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Bristol Water Draft Drought Plan 2021

Strategic Environmental Assessment

Environmental Report

Final draft report for Bristol Water

ED14443 for Bristol Water

ED14443 | Issue number 1 | Date 29/03/2021

Customer:

Bristol Water Plc

Customer reference:

3500071535

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29 March 2021

Ref: ED14443

Ricardo is certified to ISO9001, ISO14001, ISO27001 and ISO45001

Non-Technical Summary

Objectives of the plan and summary of the SEA process

Under the Water Industry Act 1991, Bristol Water Plc is required to prepare and update a Drought Plan and make the draft plan available for public consultation. The Drought Plan provides a comprehensive statement of the actions Bristol Water will consider implementing during drought conditions to safeguard essential water supplies to customers and minimise environmental impact. It is consistent with Bristol Water's Water Resources Management Plan, the objective of which is to set the strategic plan for ensuring a supply-demand balance over a 25 year planning period. This Strategic Environmental Assessment (SEA) has been undertaken on Bristol Water's draft Drought Plan 2021 (the 'Drought Plan') and is being issued for public consultation alongside the draft plan.

SEA is a statutory requirement under the Environmental Assessment of Plans and Programmes Regulations 2004. The purpose of SEA is to provide high level and strategic protection of the environment by incorporating environmental considerations into the preparation of plans, programmes and policies. An SEA Scoping Report was issued in December 2020 and provided an opportunity for the statutory consultees to provide views on the proposed scope and level of detail of this SEA Environmental Report. Issues raised by consultees have been considered in preparing this report.

The SEA provides information on the relative environmental performance of alternative options considered for the Bristol Water Drought Plan to support decision-making on the development of the plan. In particular, the SEA has been used to inform the relative timing of implementing different management measures within the Drought Plan. The findings of the SEA are presented within this Environmental Report.

Bristol Water has also undertaken a Habitats Regulations Assessment (HRA) of its draft Drought Plan, which has been carried out in parallel with the SEA and is reported separately in the HRA Screening Report. The HRA screening process identified whether any of the potential drought plan options (either alone or in combination with other plans or projects) is likely to have any significant effects on the integrity of any European sites designated for their conservation importance. The findings of the HRA have fed into the SEA Environmental Report. Similarly, consideration of the implications of relevant drought management options on Water Framework Directive compliance have informed development of the SEA Environmental Report and the draft Drought Plan.

Overall approach to the SEA

The assessment of the drought management options has been 'objectives-led'. SEA objectives have been derived from a comprehensive review of environmental objectives established in law, policy or other plans and programmes, as well as from a review of baseline relevant environmental and social information. The SEA objectives have been categorised under the following topic areas: biodiversity, flora and fauna; population and human health; material assets and resource use; water; soil, geology and land use; air and climate; archaeology and cultural heritage; and landscape and visual amenity. The overall findings of the SEA describe the assessment of beneficial and adverse effects of each potential drought management measure against the objectives set for each topic.

The outputs of the assessment are a completed appraisal framework table for each drought management measure, and a colour coded summary matrix (ranging from major beneficial to major adverse effects) which provides a comparative assessment of the residual environmental effects of implementing each drought management measure (i.e. those effects remaining after the implementation of mitigation measures).

A cumulative, or in-combination, assessment has also been undertaken which has involved examining the likely effects of each of the drought management measures in combination as well as the assessment of potential effects between the Drought Plan and other relevant plans and programmes.

Summary of findings and likely effects of the plan or programme

Overall, measures included in the Drought Plan to reduce demand for water serve to reduce pressure on limited water resources during a drought by reducing amount of water required to be abstracted from the water environment. Demand management measures typically provide moderate beneficial effects such as helping to protect and enhance health and well-being through maintaining water supplies for essential use and promoting efficient and sustainable use of water. Major adverse effects have been identified with respect to demand management measures that prohibit a wide range of non-essential water uses (adverse effects on the local economy and certain water-dependent businesses) and the potential application of an Emergency Drought Order (adverse effects on the wider population and businesses across the Bristol Water supply area).

Seven options to temporarily augment water supplies in a drought have been considered within the SEA. One option involves bringing the R24R and Well Head (R24Ra), also known as R24R Well source back into use. The assessment has indicated that the potential for adverse effects on surface waters (River Axe) is low, but that operation of the abstraction has the potential to cause a major impact to fish, invertebrates and macrophytes, localised to the Stoke Brook, due to derogated flows, completely removed flows or delayed flows depending on the seasonality of the drought option implementation; this assessment is uncertain due to limited ecological records within the Stoke Brook. The HRA Screening has identified likely significant effects on bats and wading birds during implementation of this drought option, and mitigation measures will be agreed with Natural England and the Environment Agency in order to reduce potential effects. Moderate adverse effects of implementing this measure are likely in relation to carbon emissions associated with the construction and water pumping during operation. The option would deliver additional water supplies, and therefore moderate beneficial effects are identified in terms of protecting the public health and well-being of the population served by Bristol Water.

Major adverse effects have been predicted for all drought permit options. These relate to effects on river levels, wetted width and flows under low flow conditions. The impacts are of a higher magnitude in the upper river reaches downstream of the reservoirs or the abstraction location. The river flow and level impacts are predicted to result in major adverse effects in relation to local biodiversity, flora and fauna; the local water environment; and moderate local landscape and visual amenity. The adverse effects reduce with increasing distance downstream and become negligible downstream of key confluences with other rivers or at the tidal limit. Moderate beneficial effects are identified for all of the drought permit options in terms of helping to conserve scarce water resources to protect public health and well-being of the population served by Bristol Water. Minor to negligible effects have been assessed in relation to all other SEA topic areas.

The HRA Screening concluded likely significant effects on European sites in relation to all supply side options. The next stage of the HRA, the Appropriate Assessment, is underway and will consider in further detail the possible adverse effects and will identify mitigation measures to reduce the overall magnitude and scale of effects on designated features. Following agreement on suitable mitigation measures it is assumed that a conclusion of no adverse effects on these European sites will be possible.

No significant adverse effects have been identified as a result of cumulative effects of each of the options being implemented at the same time, or with respect to other plans and programmes.

Mitigation and Monitoring

Consideration of mitigation measures has been an integral part of the SEA process. The SEA appraisals have been based on assessing the residual impacts of the different drought management options, i.e. those impacts likely to remain after the implementation of applicable mitigation measures.

During implementation of any of the drought management measures, appropriate monitoring will be undertaken to track any potential effects on the environment and/or society, which will in turn trigger deployment of suitable and practicable mitigation measures. Prior to implementation of measures likely to affect the environment, Bristol Water will review the specific requirements for any environmental monitoring in consultation with the Environment Agency and Natural England.

Consultation

This SEA Environmental Report has been issued at the same time as the draft Drought Plan for public consultation. Once comments have been received through this consultation, Bristol Water may make changes to its draft Drought Plan, and these changes will also be assessed using the approach to SEA set out in this report before the final Drought Plan is issued.

