

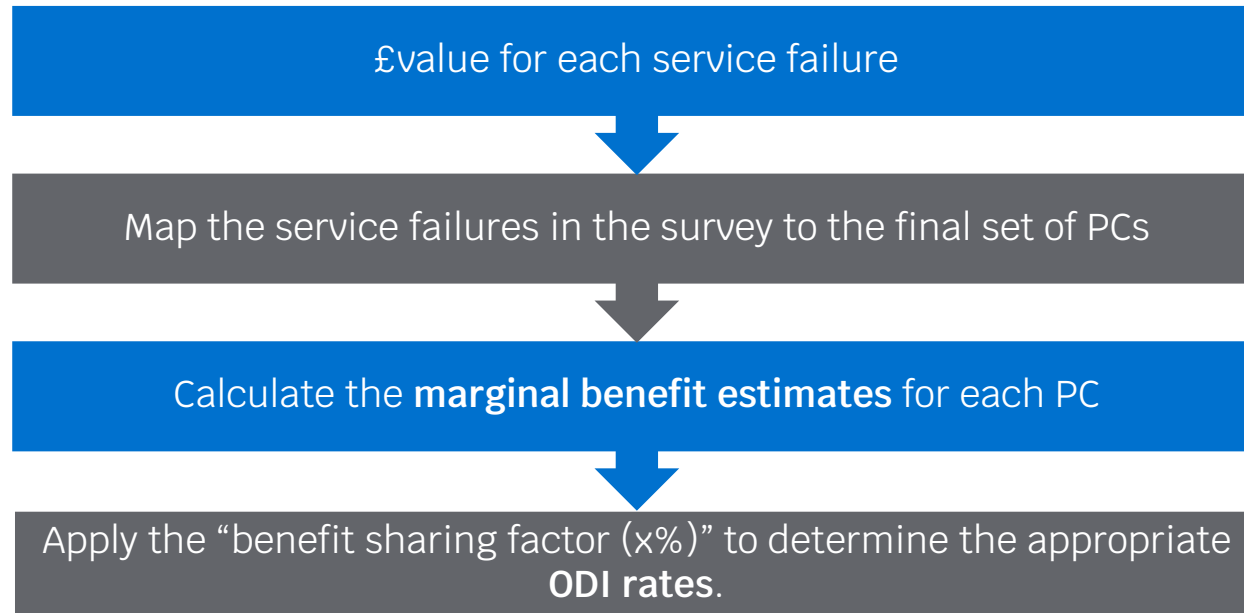
## Appendix 4: Indicative mapping from service incidents to performance commitments

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# Background

For PR24, we jointly commissioned Accent and PJM Economics to undertake research into the value water customers place on different service failures.

We planned to use the valuations produced from the analysis of the survey to derive ODI rates for the Performance Commitments (PCs) for each company as set out below:



This annex sets out the theoretical mapping approach for each PC, regardless of whether we were able to successfully produce a marginal benefit estimate or not.

# Indicative mapping for PR24 PCs

Customer facing PCs	Customer research valuations
<b>Total water demand</b> (leakage, PCC, business demand) Ml/d	Hosepipe bans Emergency drought restrictions Low flows in rivers nearby Low flows in rivers elsewhere
<b>Customer contacts about drinking water quality</b> Per 1,000 population	Discoloured water – 6 hours Discoloured water – 24 hours Taste or smell of water – 6 hours Taste or smell of water – 24 hours
<b>Compliance risk index</b> %	Boil water notice Do not drink notice
<b>Water supply interruptions</b> HH:mm:ss per customer	Planned interruption – 6 hours Unplanned interruption – 6 hours Unplanned interruption – 24 hours
<b>Internal sewer flooding</b> Per 10,000 connections	Internal sewer flooding
<b>External sewer flooding</b> Per 10,000 connections	External sewer flooding

Other PCs	Other valuation techniques
<b>Biodiversity</b> Units tbc	Expect to use external valuations
<b>Operational greenhouse gas emissions</b> tCO2e or %	Expect to use external valuations or marginal costs from bidding competition

Environmental PCs	Customer research valuations
<b>Pollution incidents</b> Per 10,000km of sewer	Minor pollution incident – nearby Minor pollution incident – elsewhere Significant pollution incident – nearby Significant pollution incident – elsewhere
<b>Serious pollution incidents</b> nr	Significant pollution incident – nearby Significant pollution incident – elsewhere
<b>Discharge permit compliance</b> %	River water quality not high – nearby River water quality not high – elsewhere
<b>River water quality</b>	River water quality not high - nearby River water quality not high - elsewhere
<b>Bathing water quality</b>	Bathing water quality - not excellent Bathing water quality - not good
<b>Storm overflows</b>	Storm overflow - nearby, 4 hours Storm overflow - elsewhere, 4 hours

Asset health PC	Other valuation techniques
<b>Mains repairs</b> Per 10,000km of mains	Inferred benefits (mapped to other PCs)
<b>Unplanned outage</b> %	Inferred benefits (mapped to other PCs)
<b>Sewer collapses</b> Per 1,000km of sewer	Inferred benefits (mapped to other PCs)

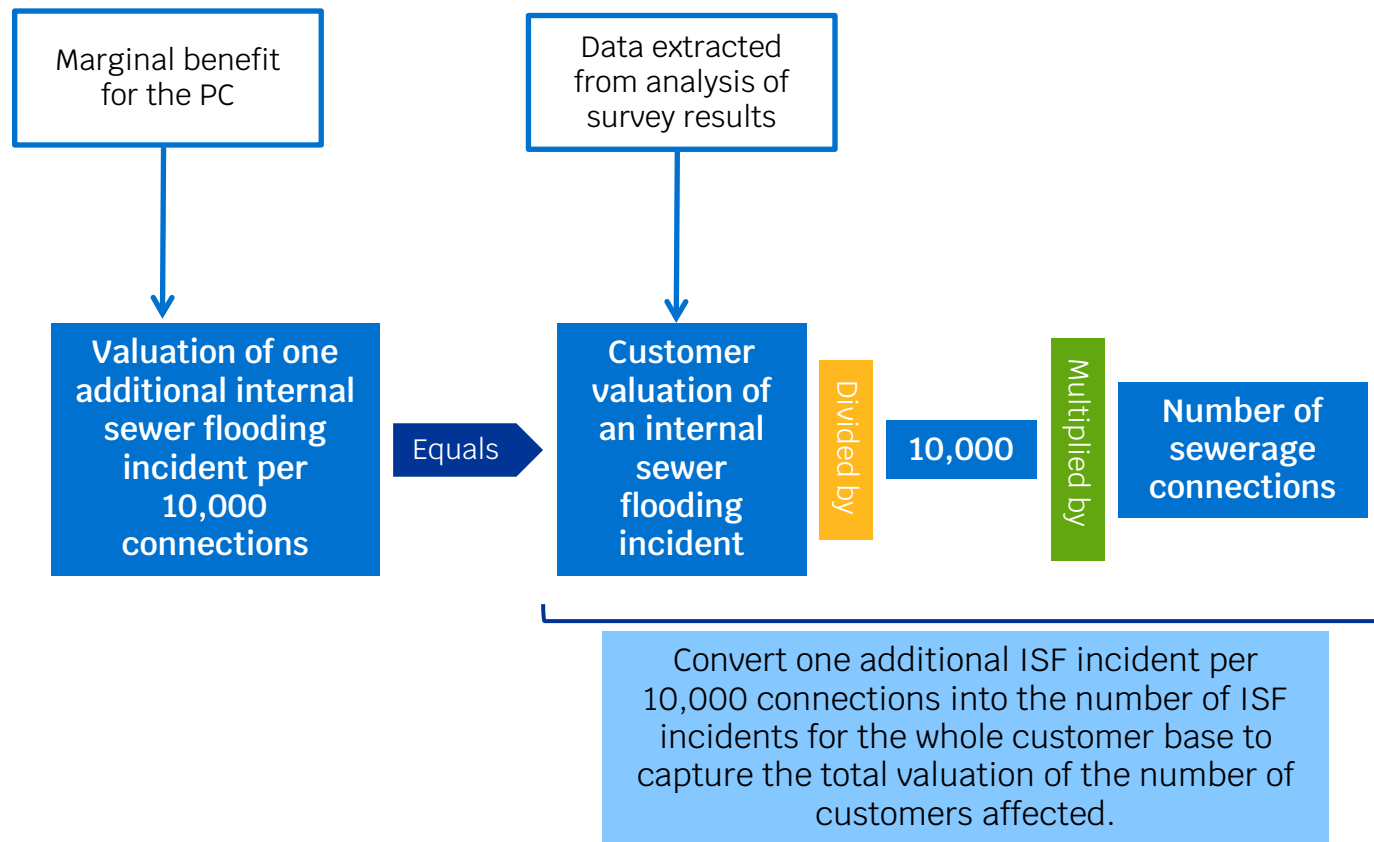




# 1. Customer facing PCs

# Internal sewer flooding

<b>PC Definition</b>	The measure is calculated as the number of internal sewer flooding incidents normalised per 10,000 sewer connections
<b>Relevant service failures</b>	Sewer flooding inside your property



