

**United Utilities Water**

# **Drainage and Wastewater Management Plan 2023**

## **Technical Appendix 4 – Risk Based Catchment Screening**

**Document Reference: TA4**

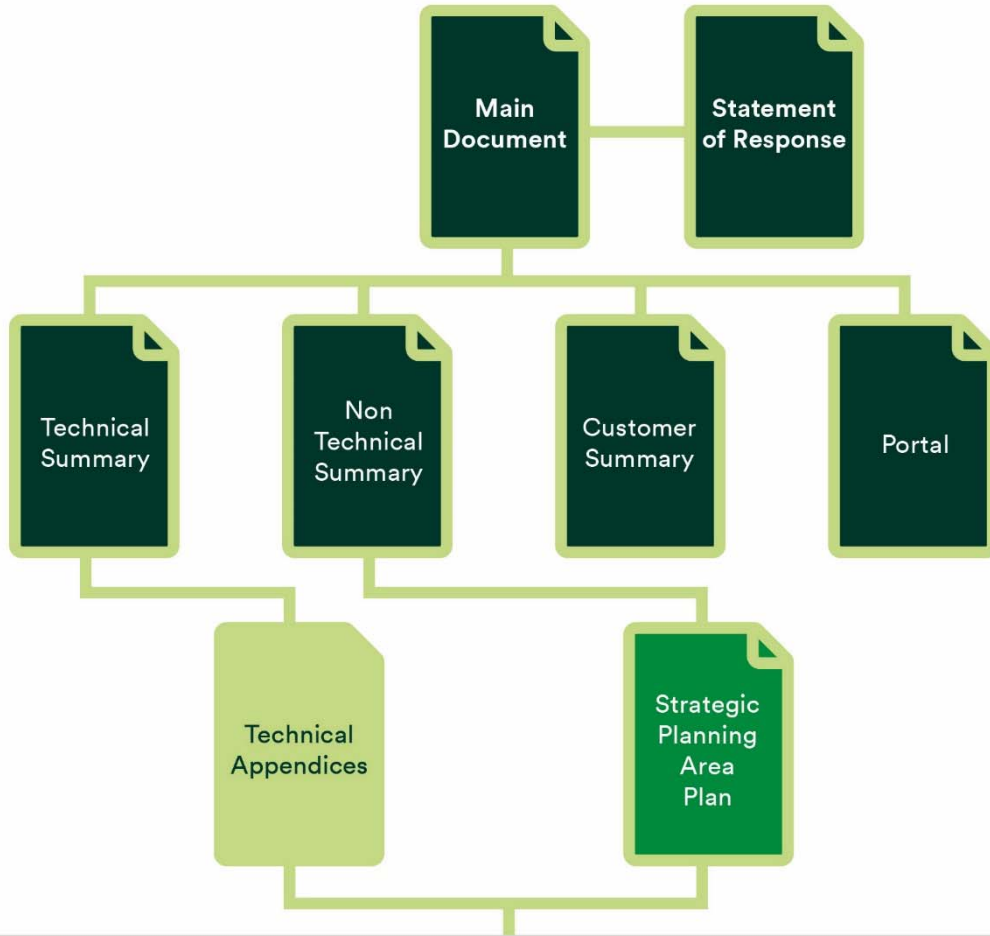
**May 2023**

## Executive Summary

As we approach the second quarter of this century, our drainage and wastewater assets are under increasing stress. The pressures generating this stress include climate change, population growth and ageing infrastructure, all of which are having negative consequences on asset health. One of the primary aims of the DWMP is about how we can work collaboratively with our partners to develop long-term plans to extend, improve and maintain a robust and resilient drainage and wastewater system. To ensure that the effort is focused in the right places, an approach was needed to understand which of our wastewater catchments are at the highest risk of experiencing issues in the future. Hence the Risk-Based Catchment Screening (RBCS) process was developed. In RBCS, each catchment draining to a wastewater treatment works is assessed against a range of indicators. These assessments are high level and draw on mainly historic data from already established reporting systems. It is, therefore, considered a pragmatic and proportionate approach to shortlist sites for the Baseline Risk and Vulnerability Assessments (BRAVA), which in turn will be used to develop Options to inform this plan and the next Price Review.

This document explains where the RBCS process sits within the DWMP framework and how it interacts with Strategic Context (the preceding stage), and BRAVA (the subsequent stage). In RBCS, each catchment is assessed against 17 standard indicators and two bespoke indicators. For each of these indicators, there is a high-level description, methodology and a discussion of any limitations. Details are then included on how a breach against an indicator impacts on whether a catchment proceeds to BRAVA, and if so, which assessments would be required. Details on the BRAVAs which were undertaken can be found in 'Technical Appendix 5 – Assessing Future Risk (TA5)'. Finally, there is a discussion on the financial year 2019 (FY19) indicator breaches, which were previously shared with the industry steering group in December 2019, and the results from the Annual Reviews in financial years 2020, 2021 and 2022.

Figure 1 DWMP document structure



|                                       |                  |
|---------------------------------------|------------------|
| TA1 Assurance and Governance          | Alt Crossens     |
| TA2 Stakeholder Engagement            | Derwent          |
| TA3 Demand Forecasting                | Douglas          |
| TA4 Risk Based Catchment Screening    | Eden Esk         |
| TA5 Assessing Future Risk             | Irwell           |
| TA6 Resilience                        | Kent Leven       |
| TA7 Options Development and Appraisal | Lune             |
| TA8 Programme Optimisation            | Mersey Estuary   |
| TA9 Customer Engagement               | Ribble           |
|                                       | South West Lakes |
|                                       | Upper Mersey     |
|                                       | Waver Wampool    |
|                                       | Weaver Gowy      |
|                                       | Wyre             |
| Environmental Assessments             |                  |

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## Glossary

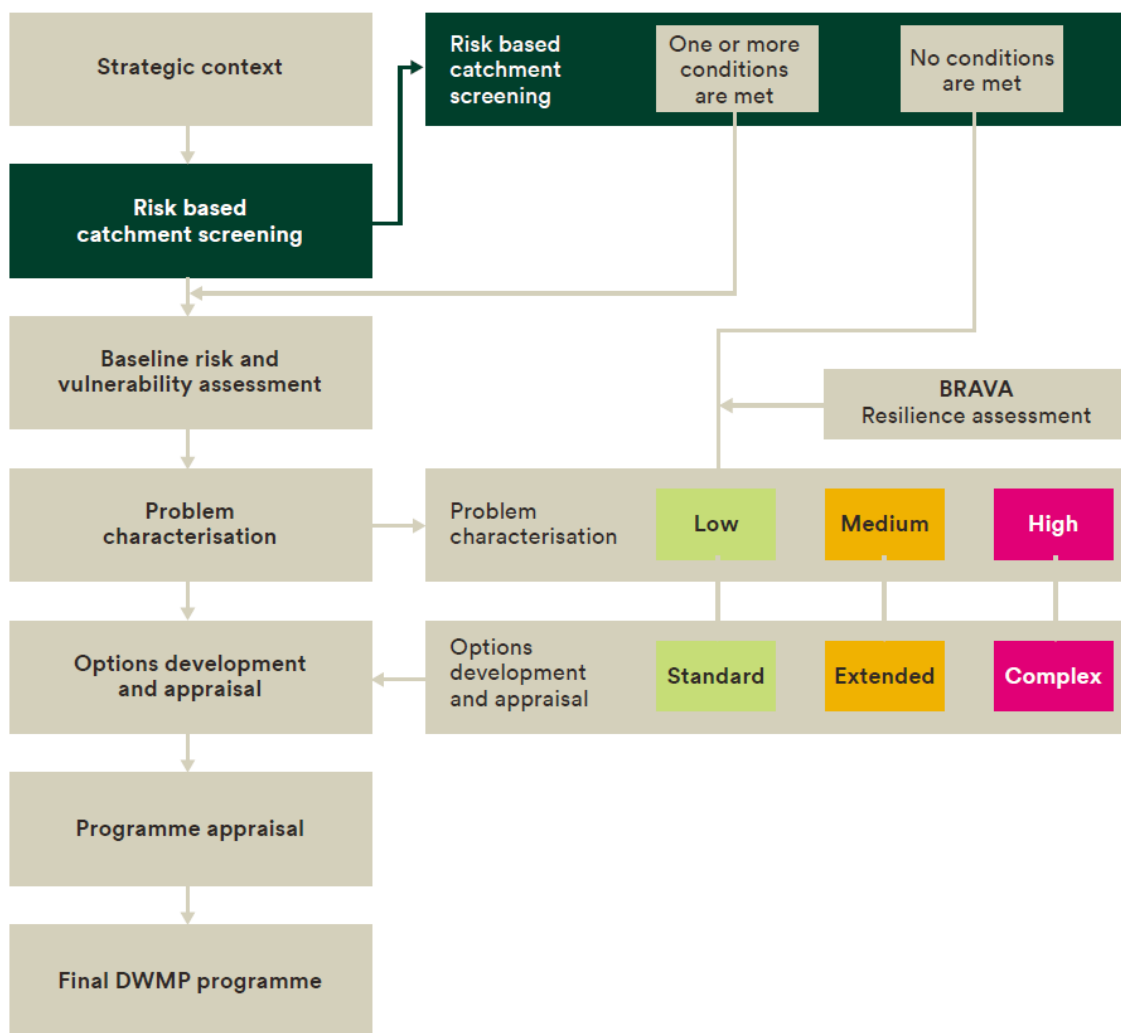
For the glossary, refer to document C003.

