FINAL WATER RESOURCES MANAGEMENT PLAN 2024

APPENDIX 7E –CARBON

Portsmouth Water Ltd
PO Box 8
West Street
Havant
Hants
PO9 1LG

October 2024

TABLE OF CONTENTS

LIST OF TABLES

1 INTRODUCTION AND OVERVIEW

At Portsmouth Water we have been supplying water to Portsmouth and the surrounding area since 1857. The area supplied by us extends through South East Hampshire and West Sussex encompassing 868 square kilometres and 3,359km of water mains.

We provide high quality public water supplies to over 740,000 customers, as well as many important industries, large defence establishments and varied commercial businesses.

We abstract, treat, and pump an average of around 175 million litres of water each day. Each million litres of water we supply produces around 95kg of carbon dioxide equivalent (CO2e) emissions. We currently produce around 16 tonnes of CO2e each day through our day-to-day operations.

As part of our ongoing pledge to reduce our emissions, we were early adopters of solar power, which since installation in 2011 has saved 800 tonnes of CO2e emissions. This saving equates to 8,300 million litres of water being pumped with no carbon emissions. Furthermore, we purchase 99% of our grid electricity from renewable sources, further underlying our commitment to reduce our environmental impact.

Research shows Net Zero Carbon is a priority for our customers, along with reducing leakage, ensuring a reliable supply of fresh water, and keeping bills affordable.

1.1 Purpose of this Appendix

This Appendix details how we have assessed carbon while developing our Water Resources Management Plan 2024 (WRMP24) and our wider approach to Net Zero Carbon. It aligns with our 'Net Zero Route Map' and has been developed in parallel with our PR24 Business Plan for 2025-30.

The aim of this Appendix is to address feedback received in response to the public consultation of our draft (dWRMP24), and to demonstrate compliance with Direction 3(d) of the 2022 water Resources management Plan (England) Direction, as shown in Table 1 below.

Table 1: Water Resources Management Plan (England) Direction 3(d) 2022

Direction	Description 3. (1) In accordance with section 37A(3)(d), a water undertaker must include in its water resources management plan a description of the following matters-
3 (d)	In respect of greenhouse gas emissions – (i) the emissions of greenhouse gases which are likely to arise as a result of each measure which it has identified in accordance with section37A(3)(b), unless that information has been reported and published elsewhere and the water resources management plan states where that information is available; (ii) how those greenhouse gas emissions will contribute individually and collectively to its greenhouse gas emissions overall; (iii) any steps it intends to take to reduce those greenhouse gas emissions; (iv) how these steps will support the delivery of any net zero greenhouse gas emissions commitment made by it; and (v) how these steps will support delivery of the UK government's net zero greenhouse gas emissions targets and commitments.

1.2 Structure of this Appendix

The Appendix is structured as follows:

Section 2: Baseline Carbon

Between 2019 and 2020 our operational carbon emissions fell by 5%, primarily thanks to the UK electricity grid carbon emission factor falling and the results of proactive operational steps we have taken to reduce our operational carbon emissions.

We measure our carbon footprint by using the water industry standard Carbon Accounting Workbook (CAW) developed by UKWIR (UKWIR, 2012)[1].

We are always looking to improve our measurement and control of operational and embedded carbon and develop skills and capabilities to accelerate the reduction in our carbon emissions.

Section 3: Carbon assessments undertaken for WRMP24 options (including demand and supply schemes)

A carbon assessment has been undertaken for all feasible options included in our WRMP24.

The carbon assessment for demand management options was undertaken in a consistent way across all Water Resources South East (WRSE) companies according to a method produced by Mott MacDonald.

The carbon assessment of WRMP24 supply options was undertaken by Wood Plc (now WSP), Portsmouth Water and WRSE. At the time of the assessment the supply schemes were largely at conceptual design stage and therefore would require detailed carbon assessments as the schemes develop.

