

**UUWR\_68**

**PR24 Draft Determination: UUW  
Representation**

**Embodied Greenhouse Gas (GHG)  
Emissions – Definition document**

**August 2024**

This document is our completed version of Ofwat's definition document template for UUW's Bespoke Performance Commitment for Embodied Greenhouse Gas (GHG) Emissions.



## PR24\_EGG\_Embodied greenhouse gas emissions

**Purpose:** This performance commitment (PC) is designed to mitigate the impacts of climate change through the reduction of greenhouse gas emissions (GHG) emissions arising from construction activities from some of our most intensive wastewater treatment, non-infrastructure projects within the Water Industry National Environment Programme (WINEP).

**Benefits:** This PC supports our ongoing strategy to reduce embodied GHG emissions and achieve net zero GHG emissions by 2050. It also supports the sector's aim to better understand and consistently measure and report embodied emissions associated with the delivery of capital programmes.

### Version control

Version	Date of issue	Performance commitment changes
0.1	August 24	New PC definition document created in response to draft determination.
1.0		
2.0		

# Performance commitment definition and parameters

## 1.1 Detailed definition of performance measure

This PC has been developed to measure, manage and reduce the GHG emissions (expressed in tonnes of carbon dioxide equivalent, tCO<sub>2</sub>e) related to our AMP8 WINEP wastewater treatment, non-infrastructure programme.

Our focus will be on managing and reducing emissions in line with the GHG reduction hierarchy, including the avoidance and minimisation of emissions through, for example, re-use of assets and optimisation of existing processes. The PC will focus on efficient material usage, design optimisation and switching to low carbon alternatives, where technology and innovation allows. We will collaborate with and incentivise our supply chain partners to support the delivery of UU's strategic themes for the AMP8 capital programme, including our net zero transition plan and the proposed PC.

The performance commitment level (PCL) will be to reduce embodied GHG emissions, measured in tCO<sub>2</sub>e, by 5% from our planned PC programme (set at PR24 Final Determination, FD). The PCL is only applicable at the end of year 5 (FY2029/30) for schemes listed in Annex 1. The baseline forecast has been assured by a third party and will be repeated at FD with the final forecast baseline.

Following feedback from Ofwat at draft determination, we have updated this PC to a reward and penalty measure, with outperformance and underperformance rates of £188 per tCO<sub>2</sub>e and £94 per tCO<sub>2</sub>e respectively. As proposed by Ofwat at draft determination and reflected in Data Table ADD22E.18, performance payments will be calculated against the revised baseline emissions of the changed project (as delivered or built), rather than on the original scope and baseline emissions of the project.

Where the project outcomes in the PC are not delivered, outperformance payments will not be eligible. If a project outcome is delivered through asset optimisation, catchment solutions or equivalent 'no build solutions' then outperformance payments are still eligible.

Table 1 sets out the relevant definitions associated with this PC.

**Table 1 Embodied GHG Emissions PC Definitions**

Title	Definition
AMP8 WINEP, wastewater treatment, non-infrastructure delivery programme	<p>Specific AMP8 WINEP, wastewater treatment, non-infrastructure projects.</p> <p>In general, wastewater treatment projects are only included at final determination if they do not meet the following criteria:</p> <ul style="list-style-type: none"> <li>• Have bathing water or shellfish water improvements as their primary driver;</li> <li>• Have a preferred solution that is centred around investigation or monitoring as part of the PR24 submission;</li> <li>• Involve improvements to septic tank discharges to surface waters as a primary driver;</li> <li>• Have storm overflow improvements as a driver, with the exception of Salford WwTW and Eccles WwTW;</li> <li>• Are expected to be delivered via the Direct Procurement for Customers (DPC) model;</li> <li>• Solutions where the estimated embodied GHG emissions at PR24 submission is &lt; 100 tCO<sub>2</sub>e;</li> <li>• Projects where the project-in-use date is later than the 31st March 2030;</li> <li>• The PR24 preferred solution does not follow our 'carbon models' estimating methodology;</li> <li>• Are part of Ofwat's proposed large scheme gated process.</li> </ul>
BS EN 17472:2022 Sustainability of construction works - Sustainability assessment of civil engineering works – Calculation Methods	<p>This standard establishes the requirements and specific methods for the assessment of environmental, economic and social performances of a civil engineering works while taking into account the civil engineering works' functionality and technical characteristics.</p>