The consultation period for this SEA Environmental Report runs concurrently with consultation on Bristol Water's draft Drought Plan, commencing on 8th June 2021 and ending on 13th July 2021. Any comments on this Environmental Report should be sent by email to:

Water.Resources@bristolwater.co.uk

Or alternatively by post to:

Water Resources Manager

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Bridgwater Road
Bristol
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1 Introduction

1.1 Background and Purpose of Report

Bristol Water published its current statutory Drought Plan in June 2018. Bristol Water has developed an updated draft Drought Plan in line with the requirements of the Drought Plan (England) Direction 2020 and to align with updated regulatory guidance. The Draft Drought Plan 2021 provides a comprehensive statement of the actions Bristol Water will consider implementing during drought conditions to safeguard essential water supplies to customers and minimise environmental impact. It is consistent with Bristol Water's Water Resources Management Plan, the objective of which is to set the strategic plan for ensuring a supply-demand balance over a 25-year planning period. Strategic Environmental Assessment (SEA) has been undertaken on Bristol Water's Draft Drought Plan 2021 and the SEA Environmental Report has been issued for public consultation alongside the draft plan. Habitats Regulations Assessment (HRA) and Water Framework Directive (WFD) compliance assessment have also been undertaken in parallel to the SEA.

This SEA Environmental Report presents the assessed environmental effects of Bristol Water's Draft Drought Plan 2021 in a form suitable for use by stakeholders and decision-makers. In December 2020, a SEA Scoping Report was report was issued to the statutory consultees (Environment Agency, Natural England and Historic England) and published on Bristol Water's website which summarised the environmental and social baseline of the area likely to be affected by the Draft Drought Plan. It also set out the assessment framework to be used for the SEA, along with the proposed objectives against which effects of the plan would be assessed. Issues raised by consultees in response to the Scoping Report have been considered in preparing this Environmental Report (see **Appendix A**).

This Environmental Report presents the environmental and social baseline information that sets the context for the effects assessment (Section 2) and provides details of the methods employed in undertaking the assessment (Section 3). The potential effects of the various Draft Drought Plan management measures are outlined in Section 4, with the assessment of cumulative, or in-combination, effects set out in Section 5. Information regarding mitigation and monitoring of the implementation of the plan is provided in Section 6.

1.2 Bristol Water Supply Area and Drought Planning

1.2.1 Introduction

In the event of severe drought, Bristol Water will need to implement a range of management measures to ensure the continued provision of essential water supplies to all of its customers. The Bristol Water Draft Drought Plan will set out the measures that the company will consider implementing in dealing with drought conditions, taking account of statutory legislation and regulatory requirements. The Draft Drought Plan has been updated in line with the requirements of the Drought Plan (England) Direction 2020 and in compliance with the Water Industry Act 1991 as amended by the Water Act 2003 and the Flood and Water Management Act 2010. The updated Drought Plan has taken account of the latest regulatory guidance for drought planning, industry best practice guidance and experiences across the water industry from recent drought events. The Draft Drought Plan also considers the wider role Bristol Water plays in securing water supplies across the region and the environmental conditions that will be under stress, both as a result of drought and as a result of implementation of Drought Plan measures.

The Drought Plan (England) Direction 2020 contains revised timeframes for submission of updated draft Drought Plans to the Secretary of State. For Bristol Water, this means that it must have submitted an updated Draft Drought Plan before the 1 April 2021 for consultation. Once reviewed and approved by the Secretary of State, the updated Drought Plan will replace the existing Bristol Water Drought Plan published in June 2018.

1.2.2 Bristol Water's Water Supply System

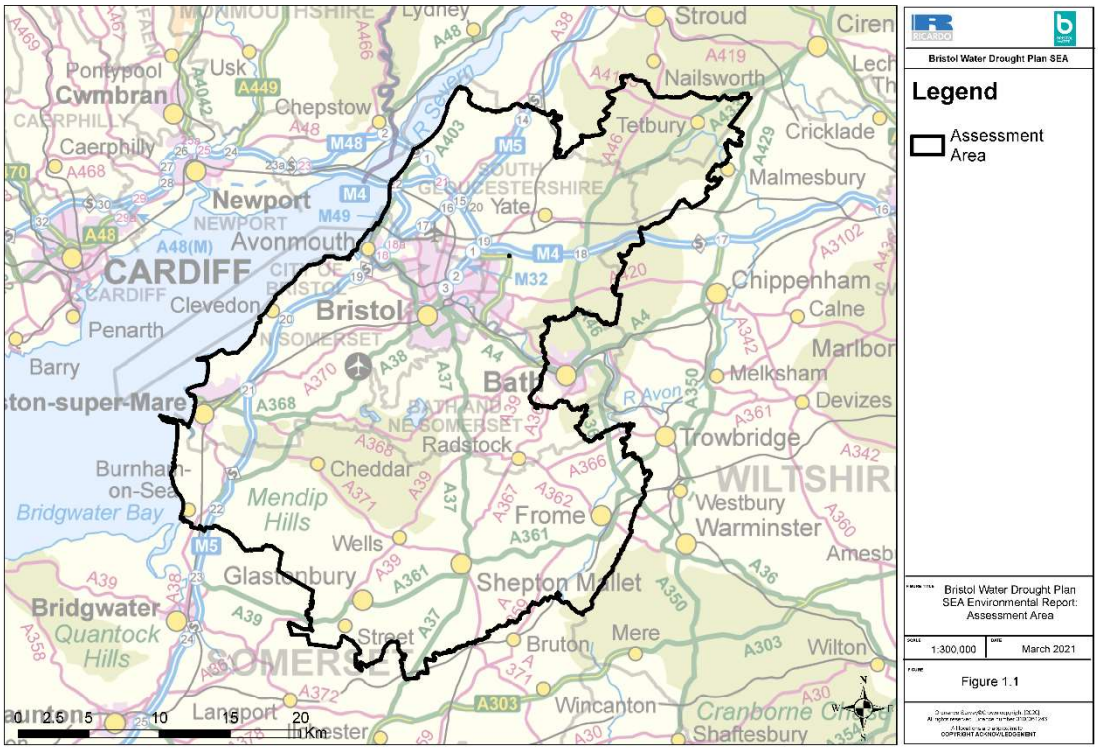
Bristol Water is a water only company that provides water supplies to 1.19 million people plus business customers in an area of approximately 2,400 square kilometres centred on Bristol and the towns and villages within a 20-mile radius of the city. The water supply area stretches from Thornbury and Tetbury in the north, to Street and Glastonbury in the south, and from Weston-Super-Mare in the west to Frome in the east. Bristol Water relies on 68 water sources, including reservoirs, rivers, springs, wells and boreholes. These 68 sources, due to their differing natures, have differing levels of sensitivity to drought events and will be impacted in different ways. Of the company's 68 water sources, 14 are raw water reservoirs of which the largest is Chew Valley Reservoir, holding up to 20,460 million litres and providing around 40% of the water required to meet demand. The Mendip Reservoirs and associated surface water abstractions account for approximately 42% of the available reliable water resource. A further 12% of reliable water resources for Bristol Water are derived from groundwater.

Water resources within the Bristol Water supply area alone are not sufficient to meet customer demand for water and therefore water supplies are also imported from neighbouring areas, including the River Severn. This water is sourced via the Gloucester & Sharpness Canal to supply the largest northern treatment works. This source accounts for the remaining 46% of Bristol Water's reliable water resources. Bristol Water has an agreement with the Canal & River Trust (the owners of the abstraction licence) to receive water supplies from the Gloucester & Sharpness Canal, which is supplied by the River Severn and other local rivers, the Cam and the Frome. The volume of water available for abstraction from the River Severn is controlled by the Environment Agency according to the River Severn Regulation System operating rules.