For the final WRMP24 (fWRMP24) all demand and supply schemes have carbon assessments completed with the exception of Temporary Use Bans (TUBs) and Non Essential Use Bans (NEUB). These schemes are expected to result in minimal carbon emissions from their implementation but would be expected to reduce carbon via the reductions in demand resulting from their implementation in a drought event.

There are some options which do not have embedded carbon as it is either captured via other dependant schemes and/or there is no embedded carbon for the scheme (i.e. the asset already exists).

Section 4: How carbon emissions influenced the decision-making process for our preferred plan, and the carbon effects of the Preferred Plan.

This includes the use of carbon metrics in the decision making to inform the best value plan and the calculation of carbon cost of the timeframe of the plan.

Section 5: Our approach to achieving our net zero carbon targets

The bulk of emission reduction will arise from our continued investment in green grid electricity in tandem with our pledge to install additional on-site renewable capacity that reduces our reliance on the grid. We intend to procure 100% of our electricity from REGO certificate-backed renewable energy, so we are able to net-off any grid emissions enabling us to move much closer to operational net zero carbon status by 2030.

[1] https://ukwir.org/Carbon-accounting-workbook

Our greatest technical challenge will be decarbonising our existing fleet as low carbon fuels for vans, which are the mainstay of our vehicle fleet, are in their market infancy. However, we remain committed to achieving this and will commence transitioning to low carbon vehicles from 2026, with 30% of vehicles being non-fossil fuel powered by 2030.

Section 6: compliance with direction 3(d) of the Water Resources Management Plan (England) Direction 2022

A check list of how we have complied with the Direction.

2 BASELINE CARBON

2.1 Overview

Portsmouth Water abstract, treat and pump an average of 170 million litres of water each day. Each million litres of water produces around 95kg of carbon dioxide equivalent (CO2e) emissions. In addition, Portsmouth Water currently produce around 16 tonnes of CO2e each day through our day-to-day operations. As part of our ongoing pledge to reduce our emissions, we were early adopters of solar power, which since installation in 2011 has saved 800 tonnes of CO2e emissions. This saving equates to 8,300 million litres of water being pumped with no carbon emissions. Furthermore, we purchase 99% of our grid electricity from renewable sources, which further underlines our commitment to reduce our environmental impact.

Between 2019 and 2020 our operational carbon emissions fell by 5%, primarily resulting from the UK electricity grid carbon emission factor falling and taking the following proactive steps to reduce operational carbon emissions:

- Regularly reviewing and implementing opportunities to improve our energy efficiency in pumps, process and our general activities.
- Installing six solar arrays across our site portfolio, together generating 2.5 million kilowatt hours of renewable electricity since installation in 2011, saving over 800 tonnes of CO2e emissions.
- Committing to purchasing over 90% of electricity backed by REGO certificates thereby ensuring that our grid-associated carbon emissions are kept to a minimum.
- Installing a vehicle telematics system which could save as much as 10% of vehicle fuel emissions.

2.2 Monitoring and reporting of operational greenhouse gas emissions:

We measure our carbon footprint by using the water industry standard Carbon Accounting Workbook (CAW) developed by UKWIR (UKWIR, 2012)[2]. The workbook is updated annually by UKWIR to reflect the latest UK emissions factors, developments in carbon accounting practices and newly available scientific data. This tool allows us to clearly see our environmental impact and monitor the impact of measures we put in place to reduce our footprint.

The emission sources included in the baseline are consistent with the net zero commitment and Portsmouth Water's reporting using the Carbon Accounting Workbook (CAW):

- **Scope 1** direct emissions from fuels including gas oil, diesel and natural gas.
- **Scope 2** indirect emissions from fuels, in this case only imported grid electricity.
- **Scope 3** other indirect emissions, specifically transmission and distribution losses from grid imports, outsourced activities and employee business travel.

Electricity data is net of current own generation (via Solar PV) used onsite and exported electricity generation is subtracted from the relevant Scope 2 and 3 emissions (consistent with the CAW). This identifies 2020/21 operational carbon emissions as 6,237 tCO2e using actual grid emissions factors.