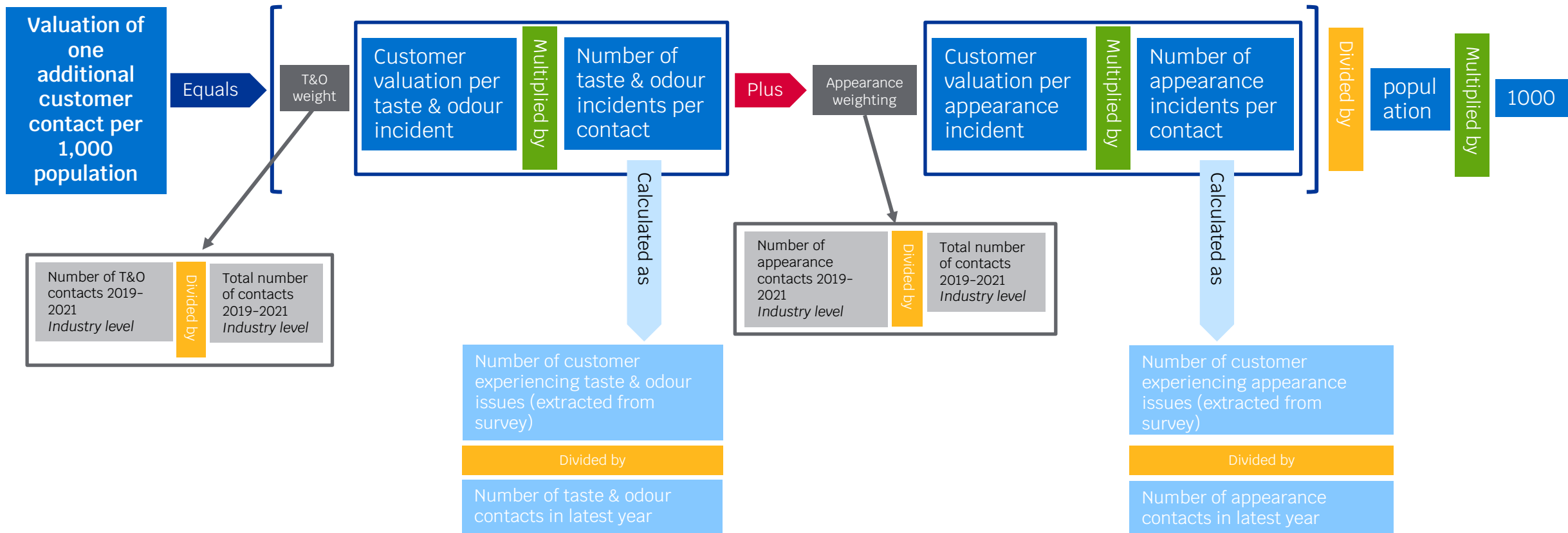
# External sewer flooding

<b>PC Definition</b>	The measure is calculated as the number of external sewer flooding incidents normalised per 10,000 sewer connections
<b>Relevant service failures</b>	Sewer flooding outside your property



# Customer contacts

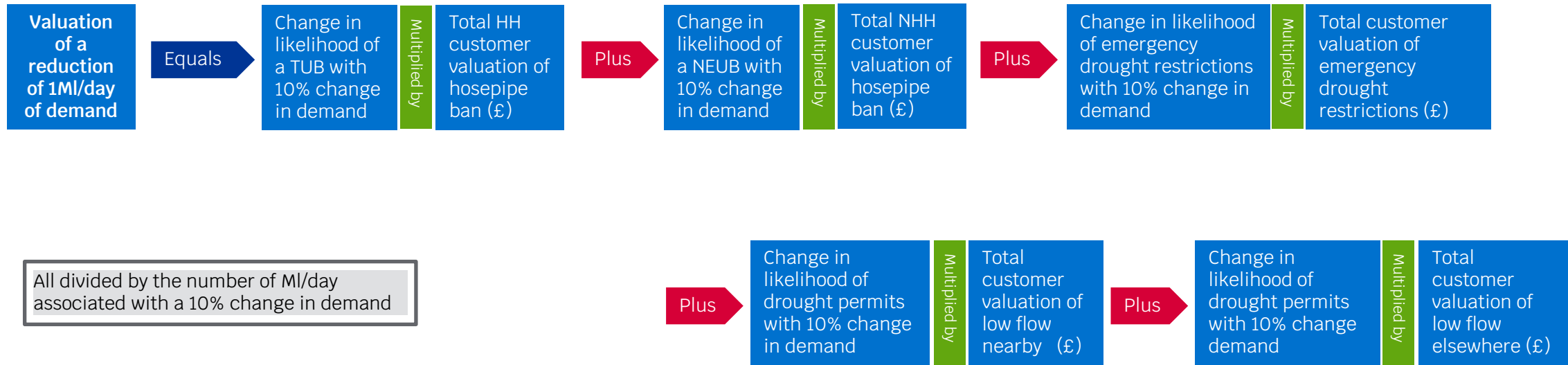
<b>PC Definition</b>	The number of times the company is contacted by consumers due to the taste and odour of drinking water or because the drinking water is not clear, reported per 1,000 population.
<b>Relevant service failures</b>	Discoloured water – 6 hours & 24 hours Taste or smell of water – 6 hours & 24 hours





# Demand (1)

<b>PC Definition</b>	Reduction in leakage, PCC and business demand
<b>Relevant service failures</b>	Hosepipe bans Emergency drought restrictions Low flows in rivers nearby Low flows in rivers elsewhere