# 1. Introduction

## 1.1 Overview

- 1.1.1 The DWMP framework states that all Tactical Planning Units (TPU) are to be subjected to a high-level, risk-based review to determine if more detailed supply/demand assessments are required. This involves assessing the TPU against a range of indicators and reporting the results.
- 1.1.2 In terms of the DWMP management structure shown in Figure 2, the Risk-Based Catchment Screening (RBCS) process sits between Strategic Context, and Baseline Risk and Vulnerability Assessment (BRAVA). In RBCS a series of high-level assessments linked to the Planning Objectives (set out in Strategic Context), was used to review and screen each TPU to determine whether a more detailed BRAVA assessment was required.

Figure 2 RBCS and the DWMP management structure <sup>1</sup>



- 1.1.3 The RBCS assessments were undertaken for a series of indicators. There are 17 standard indicators which are designed to span the key aspects of a wastewater company’s responsibilities: from the network, to the wastewater treatment works, to their interaction with the environment. Since the purpose of the DWMP is to focus effort on areas where there are existing risks and vulnerability, historic data were used for the assessment of each indicator. To maintain the high-level screening nature of this stage, these data should be readily available from company reporting systems.

<sup>1</sup> [DWMP Framework Report - Figure 4-1](#)

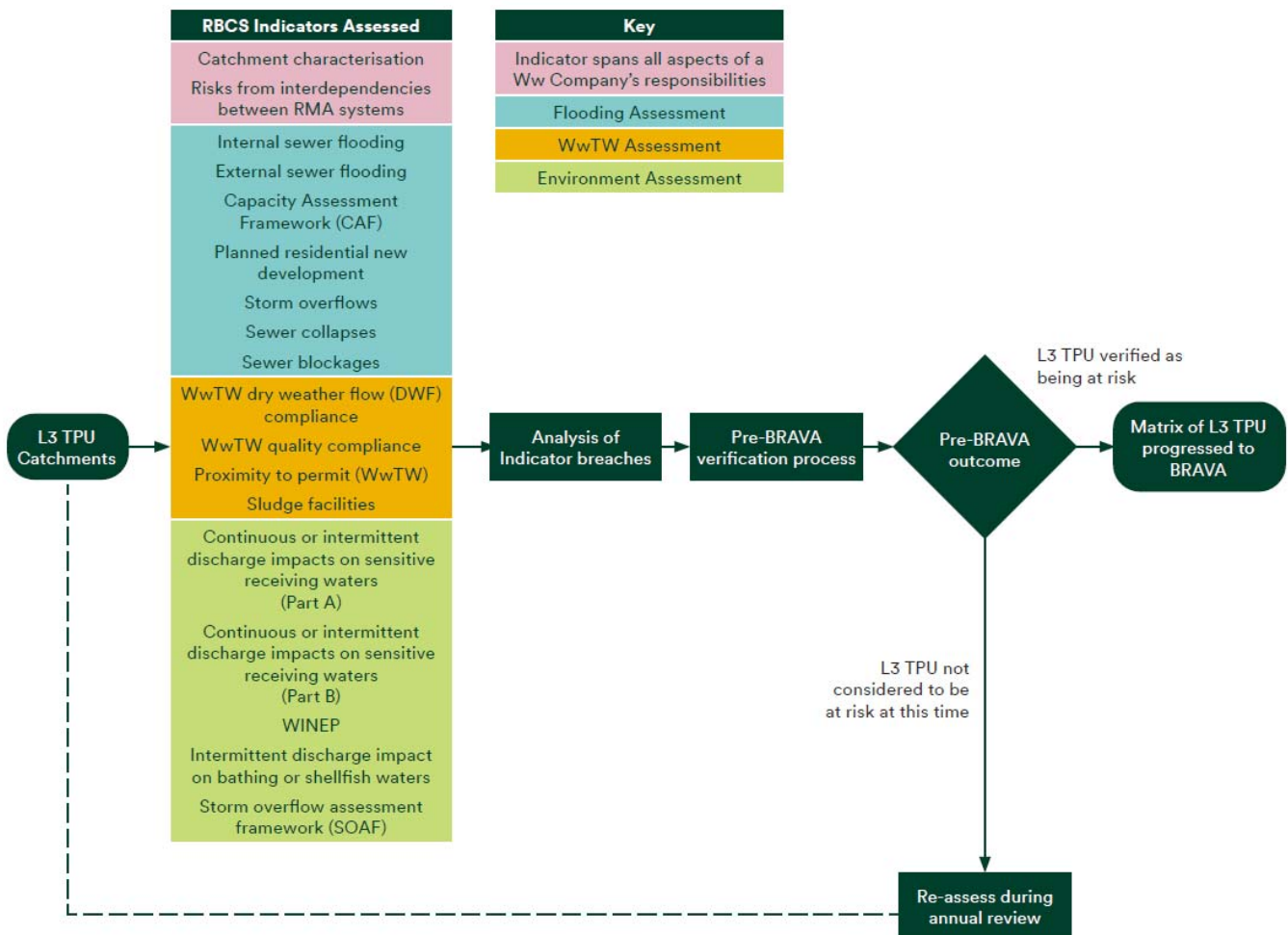
- 1.1.4 There is also scope for a company to include additional indicators reflecting specific company priorities. To capture the potential impact of sludge on wastewater, United Utilities Water (UW) has additionally included 'Sludge Facilities' as an indicator. Although the standard indicator on 'WwTW Quality Compliance' is designed to capture wastewater treatment works currently failing to meet permitted effluent quality discharge consents, UW also felt it important to capture those works which were at risk of failing in the future. Hence the inclusion of 'Proximity to Permit' as a second bespoke indicator. Each indicator is described in Section 2.
- 1.1.5 The results from the RBCS assessments were then verified with operational managers. Only following this verification process were the results used to inform BRAVA. The final BRAVA recommendation list for each TPU was also reviewed with operational managers.

## 2. Indicators and process

### 2.1 Overview

2.1.1 Figure 3 lists the 19 RBCS indicators and the colours show which category each indicator belongs to. Further details on how a breach against an RBCS indicator impacts on the list of BRAVAs undertaken are given in Section 3.1.

Figure 3 The process from RBCS to BRAVA



2.1.2 The RBCS assessment was first completed for the financial year (FY) from April 2018 to March 2019 (also know as FY19). Results were shared with the industry steering group in December 2019. These have since been updated for FY20, FY21 and FY22. The results from these updates will be used as a starting point for DWMP23.

### 2.2 Catchment characterisation (Tier 2)

2.2.1 The purpose of this indicator is to identify where there are catchments which are vulnerable to sewer flooding as a result of an extreme wet weather event. It aligns with the 'Risk of sewer flooding in a storm' metric from the common performance commitment set prior to the investment period from 2020 to 2025.

2.2.2 This assessment included all catchments irrespective of area or population. In addition to requiring standard catchment data on sewer length, population etc. this assessment comprised 15 sub-



assessments e.g., topography funnelling of flows, proximity to rivers/seas. The vast majority of TPUs breached this indicator.

## 2.3 Intermittent discharges impact upon bathing or shellfish waters

2.3.1 The purpose of this indicator is to understand where water company operations are having an impact on bathing or shellfish waters.

2.3.2 The Company’s historic NEP (National Environment Programme) records, along with the current programme, were used to identify intermittent discharges with a bathing water or shellfish water permit. This list of discharges was cross-checked against the company’s permit database to confirm that they are all still live. For all live discharges, activation frequency data was retrieved from the previous five years (where available). As defined in the DWMP framework’s Appendix B, the activation threshold for each asset was set slightly above the activation threshold stated in the permit. A TPU was considered to breach this indicator if it contains at least one asset exceeding the activation threshold for any of the analysed years.

## 2.4 Discharges impact upon other sensitive receiving waters (Part A)

2.4.1 The purpose of this indicator is to understand where water company operations are impacting on Designated Sites such as Sites of Special Scientific Interest (SSSIs) or Ramsar sites.