There is a significant degree of resilience and connectivity in both the raw water network and the treated water bulk transfer systems. This flexibility permits the sharing of resources and allows optimum use according to seasonable availability. As a result, the Bristol Water supply area is operated as a single water resource zone in which all sources are used conjunctively. Bristol Water's supply area is bounded by three other water companies (Thames Water, Wessex Water and Severn Trent Water). A number of water supply transfers are made between Bristol Water and these adjacent water companies.

The geographical area under consideration for the SEA of the Draft Drought Plan is shown in **Figure 1.1**.

Figure 1.1 Bristol Water SEA Assessment Area



1.2.3 Drought Plan overview and timetable

Under sections 39B and 39C of the Water Industry Act 1991 (as amended by the Water Act 2003 and the Flood and Water Management Act 2010), water companies are required to prepare and maintain statutory Drought Plans. The Drought Plan sets out the operational steps a water company will take before, during and after a drought to maintain essential water supplies to customers. A Drought Plan is defined by the Water Industry Act 1991 (as amended) as '*a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to drought orders*[1] *or drought permits*[2]'.

Bristol Water is required to submit its Draft Drought Plan 2021 to the Secretary of State before 1 April 2021. The Draft Drought Plan has been issued for public consultation along with this SEA Environmental Report, a HRA report and a WFD compliance assessment summary. Following feedback from the public consultation process, a Statement of Response will be published by Bristol Water setting out its responses to consultation feedback and any changes it proposes to make to the Draft Drought Plan. The Drought Plan (and associated SEA, HRA and WFD compliance assessment) will be updated as appropriate and submitted to the Secretary of State for approval to publish it as a final plan. The Final Drought Plan is expected to be published by 2022, subject to approval by the Secretary of State. The updated plan will guide Bristol Water's response to any drought events that may arise in the period between 2022 and 2027.

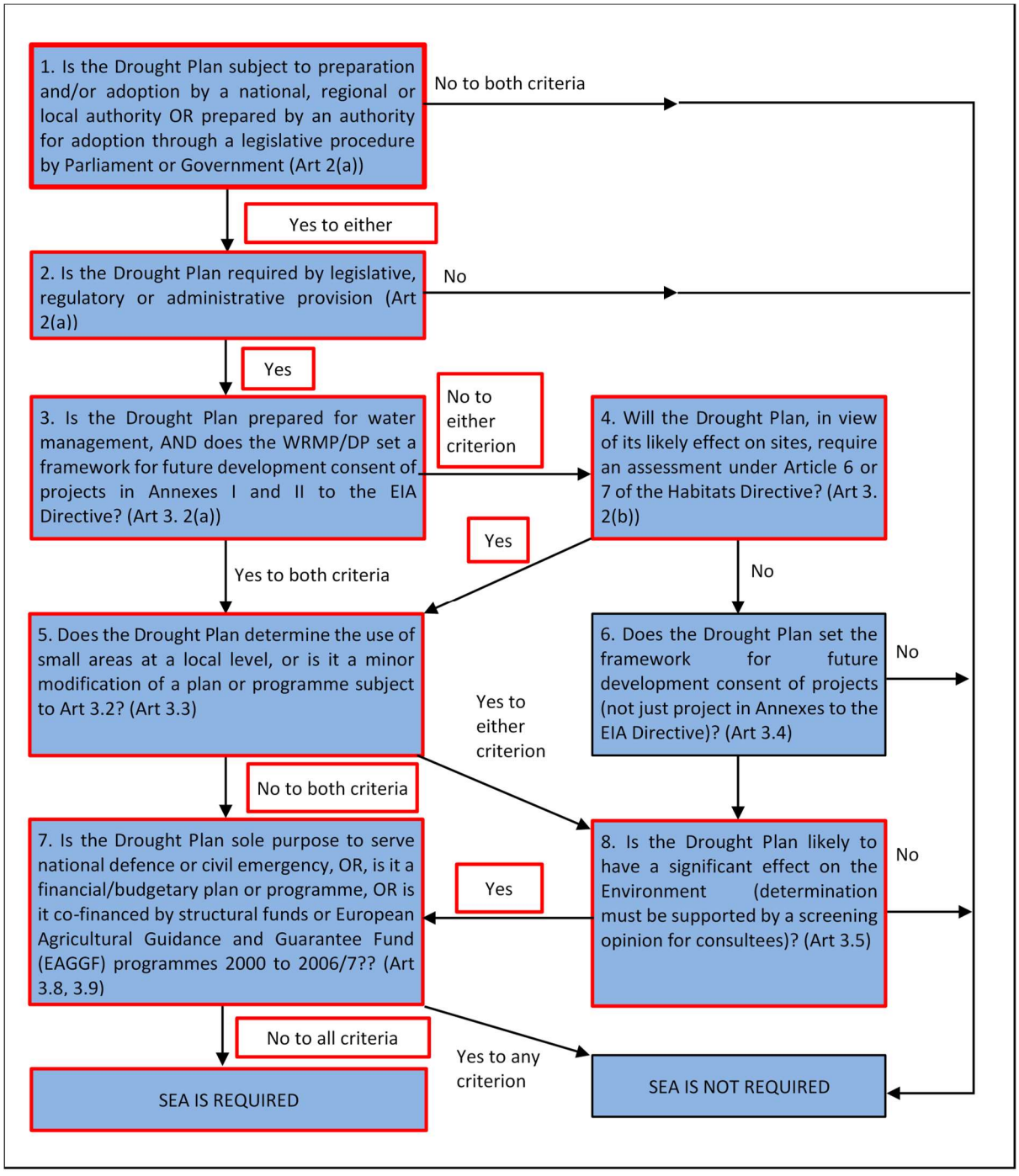
Only those drought management measures which are relevant to the period encompassed by the Drought Plan are considered within the SEA. In this regard, environmental effects of the potential drought plan measures are considered within the context of the company's existing abstraction licence conditions and operating arrangements. Additionally, only those relevant plans, projects and programmes that are likely to be effective in the period from 2022 to 2027 that may lead to cumulative effects with the Drought Plan have been considered in the SEA. The Drought Plan is closely linked and integrated with the separate statutory process of developing a long-term Water Resources Management Plan (last published by Bristol Water in 2019). Relevant linkages between the two plans are explained in the Draft Drought Plan.

1.2.4 Requirement for SEA of Bristol Water's Drought Plan

Screening was carried out to ascertain the requirement for SEA of the Bristol Water Drought Plan in accordance with the requirements of the SEA Regulations 2004 and following the screening guidance within the Office of the Deputy Prime Minister (ODPM) SEA Practical Guide[3]. The flow diagram in the ODPM guidelines has been applied to Bristol Water's Drought Plan and is presented in **Figure 1.3** with the boxes and arrows highlighted in red describing the provisions and route through the flow chart that is applicable to the Drought Plan, which demonstrate that the Drought Plan falls within the scope of the SEA Directive. Bristol Water has taken a precautionary approach in relation to the SEA screening of the Drought Plan by considering that there could be possible effects on Natura 2000 sites as a result of implementing some of the measures included in the plan.