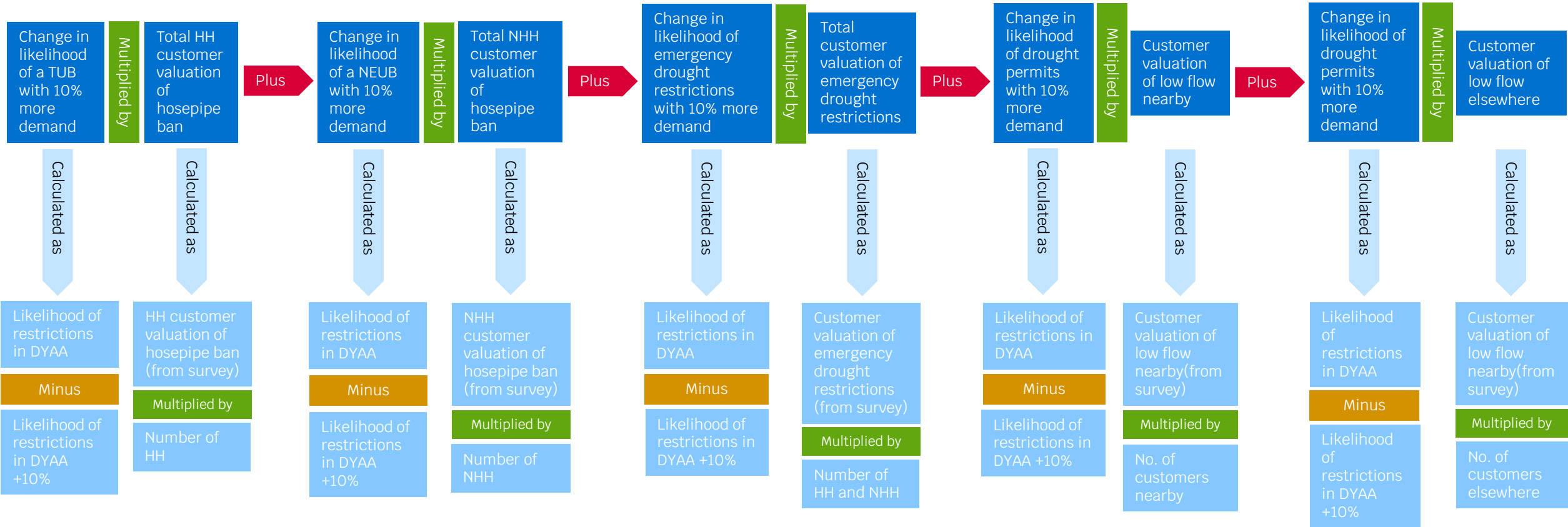


# Demand (2)

Valuation of additional 1Ml/day of demand

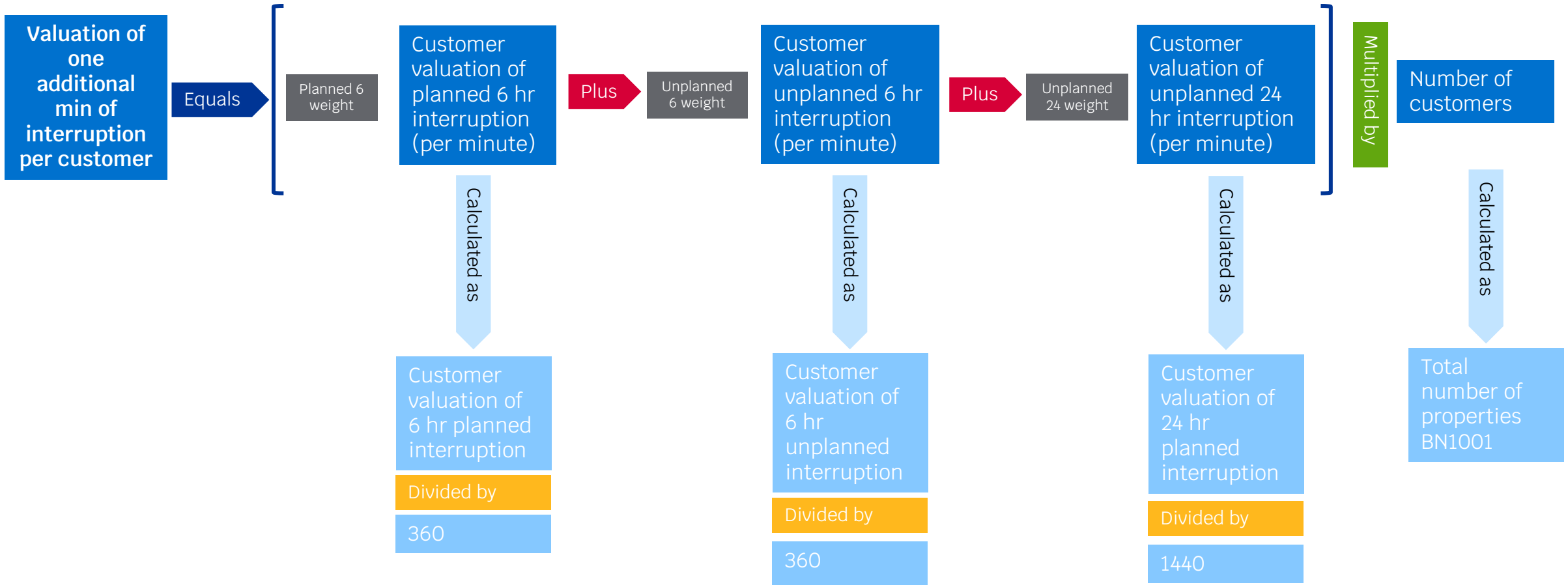
Equals

All divided by the number of Ml/day associated with a 10% change



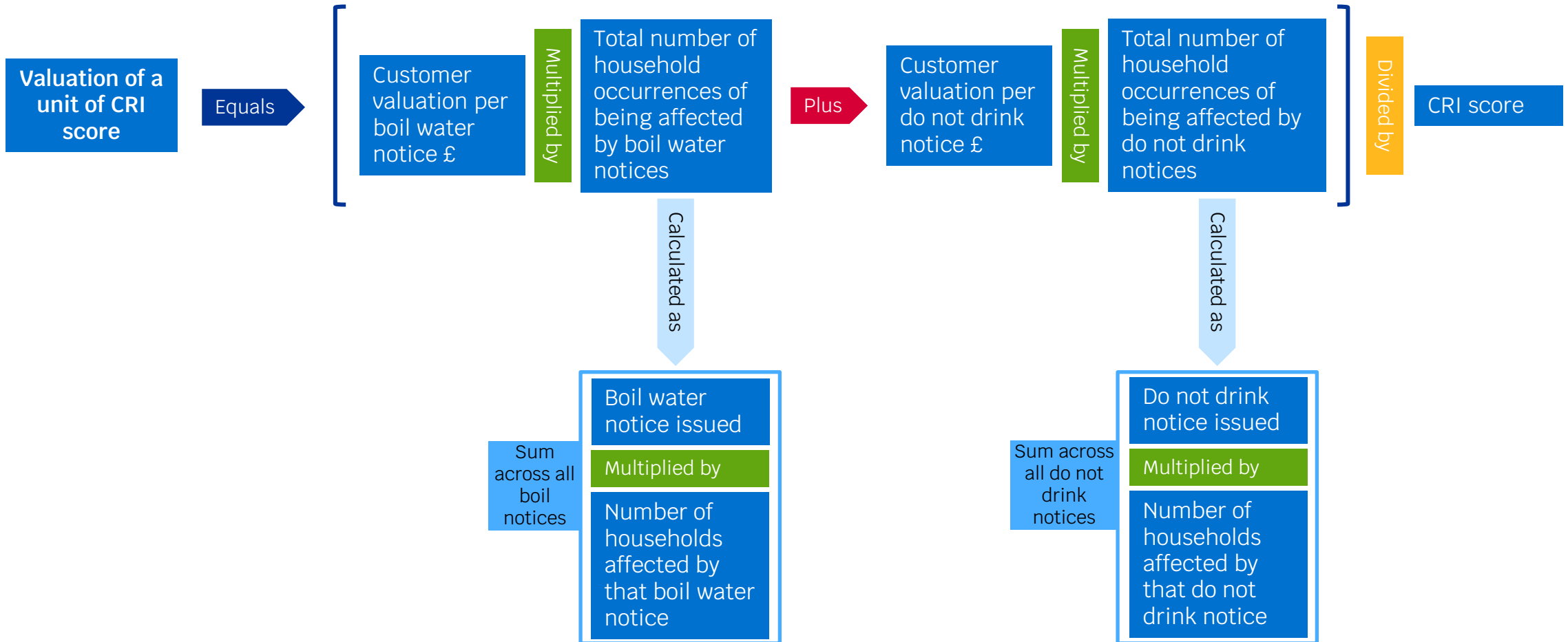
# Interruptions

<b>PC Definition</b>	The average number of minutes lost per customer for the whole customer base for interruptions that lasted three or hours or more.
<b>Relevant service failures</b>	Unexpected water supply interruption 6 hours & 24 hours Planned water supply interruption 6 hours



# Compliance Risk Index (CRI)

<b>PC Definition</b>	Compliance Risk Index score.
<b>Relevant service failures</b>	Boil water notice (48 hours) Do not drink notice (48 hours)