Embodied emissions (cradle-to-built)	<p>This PC measures the emissions resulting from the extraction, transportation, processing of raw materials, construction and off-site disposal of waste in creating an asset, inclusive of modules A1-A5 defined in BS EN 17472:2022.</p> <p>Emissions associated with 'in-use' or 'end of life' emissions (i.e. BS EN 17472:2022 B – D modules) are not included in this PC. This approach avoids duplication with the common operational GHG emissions PCs for water and wastewater operations which cover the 'in use' phase GHG emissions.</p>
PAS2080:2023	<p>A publicly available standard (PAS) published in 2023 which specifies requirements for the management of whole-life GHG emissions in buildings and infrastructure – in the provision, operation, use and end-of-life of new projects or programmes of work as well as the management or retrofit of existing assets and networks.</p>
Project In Use	<p>Project In Use (PIU) is the point at which the project outputs are delivered and evidence to that effect is submitted to the business, and if applicable, to a regulatory body, prior to the completion date.</p> <p>The assets delivered as part of the project at PIU may be subject to final optimisation and modification, prior to final contract completion.</p>

## 1.2 Additional detail on measurement units

### 1.2.1 Baseline – Preferred Solutions

The PC baseline (expressed in tonnes of embodied CO<sub>2</sub>e) for our preferred solutions is submitted in draft here and will be finalised at final determination. The version of the baseline in response to draft determination has been included in Annex 1.

We have profiled our PC baseline between FY2025/26 and FY2029/30, based on forecasted and draft project-in-use (PIU) dates. Our actual PIU dates will be confirmed as the delivery plan for our PC projects develop transitioning into AMP8. The PC baseline profile (i.e. between FY2025/26 and FY2029/30) may therefore change during the reporting period, however all PC projects will be delivered before the end of the FY2029/30 period.

As detailed in our draft determination representation document [UUWR 67 Bespoke PC - Embodied GHG Emissions](#), we propose that Davyhulme WwTW Phosphorus (P) Removal and Eccles WwTW should be removed from the PC baseline if Ofwat disagrees with our approach for the large scheme gated mechanism for these projects for final determination.

### **Baseline Methodology**

For all projects included in the PC, the embodied GHG emission baseline (i.e. programme baseline in Data Table ADD22E.14) has been estimated using our ‘carbon models’ methodology from our carbon assessment framework, which has been used across our PR24 submission.

For our projects, engineering scope documents (ESD) are produced by our engineering teams which detail the scope items required to address the associated project requirements or drivers. This document, in addition to project operational data and scope, is sent to our estimating team partners who have industry leading expertise in measuring carbon emissions on water infrastructure projects.

Where sufficient scope detail is available in the ESD, asset (i.e. pumps, valves, tanks) and process (i.e. activated sludge process) level carbon models are applied (developed and assured by an independent third party) by our estimating team. These carbon models align to BS EN 17472:2022 A1-A5 modules and draw on industry recognised data sets for emissions factors, such as Inventory of Carbon and Energy Database, Civil Engineering Standard Method of Measurement etc. Our carbon model dataset has been built up to be aligned with global standards on carbon quantification including the GHG Protocol and PAS2080. Where sufficient information or a specific model is not available (i.e. a new innovative technology) an appropriate equivalent carbon model or a carbon intensity metric is applied, still aligning to emissions associated with A1-A5 modules.

### **1.2.2 Baseline – Reductions already delivered**

As referenced in our PR24 document UUW37, our PR24 GHG emissions assessment framework is *“aligned to the best value methodology through its calculation methodology, terminology, boundaries, and key assumptions. Following assessment, we have challenged the projects to look for emission reduction opportunities for both operational and embodied emissions. It is well established within PAS 2080 that the earlier the carbon impacts of a project can be estimated, the greater the ability to influence and reduce these impacts.”*

The projects included within the embodied GHG PC baseline have, where relevant, assessed and estimated multiple options. This process, where the resulting best value

solution has also been the lower carbon solution, has enabled us to avoid approximately 13,995 tCO<sub>2</sub>e of embodied GHG emissions, or 9% when compared to the 'baseline without reductions, cumulative' (ADD22E.11).

We have provided this data (expressed in tonnes of embodied CO<sub>2</sub>e) in Annex 1 for projects in the PC and within data tables ADD22E.12 and ADDEE.13. These emissions have been estimated using our carbon assessment framework which has been used across our PR24 submission and has been verified by an independent third party. These emissions follow the same A1-A5 modules as our preferred solutions.