[1] An authorisation granted by the Secretary of State under Section 73 of the Water Resources Act (199) when there are drought conditions, which impose restrictions upon the use of water, and/or allows for abstraction/impoundment outside the schedule of existing licences on a temporary basis. A drought order can be applied for by the EA for environmental reasons and by a Water Undertaker for Public Water Supply reasons. A drought order lasts for 6 months but can be extended for a total of one year.
[2] An authorisation granted by the EA under drought conditions which allows for abstraction/impoundment outside the schedule of existing licences on a temporary basis (generally for 6 months, but can be extended up to a total of one year) under Schedule 8 of the Water Resources Act (1991) (as amended).
[3] Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive.

Figure 1.2 SEA Requirement of Bristol Water's Drought Plan[4]



The route through the flow diagram has been highlighted in red on **Figure 1.3**, and is described below:

1. Is the Plan subject to preparation and/or adoption by a national, regional or local authority OR prepared by an authority for adoption through a legislative procedure by Parliament or Government?

    - **Yes, prepared by an authority for adoption through a legislative procedure by Parliament or Government.**

[4] References in Figure 1.2 and supporting text below to European Directives can be read as referring to the relevant national regulations that remain in force following the UK's exit from the European Union.

2. Is the Plan required by legislative, regulatory or administrative provisions?
    - **Yes, required by legislative provisions.**
3. Is the Plan prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use, AND does it set a framework for future development consent of projects in Annexes I and II to the EIA Directive?
    - **Yes, the plan is prepared for water management. However, it does not set a framework for future development consent of projects in Annexes I and II of the EIA Directive.**
4. Will the Plan, in view of its likely effect on sites, require an assessment under Article 6 or 7 of the Habitats Directive?
    - **HRA screening is being undertaken and Appropriate Assessment of at least one of the measures contained in the plan might be required (precautionary approach adopted to the screening).**
5. Does the Plan determine the use of small areas at local level, OR is it a minor modification of a plan or programme subject to Art. 3.2?
    - **No to all criteria.**
8. Is it likely to have a significant effect on the environment?
    - **Possibility that it may have significant effects (precautionary approach adopted).**
7. Is the PP's sole purpose to serve national defence or civil emergency, OR is it a financial or budget PP, OR is it co-financed by structural funds or EAGGF programmes?
    - **No to all criteria.**

RESULT: THE SCREENING INDICATES THAT SEA IS REQUIRED TO BE CARRIED OUT ON THE DROUGHT PLAN, ADOPTING A PRECAUTIONARY APPROACH.

1.2.5 Bristol Water Drought Plan Measures

Bristol Water has identified drought plan triggers (Drought Management Zones) based on the combined storage in its major reservoirs (**see Figure 1.3**). These triggers act as decision-points for implementation of defined drought management measures as reservoir storage is depleted in a drought event.

There are two broad categories of drought management measures: demand management measures and supply augmentation measures. These are described in the tables below.

Demand management measures

Demand management measures are designed to reduce the demand for water in a drought and are not site-specific but often are implemented across the entire water supply area (see **Table 1.1**).

Figure 1.3 Bristol Water: Drought Management Triggers

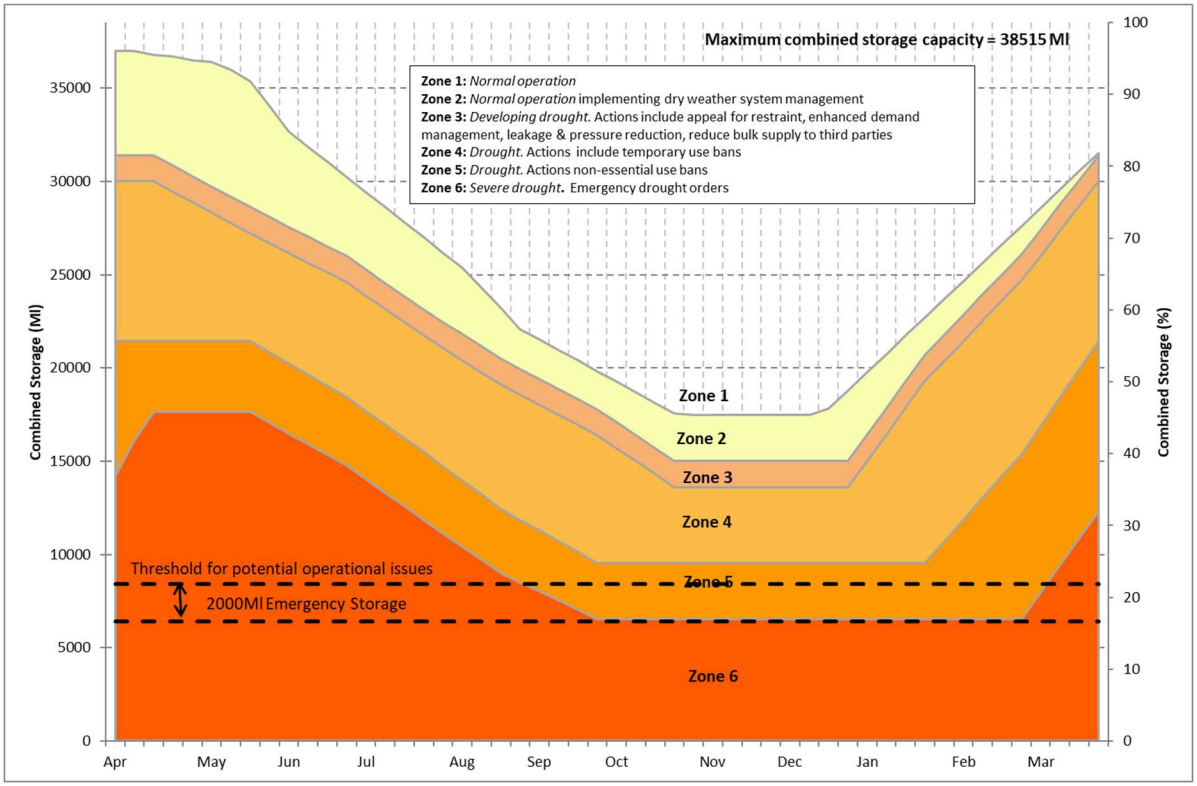


Table 1.1 Demand Management Measures

Demand Management Measure	Description
Appeals for restraint	This measure would help encourage customers to reduce their water usage via publicity campaigns and the media. The measure would be expected to reduce total household demand by around 1%.
Increased leakage detection and repair activity	These measures would help ensure that all maintenance programmes are up to date and also undertake additional leakage control. This would lead to demonstrable water savings.
Temporary Use Ban (TUB)	This measure to restrict certain non-essential water uses would be expected to reduce peak summer household demand by up to 9.5%. The restrictions in water use can include: • Cleaning a private leisure boat using a hosepipe • Cleaning a private motor vehicle using a hosepipe • Filling or maintaining an ornamental fountain • Cleaning walls, or windows, of domestic premises using a hosepipe • Cleaning paths or patios using a hosepipe • Cleaning other artificial outdoor surfaces using a hosepipe • Drawing water using a hosepipe, for domestic recreational use • Filling or maintaining a domestic swimming or paddling pool • Watering a garden using a hosepipe • Watering plants on domestic or non-commercial premises using a hosepipe • Filling or maintaining a domestic pond using a hosepipe

Demand Management Measure	Description
Non-Essential Use Ban (NEUB)	This measure requires an application to the Secretary of State for a drought order to prohibit certain non-essential water uses. The measure would be expected to reduce non-household demand by up to 2% across the year. The restrictions in water use include: • Watering outdoor plants on commercial premises • Filling or maintaining a non-domestic swimming or paddling pool • Filling or maintaining a pond • Operating cisterns (in unoccupied premises) • Cleaning industrial plant (except where required for health and hygiene) • Suppressing dust (except where controlled by health and safety regulations) • Operating a mechanical vehicle-washer • Cleaning a window of a non-domestic building • Cleaning any vehicle, boat, aircraft or railway rolling stock • Cleaning non-domestic premises

Supply augmentation measures

Supply augmentation measures considered by Bristol Water include bringing disused, licensed water sources back into supply and applying for drought permits to temporarily vary the conditions of abstraction licences for specific water sources.