We have developed both a Market and Location based view of our emissions to both align with Ofwat reporting requirements, including the proposed AMP8 Outcome Delivery Incentive (ODI), and to measure and monitor progress against our targets.

[2] https://ukwir.org/Carbon-accounting-workbook

Any variance from the proposed strategy will be identified, through our emissions monitoring and reporting processes and actions agreed through Portsmouth Water's standard management processes. This will likely be triggered via ODI and Ofwat standard reporting figures.

2.3 Uncertainty associated with carbon data.

There is an inherent level of uncertainty in carbon reporting and any associated reduction plans, however this risk is minimised through the following actions:

1. Portsmouth Water are active members of WaterUK energy and carbon groups ensuring that internal processes and procedures are aligned with the rest of the water industry.
2. Portsmouth Water are also active members of UKWIR, and specifically the carbon research projects which look to ensure that the water industry is at the forefront of carbon accounting practices.
3. The water industry updates the Carbon Accounting Workbook (CAW) annually, using the latest data available and aligning with Defra guidance and publications.

In the short term we will look to improve our measurement and control of operational and embedded carbon and develop skills and capabilities to accelerate the reduction in our carbon emissions. We will actively consider a number of initiatives and resources to achieve this, including programmes such as the Carbon Disclosure Project (CDP). We will assess the level of uncertainty in carbon reporting in AMP8.

3 CARBON ASSESSMENT FOR WRMP24

This following section details how the carbon assessment was undertaken for all feasible options in WRMP24 for demand and supply schemes. The following sub sections are split into demand and supply options. The outputs of the carbon assessment can be found in Table 4 of the WRMP24 planning tables.

3.1 Demand options

The carbon assessment for demand carbon was undertaken via a consistent approach by all WRSE companies. This section provides an overview of the method produced for WRSE.

This following section details the method produced by Mott MacDonald.

The methodology used to assess the carbon impacts was developed in response to data provided by Water Companies for preferred demand management options. The capital and operational carbon emissions in tonnes of carbon dioxide equivalent (tCO2e), as well as cost of carbon, were derived following discussions with Water Companies. This process included development and approval of suitable assumptions for modelling where data was limited.

Under the Greenhouse Gas (GHG) Protocol[3], capital carbon emissions from construction are typically categorised as Scope 3 emissions of the sector/organisation. Capital carbon emissions are a result of materials (extraction and processing), manufacture and transportation associated with construction and maintenance activities.

Operational carbon emissions would be considered as Scope 1 and 2 emissions of an organisation under the GHG Protocol, which cover direct and indirect emissions, respectively. Direct emissions in the water sector result from treatment process emissions, fossil fuel use and owned or leased transport emissions. Indirect energy emissions are the purchase and use of grid electricity by water company assets notably for water and wastewater pumping and treatment, as well as use in buildings. For the demand management options the major operational emissions areas are considered indirect Scope 2 emissions for electricity use and Scope 1 emissions associated with transport fuel consumption.

3.1.1 Data provided

Water Companies provided annualised data for 18 demand management options included within its preferred (referred to as 'Deliverable') demand management programme. Data for capital and operational cost (in £), demand saving (in megalitres per day) and quantities of activity (in numbers) at water resource zone (WRZ) level were provided for the majority of individual options. An example of data provided for an option is provided in Table 2.

Table 2: Example option and data provided by Water Companies

Option name	Code	Description	Data received
Mains Rehabilitation	Mains Rehab	Asset renewal	• Length of pipe to be replaced • Leakage benefit • Costs (Capex)

[3] World Business Council for Sustainable Development (2004) The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, A revised edition. Available at: ghg-protocol-revised.pdf (ghgprotocol.org)

3.1.2 Additional data requested

In order to develop carbon impacts for the demand management options, a data request was formulated to identify modelling assumptions. Data requested and received for an example option is summarised in Table 3.