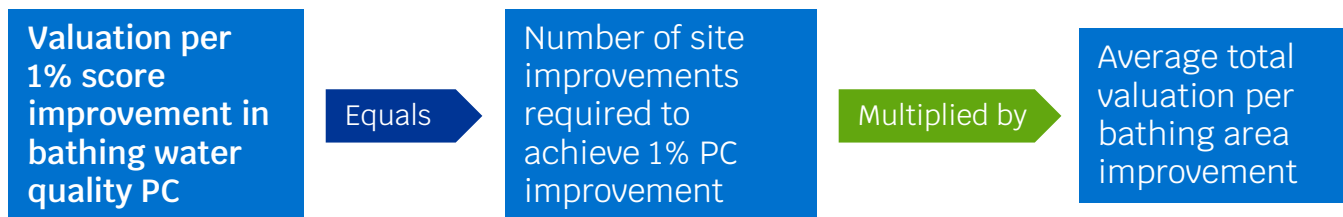


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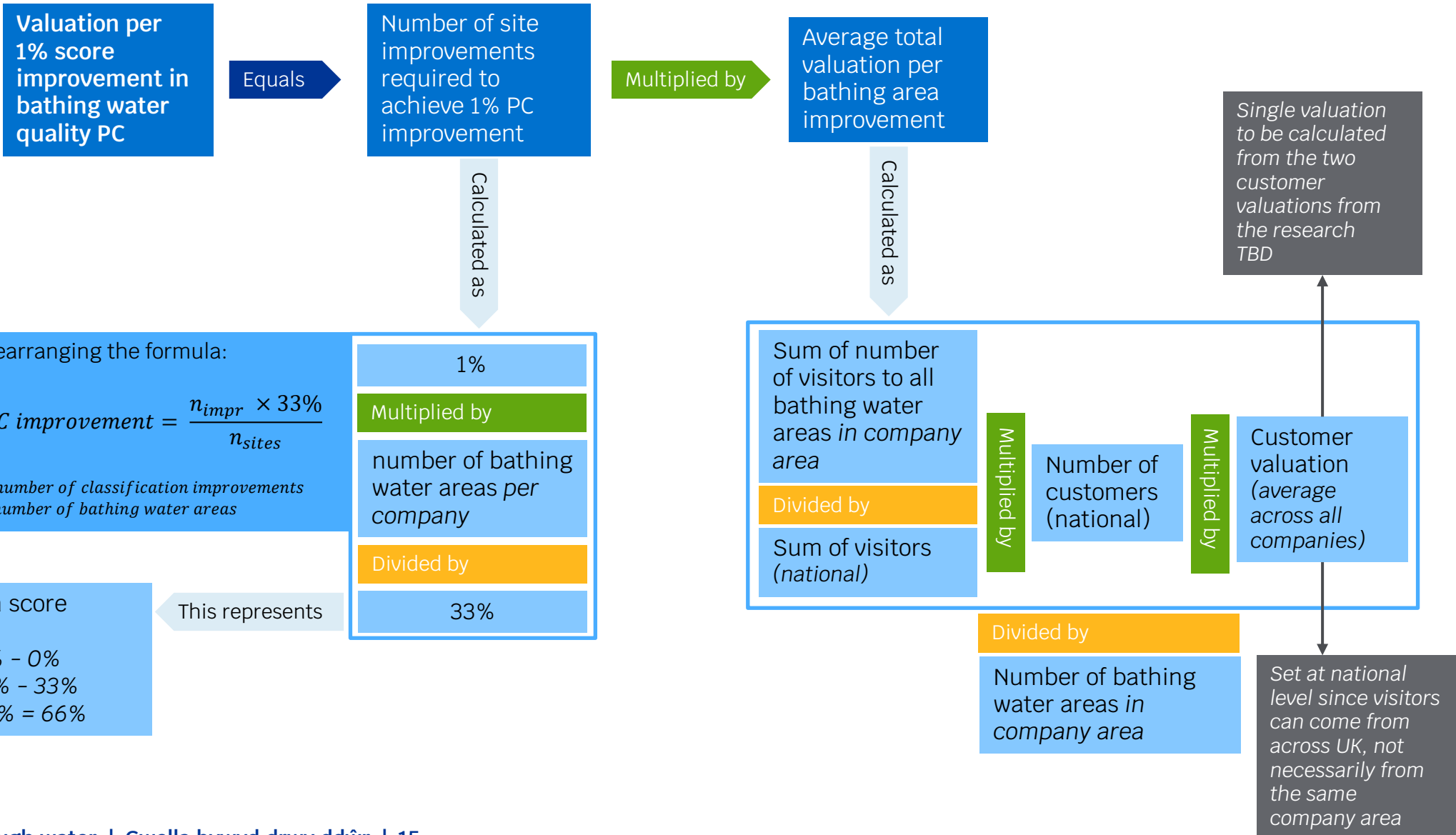
## **2. Environmental PCs**

# Bathing water quality (1)

<b>PC Definition</b>	<p>Bathing water quality provides a measure of whether the condition of bathing waters within a company's area will improve or deteriorate over a season. It determines the overall score (%) for the bathing waters in a company's region.</p> <p>Each classification is assigned a score: Poor = 0% Sufficient = 33% Good = 66% Excellent = 100%</p> <p>The overall score is the average of scores for all bathing waters in the company's region.</p>
<b>Relevant service failures</b>	<p>Coastal bathing water is <i>not Excellent quality</i> Coastal bathing water is <i>neither Excellent nor Good quality</i></p>

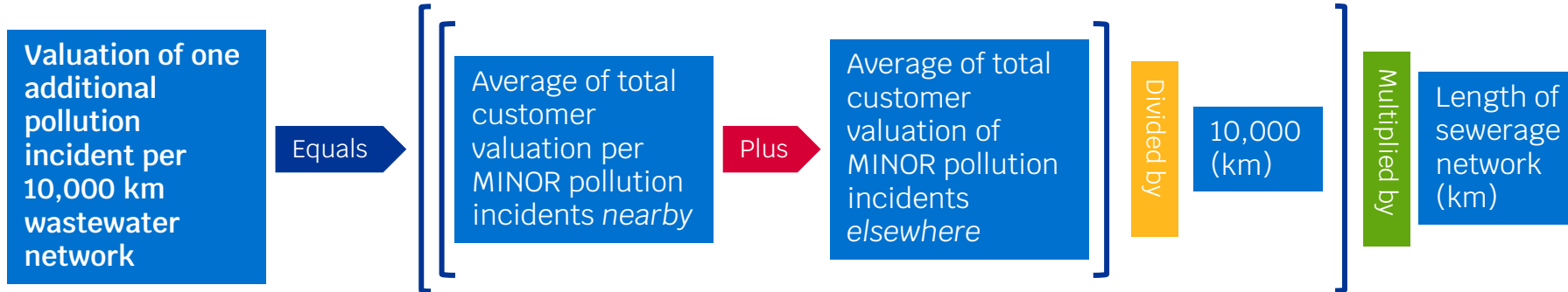


# Bathing water quality (2)



# Pollution incidents (1)

<b>PC Definition</b>	The total number of pollution incidents (categories 1 to 3) per 10,000km of sewer length from wastewater assets for which the company is responsible in a calendar year.
<b>Relevant service failures</b>	<ul style="list-style-type: none"><li>• Minor pollution incident <i>nearby</i></li><li>• Minor pollution incident <i>elsewhere</i></li></ul>



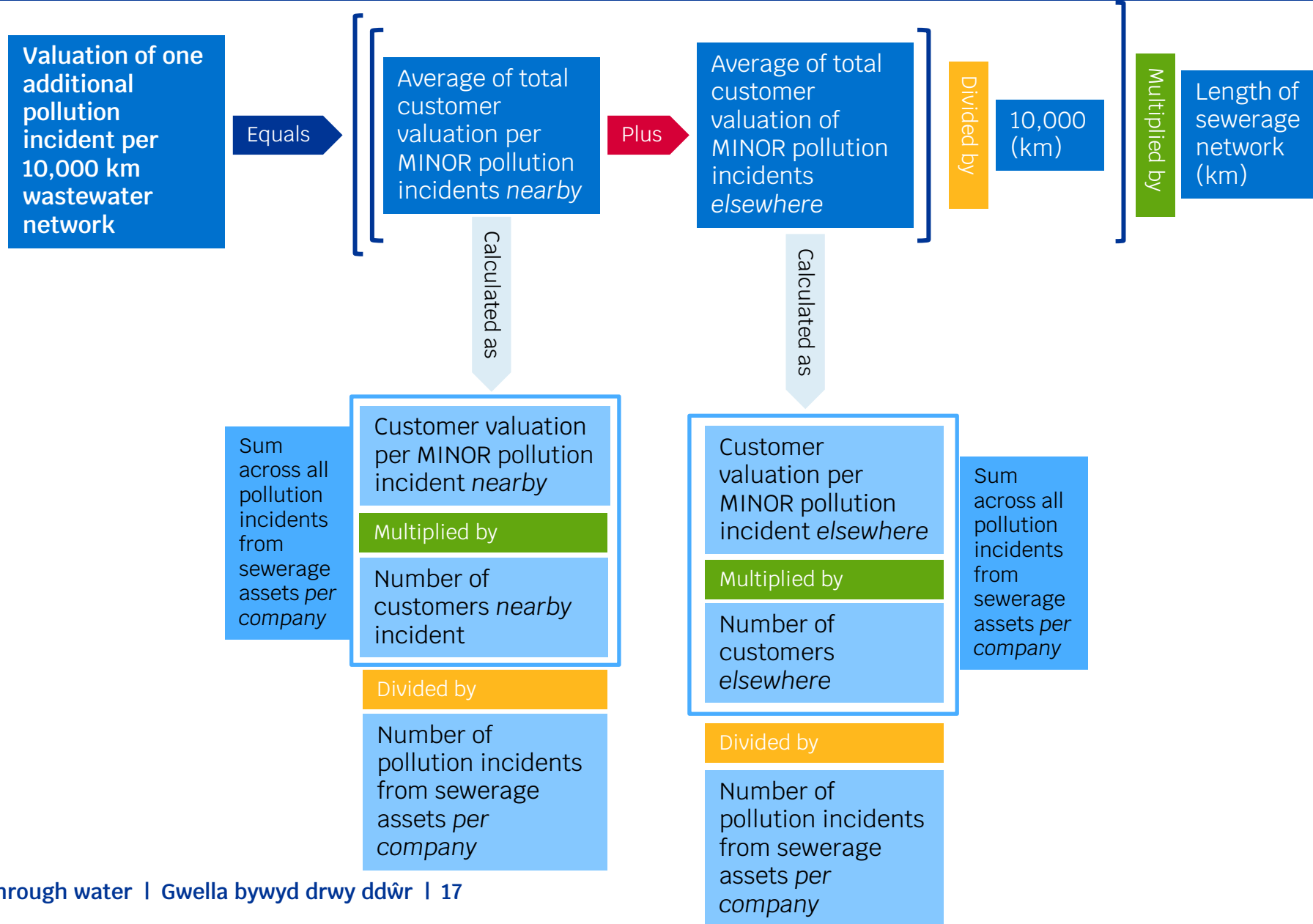
## Double counting

The *pollution incidents* PC includes category 1-2 (serious) pollution incidents in the measure, meaning customer valuations would be captured by both pollution PCs. To account for this we:

- Measure customers' minor pollution incident valuation in *pollution incidents* for category 1-2 pollution incidents
- Measure the difference between customers' major and minor pollution incident valuations in *serious pollution incidents* to only capture the additional valuation from serious pollution incidents

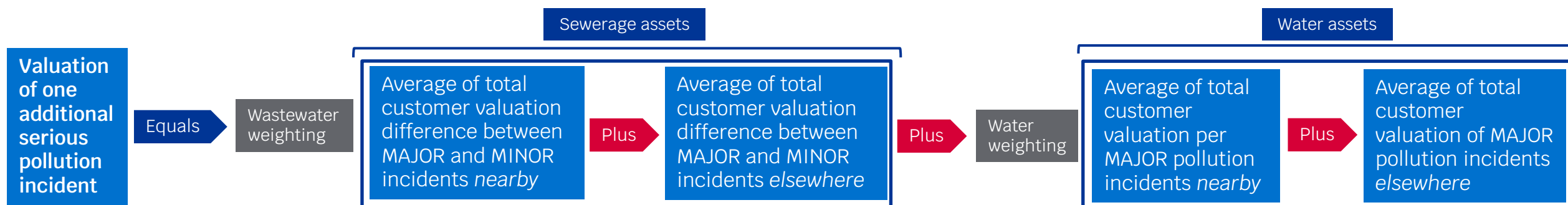


# Pollution incidents (2)



# Serious pollution incidents (1)

<b>PC Definition</b>	The number of serious pollution incidents (categories 1 to 2) from water or wastewater assets for which the company is responsible in a calendar year.
<b>Relevant service failures</b>	<ul style="list-style-type: none"> <li>• Significant pollution incident <i>nearby</i></li> <li>• Significant pollution incident <i>elsewhere</i></li> <li>• Minor pollution incident <i>nearby (applied to wastewater assets only)</i></li> <li>• Minor pollution incident <i>elsewhere (applied to wastewater assets only)</i></li> </ul>

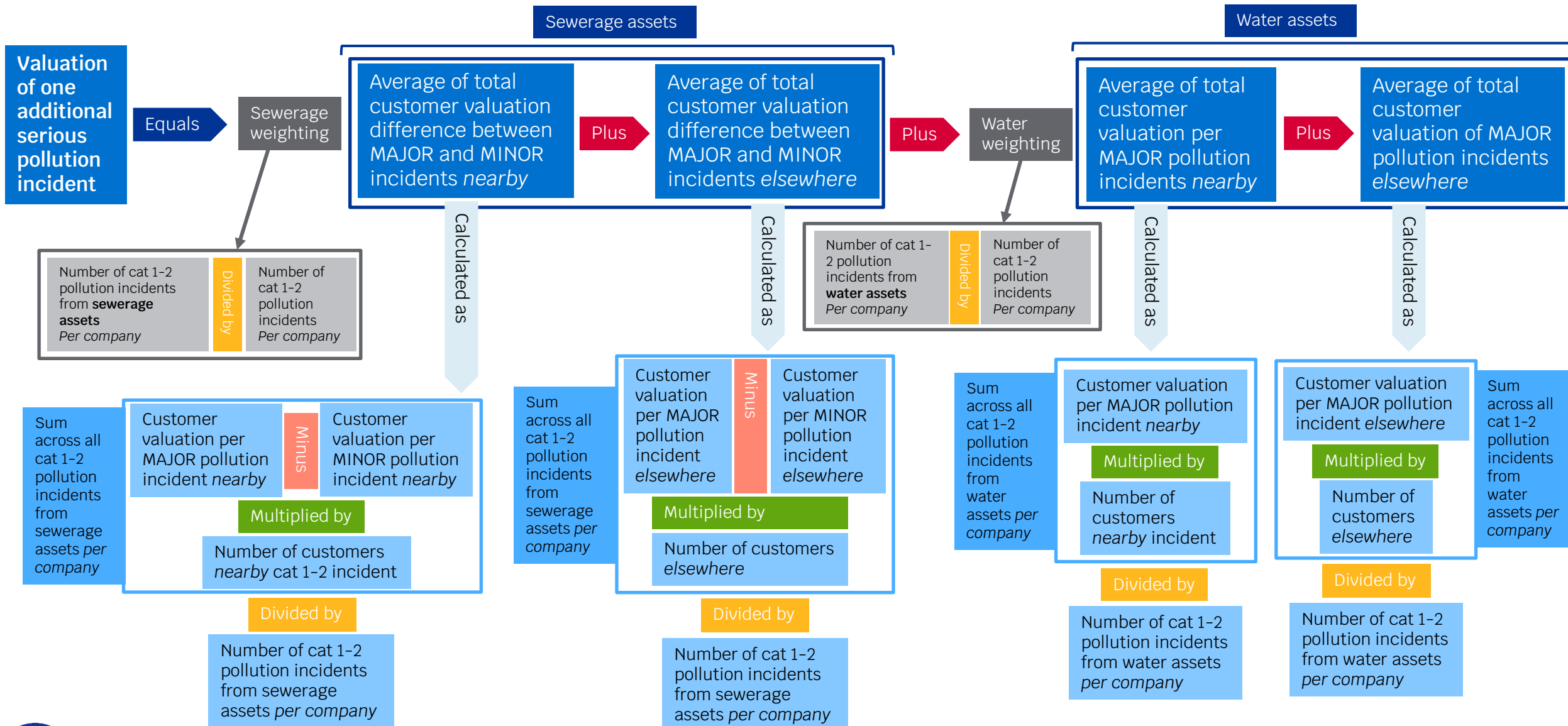


## Double counting

The *pollution incidents* PC includes category 1-2 (serious) pollution incidents in the measure, meaning customer valuations would be captured by both pollution PCs. To account for this we:

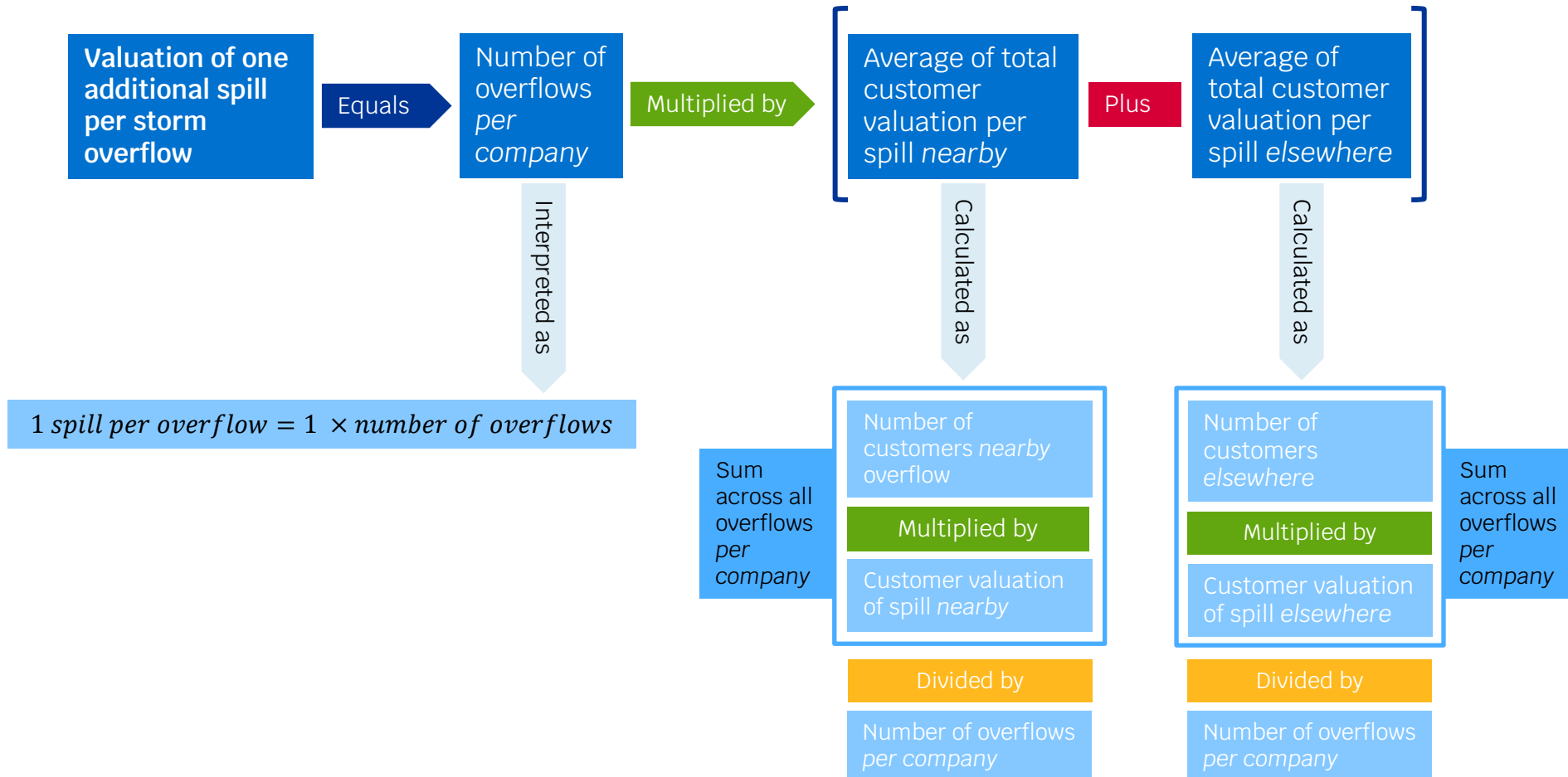
- Measure customers' minor pollution incident valuation in *pollution incidents* for category 1-2 pollution incidents
- Measure the difference between customers' major and minor pollution incident valuations in *serious pollution incidents from wastewater assets* to only capture the additional valuation from serious pollution incidents