2.4.2 The Major Landowners Group (MLG) ‘Remedies’ list was obtained from Natural England (NE). This is a list of actions required by major landowners to improve or maintain NE’s Designated Sites. The list was filtered to only show:

- Remedies where United Utilities Water are the ‘Responsible Party’;
- Remedies to resolve an ‘Adverse Condition’ within ‘Freshwater Drainage’ or ‘Freshwater Pollution Discharges’; and
- Remedies where the ‘Remedy status’ is ‘Identified’ or ‘Not Agreed’.

2.4.3 The filtered list of sites was then reviewed against the list of schemes on the NEP, and any site forming part of an NEP commitment, and completed prior to the DWMP base year (for Cycle 1, this was 2020), was excluded. The remaining sites were then mapped to the nearest TPU.

2.4.4 As defined in the DWMP framework, this indicator was also required to include any UUW actions within a Diffuse Water Pollution Plan (DWPP). The list of MLG Remedies on land owned by UUW was obtained and filtered to only show sites with a DWPP identified as a ‘Remedy’. To identify whether UUW is listed as a delivery partner in the DWPP, the Site Improvement Plan (SIP) for the Designated Site was referred to. Note, only sites requiring UUW’s involvement in improving the quality or volume of discharge were included. The filtered list of sites was then reviewed against the list of schemes on the NEP, as described in the previous paragraph, and the remaining sites were mapped to the nearest TPU.

## 2.5 Discharges impact upon other sensitive receiving waters (Part B) (Tier 2)

2.5.1 The purpose of this indicator is to understand where water company operations are impacting on sensitive receiving waters not addressed by other indicators.

2.5.2 A list of the ‘threats’ to Natural England’s (NE) Designated Sites was required for this indicator. The list was filtered to show:

- Threats where United Utilities Water is the action owner; and
- Threats to water pollution only.

- 2.5.3 This filtered list of sites was then reviewed against the list of schemes which have ever been included in the NEP, and any scheme forming part of an NEP commitment was excluded. The remaining list of threats was mapped to the nearest TPU. A TPU was considered to breach this indicator if it contained at least one site within the remaining list of sites.

## 2.6 Storm overflow assessment framework (SOAF)

- 2.6.1 The purpose of this indicator is to identify where there are activations which are currently breaching SOAF, or have the potential to breach SOAF in the future.
- 2.6.2 All activations with Event Duration Monitoring (EDM) data were included in the analysis. Depending on how many years of EDM data is available, SOAF states a sliding threshold of risk between 40 and 60 activations a year. However, for this assessment, a more conservative approach to the breach threshold was taken by assuming a breach if the number of activations in a year exceeds 40, irrespective of the number of years of data available. A TPU was therefore considered to breach this indicator if it contained at least one overflow where the *average* number of activations per year over the monitoring period exceeded 40. Sites were identified as a *possible* breach where the average was less than 40 but there was at least one year with more than 40 activations. The TPUs containing the *possible* breaches were also included in the number of breaches, to mitigate the risk of these sites breaching the SOAF triggers in the future.

## 2.7 Capacity assessment framework (CAF)

- 2.7.1 The purpose of this indicator is to identify where there are current capacity constraints in the network as a leading indicator to service failure in the future.
- 2.7.2 As per the CAF project report<sup>2</sup>, there are two different methods for assessing sewer capacity: Initial and Enhanced. The Initial Methodology uses basic pipe capacity metrics, but the Enhanced Methodology requires outputs from a network model. Where a network model was available, the Enhanced Method was used. For the year 2020, the network model was used to generate surcharge return periods for pipes and the average number of activations per year for storm overflows. TPUs containing a high proportion of frequently surcharging pipes or frequently activating storm overflows were considered to breach this indicator.

## 2.8 Internal sewer flooding

- 2.8.1 The purpose of this indicator is to identify where there are issues with internal flooding which may be indicative of capacity constraints. It is aligned to the common performance commitment on internal flooding set prior to the investment period from 2020 to 2025, apart from extreme events are excluded. As per Ofwat's guidance note<sup>3</sup> cited below, an extreme event is defined as having a return period of 1 in 30 years.
- 2.8.2 Internal flooding incident data used to generate the externally reported value was obtained for the previous three years and extreme events were excluded. These data were mapped to identify which TPU it related to. For the same timeframe, the number of properties in each TPU was also obtained and the regional total reconciled with externally reported values. The number of incidents per TPU was then normalised by calculating the number per 10,000 properties.
- 2.8.3 A small catchment (defined as having less than 2000 population equivalent) was considered to breach this indicator if there are at least two incidents over the last three years. For all other catchments, the threshold becomes the lesser of the average normalised company performance over three years, or the

<sup>2</sup> [21ST CENTURY DRAINAGE PROGRAMME - CAPACITY ASSESSMENT FRAMEWORK PROJECT REPORT - Ref. No. 21CDP.CAF](#)

<sup>3</sup> [Ofwat - Guidance note for weather-related exemptions in the GSS - April 2017](#)

industry upper quartile. The 'Industry Upper Quartile' data were taken from Ofwat's 'Delivering outcomes for customers' document produced for PR19.<sup>4</sup> A larger catchment was therefore considered to breach this indicator if the normalised number of flooding incidents in any of the preceding three years exceeds the calculated threshold, and there are at least two incidents over the last three years.

- 2.8.4 During the pre-BRAVA consultation with operational managers, the incident data were verified, plus those sites with active schemes to resolve flooding were excluded from the results.

## 2.9 External sewer flooding

- 2.9.1 The purpose of this indicator is to identify where there are issues with external flooding which may be indicative of capacity constraints. It aligns with the asset health performance commitment on external flooding set prior to the investment period from 2020 to 2025.
- 2.9.2 The same methodology was followed as is described in section 2.8.2, but external flooding incident data was used instead of internal flooding incident data.
- 2.9.3 A small catchment was considered to breach this indicator if there are more than ten incidents over the last three years. For all other catchments, the threshold becomes the lesser of the average normalised company performance over three years, or the industry upper quartile. The industry upper quartiles for external flooding incidents were calculated from the exchange of annual performance review (APR) data. A larger catchment was therefore considered to breach this indicator if the normalised number of flooding incidents in any of the preceding three years exceeds the calculated threshold, and there are more than ten incidents over the last three years.

## 2.10 Pollution incidents

- 2.10.1 The purpose of this indicator is to identify where water industry-owned assets have made an unexpected release of wastewater that has caused environmental damage. It aligns with the definitions of pollution incidents within the Environment Agency's Environmental Performance Assessment (EPA) methodology.<sup>5</sup> Note, from 2021 onwards this includes incidents from pumping stations that were formerly private but adopted in October 2016.
- 2.10.2 To align with the EPA assessment timescales, the data for this indicator was based on a calendar year (CY). The list of pollution incidents used to generate the externally reported value was obtained for the previous three years. Any incidents relating to bioresources were removed, before the rest of the incident data was mapped to identify which TPU it related to. For the same time frame, the kilometres of sewer within each TPU were obtained and the aggregated regional total reconciled with externally reported values by applying an uplift factor. The number of incidents per TPU was then normalised by calculating the number of incidents per 10,000km of sewer length. For the FY20 to FY22 annual updates, it wasn't considered necessary to repeat the sewer length analysis for those TPUs which had already undergone the full suite of network BRAVAs. Therefore for the FY20 to FY22 updates, this assessment was only repeated for TPUs which did not already have a hydraulic model for BRAVA (using the same sewer length uplift factor as FY19).
- 2.10.3 A TPU was considered to breach this indicator if it had at least one Category 1 or 2 incident from the last three years, or the average annual performance for any of the previous three years was above the threshold defined in the EPA. In addition, if the average annual performance breach was due to a single Category 3 incident, there were to be no measures in place to resolve that incident.

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<sup>4</sup> [Ofwat - Technical Appendix 1: Delivering outcomes for customers final - January 2019](#)

<sup>5</sup> [Environment Agency - Environmental Performance Assessment methodology \(v.8\) for 2021 to 2025 - October 2020](#)

## 2.11 Wastewater treatment works quality compliance

- 2.11.1 The purpose of this indicator is to identify where there are failing wastewater treatment works. It aligns with the failures identified within the Environmental Performance Assessment (EPA)<sup>5</sup> and the common performance commitment on treatment works compliance set prior to the investment period from 2020 to 2025.
- 2.11.2 As per the EPA criteria, a discharge at a wastewater treatment works was considered as failing if it breached any one of the numeric permit limits (including sanitary and non-sanitary parameters, nutrient parameters and UWWTD parameters). A TPU was considered to breach this indicator if in any of the previous three years, the wastewater treatment works had a discharge confirmed as failing and measures had not been identified to address the cause of failure.