Table 3: Information requested and received for capital and operational carbon assessment for an example demand management option

Code	Data requested	Data received (capital)	Data received (operational)
Metering	• Material breakdown and design information for meters • Average distance travelled for installation • Vehicle used for travel • Installation method (e.g. any excavation)	• 4 meters installed per trip • 30km per trip • Van used	No data provided

3.1.3 Modelling assumptions

Using the data provided as identified in Table 3 further assumptions have been made for modelling; these are shown for an example option in Table 4 (the details in bold font are sourced from the assumptions provided in Table 3).

Table 4: Modelling assumptions for developing the capital and operational carbon impacts for an example demand management option

Code	Modelling assumptions	Modelling assumptions
Metering	• 1 smart meter installed per household (using Mott MacDonald smart meter estimate – based on Xylem's ally® Smart Water Meter (5/8" (DN 15 mm) size)) • Average distance for installation is 7.5km (**from 4 meters in a 30km trip**) • Installation uses a **diesel van**	• Average travel distance for maintenance of communications network per meter (pro rata basis) of 100km/year • 1kWh/year power usage by communications network

Where Mott MacDonald have developed carbon estimates, these have been developed using water industry engineering knowledge, supplier information and publicly available data. These estimates are calculated using emissions factors from the Inventory of Carbon and Energy (ICE)[4] and Civil Engineering Standard Method of Measurement (CESMM4) Carbon & Price Book 2013[5] which aligns to different aspects of capital delivery and covers the cradle to built asset aspect of lifecycle assessment (module A1-A5). As an example, construction activities such as excavation and reinstatement of pipeline routes, use multiple emissions factors from CESMM4 Carbon & Price Book. Whereas, the ICE inventory is used for construction materials, such as Ductile Iron (DI) or Steel pipes.

[4] Inventory of Carbon and Energy version 3 (2019) available at: https://www.circularecology.com/embodied-carbon-footprint-database.html

[5] Civil Engineering Standard Method of Measurement (CESMM4) Carbon & Price Book (2013). Available at: CESMM4 Carbon & Price Book 2013 (icevirtuallibrary.com)

The capital and operational carbon outputs were monetised using BEIS Green Book Data Tables 1-19, Table 3[6]. The monetised cost has not been discounted.

The assumptions identified in Table 4 were used alongside the details of the number of household visits, meter installations and pipeline lengths, depending on the source data for the option. Where this data was not available, a carbon intensity factor (in tCO2e/£M) was quantified using data for other similar options (PMP, PSUP, Bulks, Mini Bulks and Mains Rehab) and used to estimate a carbon output based on capex spend.

3.2 Supply Schemes

This section details the approach undertaken for the carbon assessment of the supply schemes which formed part of WRMP24. These assessments were undertaken by Wood Plc (now WSP), Portsmouth Water and WRSE. There are a range of supply schemes considered in the rdWRMP24 and therefore the following sections are split into option type. At the time of the assessment the supply schemes were largely at conceptual design stage and therefore would require detailed carbon assessments as the schemes develop.

3.2.1 Embodied Carbon – Bulk transfer pipelines and pumps

This assessment was undertaken by WSP and the following sub-section details the method.

In line with other options, where option development is high-level, order of magnitude estimates has been informed by the Environment Agency's science report "Greenhouse gas emissions of water supply and demand management options"[7]. In this case, the "bulk transfer pipeline" option is used as our proxy for estimating. This included pumping station and pipes. This provides an embodied carbon value of 6,200 tCO_2e. Where this approach is taken, the following assumptions are noted:

- Base system design includes allowance for connecting pipework to a source reservoir, treatment plant assets and associated pumps and ancillary buildings.
- Embodied carbon figures are primarily sourced from the Inventory of Carbon and Energy (https://circularecology.com/embodied-carbon-footprint-database.html).
- Details here are built from a single concept design ('top down'), rather than individual primary components from a bill of quantities ('bottom up'). It therefore provides an initial order of magnitude estimate that would need further refinement as design details are progressed.
- The estimate is not site specific so no details relating to sourcing of materials or transport options in accessing site have been reviewed.

3.2.2 Embodied carbon – Treatment element

This assessment was undertaken by WSP and the following sub-section details the method.