Where projects within the embodied GHG PC baseline only have a single technically feasible option, it has not been possible to quantify the associated avoided emissions of an alternative scheme. However, for all projects a risk based, value engineering methodology was adopted in our design process to reduce new capital infrastructure and as such, avoid embodied GHG emissions. As an example, for the Keswick WWTW Habitats scheme we undertook optimisation and a risk-based assessment which enabled the removal of humus tanks, sludge holding tanks and caustic dosing from scope. This will have reduced embodied GHG emissions significantly on the single option for this project, however this has not been quantified through our estimating process or included within Annex 1.

### 1.2.3 Built solutions at PIU (AMP8)

#### **Built Solutions Methodology**

Emissions for our built solutions at PIU will be estimated by our internal estimating team or our delivery partners. To ensure consistency of measurement and reporting between suppliers, we are embedding a new GHG emissions accounting tool in readiness for AMP8. We also intend to closely collaborate with our delivery partners, providing training and additional governance on their estimates to ensure there is a consistent approach being followed for projects across the PC.

Embodied GHG emissions for our built solutions will be estimated based on 'bottom up' data where available i.e. quantities of materials used, fuel consumed etc, using the same Scope 3 boundaries, BS EN 17472:2022 A1-A5 modules and emissions factors consistent with the FD baseline This methodology broadly aligns with 'Level 1 and 2 assessment using embodied GHG emissions factors for materials and work items' as per UKWIR Framework for Accounting for Embodied Carbon 2012. Where 'bottom up' data is not available i.e. because data is not available from a product supplier, we will look to use equivalent or comparable data from similar products or assets. We will clearly evidence this within our estimates.

Emissions factors that were used to inform our baseline will be fixed for our projects in the PC throughout the AMP to ensure consistent and comparable reporting. This will ensure that we will not benefit from market decarbonisation or that changes in emissions factors are not attributable to the use of offsets, green tariff energy purchases, and renewable energy delivered through the grid, including where this due to direct, corporate or power purchase agreements. Where electricity emission factors are used for construction related activities (i.e. electricity associated with a battery pod used to power site cabins), these will be calculated using a location-based methodology, unless it has a renewable source and not taken from the grid (i.e. solar or wind).

We may add to our emission factor fixed approach with new products and corresponding emissions factors (i.e. from environmental product declarations (EPD)) where they are available and where we are able to effectively deploy new low carbon products, such as concrete or steel for example. Where emission factors or EPDs are not available from supply chain for new products or innovations, we will look to use equivalent or comparable data from similar products and/or materials. We will clearly evidence this within our estimates.

### **Circumstances for proportioning embodied GHG emissions**

Where the outcomes or requirements of a project change following FD i.e.

- If multiple projects with different outcomes or requirements are combined in order achieve efficiencies in delivery such as programme and costs;
- If additional requirements are added to the project i.e. a maintenance driver.

We will measure and report the embodied GHG emissions associated with the outcomes or drivers attached to the baseline solutions only. As an example, if a wastewater (Ww) project included in the PC baseline with a phosphorus (P) removal driver is combined with a project not included in the PC baseline at the same Ww site with a storm overflow driver, we will measure and report the embodied GHG emissions associated with delivering the P removal driver only. In this circumstance, we would therefore not report embodied GHG emissions associated with the storm overflow driver (i.e. construction of the storm or detention tank). Where there are commonalities in emissions across the outcomes / drivers i.e. site welfare which may have emissions associated with fuel or electricity use, we will apportion those emissions based on percentage spend attached to each driver.



## 1.2.4 Other

As part of our project delivery process, we have robust procedures, standards and governance in place relating to environmental management, including the prevention of pollution or creation of new pollution sources. Throughout all stages of project delivery, our delivery teams including designers, delivery partners, operational staff, asset owners etc carefully consider the risk of pollution associated with our design choices, and the necessary steps required to mitigate the risk. This process is rigorously documented, monitored and actioned against across our risk management systems and associated project delivery documentation.

Our projects included in this PC will follow this process to safeguard against the creation of other pollution types and/or sources of pollution shifting to a different environmental medium. This will ensure that any design or management choices relating to the carbon reduction (i.e. opportunities of building less, new technologies or innovations explored) will be carefully considered in line with pollution, and appropriate steps put in place to mitigate associated risk.

## 1.3 Specific exclusions

There are no specific exclusions proposed for this bespoke PC.

## 1.4 Reporting and assurance

We openly report our emissions annually across all relevant areas of scopes 1, 2 and 3. Our reporting covers both our operational and embodied emissions. For example, we were an early adopter of the Taskforce for Climate-related Financial Disclosures (TCFD) and have benchmarked our performance for many years in the CDP, last year securing a leading “A-“ rating.

