definition states: "Forecast reduction of internal flooding *incidents* as a result of DWMP intervention(s) delivered by Tables 1A and 1B". The main description refers to the "reduction in *households* with internal sewer flooding". We have interpreted this to mean the "reduction in **households** with internal sewer flooding" rather than a reduction in incidents.
Bespoke outcomes (add here)	As with the internal flooding planning objective, we have reported the reduction in households (properties) with external sewer flooding, rather than a reduction in incidents.

Line 3 - Interventions at WwTWs - additional treatment capacity

Additional FFT treatment capacity required at WwTWs	AMP8-AMP12: These summate values for schemes where FFT[30] is being increased for growth and climate change. This only includes FFT increases rather than ALL treatment capacity upgrades, as in keeping with the line description. There are a number of FFT upgrades required as part of the WINEP programme too. Where relevant they have been included in this line. There is a lower level of confidence in the FFT values associated with the WINEP upgrades as the source data in some circumstances is from unverified hydraulic models. Where a range of values have been presented, we have selected the higher, in order to represent a worst-case scenario. Our FFT programme is front end-loaded, with the majority of commitment in AMP8, in line with our overflow reduction target.
Number of individual schemes	The count of schemes will refer directly to those offering additional FFT increases captured in the cell above and have been reported in the final year of the AMP rather than a distributed profile. Where a location has more than one planned increase, over different AMPs, these have been counted as different schemes rather than just one.
Projected spend on additional WwTW capacity - capex	This includes all DWMP expenditure to address treatment works compliance risks due to population growth and climate change, not just FFT increases indicated in the line above. This is in keeping with the line description. It also includes the expenditure associated with those WINEP schemes requiring additional FFT. There are two assumptions: this is total spend at these sites (i.e. it will include all scope at the site, not just FFT), and this does not include schemes at other sites which do not have FFT increases (i.e. other schemes to address treatment compliance such as population growth, low phosphorous limits, etc). We have assumed a spend profile which covers all years of the AMP as, while delivery and commissioning may be in the final year, capex will be incurred in all years.
Projected spend on additional WwTW capacity - opex	We have assumed that opex will only be incurred in the final year of the AMP in line with the scheme commissioning.
Projected spend on additional WwTW capacity - totex	See table in Section 0.

[30] FFT = Flow to Full Treatment

Planning Objectives delivered by Table 3 (multiple benefits)	
Reduced number of category 1-3 pollution incidents	The FFT related options do not directly impact upon the number of category 1-3 pollution incidents, as these are all derived from network interventions (sewer lining in GISMP catchments) in the reduction of sewer collapses. Therefore, the reduced number of category 1-3 pollution incidents for interventions at WwTW will be 0 across all AMPs.
Improvement in WwTW compliance	Forecast percentage change in WwTW compliance as a result of DWMP intervention(s) delivered by Table 3. The Additional Line definition refers to "Forecast percentage change in WwTW compliance as a result of DWMP intervention(s) delivered by Table 3", for this line we report the percentage change, and not the overall percentage of compliance achieved at WwTWs.
Percentage of properties at risk of sewer flooding in a 1 in 50 storm	NOTE: The additional line definition states: "forecast reduction in the number of flooding incidents as a result of DWMP intervention(s) delivered by Tables 1A and 1B", whereas the description sates "Percentage of properties at risk of sewer flooding in a 1 in 50 storm". The two definitions do not correlate. NOTE: As per Table 1 Line 3 we are reporting the percentage of population at risk of sewer flooding and not the percentage of properties at risk of sewer flooding. We will report on the percentage of population affected by a 1 in 50 storm and NOT the percentage of properties. For more details see commentary for Table 1 (outcomes) Line 3. We have interpreted this to mean the forecast reduction in percentage reduction in population at risk of sewer flooding from a 1:50 storm.
Storm overflow average spill reduction	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduced number of overflows spilling 10 or more per year	NOTE: There is a discrepancy in the definitions here. The description refers to "the reduced number of overflows spilling 10 or more per year", while the Additional line definition refers to the "forecast reduction of overflows operating more than 10 times per year". In line with Table 1 line 4 we have interpreted this to mean the "forecast reduction of overflows operating ***more*** than 10 times per year".