In line with other options, where option development is high-level, order of magnitude estimates have been informed by the Environment Agency's science report "Greenhouse gas emissions of water supply and demand management options". Within this report, a number of

[6] BEIS Green Book Data Tables 1-9, Table 3 (2021) available at: data-tables-1-19.xlsx (live.com)

[7] Greenhouse gas emissions of water supply and demand management options. Science Report SC070010 (Environment Agency 2008) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291728/scho0708bofv-e-e.pdf

option types are considered. In this case, the "river intake" option is used as our proxy for estimating. An upper bound range of 2,200 tCO_2e is determined for a 10Ml/d WTW.

3.2.3 Embodied Carbon- Groundwater Abstraction

This assessment was undertaken by WSP and the following sub-section details the method.

In line with other options, where a bottom-up estimate has not been created, order of magnitude estimates have been informed by the Environment Agency's science report "Greenhouse gas emissions of water supply and demand management options". Within this report, a number of option types are considered. In this case, the "groundwater abstraction" option is used as our proxy for estimating. This provides an embodied carbon value of 100 tCO2e. Where this approach is taken, the following assumptions are noted:

- Base system design includes allowance for connecting pipework to a source reservoir, treatment plant assets and associated pumps and ancillary buildings
- Embodied carbon figures are primarily sourced from the Inventory of Carbon and Energy (https://circularecology.com/embodied-carbon-footprint-database.html)
- Details here are built from a single concept design ('top down'), rather than individual primary components from a bill of quantities ('bottom up'). It therefore provides an initial order of magnitude estimate that would need further refinement as design details are progressed
- The estimate is not site specific so no details relating to sourcing of materials or transport options in accessing site have been reviewed.
- No details regarding specific operational chemical requirements have been reviewed at this point. An initial estimate, based on experience from previous modelling, provides an allowance of 10% of total GHG to account for chemical usage in operation.

3.2.4 Embodied Carbon – Source O Booster Upgrade

Source O Booster upgrade carbon assessment was undertaken by Portsmouth Water.

The emissions calculation is based on emissions factors published by Defra, as reported by the Welsh Government in its 'Public sector net zero reporting guide' for 2022/23. These factors are complete and relevant for a business operating in England. They are also applicable to the 2022/23 reporting year without any inflationary adjustments. They provide an estimate of indirect Greenhouse Gas (GHG) emissions resulting from expenditure. They are on a purchasers' price basis in real terms (i.e. the actual sales price in that year including taxes (VAT) on products and distribution margins). They include tCO2e i.e. relate to the basket of greenhouse gases in aggregate, not just CO2.

3.2.5 Operational carbon

This following section details how the operational carbon was calculated for the supply schemes.

3.2.5.1 Pipeline element

It is assumed that the pipeline element will generally to be dominated by electricity, which is dealt with separately by WRSE using electricity requirements uploaded for each option and an assumption regarding REGO or normal grid.

3.2.5.2 Treatment element

Operational treatment carbon was undertaken by WSP. Carbon from chemicals in treatment assume at 4.7tCO2e/Ml. This is based on an initial estimate, based on experience from previous modelling at Wood, which suggests an allowance of 10% of total GHG to account for chemical usage in operation. This is informed by WSP's WTW costing model, which indicates an overall operational carbon figure of 300-500 kgCO2e/d.

3.2.5.3 Electricity

Carbon emissions from electricity were undertaken within the investment modelling by WRSE. The following details the approach which is taken from the WRSE method:

"Emissions from electricity are calculated in the investment model based upon the estimated power requirement and the grid emissions factors that apply for each year in the planning period. The grid emission factor profiles applied also depend upon whether "Normal Grid", "REGO Grid" or "Generated" is identified in the upload as the source for the electricity. The power requirements are broken down into a profile of fixed electricity (in kWh/year) for electricity requirements that do not vary with utilisation and variable electricity (in kWh/Ml) for emissions that do vary with utilisation. Where a minimum flow is included for an option then this is used for calculating the minimum level of operational emissions and emissions from electricity."