We have been reporting a full scope 3 emissions inventory in our annual report for many years using a spend-based methodology. We will continue to make strides in improving our regulatory reporting for our inventory of scope 3 emissions, including maturing in line with Ofwat’s APR reporting requirements to report ‘embedded emissions’.

For this PC, we propose to report our emissions associated with built solutions in each reporting year (i.e. for PC projects that achieve PIU within that year) in our annual report. We will also report our performance against our PC baseline position. The emissions we report for the PC will be based on the methodology outlined in the ‘built

solutions methodology' section of this definition document. We will report progress of the PC independently to our usual scope 3 regulatory reporting.

We will commit to sharing lessons learned from our bespoke PC with the wider water industry, including carbon measurement, management, reduction and innovations explored. We are active members of numerous working groups where these learnings can be shared i.e. Capital Carbon Forum and the Net Zero Low Carbon Construction Materials and Techniques forum. We will also explore other forums and channels where we can share learnings from the PC i.e. hosting webinars through the Supply Chain Sustainability School, of which we are an active and supporting member.

Our carbon assessment framework is supported by written methodologies, using data which is externally verified by an independent third party with expertise in assurance of GHG emissions information. During the project lifecycle we will track and update GHG emissions estimates at select project gateways as the design matures. Final performance will be reported for solutions at PIU stage. We will ensure a third-party verification (by those with appropriate qualifications and experience) is undertaken as part of our Annual Performance Report (APR) each year.

### Compliance checklist

Ofwat has not provided a compliance checklist for this measure indicating the elements which need to be reported against.

**Table 3 Definition parameters**

Parameters	
<b>Measurement unit and decimal places</b>	Tonnes CO <sub>2</sub> e reported to two decimal places. Performance represented as percent change (%) to two decimal places, calculated against the revised baseline emissions of the built project.
<b>Measurement timing</b>	Reporting year, financial ODI applicable in FY2029/30 only
<b>Incentive form</b>	Revenue and penalty
<b>Incentive type</b>	Outperformance and underperformance only
<b>Timing of underperformance and outperformance payments</b>	End of period i.e. FY2029/30 only
<b>Price control allocation</b>	100% Wastewater Network Plus
<b>Frequency of reporting</b>	Reporting annually each year through AMP8
<b>Any other relevant information</b>	N/A
<b>Links to relevant external documents</b>	N/A

## Annex 1 Embodied GHG Emissions DD Forecast

This section provides an overview of the projects within the proposed draft PC baseline.

**Table 1: Embodied GHG PC – Project Baseline (draft determination version)**

Project Name	FY which PIU falls in (forecast)	Preferred solution – embodied carbon – tCO <sub>2</sub> e ADD22E.14	Avoided embodied emissions – tCO <sub>2</sub> e – ADD22E.12	Programme baseline without reductions – embodied carbon – tCO <sub>2</sub> e – ADD22E.10
Ravenstonedale WwTW – Habitats	FY28–29 Only	1,462.00	N/A	1462.00
Kirkby Stephen WwTW – Habitats	FY29–30 Only	1,274.00	N/A	1274.00
Shap WwTW – Habitats	FY29–30 Only	258.00	N/A	258.00
Brampton (Carlisle) WwTW – Habitats	FY26–27 Only	1,246.00	N/A	1246.00
Dufton WwTW – Habitats	FY25–26 Only	383.00	N/A	383.00
Embleton WwTW – Habitats	FY29–30 Only	1,362.00	N/A	1362.00
Rosthwaite WwTW – Habitats	FY29–30 Only	549.00	N/A	549.00
WARWICK BRIDGE WWTW – Nutrient Neutrality	FY29–30 Only	897.00	N/A	897.00
PENRITH WwTW – WINEP Habitats	FY29–30 Only	208.00	N/A	208.00
APPLEBY WwTW – WINEP Habitats	FY26–27 Only	615.00	N/A	615.00
BASSENTHWAITE WwTW – WINEP Habitats	FY28–29 Only	882.00	N/A	882.00
Barton WwTW	FY29–30 Only	4,385.00	N/A	4385.00
Garstang WwTW (Chemicals standalone)	FY29–30 Only	3,506.00	N/A	3506.00
Oldham WwTW P	FY29–30 Only	1,392.00	3679.00	5071.00
DAVYHULME WwTW – P(*)	FY28–29 Only	5,457.00	N/A	5457.00
St Helens WwTW P	FY29–30 Only	881.00	2636.00	3517.00
ALPRAHAM WwTW – UWWTD – SD	FY29–30 Only	707.00	572.00	1279.00
WINEP Habitats – LORTON WwTW	FY29–30 Only	716.00	N/A	716.00
WINEP Habitats – DALSTON WwTW	FY28–29 Only	1,314.00	N/A	1314.00
WINEP Habitats – GRAYRIGG WwTW	FY29–30 Only	248.00	N/A	248.00
WINEP Habitats – THRELKELD WwTW	FY29–30 Only	1,106.00	N/A	1106.00
WINEP Habitats – MILBURN WwTW	FY25–26 Only	908.00	N/A	908.00
WINEP Habitats – CALDBECK WwTW	FY29–30 Only	858.00	N/A	858.00
WINEP Habitats – GLENRIDDING WwTW	FY29–30 Only	1,019.00	N/A	1019.00