	Whereas Table 1 reported the "Number of", this planning objective is looking to report the reduced number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduction in high priority overflows causing ecological harm per year	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduction in overflows causing ecological harm per year	Whereas Table 1 reported the "Number of", this planning objective is looking to report the "reduction in" the number of, we therefore will report the differences between AMPs that are calculated. In line with the delivery timescale of the blue/green interventions, commissioning of all screening planning objectives is also in the final year of the AMP.
Reduction in sewer collapses	The FFT options delivered by Table 3 do not directly impact upon the number of sewer collapses, as these are all derived from network interventions (sewer lining in GISMP catchments). Therefore, the reduced number of sewer collapses for interventions at WwTW will be 0 across all AMPs.
Reduction in households with internal sewer flooding	NOTE: The additional line definition states: "Forecast reduction of internal flooding *incidents* as a result of DWMP intervention(s) delivered by Tables 1A and 1B". The main description refers to the "reduction in *households* with internal sewer flooding". We have interpreted this to mean the "reduction in households with internal sewer flooding" rather than a reduction in incidents.
Bespoke outcomes (add here)	As with the internal flooding planning objective, we have reported the reduction in households (properties) with external sewer flooding, rather than a reduction in incidents.

Line 4 - Interventions at storm overflows – screening	
Total number of storm overflows	Total number of known overflows within the Thames Water region regardless of screen status.

Number of new screens required on overflows where the overflow has an existing screen (i.e. replacement screens)	Number of new screens where the asset condition is known to be poor to the point that it will require replacement. This is assumed to be 0 in the absence of any data regarding screen age, condition or design life. All assets requiring screens will have screens in line with pre-existing permits.
Number of new screens required on overflows where the overflow has not had a screen installed previously.	The number of storm overflow sites where there is no screen currently required by permit, or no permit. The assumption is that a screen will be required to meet Environment Act in these locations (IMP5 driver).
Projected spend on storm discharge screening for SODRP - capex	This will show a combination of both the costs associated with "replacement" screens and "new" screens. For AMP8 and AMP9 we have applied an expenditure profile to distribute the costs across the AMP, as it is anticipated that screen installations are relatively short duration and benefit will be seen immediately upon construction. NOTE: there are no anticipated replacement screen costs.
Projected spend on storm discharge screening for SODRP- opex	There are no opex costs associate with this line.
Projected spend on storm discharge screening for SODRP - totex	Capex and opex has been summated to calculate this line.

Line 5 - Reduction in OPERATIONAL GHG emissions
This data line was not required to be completed for the draft DWMP. NOTE: The additional line definition states "Total forecast reduction in operational GHG emissions compared to the baseline (2020)", whereas the main description refers to "Total operational GHG emissions". It is assumed that this should be "Total Reduction in Operational GHG emissions". Therefore, the GHG emissions will be a negative number as all activities result in an increase in GHG. NOTE: The data table has calculated totals for AMP8 and AMP9 and the 25-year. For line 5, the operational reductions are cumulative due to incremental population increase, and therefore cannot be totalled – and will result in errors.

Line 6 - Reduction in EMBODIED GHG emissions
This data line was not required to be completed for the draft DWMP.

NOTE: The additional line definition states "Total forecast reduction in embodied GHG emissions compared to the baseline (2020)", whereas the main description refers to "Total embodied GHG emissions". It is assumed that this should be "Total **Reduction** in embodied GHG emissions".

Therefore, the GHG emissions will be a negative number as all activities result in an increase in GHG.

NOTE: The data table has calculated totals for AMP8 and AMP9 and the 25-year. For line 5, the operational reductions are cumulative due to incremental population increase, and therefore cannot be totalled – and will result in errors.

Line 7 - Significant DWMP and PR24 schemes

At draft DWMP we presented our transformational 25-year SuDS programme to attenuate surface water flows from over 7000 ha and discharge attenuated flows a) to surface water systems, soakaways or direct to waterbodies or b) back to foul/combined systems where a) is impractical. We have now however added more clarity and detail to the definition of "significant".