## 2.12 WwTW dry weather flow compliance

- 2.12.1 The purpose of this indicator is to identify where there are wastewater treatment works with a risk of exceeding their dry weather flow (DWF) permit.
- 2.12.2 For sites which hold a numeric DWF permit, flow data from the previous calendar year was collated and the flow which is exceeded 90% of the time (Q90) was calculated.
- 2.12.3 For the FY19 analysis, a TPU was considered to breach this indicator if the Q90 exceeds the DWF permit for two consecutive years out of five. From FY20 onwards, a TPU will breach this indicator if Q90 exceeds DWF for three out of five years (including the most recent calendar year).

## 2.13 Storm overflows

- 2.13.1 The purpose of this indicator is to identify where there are permit risks relating to storm overflows that have not been captured by other indicators.
- 2.13.2 Network and wastewater treatment works' operators were consulted to understand where assets had been flagged through business-as-usual processes as being at risk of permit non-compliance and did not have corrective action underway. These assets were then mapped to identify which TPU they related to.
- 2.13.3 A TPU was considered to breach this indicator if it was flagged as being at risk of permit non-compliance.

## 2.14 Risks from interdependencies between RMA (Risk Management Authority) drainage systems

- 2.14.1 The purpose of this indicator is to identify where there are risks due to interactions between RMA drainage systems.
- 2.14.2 The surface water flooding maps produced by both the Environment Agency and National Highways were overlaid on top of UUW's sewer network. For each TPU, the number of properties within a third-party flood risk area was calculated and represented at a TPU level as the number of impacted properties per 10,000 properties.
- 2.14.3 A TPU was considered to breach this indicator if the normalised number of impacted properties is above the company upper quartile.
- 2.14.4 The limitation with this methodology is that smaller TPUs were breaching the indicator without having many manholes at risk. To address this, all indicator breaches were verified during the pre-BRAVA consultation to understand actual risks.

## 2.15 Planned residential new development

- 2.15.1 The purpose of this indicator is to understand where the increase in new development is likely to have an impact on the existing wastewater assets.
- 2.15.2 For each TPU, local planning data was used to estimate population increases up to the ten-year forecast. Beyond this, local data was supplemented with regional forecast data, to estimate population increases up to the twenty-five year forecast. The future population forecasts were assessed against existing population and the percentage increase was compared to the thresholds in Table B-3 from DWMP framework Appendix B<sup>6</sup>. For populations not defined in the table, the given thresholds were interpolated.
- 2.15.3 For each design horizon, a TPU was considered ‘At Risk’ if the estimated population increase exceeds the threshold generated from Table B-3. Note, TPUs with less than or equal to 10 population were noted as ‘Less than 10 p.e.’ in the risk columns. Non-residential new development was not assessed as there was high uncertainty in development forecasts on the allocation of non-households.
- 2.15.4 Baseline property numbers were refreshed annually, and property forecasts were screened. This was completed using updated plan-based data, and areas of growth that were not previously highlighted were reviewed to understand if additional baseline risk assessments were required. For the FY19 RBCS analysis, the 2019 property update was used. For the FY20 and FY21 RBCS updates, the 2020 update was used. This indicator was not repeated for FY22.

## 2.16 The Water Industry National Environment Programme (WINEP)

- 2.16.1 The purpose of this indicator is to identify where the company may need to invest in the future to meet environmental obligations. The current WINEP was used to identify these locations.
- 2.16.2 Measures identified as having a confirmed environmental driver but assessed as not cost beneficial were included, as were measures defined as investigations or option appraisals. Since all coastal models were run as investigations within the current WINEP, any catchment that actively contributes to Bathing Water Quality was included. Note, this assessment excluded any investment identified in the WINEP for delivery during the current investment cycle. Investigations into storm overflows with a high frequency of activations (U\_INV) were excluded to avoid double counting with the SOAF indicator, and, as stated in the DWMP framework’s Appendix B, ‘Monitor only’ drivers were also excluded. The locations of the measures to be included were mapped to the relevant TPU.
- 2.16.3 A TPU was considered to breach this indicator if it contained a WINEP site identified for future investment.

## 2.17 Sewer collapses

- 2.17.1 The purpose of this indicator is to identify where the integrity of the sewer system is at risk. It is aligned to the common performance commitment on sewer collapses set prior to the investment period from 2020 to 2025.
- 2.17.2 The company’s regulatory reporting system was used to extract the sewer collapse records from the previous three years. Small TPUs were considered to breach this indicator if there were two or more collapses in any of the preceding three years. For all other TPUs, the collapses data were normalised by sewer length (number of incidents per 10,000km of sewer) and a breach was considered to occur if the normalised collapses performance in any of the preceding years was greater than the company average for the last year.
- 2.17.3 The sewer length for each TPU was calculated using corporate data, and the aggregated regional total was reconciled with externally reported values by applying an uplift factor. For the FY21 annual updates,

<sup>6</sup> [DWMP framework Appendix B](#)

it wasn't considered necessary to repeat the sewer length analysis for those TPUs which had already undergone the full suite of network BRAVAs, so for those years this assessment was only repeated for TPUs which did not already have a hydraulic model for BRAVA (using the same sewer length uplift factor as FY19).

## 2.18 Sewer blockages

- 2.18.1 The purpose of this indicator is to identify where there have been obstructions in a sewer, which causes a reportable problem (not caused by hydraulic overload). It aligns with the asset health performance commitment on sewer blockages set prior to the investment period from 2020 to 2025.
- 2.18.2 The company's regulatory reporting system was used to extract the sewer blockage records from the previous three years. All the data were then normalised by sewer length, as described in Section 2.17. A TPU was considered to breach this indicator if the number of blockages (normalised by sewer length) in any of the preceding years was greater than the company average.

## 2.19 Sludge facilities

- 2.19.1 The purpose of this indicator is to identify where there are sludge treatment facilities. Since sludge production and treatment have the potential to significantly affect wastewater treatment, it was felt that this indicator was required to ensure that facilities potentially impacted proceeded to BRAVA.
- 2.19.2 A list of sludge treatment facilities was collated. This included sites with sludge thickening, dewatering, digestion and/or lime addition. A TPU was considered to trigger this indicator if it contained a site with sludge treatment facilities.

## 2.20 Proximity to permit

- 2.20.1 The purpose of this indicator is to identify where there are wastewater treatment works which are at risk of failing in the future. Although the standard indicator 'Wastewater treatment works quality compliance' is designed to capture failing works, it was felt important to capture those works which were at risk of failing in the future.
- 2.20.2 For all sites with final effluent water quality monitors, the monthly sampling data from the past four years was assessed in terms of proximity to permit and allocated a risk status. The total number of months for which the wastewater treatment works was classified as either 'High' or 'Medium' risk was then used to determine if this indicator was breached. Note, sites that breached their permit were excluded from this indicator as they would be picked up through the treatment works compliance indicator.

## 3. Progression to BRAVA

### 3.1 Tier classification

- 3.1.1 In line with the framework, each indicator was allocated a tier number to show the significance of that indicator on the decision for a TPU to proceed to BRAVA. Almost all indicators are Tier 1, with the exception of Blockages and Collapses (unclassified), and the Tier 2 indicators listed below:
- Catchment characterisation;
  - Discharge impacts on sensitive receiving waters (Part B)
  - Sludge facilities
  - Proximity to permit
- 3.1.2 All breaches against a Tier 1 indicator will trigger a BRAVA. If a TPU only has breaches against Tier 2 indicators, there must be at least two Tier 2 breaches to validate proceeding to BRAVA. A single breach against a Tier 2 indicator will not trigger a BRAVA. If no indicators are breached, it is assumed the TPU area is not vulnerable to changes in future risks. These TPUs will still be assessed using UUW's regional asset deterioration model, but no detailed baseline risk assessment is required. They will however be subject to a resilience assessment.
- 3.1.3 The initial RBCS results were reviewed with operational managers prior to commencing BRAVA. For sites which only triggered a small number of indicators, discussions were held on which BRAVA assessments would be appropriate to run. The process of reviewing the RBCS results prior to BRAVA is discussed in further detail in TA5.

## 4. Other considerations

### 4.1 Normalisation

- 4.1.1 For several of the network indicators, normalisation was applied to the results so that relative risk can be assessed and compared to company average/upper quartile performance. This can lead to some TPUs not breaching the stated thresholds, despite localised risk. This was discussed through the pre-BRAVA consultations and, where not being considered as part of current delivery programmes, they were captured for further investigation or inclusion within BRAVA.

### 4.2 Insufficient data risk

- 4.2.1 Where there is insufficient data to apply the indicator, it is classed as 'at risk' to highlight where more information or data is required for future iterations of RBCS.