# Serious pollution incidents (2)



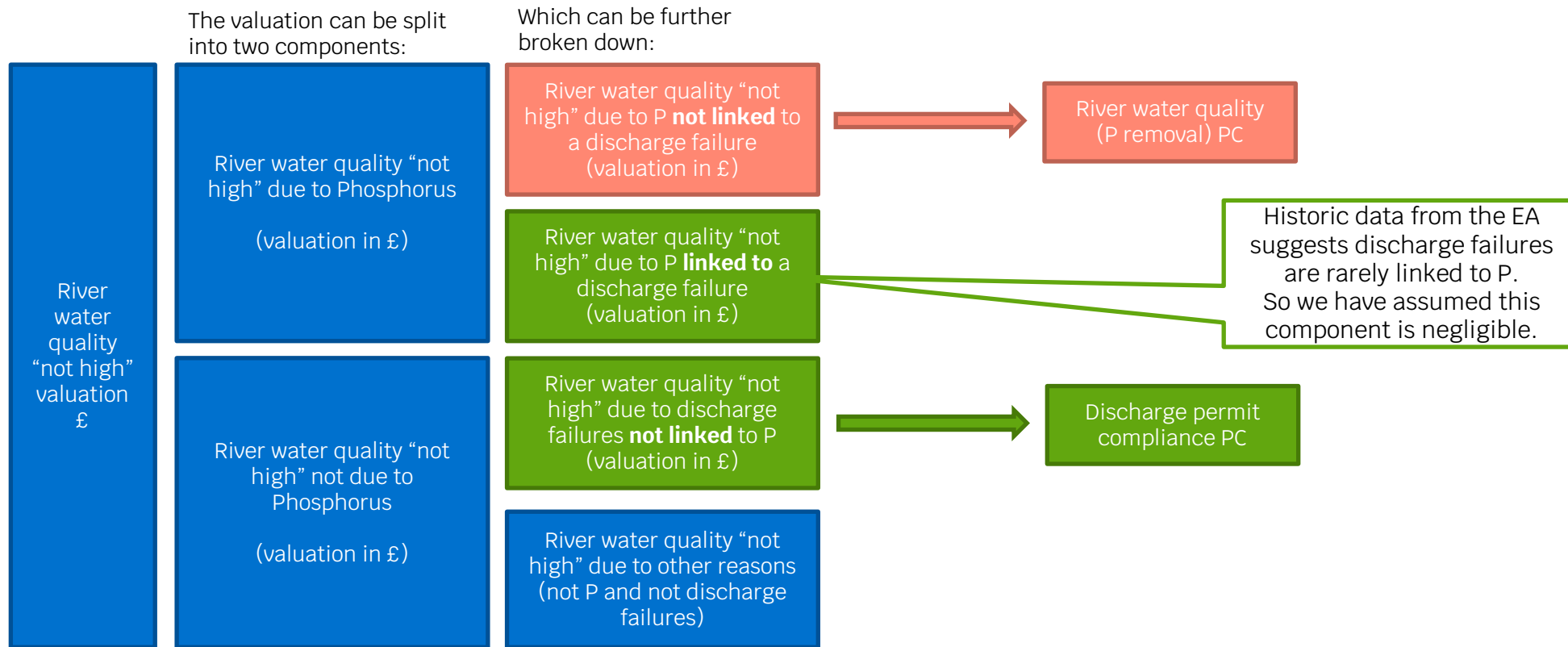
# Storm overflows

<b>PC Definition</b>	The average number of spills per overflow per calendar year.
<b>Relevant service failures</b>	<ul style="list-style-type: none"> <li>Storm overflow <i>nearby</i></li> <li>Storm overflow <i>elsewhere</i></li> </ul>



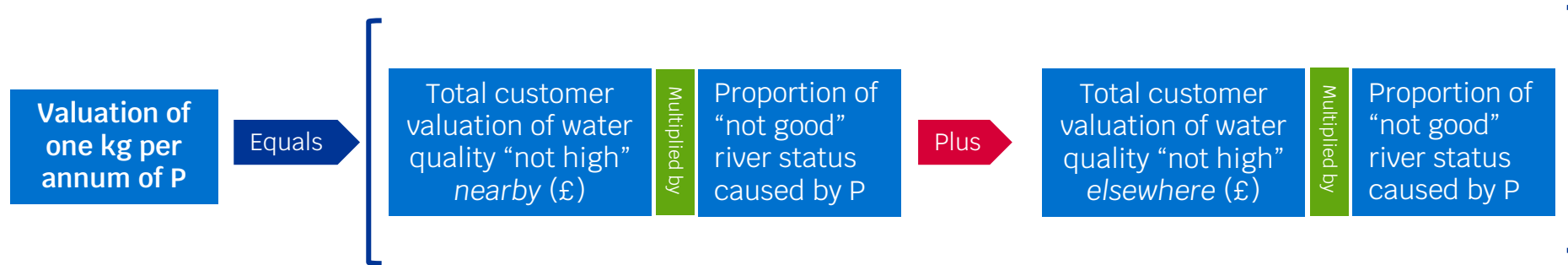
# Discharge permit compliance and river water quality interaction

- In the survey customers valued “river water quality not high” nearby and elsewhere
- River water quality is driven by a number of factors – some of which are captured by our PCs
- There are two PCs which capture elements of river water quality – discharge permit compliance and the river water quality PC
- We needed to ensure there is no double counting of the valuation across the two PC’s