We have used the following criteria to determine a "significant" scheme:

- For treatment assets: Include all schemes with a capex value greater than £0.5m
- For network assets: Include top 25% on scheme value

Where an option has more than one part to it, that was also included (sometime a phased approach, or alternatively it could be different elements, but that were reliant upon each other for the whole scheme to work). Where an option is phased over multiple AMPs then the final delivery date is the last year of the last AMP period the scheme is delivered in.

Line 8 - Key partnership schemes

The list is a snapshot view of our Partnership Opportunity Database which is considered a live database and as such is subject to change regularly. As of 10th March 2023, the Partnership Opportunity Database contained 271 partnership opportunities, of which 80 had passed through primary and secondary screening. Following a final revision process, a final list of 71 partnership opportunities are presented in the data table. The remaining 200 opportunities are yet to fully complete the primary screening and/or secondary scoring and represent opportunities at early stages of developments and require further engagement and investigation; therefore they have not been included in the Data table line at this time .

The schemes are at different stages of development from across our region. All partnership project opportunities will require further engagement with stakeholders to determine if they will be viable to deliver but in particular those that have not passed primary screening will require the most engagement due to many of these being initial suggestions or areas for investigation.

NOTE: The structure of the table has changed slightly from draft DWMP. The description of the Key Partnership schemes on the data table has the addition of the italic text in the paragraph above. In addition to this, at draft the table asked for the "Type of Spend", now this is "Type of Scheme". Whilst the terminology is different, we have interpreted this to fundamentally mean the same thing.

Definitions used in the data table:

- *Not yet defined*: The opportunity is not yet well defined enough to determine what the funding input requirement is from either Thames Water and/or other partners. Further investigation, a cost-benefit assessment and/or further engagement to better understand the opportunity are yet to be completed.
- *TBA (To be agreed):* The combined funding requirement for an opportunity (i.e. Company and Partnership Input combined) is defined to some degree through a cost-benefit assessment (varies between opportunities/stakeholders), but the split of the funding input has not yet been determined or agreed.
- *N/A (Not Applicable)*: It is not anticipated that the opportunity will require funding in this AMP (i.e. expected to have already been delivered).

In some instances we have provided a range (e.g. 100,000 – 200,000, or >500,000) in place of an exact figure in the Company Input and/or Partnership Input. This is to reflect that the opportunity has more certainty on the funding requirements than 'not yet defined' but not enough certainty at this stage to provide an exact figure.

Partnership funding may change at any time, and as such may remove the viability of a scheme.

Costs presented have not been deflated for the 2021-22 to 2020-21 price base. As costs are currently less or based upon top-down assessments rather than bottom-up costing, this would result in irregular company and partnership costs being presented in the table.

6 Table 3: Adaptive Plans

6.1 The Final DWMP has been split into the following Adaptive Plan component parts:

- Spills: addressing all requirements arising from the Storm Overflow Discharge Reduction Plan
- Flooding: Achieving our ambitious targets to reduce risk of sewer flooding of properties
- WWTW Compliance
- Other: Elements of our Plan where an adaptive planning approach is not considered viable

Adaptive Plans	
AP0 – Whole DWMP Plan	This is the adaptive plan and alternative pathways for the complete (L1) company DWMP. The core pathway is the no / low regrets plan that includes all activities that need to be undertaken to be ready for all plausible future scenarios and the alternative pathways describe how investment requirements may need to change over time. As the alternative pathways will usually be followed under more adverse scenarios, the additional or alternative activities may be described as 'higher-regret', relative to investments included in the core pathway. This block should include the total DWMP totex per AMP required to deliver improvements in performance from base expenditure and any additional enhancement expenditure representing the whole final DWMP. The 'Description of differences between pathways, including trigger and decision points' column was completed to provide the narrative for triggering an alternative pathway (such a specific climate change or growth scenario).

AP1 - Adaptive Plan components 1, 2 & 3	These blocks should describe the adaptive plan and alternative pathways for component parts (e.g. individual outcomes) of your final DWMP. The core pathway is the no / low regrets plan that includes all activities that need to be undertaken to be ready for all plausible future scenarios and the alternative pathways describe how investment requirements may need to change over time. As the alternative pathways will usually be followed under more adverse scenarios, the additional or alternative activities may be described as 'higher-regret', relative to investments included in the core pathway. These blocks should include the totex required to deliver improvements in performance of individual components of your final DWMP (outcomes) from base expenditure and any additional enhancement expenditure representing the whole final DWMP. The 'Description of differences between pathways, including trigger and decision points' was completed to provide the narrative for triggering an alternative pathway (such a specific climate change or growth scenario).