## 5. RBCS outputs

### 5.1 Tactical planning unit (TPU) results

5.1.1 The FY19 RBCS results were previously shared with the industry steering group in December 2019. An extract from these results is provided in Table 1. The format of the results is that each TPU is listed along with some key facts, and any blue shading within the main body of the table indicates that the TPU has breached a particular indicator. Logic formulae are then used to determine if a TPU should proceed to BRAVA. Out of 567 TPUs assessed, 397 were flagged as requiring BRAVA. Although this is nearly 70% of TPUs proceeding to BRAVA, these sites represent over 99% of the population in the company area.

**Table 1 Extract from tactical planning unit RBCS results for United Utilities Water**

| Level 1 Company Name | Level 2 Strategic Planning Area | Level 3 Tactical Planning Unit |               | Total Population Equivalent<br>(Per APR Table 4S Line 16) | 1                                   | 2                           | 3                                      | 4  | 5    | 6   | 7                       |
|----------------------|---------------------------------|--------------------------------|---------------|---|-------------------------------------|-----------------------------|--|--|------|-----|-------------------------|
|                      |                                 | Ref                            | Name          |   | Catchment Characterisation (Tier 2) | Bathing or shellfish waters | Discharge to sensitive waters (part A) | Discharge to sensitive receiving (part B) (Tier 2) | SOAF | CAF | Internal Sewer Flooding |
| United Utilities     | Mersey Estuary                  | BIRKE-WW1                      | Birkenhead    | 179,046   |                                     |                             |  |  |      |     |                         |
| United Utilities     | Douglas                         | BISPG-WW1                      | Bispham Green | 95  |                                     |                             |  |  |      |     |                         |
| United Utilities     | Ribble                          | BLACK-WW1                      | Blackburn     | 272,701   |                                     |                             |  |  |      |     |                         |
| United Utilities     | Douglas                         | BLKRD-WW1                      | Blackrod      | 5   |                                     |                             |  |  |      |     |                         |
| United Utilities     | Eden and Esk                    | BLENC-WW1                      | Blencarn      | 127   |                                     |                             |  |  |      |     |                         |
| United Utilities     | Derwent (NW)                    | BLENN-WW1                      | Blennerhasset | 303   |                                     |                             |  |  |      |     |                         |
| United Utilities     | Derwent (NW)                    | BLIND-WW1                      | Blind Crake   | 141   |                                     |                             |  |  |      |     |                         |
| United Utilities     | Irwell                          | BOLTO-WW1                      | Bolton        | 381,527   |                                     |                             |  |  |      |     |                         |

### 5.2 Consolidation to strategic planning area and company area

5.2.1 The TPU results were consolidated to SPA and company area using population equivalent (PE) to normalise the data. The results from the consolidation process are presented in Table 2 and Table 3. In Table 2, the blue and yellow shading has been used to indicate the percentage of the population in each SPA living in a TPU which breaches each indicator (see key).

**Table 2 Strategic planning area RBCS results for United Utilities Water**

| strategic planning area | Total population equivalent | Percentage population in each strategic planning area (SPA) living in a tactical planning unit (TPU) which breaches the RBCS indicator |                             |  |   |      |      |
|-------------------------|-----------------------------|--|-----------------------------|--|---|------|------|
|                         |                             | Catchment Characterisation (Tier 2)  | Bathing or shellfish waters | Discharge to sensitive waters (part A) | Discharge to sensitive receiving waters (part B) (Tier 2) | SOAF | CAF  |
| Alt/Crossens            | 390,787                     | 100%   | 23%                         | 0%                                     | 0%  | 97%  | 57%  |
| Derwent (NW)            | 87,018                      | 98%  | 61%                         | 0%                                     | 0%  | 93%  | 26%  |
| Douglas                 | 627,680                     | 100%   | 84%                         | 0%                                     | 0%  | 100% | 91%  |
| Eden and Esk            | 172,330                     | 95%  | 0%                          | 0%                                     | 0%  | 91%  | 22%  |
| Irwell                  | 1,035,600                   | 100%   | 0%                          | 0%                                     | 0%  | 100% | 21%  |
| Kent/Leven              | 121,578                     | 99%  | 85%                         | 0%                                     | 1%  | 97%  | 83%  |
| Lune                    | 167,333                     | 97%  | 87%                         | 0%                                     | 0%  | 73%  | 95%  |
| Mersey Estuary          | 1,971,195                   | 100%   | 13%                         | 17%                                    | 0%  | 93%  | 38%  |
| Ribble                  | 999,351                     | 100%   | 61%                         | 0%                                     | 0%  | 95%  | 61%  |
| South West Lakes        | 140,407                     | 98%  | 74%                         | 0%                                     | 0%  | 97%  | 43%  |
| Upper Mersey            | 2,324,930                   | 100%   | 0%                          | 1%                                     | 0%  | 96%  | 92%  |
| Waver_Wampool           | 13,568                      | 94%  | 0%                          | 0%                                     | 0%  | 84%  | 96%  |
| Weaver/Gowry            | 586,038                     | 99%  | 0%                          | 0%                                     | 0%  | 91%  | 59%  |
| Wyre                    | 280,986                     | 100%   | 98%                         | 0%                                     | 0%  | 98%  | 100% |

| strategic planning area | Percentage population in each strategic planning area (SPA) living in a tactical planning unit (TPU) which breaches the RBCS indicator |                         |                     |                   |                     |                 |                   |
|-------------------------|--|-------------------------|---------------------|-------------------|---------------------|-----------------|-------------------|
|                         | Internal Sewer Flooding  | External Sewer Flooding | Pollution Incidents | WwTW Q compliance | WwTW DWF compliance | Storm overflows | Other RMA systems |
| Alt/Crossens            | 99%  | 100%                    | 35%                 | 0%                | 0%                  | 46%             | 58%               |
| Derwent (NW)            | 83%  | 88%                     | 81%                 | 1%                | 1%                  | 20%             | 9%                |
| Douglas                 | 96%  | 100%                    | 91%                 | 60%               | 8%                  | 17%             | 82%               |
| Eden and Esk            | 79%  | 86%                     | 82%                 | 0%                | 0%                  | 71%             | 24%               |
| Irwell                  | 99%  | 100%                    | 99%                 | 16%               | 18%                 | 78%             | 98%               |
| Kent/Leven              | 91%  | 95%                     | 93%                 | 2%                | 3%                  | 10%             | 86%               |
| Lune                    | 91%  | 92%                     | 67%                 | 0%                | 1%                  | 12%             | 84%               |
| Mersey Estuary          | 98%  | 100%                    | 55%                 | 31%               | 0%                  | 71%             | 46%               |
| Ribble                  | 98%  | 99%                     | 56%                 | 0%                | 3%                  | 35%             | 65%               |
| South West Lakes        | 86%  | 95%                     | 44%                 | 0%                | 0%                  | 8%              | 50%               |
| Upper Mersey            | 100%   | 100%                    | 80%                 | 4%                | 0%                  | 69%             | 21%               |
| Waver_Wampool           | 68%  | 68%                     | 78%                 | 0%                | 4%                  | 14%             | 4%                |
| Weaver/Gowry            | 94%  | 97%                     | 94%                 | 31%               | 0%                  | 28%             | 21%               |
| Wyre                    | 99%  | 99%                     | 9%                  | 0%                | 0%                  | 7%              | 92%               |

| strategic planning area | Percentage population in each strategic planning area (SPA) living in a tactical planning unit (TPU) which breaches the RBCS indicator |       |                   |                   |                   |                                |
|-------------------------|--|-------|-------------------|-------------------|-------------------|--------------------------------|
|                         | Planned residential development  | WINEP | (Sewer Collapses) | (Sewer Blockages) | Sludge Facilities | WwTW close to breaching permit |
| Alt/Crossens            | 99%  | 99%   | 26%               | 100%              | 81%               | 43%                            |
| Derwent (NW)            | 80%  | 88%   | 92%               | 42%               | 54%               | 8%                             |
| Douglas                 | 100%   | 95%   | 5%                | 87%               | 68%               | 70%                            |
| Eden and Esk            | 96%  | 95%   | 85%               | 9%                | 76%               | 64%                            |
| Irwell                  | 99%  | 52%   | 100%              | 63%               | 91%               | 36%                            |
| Kent/Leven              | 90%  | 84%   | 95%               | 99%               | 68%               | 56%                            |
| Lune                    | 98%  | 88%   | 92%               | 97%               | 77%               | 2%                             |
| Mersey Estuary          | 100%   | 91%   | 46%               | 78%               | 91%               | 50%                            |
| Ribble                  | 100%   | 78%   | 91%               | 81%               | 80%               | 71%                            |
| South West Lakes        | 97%  | 98%   | 98%               | 43%               | 49%               | 0%                             |
| Upper Mersey            | 99%  | 83%   | 87%               | 99%               | 74%               | 61%                            |
| Waver_Wampool           | 78%  | 100%  | 81%               | 88%               | 0%                | 0%                             |
| Weaver/Gowry            | 98%  | 27%   | 63%               | 92%               | 44%               | 41%                            |
| Wyre                    | 99%  | 98%   | 99%               | 94%               | 90%               | 90%                            |

|                         |  |
|-------------------------|--|
| Grey text               | This is a Tier 2 indicator. A breach against a Tier 2 indicator would not trigger BRAVA if it is the <b>only</b> indicator breached. |
| (Grey text in brackets) | This is an unclassified indicator. A breach against an unclassified indicator will not influence whether a TPU proceeds to BRAVA.    |

|         |  |
|---------|--|
| 0-33%   | 0-33% of the population in the SPA live in a TPU which breaches this indicator   |
| 33-66%  | 33-66% of the population in the SPA live in a TPU which breaches this indicator  |
| 66-100% | 66-100% of the population in the SPA live in a TPU which breaches this indicator |

5.2.2 In Table 3 the blue and yellow shading has been used to indicate the percentage of the population in the company area living in a TPU which breaches each indicator (see key).