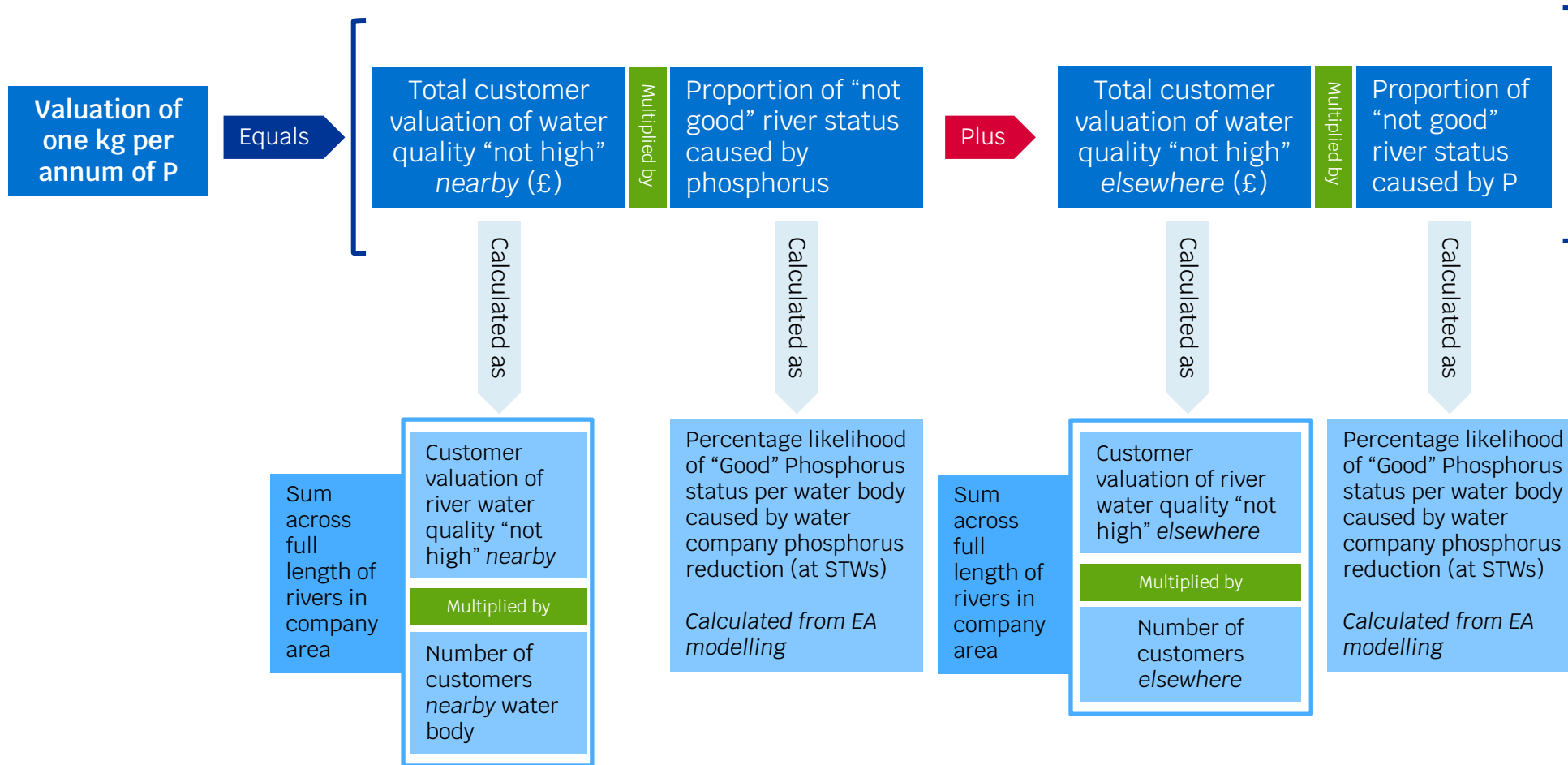


# River water quality (1)

<b>PC Definition</b>	The percentage reduction in phosphorus emissions to river catchments as a result of water company activities relative to the load of total phosphorus discharged by all wastewater treatment works in the 2020 baseline
<b>Relevant service failures</b>	<ul style="list-style-type: none"><li>• River water quality not high - nearby</li><li>• River water quality not high - elsewhere</li></ul>

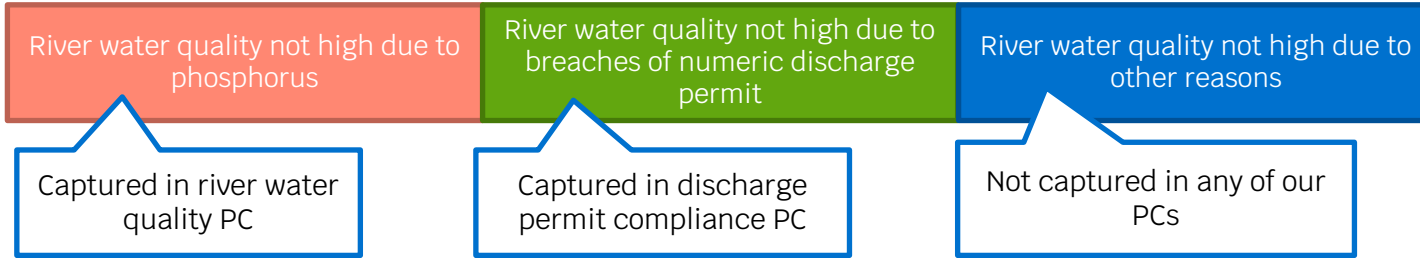


# River water quality (2)



# Discharge permit compliance

River water quality “not high” can be split into three components:



- Using the RNAG data set we have considered options to work out the weight we should apply to the river water valuations for the discharge permit compliance PC.
- Discharge permit compliance failure is not a category in this data set so we have considered options (set out in the table)
- Our preferred approach is option 2.
- We took advice from the EA and we proposed to assume RNAG caused by NH<sub>3</sub> and BOD linked to “sewerage discharges (continuous)” are caused by discharge failures.
- We would use GIS spatial mapping to assign population to historic incidents where discharges have led to “not-good” status to enable us to distinguish between nearby and elsewhere.

## Options for mapping approach

**Option 1.** Assume all “not good” status water bodies not linked to phosphorus are caused by discharge failures.

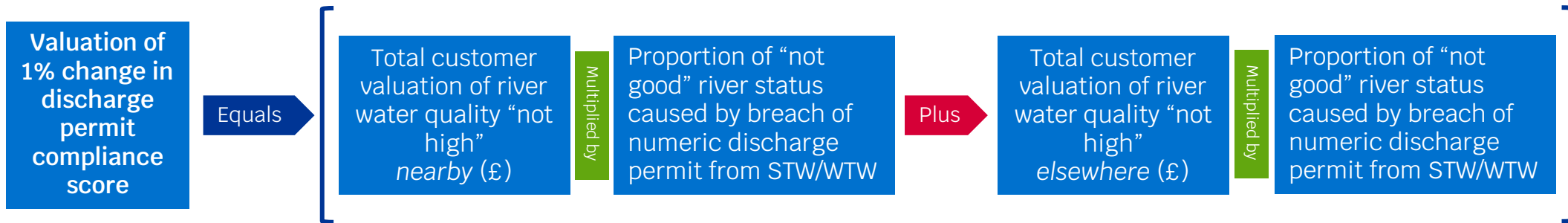
**Option 2. Assume a subset of all “not good” status water bodies are caused by discharge failures, based on expert judgement.**

**Option 3.** Derive a relationship between discharge consent failures and status of water bodies using econometric modelling.

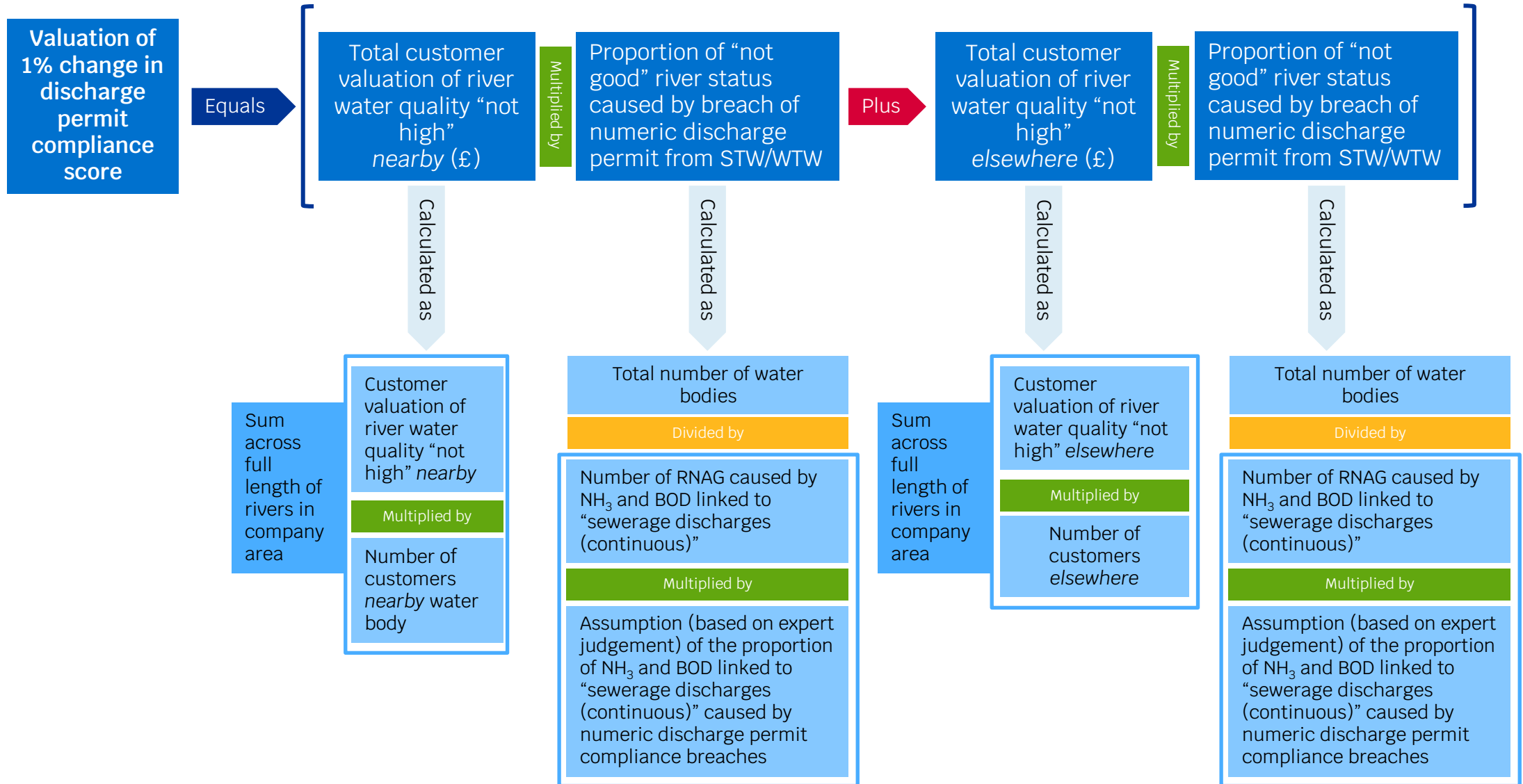


# Discharge permit compliance (1)

<b>PC Definition</b>	The discharge permit compliance metric is reported as the number of wastewater treatment works (to treat and dispose of sewage) and water treatment works (for the water supply service) in line with their numeric discharge permit conditions divided by the total number of numeric permits in a year.
<b>Relevant service failures</b>	<ul style="list-style-type: none"><li>• River water quality not high - nearby</li><li>• River water quality not high - elsewhere</li></ul>