R24R and Well Head (R24Ra)

Bristol Water's R24R and Well Head (R24Ra) (referred to as "R24R Well" for brevity hereafter) is a licensed water source that has not been in operation for approximately 20 years. In the event of a drought, it would require recommissioning before it could be used to supply water. If implemented in a drought, this measure is expected to provide an additional 2.4 Ml/d of water supplies.

Some construction activities are required in order to bring R24R Well into operation, including the replacement of the pumps at R24R Well and the construction of a new pipeline to link the source to a water treatment works.

Drought Permits

Drought permits are drought management measures available to water companies under national water resources legislation which, if granted by the Environment Agency, can temporarily allow more flexibility to manage water resources and the effects of drought on public water supply and the environment. Potential drought permits to be considered by Bristol Water in developing the Drought Plan are identified in **Table 1.2.**

Table 1.2 Drought Permit Options

Drought Permit	Description
Temporary reduction in compensation flow release from Blagdon Reservoir	This permit would allow the compensation flow release from Blagdon Reservoir to be temporarily reduced from 8.64 Ml/d to 4.6Ml/d between 15th May and 30th November only. This will help to conserve water resources within Blagdon Reservoir.
Temporary reduction in compensation flow release from Chew Valley Reservoir	This permit would allow the compensation flow release from Chew Valley Reservoir to be temporarily reduced from 14.32Ml/d to 7Ml/d between 1st May and 30th November, or from 6.82Ml/d to 3.4Ml/d (between 1st December to 30th April). This will help to conserve water resources within or refill Chew Valley Reservoir.
Temporary reduction of prescribed flow at Cheddar Reservoir	This permit would allow a temporary reduction to the prescribed flow into the Cheddar Yeo from 6.8Ml/d to 3.4Ml/d (between 1st December to 14th May) only. This will help to refill Cheddar Reservoir.
Temporarily amend the Minimum Residual Flow conditions for the P08R abstraction licence	Relaxation of the Minimum Residual Flow conditions to allow abstraction to continue at a higher rate than allowed under the licence when Ozleworth Stream drops below 13Ml/d. Under the permit abstraction of up to 4.25Ml/d would be permitted when flows drop below 13Ml/d.
Temporarily amend the Minimum Residual Flow conditions for the P05R abstraction licence	Changes to the Minimum Residual Flow conditions set out in the P05R abstraction licence Under the licence conditions a flow of 4.41Ml/d at the Kenn gauge must be maintained. Under the permit conditions the minimum flow requirement at the Kenn gauge would be reduced to 2.21Ml/d.
Temporarily amend the River Axe licence to allow abstraction for a longer period	Extension to the licensed abstraction period for the River Axe source to support the refill of Cheddar reservoir by 2 months to include May and October (period of abstraction extended from November – April, to October to May) and an increase in the annual abstraction volume from 4750Ml/year to 7145Ml/year (increase of 2395Ml/year).

Bristol Water is currently undertaking adaptive management trials under the Water Industry National Environment Programme (WINEP) at Blagdon Reservoir and Chew Valley Reservoir. This involves changes to compensation flow releases from the reservoirs aimed at improving ecological quality in the downstream waterbodies (River Yeo and River Chew, respectively). The implications of these changes have been considered in the development of the Draft Drought Plan and as part of the SEA.

Bristol Water has been in dialogue with the Environment Agency regarding the P08R, P05R and River Axe drought permit options which were not included in the 2018 Drought Plan. They have been included in the Draft Drought Plan 2021 and considered within the SEA (and accompanying HRA and WFD assessment processes).

1.3 Drought Permit Environmental Assessment Reports

Environmental Assessment Reports (EARs) have been prepared for the three existing drought permits (Blagdon, Chew Valley and Cheddar reservoirs). These are currently being updated to support Bristol Water's Drought Plan 2021.

Bristol Water aims to agree the findings of these EARs with the Environment Agency and Natural England in advance of a future drought so that they are readily available for refreshing based on the prevailing drought situation at that time. The EARs consider all potentially affected habitats and species

including, but not limited to, Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar features as well as any Site of Special Scientific Interest (SSSI) or species/habitats of principal importance for the conservation of biodiversity in England (identified in the Natural Environment and Rural Communities (NERC) Act 2006 Section 41). The EARs also include Environmental Monitoring Plan (EMP) recommendations for each drought permit. These EAR studies, undertaken outside of an actual drought event, are intended to be used as the basis for the EAR to be prepared in support of a specific drought permit application, should the need arise.

Information from the EARs has been used to inform the SEA (and the accompanying HRA and WFD compliance assessment). EARs will be developed for the three additional drought permit options following consultation on the Draft Drought Plan and further dialogue with the Environment Agency and Natural England regarding their inclusion.

1.4 Strategic Environmental Assessment

1.4.1 Overview of Strategic Environmental Assessment (SEA)

SEA is a statutory requirement under the Environmental Assessment of Plans and Programmes Regulations 2004.

The objectives of SEA are:

> *'to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development'.*

The SEA Regulations require assessment of the likely significant effects on the environment of implementing plans or programmes, and any reasonable alternatives, taking into account the objectives and geographical scope of the plan or programme. It should be noted, however, that as stated in the ODPM SEA Guidelines[5]

> *"It is not the purpose of the SEA to decide the alternative to be chosen for the plan or programme. This is the role of the decision-makers who have to make choices on the plan or programme to be adopted. The SEA simply provides information on the relative environmental performance of alternatives and can make the decision-making process more transparent."*

The SEA can, therefore, be used to support the consideration of alternative drought management measures and the timing and implementation of the selected management measures within the plan, although this needs to be set within the context of applying SEA to drought planning, as described in Section 1.4.2 below.

The range of issues to be included in an SEA is set out in the SEA Regulations, and includes biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage, and landscape. As such, the full range of environmental and social effects which are likely to arise from implementation of the Drought Plan have been considered.

As identified above, the UK Government has produced generic SEA best practice guidance - the "Practical Guide"[5] which sets out the stages of the SEA process[6]. This, together with guidance for undertaking SEA of drought plans, which has been produced on behalf of United Kingdom Water Industry Research (UKWIR)[7], has been used to inform this SEA.

[5] Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive.
[6] Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.
[7] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (prepared by Ricardo Energy & Environment for UKWIR).

Preparation of this Environmental Report also takes into consideration the Environment Agency's 2020 Drought Plan Guideline (DPG)[8] which includes guidance on the preparation of EARs, environmental monitoring and mitigation, as well as SEA, HRA and WFD compliance assessment of Drought Plans.