**Table 3 Company area RBCS results for United Utilities Water**

| Percentage population across the company area living in a tactical planning unit (TPU) which breaches the RBCS indicator |                             |                                     |                             |  |   |      |     |
|--|-----------------------------|-------------------------------------|-----------------------------|--|---|------|-----|
| company area   | Total population equivalent | Catchment Characterisation (Tier 2) | Bathing or shellfish waters | Discharge to sensitive waters (part A) | Discharge to sensitive receiving waters (part B) (Tier 2) | SOAF | CAF |
| United Utilities   | 8,918,802                   | 100%                                | 24%                         | 4%                                     | 0%  | 95%  | 62% |

| Percentage population across the company area living in a tactical planning unit (TPU) which breaches the RBCS indicator |                         |                         |                     |                   |                     |                 |                   |
|--|-------------------------|-------------------------|---------------------|-------------------|---------------------|-----------------|-------------------|
| company area   | Internal Sewer Flooding | External Sewer Flooding | Pollution Incidents | WwTW Q compliance | WwTW DWF compliance | Storm overflows | Other RMA systems |
| United Utilities   | 97%                     | 99%                     | 71%                 | 16%               | 3%                  | 54%             | 51%               |

| Percentage population across the company area living in a tactical planning unit (TPU) which breaches the RBCS indicator |                                 |       |                   |                   |                   |                                |
|--|---------------------------------|-------|-------------------|-------------------|-------------------|--------------------------------|
| company area   | Planned residential development | WINEP | (Sewer Collapses) | (Sewer Blockages) | Sludge Facilities | WwTW close to breaching permit |
| United Utilities   | 99%                             | 80%   | 71%               | 83%               | 78%               | 54%                            |

|                         |  |
|-------------------------|--|
| Grey text               | This is a Tier 2 indicator. A breach against a Tier 2 indicator would not trigger BRAVA if it is the <b>only</b> indicator breached. |
| (Grey text in brackets) | This is an unclassified indicator. A breach against an unclassified indicator will not influence whether a TPU proceeds to BRAVA.    |

|         |   |
|---------|---|
| 0-33%   | 0-33% of the population in the company area live in a TPU which breaches this indicator   |
| 33-66%  | 33-66% of the population in the company area live in a TPU which breaches this indicator  |
| 66-100% | 66-100% of the population in the company area live in a TPU which breaches this indicator |

### 5.3 Annual review

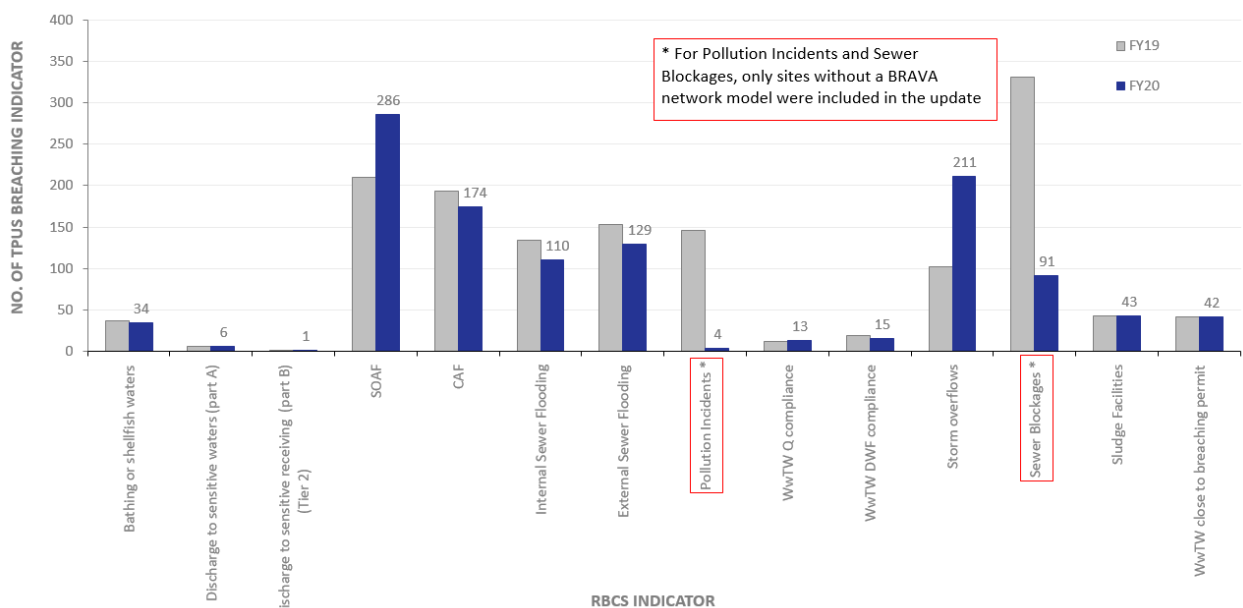
#### 5.3.1 Overview

5.3.1.1 Annual reviews were undertaken for all indicators where the data was considered to have changed and could lead to a TPU which was not previously proceeding to BRAVA, now triggering the BRAVA process. The data associated with Catchment characterisation, Other RMA systems, and WINEP, were not considered to have changed, and so these indicators were not included in the FY20 and FY21 annual review. Due to the timing of the draft and final DWMP Cycle 1 submission dates, U UW only assessed indicators that were likely to have significantly changed during the last 12 months in the FY22 assessment.

#### 5.3.2 FY20 Annual review

5.3.2.1 For the indicators which were re-assessed as part of the FY20 annual review, the TPU summary results are presented alongside the FY19 TPU summary results in Figure 4.

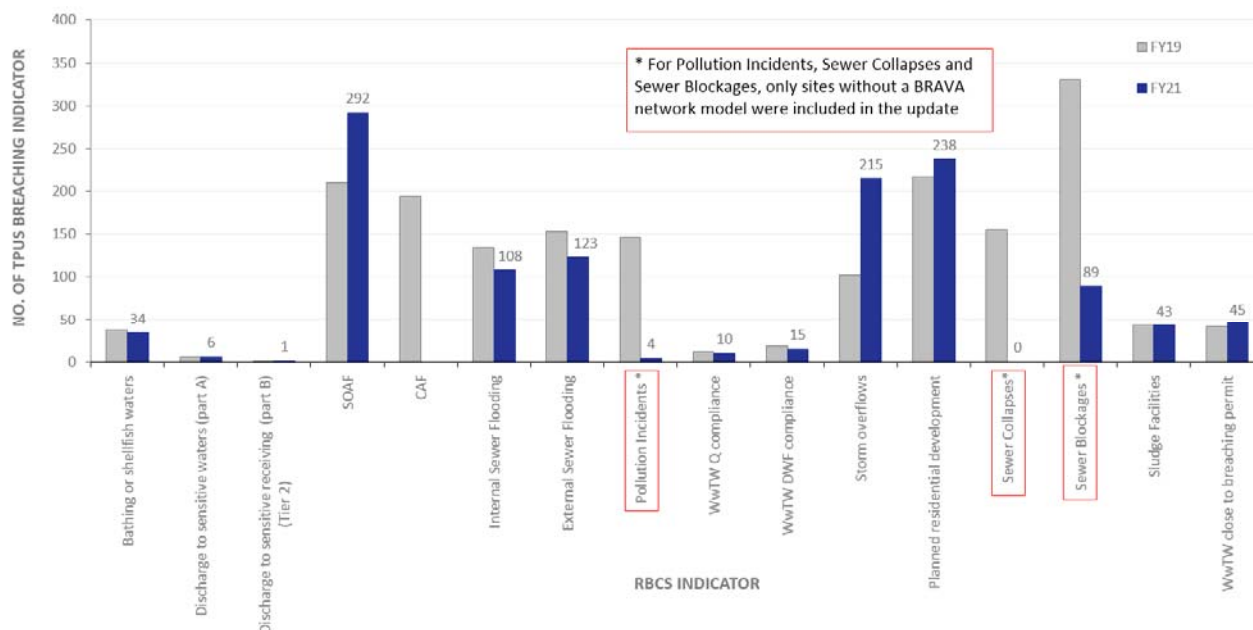
**Figure 4 No. of TPUs breaching each indicator in FY20 (vs FY19)**



### 5.3.3 FY21 Annual review

5.3.3.1 For the indicators which were re-assessed as part of the FY21 annual review, the TPU summary results are presented alongside the FY19 TPU summary results in Figure 5.