3.3 Gaps in carbon data

For the rdWRMP24 all demand and supply schemes will have carbon assessments completed with the exception of Temporary Use Bans (TUBs) and Non Essential Use Bans (NEUB). These schemes are expected to result in minimal carbon emissions from their implementation but would be expected to reduce carbon via the reductions in demand resulting from their implementation.

There are some options which do not have embedded carbon as the embedded carbon is captured via other dependant schemes and/or there is no embedded carbon for the scheme (i.e. the asset already exists).

4 CARBON IMPACT OF THE PREFERRED PLAN

Carbon was one of the sub metrics used in the decision making of the Best Value Plan (this includes sum of carbon emissions and the monetised carbon costs). Further information on this approach is detailed in Section 8 of our main statutory document. The following section details the Carbon impact of the Preferred Plan. This information is based on the options selected (as per Table 4 of the WRMP24 tables) and the option utilisation.

In summary, the plan is expected to result in 1,485,833 tCO_2 equivalent over the planning period (2025 to 2075), based on average utilisation. The key carbon emissions result from the supply schemes which occur later within the planning period.

The short-term plan is dominated with demand reductions to meet Government targets. The carbon resulting from the demand reduction schemes does not account for the reduction in carbon from a reduction of water into supply from their implementation i.e. it represents a worst case scenario. However, reduced water into supply is part of our overall plan to reach Net Zero (see Section 5).

Supply schemes are introduced later into the plan from 2040 onwards. The carbon cost of these schemes is based on the high-level design estimates as part of the options appraisal. As part of the detailed design of the schemes, a consideration of low carbon materials will be considered. It should also be noted that with the gradual decarbonisation of the economy, the carbon resulting from these schemes is expected to reduce.

The carbon resulting from the Preferred Plan is detailed in Table 5.

Table 5: Carbon resulting from the implementation of the Preferred Plan

Option Type	Embodied carbon emissions (tCO2 equivalent)	Operational carbon emissions under maximum utilisation scenario (tCO2 equivalent)	Average operational carbon emissions (tCO2 equivalent)
Bulk Imports	10,052	490	468
Demand Reductions	34,193	330	330
Network Enhancements	449	8	4
Supply Schemes	17,430	1,818,604	1,382,296
Demand Reductions (drought permits)	0	0	0
Supply Scheme (drought permits)	100	7	2
Leakage Reductions	40,509	0	0
Total	**102,733**	**1,819,439**	**1,383,100**

**Note this assessment excludes options linked to Southern Water's abstraction from Havant Thicket Reservoir as that would be captured in Southern Water WRMP24.*

5 APPROACH TO NET ZERO

5.1 Net Zero Strategy for Operational Carbon

We are continuing to develop our Net Zero Route map, which sets out how we plan to deliver the sector-wide target for net-zero emissions. We remain committed to achieving Net Zero for operational emissions and aligned the rdWRMP24 and draft PR24 submission to support the delivery of this objective. We will refine our plans and timescales as we progress toward the delivery of PR24 but at present our plans to support Net Zero emissions include:

1. **WRMP24**
    a. The water efficiencies identified in the WRMP24 (both customer demand and leakage reductions) play a key component in driving down overall water demand and associated emissions. These have been included in the NetZero plan, as set out in the WRMP.

2. **Decarbonisation**
    a. Transitioning the Fleet away from reliance Fossil Fuels, to commence from 2026
    b. Interim transition for HGV's and emergency generators to Hydrotreated Vegetable Oil (HVO) in the short term, followed by a potential conversion to Hydrogen in the future.

3. **Energy Efficiency**
    a. Multiple measures to improve energy efficiency of treatment process, operations and buildings.
    b. Installing sub-metering across our sites to better monitor energy consumption.
    c. Adoption of emerging technology to reduce process emissions.
    d. Keeping to a minimum any growth in carbon emissions from new projects and processes.