1.4.2 Applying Strategic Environmental Assessment to Drought Planning

Drought Plans encompass a basket of measures that will only be implemented if and when required because of the unpredictable occurrence of a drought event, and thus the actual impact of implementation of the plan over its life (typically 5 years) is subject to very significant uncertainties. There may or may not be a drought during the period of the plan, and each drought is different in terms of severity, season, location, duration and influence of other abstractors within the catchment. Each combination of these factors may require a bespoke reaction in terms of measures.

It is therefore impossible to predict in advance which of the measures will be required, as this will depend on the specific drought event. Consequently, the SEA cannot provide a certain prediction of an overall environmental effect of adopting the plan, as its implementation will vary for each drought event. However, scenarios are discussed in the Draft Drought Plan to show which measures would be required under different drought events (e.g. different severity and duration), and the effects of these scenarios are discussed in this Environmental Report. The SEA focuses on the effects resulting from the implementation of drought management measures rather than the 'natural' impacts of drought (which provides the baseline environment conditions against which the effects will be assessed).

The SEA includes cumulative effect assessments of implementing multiple Drought Plan measures that may affect the same environmental and/or social receptors, as well as considering potential cumulative assessments with other programmes, plans and projects (e.g. other water company Drought Plans).

1.4.3 Stages of Strategic Environmental Assessment

SEA incorporates the following generic stages:

- Stage A: Setting the context, identifying objectives, problems and opportunities, and establishing the baseline (scoping) – this report
- Stage B: Developing and refining options and assessing effects (impact assessment)
- Stage C: Preparing the Environmental Report (recording results)
- Stage D: Consulting on the Draft Plan and the Environmental Report (seeking consensus)
- Stage E: Monitoring the significant effects of the plan or programme on the environment (verification).

Table 1.3 is an extract from the ODPM Practical Guide[9] that sets out the main stages of the SEA process and the purpose of each task within the process.

Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope has already been completed by Bristol Water. A Scoping Report was issued to the statutory consultees (Environment Agency, Natural England and Historic England) and published on Bristol Water's website on 18th December 2020 (see Section 1.6 below) which provided an opportunity for these statutory bodies and other stakeholders to provide views on the proposed scope and level of detail to be provided in the SEA Environmental Report.

This Environmental Report represents work carried out in fulfilment of Stages B and C of the SEA process.

[8] Environment Agency (2020) Water Company Drought Plan Guideline, December 2020.
[9] Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.

Table 1.3 SEA Stages and Tasks

Stages in the SEA Process	
SEA Stages and Tasks	Purpose
Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope	
Task A1. Identifying other relevant plans, programmes and environmental protection objectives	To establish how the plan or programme is affected by outside factors to suggest ideas for how any constraints can be addressed, and to help identify SEA objectives.
Task A2. Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives.
Task A3. Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline information analysis, setting of the SEA objectives, prediction of effects and monitoring.
Task A4. Developing SEA Objectives	To provide a means by which the environmental performance of the plan or programme and alternatives can be assessed.
Task A5. Consulting on the scope of the SEA	To ensure the SEA covers the likely significant environmental effects of the plan or programme.
Stage B: Developing and refining alternatives and assessing effects	
Task B1. Testing the plan or programme objectives against SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan or programme and the SEA objectives and help in developing alternatives.
Task B2. Developing strategic alternatives	To develop and refine strategic alternatives.
Task B3. Predicting the effects of the plan or programme, including alternatives	To predict the significant environmental effects of the plan or programme and its alternatives.
Task B4. Evaluating the effects of the plan or programme, including alternatives	To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme.
Task B5. Mitigating adverse effects	To ensure that adverse effects are identified and potential mitigation measures are considered.
Task B6. Proposing measures to monitor the environmental effects of plan or programme implementation	To detail the means by which the environmental performance of the plan or programme can be assessed.
Stage C: Preparing the Environmental Report	
Task C1. Preparing the environmental report	To present the predicted environmental effects of the plan or programme, including alternatives, in a form suitable for public consultation and use by decision-makers.
Stage D: Consulting on the Draft Plan or programme and the Environmental Report	
Task D1. Consulting the public and consultation bodies on the draft plan or programme and the Environmental Report	To give the public and the consultation bodies an opportunity to express their opinions on the findings of the Environmental Report and to use it as a reference point in commenting on the plan or programme. To gather more information through the opinions and concerns of the public.

Stages in the SEA Process	
SEA Stages and Tasks	Purpose
Task D2. Assessing significant changes	To ensure that the environmental implications of any significant changes to the draft plan or programme at this stage are assessed and taken into account.
Task D3. Making decisions and providing information	To provide information on how the Environmental Report and consultees opinions were taken into account in deciding the final form of the plan or programme to be adopted.
Stage E: Monitoring the significant effects of the plan or programme on the environment	
Task E1. Developing aims and methods for monitoring	To track the environmental effects of the plan or programme to show whether they are as predicted; to help identify adverse effects.
Task E2. Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified.

1.4.4 Habitats Regulations Assessment (HRA)

As a competent authority, Bristol Water must ensure that its Drought Plan meets the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended), commonly referred to as the 'Habitats Regulations'. Under Regulations 63 and 102, any plan or project which is likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and is not directly connected with, or necessary for, the management of the site, must be subject to a HRA to determine the implications for the site in view of its conservation objectives.

The HRA of the Draft Drought Plan has been undertaken in accordance with the latest available guidance for England[10,11]. The findings from the HRA have informed the SEA, in particular the SEA topics of 'biodiversity, flora and fauna' and 'water'.

1.4.5 Water Framework Directive (WFD) Compliance Assessment

Water companies are required to demonstrate how their Drought Plans meet the requirements of the WFD Regulations[12], including the objectives set out in relevant River Basin Management Plans. A WFD compliance assessment of the Draft Drought Plan has been undertaken taking account of the Environment Agency's 2020 Water Company Drought Plan Guideline (DPG): Environmental assessment for water company drought planning supplementary guidance (Supplementary Guidance). The findings from the WFD assessment has informed the SEA, in particular the SEA topics of 'water' and 'biodiversity, flora and fauna'.

The WFD compliance assessment has been undertaken in parallel with the SEA and HRA to ensure an integrated approach to environmental assessment and to inform the development of the Draft Drought Plan, and therefore ensure its overall compliance with relevant environmental legislation

1.5 Structure of the Environmental Report

This Environmental Report presents the findings of SEA Tasks B1 to B6 set out in **Table 1.3** and provides the public, SEA statutory bodies and other interested stakeholders with relevant environmental

[10] Tyldesley, D. & Chapman, C. (2019) The Habitats Regulations Assessment Handbook. DTA Publications.
[11] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (in preparation: prepared by Ricardo Energy & Environment and awaiting final UKWIR approval for publication)
[12] Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. SI 2017 No. 407

information to understand the potential environmental and social effects of the Draft Drought Plan. The Environmental Report is structured as follows:

- **Section 1** (this section) - describes the requirement for, purpose and process of the SEA, and its context in relation to the Draft Drought Plan.
- **Section 2** – Baseline and Context: identification of key messages and environmental protection objectives from other relevant plans and programmes and sets out key environmental issues Bristol Water considers in the SEA, drawing on information on the current state of the environment within Bristol Water's water supply area.
- **Section 3** – Methodology: provides details of the methods employed in undertaking the assessment including the cumulative effects assessment methodology.
- **Section 4** – Assessment of the drought management measures: presents the potential effects of the various drought management measures against the SEA assessment framework.
- **Section 5 –** Cumulative Effects Assessment: discusses the potential in-combination impacts of the drought management measures and other plans and projects in the area affected by the Drought Plan.
- **Section 6 –** Mitigation and Monitoring: discusses the measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the Drought Plan, and monitoring to track the environmental effects to show whether they are as predicted, identifying any adverse effects to trigger deployment of mitigation measures.
- **Section 7** - ODPM Guidance Quality Assurance checklist: demonstrating that the requirements of the SEA Directive have been met.