**Figure 5 No. of TPUs breaching each indicator in FY21 (vs FY19)**



5.3.3.2 As detailed in Table 4, the FY21 results showed 21 new TPUs now proceeding to BRAVA (versus FY19 results). For each of these TPUs, the blue shading in the table shows the newly-breached indicators which triggered BRAVA. Where possible, these TPUs have been incorporated into BRAVA. However, some sites were identified too late for incorporation into BRAVA and so will therefore be closely monitored and fed into the next cycle of DWMP.

**Table 4 New risk sites identified in FY21 (since FY19)**

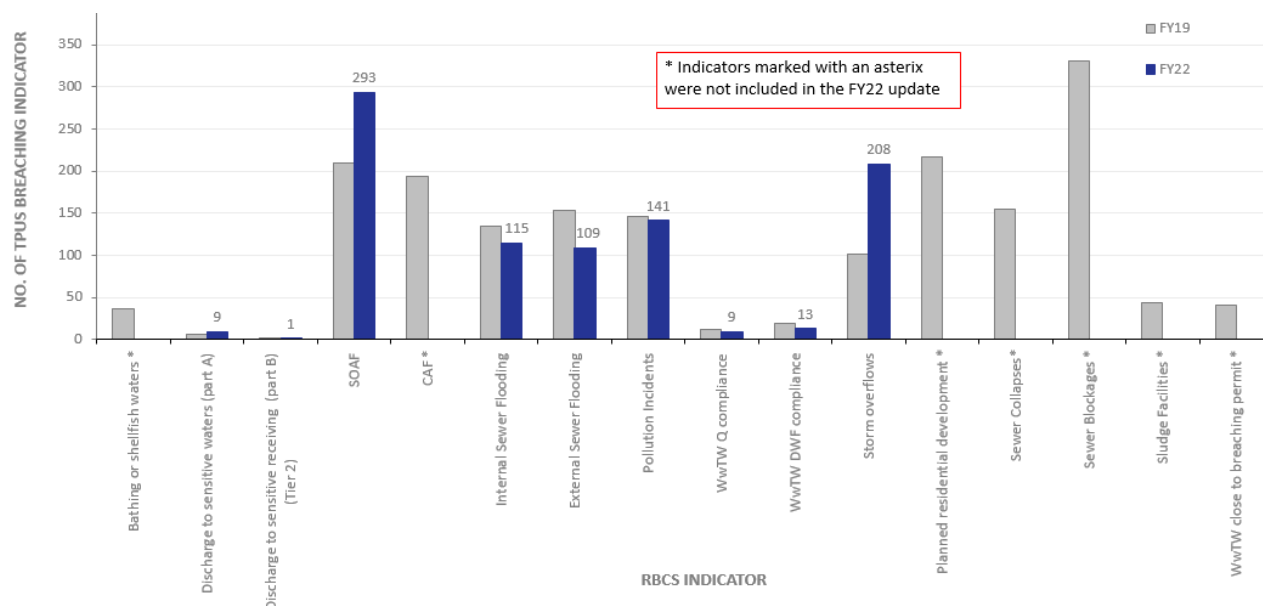
|              |                                     |
|--------------|-------------------------------------|
| Light Yellow | Indicator not breached              |
| Dark Blue    | Indicator breached (new since FY19) |

| strategic planning area | tactical planning unit |                     | PE  | SOAF | CAF | Pollution Incidents<br>(n/a = hydraulic model already exists) | Storm overflows | Planned residential development |
|-------------------------|------------------------|---------------------|-----|------|-----|---|-----------------|---------------------------------|
|                         | Ref                    | Name                |     |      |     |   |                 |                                 |
| Weaver/Goway            | ARCLI-WW1              | Arclid              | 179 |      |     |   |                 |                                 |
| Douglas                 | BISPG-WW1              | Bispham Green       | 96  |      |     |   |                 |                                 |
| Kent/Leven              | BOUTH-WW1              | Bouth               | 94  |      |     |   |                 |                                 |
| Weaver/Goway            | BRHSE-WW1              | Brookhouse Grn      | 18  |      |     |   |                 |                                 |
| SW Lakes                | DRIGG-WW1              | Drigg Tanks         | 165 |      |     |   |                 |                                 |
| Weaver/Goway            | EATNN-WW1              | Eaton               | 133 |      |     |   |                 |                                 |
| Kent/Leven              | ENDMO-WW1              | Endmoor             | 641 |      |     | n/a   |                 |                                 |
| Upper Mersey            | HERLN-WW1              | Heron Lane          | 9   |      |     | n/a   |                 |                                 |
| Weaver/Goway            | HOOGR-WW1              | Hoo Green           | 32  |      |     |   |                 |                                 |
| Derwent (NW)            | IRBYZ-WW1              | Ireby               | 199 |      |     |   |                 |                                 |
| SW Lakes                | KIRKL-WW1              | Kirkland            | 156 |      |     | n/a   |                 |                                 |
| Weaver/Goway            | MOSTS-WW1              | Moston South        | 12  |      |     |   |                 |                                 |
| Eden and Esk            | MOTHE-WW1              | Motherby            | 299 |      |     | n/a   |                 |                                 |
| Kent/Leven              | OUTGA-WW1              | Outgate             | 42  |      |     |   |                 |                                 |
| Derwent (NW)            | PARDS-WW1              | Pardshaw            | 114 |      |     |   |                 |                                 |
| SW Lakes                | PICAZ-WW1              | Pica                | 462 |      |     |   |                 |                                 |
| Eden and Esk            | SKELT-WW1              | Skelton             | 313 |      |     | n/a   |                 |                                 |
| Kent/Leven              | STAVC-WW1              | Staveley-In-Cartmel | 3   |      |     |   |                 |                                 |
| Derwent (NW)            | TORPE-WW1              | Torpenhow           | 164 |      |     | n/a   |                 |                                 |
| Weaver/Goway            | WHTGT-WW1              | Whitegate           | 86  |      |     |   |                 |                                 |
| Lune                    | YEWTC-WW1              | Yew Tree Cottage    | 239 |      |     |   |                 |                                 |

### 5.3.4 FY22 Annual review

5.3.4.1 For the indicators which were re-assessed as part of the FY22 annual review, the TPU summary results are presented alongside the FY19 results in Figure 6.

**Figure 6 No. of TPUs breaching each indicator in FY22 (vs FY19)**



- 5.3.4.2 The significant increase in the number of breaches against the SOAF and Storm Overflows indicators (shown in Figure 6) were largely due to the increase in the number of event duration monitors installed in the U UW network. However only nine of the new SOAF breaches were for TPUs which hadn't previously triggered BRAVA, and only Brookhouse Green didn't already have measures in place to resolve (see Table 5).
- 5.3.4.3 Only two of the new Storm Overflow breaches (Ireby and Torpenhow) were for TPUs which hadn't previously triggered BRAVA, and both were also new SOAF breaches and had measures in place to resolve as part of the water industry national environment programme (WINEP).
- 5.3.4.4 The Discharge to Sensitive Waters indicator showed an increase in the number of breaches due to the inclusion of an SSSI along the River Eden. However the TPUs impacting on this designation triggered BRAVA in FY19, and so already form part of DWMP Cycle 1 .
- 5.3.4.5 Aside from the storm overflow indicators and the discharge to sensitive waters indicator, all other indicators in Figure 6 show a decrease in the number of breaches since FY19.
- 5.3.4.6 As per the last two columns in Table 5, due to the exclusion of breaches where there are already measures in place to resolve the incident, there are just two additional TPUs which might require BRAVA in DWMP Cycle 2, and so will be closely monitored in the interim.