Glossary

Term	Description
1 in 30-year storm	A storm that has a 1 in 30 chance (3.33% probability) of being equalled or exceeded in any given year. This does not mean that a 30-year flood will happen regularly every 30 years, or only once in 30 years.
1 in 50-year storm	A storm that has a 1 in 50 chance (2% probability) of being equalled or exceeded in any given year. This does not mean that a 50-year flood will happen regularly every 50 years, or only once in 50 years.
Asset Management Plan (AMP)	A five-year planning cycle used by English and Welsh water industry regulators to set allowable price increases for privately owned water companies and for the assessment of performance indicators such as water quality and customer service.
Baseline Risk And Vulnerability Assessment (BRAVA)	Following Risk Based Catchment Screening (RBCS), more detailed risk assessments on those catchments where we believed there was an adverse risk to performance over time. We modelled their performance to 2020 (baseline), 2030, 2035 and 2050.
Business Plan	Business Plans are produced by water companies every 5 years. They set out their investment programme to ensure delivery of water and wastewater services to customers. These plans are drawn up through consultation with the regulators, stakeholders and customers and submitted to Ofwat for detailed scrutiny and review.
Catchment Strategic Plans (CSPs)	Summary reports to promote system thinking across large wastewater catchments. These provide early sight of our final plans enabling co-authoring opportunities for our stakeholders. Each document outlines the challenges that the catchment will face in the future and the long-term plans to address these issues.
Combined sewer	A sewer designed to receive both wastewater and surface water from domestic and industrial sources to a treatment works in a single pipe.
Customer Challenge Group (CCG)	An independent body that challenges both our current performance and our engagement with customers on building our future plans.
Cycle 1 and Cycle 2 DWMP	Our current DWMP is referred to as Cycle 1, it covers a planning period of 2025-2050. Our next plan will be published in five years' time and is referred to as our Cycle 2 DWMP, it will cover a planning period of 2030-2055.
Department for Environment, Food and Rural Affairs (Defra)	UK government department responsible for safeguarding the natural environment, food and farming industry, and the rural economy.
Drainage and Wastewater Management Plan (DWMP)	A Drainage and Wastewater Management Plan (DWMP) is '*a long-term strategic plan that sets out how wastewater systems, and the drainage networks that impact them, are to be extended, improved and maintained to ensure they are robust and resilient to future pressures*'. The planning period is 25 years, from 2025 to 2050. DWMP is iterated every five years; the first known as 'Cycle 1', published as a final plan in May 2023.
dDWMP	The draft version of the Drainage and Wastewater Management Plan, published in June 2022[31].
fDWMP	The final version of the Drainage and Wastewater Management Plan, to be published in May 2023.

[31] https://www.thameswater.co.uk/about-us/regulation/drainage-and-wastewater-management