4. **Securing long term Renewable energy supplies**
    a. Whilst not applicable for location-based calculations, securing long term renewable energy sources will support us in complying with our objectives of achieving Net Zero from a market perspective. This also reduces the risk of Grid emissions not reducing as forecast and cost fluctuations in the energy market.
    b. We are currently increasing Solar PV on our sites form 300kW to over 1,800kW. We have plans to increase this further by another 6,500kW, dependent on planning permission. This does not include opportunities at Havant Thicket Reservoir.

5. **Identifying 1% insetting opportunities (as allowed in the Ofwat methodology)**
    a. Working across the business to identify opportunities to inset emissions, such as through Havant Thicket Reservoir, catchment management or biodiversity projects (such as tree planting).

Our drive to reduce carbon emissions means we will need to work closely and in collaboration with our employees, supply chain and customers to make net-zero carbon a reality. We welcome this challenge and the opportunities it will provide to us to reduce our impact on the environment further than we have done so far.

The PR24 process is currently ongoing therefore our plans for Net Zero are provisional at this stage, subject to Ofwat approval and funding via the final determination. Any changes to funding included in the plan may delay our timeframe in reaching NetZero.

5.2 Net Zero location based operational carbon and embedded carbon by 2050

The journey to Net Zero for operational carbon is within our short-term vision and therefore has a developed and well understood plan. The longer term plan is for Net Zero location based

operational carbon and embedded carbon by 2050, which we will continue to devise and develop over time. It is not considered possible to reach net zero for embedded carbon before 2050 as it is linked to the wider industry and government policy to meet the overall targets. Embedded carbon is linked to goods and services we procure and utilise in the delivery of our services and so Carbon will also be a consideration in our future procurement strategy. We completed our report on embedded carbon for 2022-23 and will also be reporting it in the future. Additionally, we will be developing the reporting tools further and will provide a more detailed, full embedded carbon report for 2024-25 (in line with operational carbon, the tools will allow us to report total carbon annually).

Whilst our target is 2050 for embedded carbon, we are seeking ways to minimise the effects in current construction projects. The construction of the Havant Thicket Reservoir scheme is expected to have a negative carbon impact that will need to be offset. A new carbon emissions assessment for the Reservoir has been completed to reflect the current design and construction programme. This is made up of construction phase carbon emissions as well as operational phase carbon emissions but does not include the impact of the Visitor Centre, or the offset benefits of the environmental mitigation and compensation projects. The assessment will be updated to reflect further changes (e.g. the proposed revised pipeline route), potential use of renewable energy and the off-setting impact of environmental works – e.g. installation of the reservoir's new wetland area.

6 COMPLIANCE WITH DIRECTION 3(D) OF THE WATER RESOURCES MANAGEMENT PLAN (ENGLAND) DIRECTION 2022

The following provides cross references to the relevant Directions linked to Carbon.

Table 6: COMPLIANCE WITH DIRECTION 3(D) OF THE WATER RESOURCES MANAGEMENT PLAN (ENGLAND) DIRECTION 2022

Description 3. (1) In accordance with section 37A(3)(d), a water undertaker must include in its water resources management plan a description of the following matters- **3 (d) In respect of greenhouse gas emissions –**	**Where in this appendix this Direction requirement is addressed:**
(i) the emissions of greenhouse gases which are likely to arise as a result of each measure which it has identified in accordance with section37A(3)(b), unless that information has been reported and published elsewhere and the water 5 of 7 resources management plan states where that information is available;	The approach to undertaking carbon assessment is summarised in Section 3 with the outcome presented in Section 4. The carbon per scheme is presented in Table 4 of the WRMP24 planning tables.
(ii) how those greenhouse gas emissions will contribute individually and collectively to its greenhouse gas emissions overall;	Please refer to Section 4 which details the carbon emissions linked to the preferred plan.
(iii) any steps it intends to take to reduce those greenhouse gas emissions;	Please refer to Section 5 which details our approach to net zero.
(iv) how these steps will support the delivery of any net zero greenhouse gas emissions commitment made by it; and	Please refer to Section 5 which details our approach to net zero.
(v) how these steps will support delivery of the UK government's net zero greenhouse gas emissions targets and commitments.	Please refer to Section 5 which details our approach to net zero.