1.6 Consultation

1.6.1 Overview

The SEA Regulations provide for consultation with the statutory bodies during the Scoping stage and with the public when the Environmental Report is issued alongside the Draft Drought Plan for public consultation.

Once the Drought Plan has been approved by the Secretary of State and adopted by Bristol Water, the company will prepare an SEA Post-Adoption Statement setting out how the SEA and any views expressed by the consultation bodies or the public have influenced the Drought Plan.

1.6.2 Consultation on the Scoping Report

The consultation bodies and other interested stakeholders were invited to express their views on the Scoping Report in accordance with SEA Regulation 12(5). A summary of the issues raised and responses to comments made are presented in **Appendix A**.

1.6.3 Consultation on the Environmental Report

The Environmental Report takes into consideration the responses received on the SEA Scoping consultation. The Environmental Report provides assessments of the adverse and beneficial effects of the various drought management measures and the overall Drought Plan. The Environmental Report is being issued for public consultation alongside the consultation on the Draft Drought Plan.

Feedback from the consultation on the Environmental Report will be considered by Bristol Water and incorporated into a formal Statement of Response, setting out how the feedback has been used in the finalisation of the Drought Plan. It is expected that the Final Drought Plan will be published during autumn 2021.

The company will prepare an SEA Post-Adoption Statement once the Final Drought Plan has been approved for publication by the Secretary of State. This Statement will set out how the SEA and any views expressed by the consultation bodies or the public have influenced the Final Drought Plan.

2 Environmental Baseline and Context

2.1 Introduction

In accordance with the SEA Regulations, a review of relevant plans and programmes is presented in Section 2.2 and **Appendix B**. The current environmental baseline conditions and their likely evolution during the life of the plan is presented in **Appendix C** and summarised in Section 2.3.

2.2 Review of Policies, Plans and Programmes

2.2.1 Introduction

Identifying other relevant plans, programmes and environmental protection objectives is one of the first steps in undertaking SEA, forming part of Stage A. The review identifies how Bristol Water's Drought Plan might be influenced by other plans, programmes and other environmental protection objectives which Bristol Water should consider in developing its plan. This information helps to identify the objectives for the SEA process.

Relevant plans and programmes were identified from the wide range that has been produced at an international, national, regional and local level. Plans that have no likely interaction with the Drought Plan (i.e. where they are unlikely to influence the plan, or be influenced by it), were not included in the review. The information presented below and in Section 2.3 was initially set out in the SEA Scoping Report for consultation and is reproduced below taking account of feedback on the Scoping Report (see Appendix A).

2.2.2 Key Policy Messages

International, national, regional and local policies, plans, programmes and strategies reviewed are listed in **Table 2.1**, with the findings of the review provided in **Appendix B**. Alongside the current and future baseline information reviewed in **Appendix C**, the key messages have been used to develop proposed objectives for the SEA (Section 3).

Table 2.1 Key Policy Messages Derived from the Review of Plans, Policies and Programmes

SEA Topic	Key Messages	Plans, Policies and Programmes
Biodiversity, flora and fauna	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites, whilst taking into account future climate change. Promote a catchment-wide approach to water management to ensure better protection of biodiversity. To achieve favourable condition for priority habitats and species, including UK NERC habitats and species. Avoidance of activities likely to cause irreversible damage to natural heritage. Support well-functioning ecosystems, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species. Strengthen the connections between people and nature and realise the value of biodiversity. Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contributes to the economy and therefore should be protected and, where possible, enhanced. To seek opportunities for biodiversity net gain from infrastructure development. Avoidance of activities likely to increase the spread of Invasive Non-Native Species (INNS).	*International:* The Convention on Wetlands of International Importance (Ramsar Convention) (1971) The Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979) The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983) European Commission, Habitats Directive (1992/43/EEC) United Nations (1992) Convention on Biological Diversity (CBD) European Commission, The Water Framework Directive (2000/60/EC) European Commission (2007), Establishing Measures for the Recovery of the Stock of the European Eel (1100/2007) European Commission, Birds Directive (2009/147/EC) European Commission, The EU Biodiversity Strategy for 2030 *National:* Salmon and Freshwater Fisheries Act 1975 (as amended) Wildlife and Countryside Act 1981 (as amended) Environmental Protection Act 1990 (as amended) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2018 SI2018/574 Water Resources Act 1991 (as amended) Water Industry Act 1991 (as amended) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104 The Environment Act 1995 The Environment Act 1995 (Commencement no. 26) Order 2020 The Countryside and Rights of Way (CROW) Act 2000 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 Natural Environment and Rural Communities Act 2006 Environment Agency (2008) Sea trout and salmon fisheries. Our strategy for 2002 – 2021 The Eels (England and Wales) Regulations 2009 (as amended) Environment Agency (2020): EA2025 – Creating a Better Place Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network Defra (2010) Eel Management Plans for the United Kingdom: South West River Basin District Defra 2011 UK National Ecosystem Assessment and Defra, 2014, UK National Ecosystems Assessment Follow on, Synthesis of Key Findings Defra (2011) Water for Life - Water White Paper

	Consideration of the potential for future requirements linked to the Environment Bill (2020)	Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services Defra (2015) The Great Britain Invasive Non-Native Species Strategy Conservation of Habitats and Species Regulations 2017 (as amended) HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 MHCLG (2019) National Planning Policy Framework Defra (2020) Enabling a Natural Capital Approach (ENCA) HM Government (2020) The Environment Bill Environment Agency (undated) Hydroecology: Integration for modern regulation Environment Agency (undated) WFD River Basin Characterisation Project Technical Assessment Method - River abstraction and flow regulation *Regional/Local:* Natural England Site Improvement Plans (2014-15): South West (SIPs) Environment Agency and Defra, (2015) River Basin Management Plan Severn River Basin District Environment Agency and Defra, (2015) South West River Basin District River Basin Management Plan Environment Agency and Defra, (2015) River Basin Management Plan Thames River Basin District Environment Agency, Abstraction Licence Strategies (various dates for relevant catchments) Defra (2010) Eel Management Plans for the United Kingdom: Severn River Basin District Bristol Water (2019) Business Plan 2020-2025: Bristol Water For All Bristol Avon Catchment Partnership (2016) Catchment Plan
Population and human health	Water resources play an important role in supporting the health and recreational needs of local communities. Effective water resource management can create opportunities for regeneration, tourism and the wider economy. The issue of water supply is becoming a development constraint in some areas, which is recognised as an issue in the National Planning Policy Framework.	*International:* United Nations Economic Commission for Europe (1998) Aarhus Convention - Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters European Commission, Drinking Water Directive (1998/83/EC) and subsequent amendments European Commission, The Water Framework Directive (2000/60/EC) The Environmental Noise Directive (Directive 2002/49/EC) European Commission, Floods Directive (2007) European Commission, 7th Environmental Action Programme (EAP) Environment Action Programme to 2020 'Living well, within the limits of our planet' (1386/2013/EU)