Dry Weather Flow (DWF)	Dry Weather Flow is the average daily flow to a Sewage Treatment Works (STW) during a period without rain.
Environment Agency (EA)	UK government agency whose principal aim is to protect and enhance the environment in England and Wales.
EA Pollution Categories 1 to 3	Category 1 incidents have a serious, extensive or persistent impact on the environment, people or property. Category 2 incidents have a lesser, yet significant, impact. Category 3 incidents have a minor or minimal impact on the environment, people or property with only a limited or localised effect on water quality. Further Ofwat guidance available here: WatCoPerfEPAmethodology v3-Nov-2017-Final.pdf (ofwat.gov.uk)
Event Duration Monitoring (EDM)	Event duration monitoring (EDM) measures the frequency and duration of storm discharges to the environment from storm overflows.
External hydraulic sewer flooding	External flooding occurs within the curtilage of a property due to hydraulic sewer overload. Further Ofwat guidance available here: Reporting-guidance-sewer-flooding.pdf (ofwat.gov.uk)
Foul sewer	A foul sewer is designed to carry domestic or commercial wastewater to a sewage works for treatment. Typically, it takes wastewater from sources including toilets, baths, showers, kitchen sinks, washing machines and dishwashers from residential and commercial premises.
Grey infrastructure	New sewers, sewer upsizing and attenuation storage to provide additional capacity in the wastewater networks. Also covers new pumping stations, rising mains and/or civil structures at STWs.
Green infrastructure	Sustainable surface water management solutions, including sustainable drainage systems (SuDS), that are designed to mimic naturally draining surfaces. Typically applied to surface water or combined sewerage systems, but can also be applied to land, highway or other forms of surface drainage.
Historic England (HE)	A non-departmental public body of the government whose aim is to protect the historical environment of England by preserving and listing historic buildings, ancient monuments.
Hydraulic overload	Hydraulic overload occurs when a sewer or sewerage system is unable to cope with the receiving flow.
Internal hydraulic sewer flooding	Flooding which enters a building or passes below a suspended floor caused by flow from a sewer. Further Ofwat guidance available here: Reporting-guidance-sewer-flooding.pdf (ofwat.gov.uk)
L2 Area (Strategic Planning Area)	An aggregation of level 3 catchments (tactical planning units) into larger level 2 strategic planning areas. The level 2 strategic planning areas allow us to describe strategic drivers for change (relevant at the level 2 strategic planning area scale) as well as facilitating a more strategic level of planning above the detailed catchment assessments.
L3 Catchment (Tactical Planning Unit)	Geographical area in which a wastewater network drains to a single STW. Stakeholders may be specifically associated with this area. Includes for surface water sewerage that may exist which serves the wastewater geographical area but drains to a water course.
Lead Local Flood Authorities (LLFAs)	LLFAs are Risk Management Authorities as defined by the Flood and Water Management Act 2010. They have statutory duties with respect to flood risk management, investigating flooding and the compilation of surface water management plans.

Long-Term Delivery Strategy (LTDS)	A requirement by Ofwat on water companies, to ensure that short term expenditure meets long term objectives for customers, communities, and the environment. These will be submitted as part of the Price Review.
Misconnections	Misconnections are where either surface water drainage or foul water is connected to the wrong system e.g., surface water to foul only or foul to surface water systems.
Natural capital accounting	The process of calculating the total stocks and flows of natural resources in a given system, either in terms of monetary value or in physical terms.
Natural England (NE)	A non-departmental public body sponsored by the Department for Environment, Food and Rural Affairs to protect the natural environment in England, helping to protect England's nature and landscapes.
Non-governmental organisation (NGO)	An organisation that operates independently of any government, typically one whose purpose is to address a social or political issue.
Options Development and Appraisal (ODA)	A method to focus the level of planning effort, i.e., proportionate to the risks identified, with a view to providing a measure of consistency across the industry.
Ofwat	The regulatory body responsible for economic regulation of the privatised water and wastewater industry in England and Wales.
PR24	Every five years, water companies set out their plans for what they'll deliver and how much they'll charge customers[32]. Their plans over the next five years should include how they will: • Provide a safe and clean water supply • Provide efficient sewerage pumping and treatment services • Control leaks • Install meters • Maintain pipes and sewers • Maintain and improve environmental standards This process is known as the price review, and the next one will be in 2024, when Ofwat will make its final decisions. We call this PR24.
Risk-Based Catchments Screening (RBCS)	A first-pass screening exercise of catchment vulnerability against 17 different risk indicators. To understand which catchments are low risk catchments and those that are likely to be at risk in the future if not supported by our long-term plan.
Risk Management Authorities (RMAs)	Authorities responsible for Flood Risk as defined in the Flood and Water Management At 2010. These include, Lead Local Flood Authorities, Highway Authorities, Local Planning Authorities, Natural England and the Environment Agency.
Sewage Treatment Works (STW)	A sewage treatment works receives and treats wastewater to a standard legally agreed with the Environment Agency, before it is released back into the environment.
Specific, Measurable, Achievable, Relevant, and Time-Bound (SMART)	A framework for setting effective targets.
Storm overflow discharges	Storm overflows are used to manage excess flows, which typically occur as a result of heavy rainfall. Excess flow that may otherwise have caused flooding is released through a designated outfall to a water course, land area or alternative drainage system.