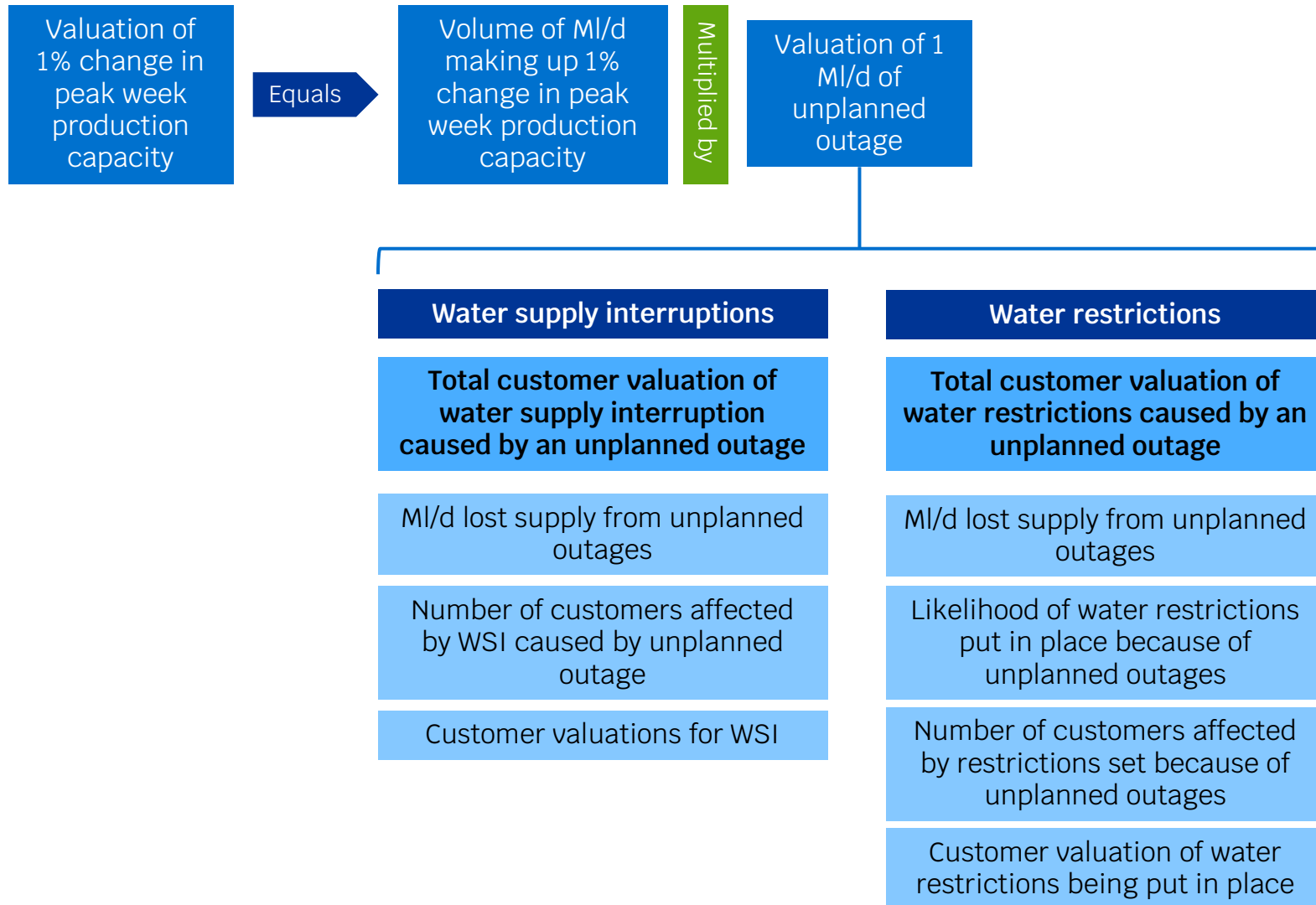
# Discharge permit compliance (2)



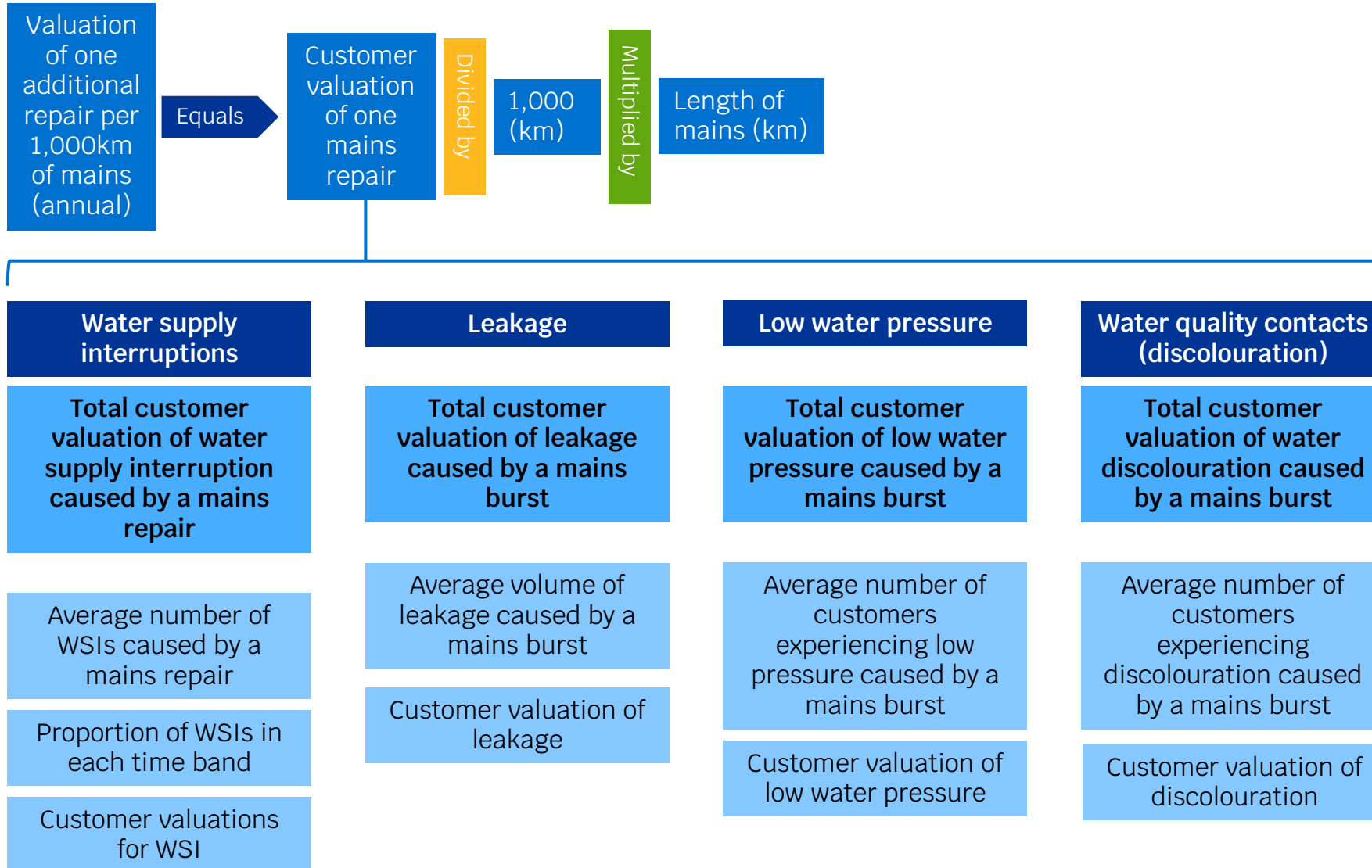
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### **3. Asset health PCs**

# Unplanned outages – conceptual mapping and links to customer valuations



# Mains repairs (bursts) – conceptual mapping and links to customer valuations



# Sewer collapses – conceptual mapping and links to customer valuations