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WINEP Habitats – Morland WwTW	FY25-26 Only	561.00	N/A	561.00
WINEP Habitats – BRANTHWAITE WwTW	FY29-30 Only	1,057.00	N/A	1057.00
No Det – Orton WwTW	FY25-26 Only	530.00	389.00	919.00
No Det – TORPENHOW WwTW	FY25-26 Only	306.00	N/A	306.00
Low Marple WwTW – Phosphorus	FY29-30 Only	1,757.00	N/A	1757.00
No Det – Warrington South WwTW	FY25-26 Only	3,323.00	N/A	3323.00
No Det – POOLEY BRIDGE-EAST WwTW	FY28-29 Only	1,005.00	N/A	1005.00
WINEP Habitats – KESWICK WwTW	FY29-30 Only	923.00	N/A	923.00
No Det – Nether Kellet WwTW	FY25-26 Only	212.00	N/A	212.00
No Det – Over Kellet	FY25-26 Only	298.00	N/A	298.00
Irwell B5 – ROSSENDALE WwTW	FY29-30 Only	1,703.00	N/A	1703.00
No Det- Nether Peover WwTW – P	FY25-26 Only	301.00	N/A	301.00
Long Marton West WwTW	FY28-29 Only	397.00	N/A	397.00
Long Marton East WwTW	FY25-26 Only	1,411.00	N/A	1411.00
No Det – Crewe WwTW	FY25-26 Only	3,629.00	1052.00	4681.00
Hazel Grove WwTW – Phosphorus – River Goyt	FY29-30 Only	3,499.00	2753.00	6252.00
Altrincham WwTW – Phosphorus	FY29-30 Only	4,471.00	2001.00	6472.00
No Det – Carlisle WwTW	FY28-29 Only	4,228.00	N/A	4228.00
Lane Bottom – No Det	FY29-30 Only	393.00	N/A	393.00
DUKINFIELD WwTW – Ammonia	FY29-30 Only	6,652.00	913.00	7565.00
ASHTON-U-LYNE WwTW – Ammonia	FY29-30 Only	2,628.00	N/A	2628.00
Eaglesfield WwTW	FY29-30 Only	803.00	N/A	803.00
Grange-in-Borrowdale WwTW	FY29-30 Only	210.00	N/A	210.00
Kirkby Thore WwTW	FY29-30 Only	276.00	N/A	276.00
Warcop WwTW	FY29-30 Only	237.00	N/A	237.00
Murton East WwTW	FY29-30 Only	316.00	N/A	316.00
WINEP Habitats – COCKERMOUTH WwTW	FY29-30 Only	869.00	N/A	869.00
Hyde WwTW	FY29-30 Only	3,604.00	N/A	3604.00
Fazakerley – EnvAct_IMP1	FY29-30 Only	347.00	N/A	347.00
Ainsdale – EnvAct_IMP1	FY29-30 Only	741.00	N/A	741.00
Salford WwTW	FY29-30 Only	18,774.00	N/A	18774.00
Eccles WwTW – NH4(*)	FY29-30 Only	37,666.00	N/A	37666.00
Great Broughton WwTW	FY29-30 Only	165.00	N/A	165.00

Please note that Davyhulme WwTW P and Eccles WwTW – NH4 have been highlighted with a (\*) to identify them as projects which form the large scheme gated mechanism at draft determination. As detailed in our draft determination representation document [UUWR 67 Bespoke PC - Embodied GHG Emissions](#), we propose that Davyhulme WwTW

Phosphorus (P) Removal and Eccles WwTW should be removed from the PC baseline if Ofwat disagrees with our approach for the large scheme gated mechanism for these projects for final determination.