[32] https://www.ccwater.org.uk/priorities/price-review/

Strategic Environmental Assessment (SEA)	A systematic decision support process to ensure that environmental and other sustainability aspects are considered effectively in policy, plan and programme making.
Surface water sewer	A surface water sewer collects rainwater from domestic and commercial roofs, driveways, patios etc to a local watercourse or suitable surface water drainage system.
Sustainable Drainage systems (SuDS)	Drainage solutions that provide an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses. SuDS aim to reduce surface water flooding, improve water quality, and enhance the amenity and biodiversity value of the environment. SuDS achieve this by lowering flow rates, increasing water storage capacity and reducing the transport of pollution to the water environment.
Thames Regional Flood and Coastal Committee (TRFCC) area	The TRFCC area was established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members representing the Constituent Authority. Featured TRFCCs are listed here on our DWMP portal: Drainage and Wastewater Management Plan (arcgis.com)
Water Industry National Environmental Programme (WINEP)	The framework under which Defra and the EA require environmental improvements to be delivered by water companies. Guidance is released by regulators, which water companies interpret for their geographical area, and resubmit the outputs back to regulators for endorsement.

Navigating our DWMP

We've developed a comprehensive document suite to share our final DWMP. This includes five summary documents that contain increasing levels of detail. To help you to navigate around our document suite and to find key DWMP content, we provide a Navigation index below and on our DWMP webpage. The orange cells refer to where key DWMP content can be found across our final document suite.

Navigation index		Protecting the environment and providing a reliable, sustainable wastewater service							Best value and delivery					Working together		DWMP stages and data				
		Storm overflows	Sewer flooding	Level of ambition & pace of delivery	Growth & climate change	Resilience: flooding & power	Groundwater	Environmental assessments	Affordability & bill impact	Best Value	Base vs Enhancement	Solutions & deliverability	Programme alignment	Partnership working	Stakeholder & customer engagement	DWMP stages & process	Level 2 regional summaries	Level 3 regional summaries	Data tables	Risk & Assurance
Summary documents	Customer summary	■	■											■	■	■				
	Non-technical summary	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Technical summary	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	The Plan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	Catchment Strategic Plans x13	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■		
Technical appendices x11	Appendix A - Strategic context												■			■				
	Appendix B - Risk-Based catchment screening															■				
	Appendix C - Baseline risk and Vulnerability assessment				■	■										■				
	Appendix D - Options development and appraisal	■										■				■				
	Appendix E - Programme appraisal	■		■		■			■	■	■	■	■			■				
	Appendix F - Stakeholder engagement														■	■				
	Appendix G - Adaptive pathway planning	■	■		■															
	Appendix H – Customer engagement Part A – Draft DWMP														■	■				
	Appendix I - Risk and uncertainty											■								■
	Appendix J - DWMP and WRMP alignment												■							
	Appendix M - Assurance																			■
New technical appendices x9	Appendix N - You Said, We Did (YSWD)	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	Appendix O - What base buys										■									
	Appendix P - Response to July 2021 Floods		■	■	■	■			■			■	■	■	■					
	Appendix Q - Storm overflows	■		■	■				■			■	■							
	Appendix R - Delivery of SuDS and nature-based solutions	■	■	■	■	■			■	■		■	■	■	■					
	Appendix S - Partnership opportunities and working			■								■		■	■					
	Appendix T - Groundwater quality						■													
	Appendix U - Resilience		■		■	■							■	■	■					
	Appendix V – Customer engagement Part B – Consultation Survey Report														■					
Environmental assessments	Appendix K - Strategic environmental assessment (SEA)							■												
	Appendix L - Habitats regulations assessment (HRA)							■												
Portals and data	Customer portal	■	■							■		■		■	■	■	■	■		
	Practitioner portal	■	■											■	■		■	■		
	Data tables			■							■								■	
	Data tables commentary																		■	

We welcome your views on our DWMP. Please share them with us by emailing: DWMP@thameswater.co.uk.

This document reflects our DWMP 2025-2050 as published in May 2023.