**Table 5 New risk sites identified in FY22 (since FY19)**

| strategic planning area | tactical planning unit |                            | PE  | SOAF | Pollution Incidents | Storm overflows | FY19 proceed to BRAVA | FY22 proceed to BRAVA                    |                              |
|-------------------------|------------------------|----------------------------|-----|------|---------------------|-----------------|-----------------------|--|------------------------------|
|                         | Ref                    | Name (FY19 published list) |     |      |                     |                 |                       | assuming no measures in place to resolve | after considering exclusions |
| Weaver/Gowy             | BRHSE-WW1              | Brookhouse Grn             | 18  |      |                     |                 | NO                    | YES                                      | YES                          |
| Weaver/Gowy             | EATNN-WW1              | Eaton                      | 145 |      |                     |                 | NO                    | YES                                      | NO                           |
| Derwent (NW)            | IRBYZ-WW1              | Ireby                      | 210 |      |                     |                 | NO                    | YES                                      | NO                           |
| SW Lakes                | KIRKL-WW1              | Kirkland                   | 175 |      |                     |                 | NO                    | YES                                      | NO                           |
| Eden and Esk            | MOTHE-WW1              | Motherby                   | 307 |      |                     |                 | NO                    | YES                                      | NO                           |
| Weaver/Gowy             | OLDFI-WW1              | Oldfields                  | 25  |      |                     |                 | NO                    | YES                                      | NO                           |
| Weaver/Gowy             | OLLIH-WW1              | Olliers                    | 27  |      |                     |                 | NO                    | YES                                      | NO                           |
| Kent/Leven              | OUTGA-WW1              | Outgate                    | 41  |      |                     |                 | NO                    | YES                                      | YES                          |
| Derwent (NW)            | PARDS-WW1              | Pardshaw                   | 116 |      |                     |                 | NO                    | YES                                      | NO                           |
| SW Lakes                | PICAZ-WW1              | Pica                       | 450 |      |                     |                 | NO                    | YES                                      | NO                           |
| Eden and Esk            | SKELT-WW1              | Skelton                    | 333 |      |                     |                 | NO                    | YES                                      | NO                           |
| Derwent (NW)            | TORPE-WW1              | Torpenhow                  | 165 |      |                     |                 | NO                    | YES                                      | NO                           |
| Weaver/Gowy             | WHTGT-WW1              | Whitegate                  | 91  |      |                     |                 | NO                    | YES                                      | NO                           |

| Colour codes   | Description                         |
|----------------|-------------------------------------|
| (Light Yellow) | Indicator not breached              |
| (Dark Blue)    | Indicator breached (new since FY19) |

## 6. Conclusions and recommendations

### 6.1 Overview

- 6.1.1 The FY19 RBCS assessment confirmed that 70% of TPUs would proceed to BRAVA. This represents over 99% of the population within the company area. These percentages require monitoring, particularly when there are additional sites identified as proceeding to BRAVA through the annual updates and no BRAVAs have previously been undertaken. Note, depending on timings, for any new TPUs identified as proceeding to BRAVA following the annual review, it may not always be possible to incorporate the TPUs into BRAVA for that cycle of DWMP.
- 6.1.2 The purpose of including sewer collapses and sewer blockages in this analysis will be reviewed since neither impacts directly on the decision to send a TPU to BRAVA.

## Appendix A

Table A1 Indicator breach thresholds

| Breach thresholds to be applied at the tactical planning unit (TPU) level          |  |  |  |
|--|--|--|--|
| Indicator  | Breach description (per TPU)   | Threshold value  | Units                                      |
| Catchment characterisation   | Risk score   | 4 or 5   | score out of 5                             |
| Intermittent discharge impact on bathing or shellfish waters                       | Activations during the BW season exceeds threshold value   | 5  | activations                                |
|  | Activations per year exceeds threshold value   | 14   | activations                                |
| Continuous or intermittent discharge impact on sensitive receiving waters (Part A) | Entries in Natural England's MLG Remedies workbook when filters in value column applied  | Filters to be applied:<br><i>Responsible Party</i> = UUW<br><i>Adverse Condition</i> = Freshwater Drainage or Freshwater Pollution Discharges<br><i>Remedy status</i> = Identified or Not Agreed | none                                       |
| Continuous or intermittent discharge impact on sensitive receiving waters (Part B) | Entries in Natural England's MLG Threats workbook when filters in value column applied   | Filters to be applied:<br><i>Action owner</i> = UUW<br><i>Threats</i> = Water Pollution  | none                                       |
| Storm overflow assessment framework (SOAF)   | Average number of activations over last three years exceed threshold value,<br><b>and/or</b><br>Activations in a year exceed threshold value for at least one year from last three years | 40   | number of activations in a year            |
| Capacity assessment framework (CAF)  | Risk score for surcharge return period for pipes <b>and/or</b><br>Activations per year for storm overflows equals the threshold value  | 4 or 5   | score out of 5                             |
| Internal sewer flooding (lesser of a. or .b)                                       | a. Internal flooding incidents exceed the Industry Upper Quartile, <b>or</b>   | 1.68 (FY19)  | incidents per 10,000 properties in a year  |
|  | b. Internal flooding incidents exceed the average normalised company performance over three years  | 3.09 (FY19)  | incidents per 10,000 properties in a year  |
|  | <b>and</b><br>Internal flooding incidents over three years is at least the threshold value   | 2  | total number of incidents over three years |



| <b>Breach thresholds to be applied at the tactical planning unit (TPU) level</b> |   |                        |   |
|--|---|------------------------|---|
| <b>Indicator</b>   | <b>Breach description (per TPU)</b>   | <b>Threshold value</b> | <b>Units</b>  |
| <b>Internal sewer flooding (small catchments)</b>                                | Internal flooding incidents over three years is at least the threshold value  | 2                      | total number of incidents over three years  |
| <b>External sewer flooding (lesser of a. or .b)</b>                              | a. External flooding incidents exceed the Industry Upper Quartile   | 14.81 (FY19)           | incidents per 10,000 properties in a year   |
|  | b. External flooding incidents exceed the average normalised company performance over three years   | 24.98 (FY19)           | incidents per 10,000 properties in a year   |
|  | <b>and</b><br>External flooding incidents over three years exceeds the threshold value  | 10                     | total number of incidents over three years  |
| <b>External sewer flooding (small catchments)</b>                                | External flooding incidents over three years is more than the threshold value   | 10                     | total number of incidents over three years  |
| <b>Pollution incident category 1,2,3</b>   | Number of Category 1 or 2 incidents over three years is at least the threshold value, <b>or</b>   | 1                      | total number of Cat. 1 or 2 incidents over 3 years                                |
|  | EPA threshold value (per 10,000km sewer) is exceeded for any of the previous three years  | 25                     | average annual performance per 10,000km sewer length                              |
| <b>Wastewater treatment works quality compliance</b>                             | Number of failing discharges is at least the threshold value for any of the previous three years  | 1                      | number of failing discharges at a wastewater treatment works in a year            |
| <b>WwTW dry weather flow (DWF) compliance (FY19 only)</b>                        | Number of consecutive years from the past five years where DWF classed as failing exceeds the threshold value   | 2                      | number of consecutive years from the past five years where DWF classed as failing |
| <b>Storm overflows</b>   | Number of incidents relating to storm overflows in the network and/or treatment works is at least the threshold value (over three years)  | 1                      | total number of incidents over three years  |
| <b>Risks from interdependencies between RMA systems</b>                          | Number of properties within a TPU (per 10,000 properties) which lie within the Environment Agency (EA) flood risk map or the National Highways flood risk map and exceeds the threshold value. The upper quartile of all company data was used as the threshold value | 1281                   | impacted properties per 10,000 properties   |

| <b>Breach thresholds to be applied at the tactical planning unit (TPU) level</b> |   |  |   |
|--|---|--|---|
| <b>Indicator</b>   | <b>Breach description (per TPU)</b>   | <b>Threshold value</b>   | <b>Units</b>  |
| <b>Planned residential new development</b>                                       | Acceptable percentage increase in population growth exceeds the threshold value   | varies with existing PE and number of years look ahead (see Table B-3 in Appendix B) | % population growth                                     |
| <b>WINEP</b>   | The number of measures listed in the latest WINEP defined as investigations, option appraisals or non-cost beneficial exceeds the threshold value.<br><br>(Excludes investment within current cycle, and storm overflows with a high number of activations) | 1  | measure on the WINEP                                    |
| <b>Sewer collapses</b>   | Number of sewer collapses normalised per 10,000km (in any of the preceding three years) exceeds the company average for the last year   | 7.49   | average sewer collapses per 10,000km (for last year)    |
| <b>Sewer collapses (small catchments)</b>  | Number of sewer collapses per year (in any of the preceding three years) is at least the threshold value  | 2  | incidents per year                                      |
| <b>Sewer blockages</b>   | Number of sewer blockages normalised per 10,000km (in any of the preceding three years) exceeds the company average over the last three years   | 276  | average sewer blockages per 10,000km (over three years) |
| <b>Sludge facilities</b>   | Wastewater treatment works contains sludge thickening facilities, dewatering facilities, digestion facilities and/or lime addition facilities   | none   | none  |
| <b>Proximity to permit</b>   | Final effluent data classified as a threshold value by corporate systems  | high or medium   | risk level  |

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