	To ensure all communities have a clean, safe and attractive environment in which people can take pride. To ensure secure, safe, reliable, dependable, sustainable and affordable supplies of water are provided for all communities.	European Commission Blueprint to Safeguard Europe's Water Resources *National:* Environmental Protection Act 1990 (as amended) The Countryside and Rights of Way (CRoW) Act, 2000 Defra (2005) Securing the Future; Delivering UK Sustainable Development Strategy The Natural Environment and Rural Communities (NERC) Act (2006) UK Government (2007) The Air Quality Strategy for England, Scotland and Wales Defra (2011) The Natural Choice: securing the value of nature. The Natural Environment White Paper Defra (2011) Drought Direction 2011 Defra (2011) Water for Life – Water White Paper HM Government (2014)The National Infrastructure Plan Defra (2016) Drought Plan (Direction) Defra, Environment Agency, Natural England, Forestry Commission England (2016) Creating a Great Place for Living HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Government (2018) A Green Future: Our 25-year Plan for the Environment MHCLG (2019) National Planning Policy Framework Cabinet Office, Department for International Development, Foreign, Commonwealth and Development Office (2019) Implementing the Sustainable Development Goals *Regional/Local:* Bristol Development Framework: Core Strategy 2011 North Somerset Council Core Strategy, January 2017 Bath and North East Somerset (2018) Local Plan 2016-2036 South Gloucestershire Local Plan Core Strategy 2006-2027 Bristol Health and Wellbeing Policy 2020-2025 Bristol Avon Catchment Partnership (2016) Catchment Plan
Material assets and resource use	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources.	*International:* European Commission (1999) Landfill Waste Directive (99/31/EC) United Nations (2002) Commitments arising from the World Summit on Sustainable Development, Johannesburg *National:* Environmental Protection Act 1990 (as amended) The Water Act 2003 (as amended) Defra (2011) Government Review of Waste Policy in England 2011 Defra (2011) Future Water: The Government's water strategy for England

	Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, whilst seeking to maintain a healthy water environment. Accelerating the transition to sustainable forms of energy and achieving regional renewable energy deployment targets. Minimise the production of waste, ensure waste management is in line with the 'waste hierarchy', and eliminate waste sent to landfill.	Defra (2011), Water for Life, Water White Paper, November 2011 Natural Environment White Paper (2011) Department of Energy and Climate Change (2011) National Policy Statements for Energy Infrastructure HM Government (2011) The Natural Choice: Securing the Value of Nature MHCLG (2019) National Planning Policy Framework HM Treasury Infrastructure UK (2014) National Infrastructure Plan Defra (2019) The government's response to the Natural Capital Committee's sixth annual report HM Treasury Infrastructure UK (2020) National Infrastructure Strategy HM Government (2018) National Infrastructure Delivery Plan 2016-2021 Energy Challenge (2020)
Water	Promote sustainable water resource management, including a reduction in water consumption. Maintain and improve water quality (surface waters, groundwater and coastal waters). Expand the scope of water quality protection measures to all waters, surface waters and groundwater. Improve the quality of the water environment and the ecology which it supports and continue to provide high levels of drinking water quality. Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions. Prevent deterioration of WFD waterbody status. Balance the abstraction of water for supply with the other functions and services the water	*International:* European Commission Urban Wastewater Treatment Directive (91/271/EEC) European Commission Nitrates Directive (91/676/EEC) European Commission Drinking Water Directive (1998/83/EC) (amended 2015) European Commission, The Water Framework Directive (2000/60/EC) Directive 2006/118EC of the European Parliament and of the council of 12 December 2006 on the protection of groundwater against pollution and deterioration European Commission Floods Directive (2007/60/EC) *National:* Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104 Water Resources Act 1991 (as amended) The Water Act 2003 (as amended) The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 Defra (2005) Making Space for Water Environment Agency (2010) Water Resources Action Plan for England and Wales Environment Agency (2009) Water Resources Strategy for England and Wales Flood and Water Management Act (2010) Environment Agency (2010) Water Resources Action Plan for England and Wales Water Industry Act 1991 (as amended by the commencement of Section 38 of the Flood and Water Management Act 2010) Defra (2011) Water for Life - Water White Paper

	environment performs or provides. Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. Promote measures to enable and sustain long term improvement in water efficiency. Ensure a sustainable balance between the supply and demand for water. Encourage more efficient use of water and promote awareness of water sustainability.	Defra (2011) Drought Direction 2011 Environment Agency (2011) National Flood and Coastal Risk Management Strategy for England Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report Defra (2012) National Policy Statement for Wastewater Environment Agency (2013) Managing Water Abstraction Environment Agency (2013) Climate change approaches in water resources planning – overview of new methods Defra and Welsh Government (2014) River Basin Planning Guidance Defra and Environment Agency (2015) How to Write and Publish a Drought Plan Environment Agency (2015) Drought Response: our framework for England Defra (2016) Drought Direction 2016 Environment Agency (2020) Drought plan guidance Defra (2016) Guiding Principles for Water Resources Planning for Water Companies Operating Wholly or Mainly in England. Environment Agency (2017) Drought Response: Our Framework for England MHCLG (2019) The National Planning Policy Framework The State of the Environment: Water Resources 2018 UKTAG on the WFD Guidance Documents (various dates) Environment Agency (2020) Meeting our future water needs: a national framework for water resources *Regional/Local:* Environment Agency (2009 and 2012) Catchment Flood Management Plans; Bristol Avon, Severn Tidal Tributaries, North and Mid Somerset, Bristol Avon Catchment Partnership (2016) Catchment Plan Bristol Avon Catchment Plan Progress Report (2015-2018) Wessex Water (2018) Drought Plan Thames Water (2017) Drought Plan Severn Trent Water (2019) Drought Plan Environment Agency (2015) Drought response: our framework for England Environment Agency Abstraction Licensing Strategies (various dates for different catchments) Bristol Water (2019) Final Water Resources Management Plan 2019 Water Resource Management Plans (2019) for Thames Water, Severn Trent Water and Wessex Water. Environment Agency and Defra, (2015) South West River Basin District River Basin Management Plan Environment Agency and Defra, (2015) River Basin Management Plan Severn River Basin District Environment Agency and Defra, (2015) River Basin Management Plan Thames River Basin District Environment Agency (2016) South West River Basin District, Flood risk management plan 2015-2021

Soil, geology and land use	Maintain the quality and diversity of geology (including geological SSSIs) and soils, including geomorphology and geomorphological processes. These can be lost or damaged by insensitive development. Ensure that soils will be protected and managed to optimise the varied functions they perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with sustainable development principles. Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change. Promote mixed-use developments and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.	*International:* European Commission (1999) Landfill of Waste Directive (99/31/EC) Council of Europe (2003) European Soils Charter European Commission (2006) Thematic Strategy for Soil Protection *National:* Wildlife and Countryside Act 1981 (as amended). The Countryside and Rights of Way (CROW) Act (2000) Defra (2004) The First Soil Action Plan for England Defra (2004) Rural Strategy 2004 Defra (2006) Sustainable Farming and Food Strategy: Forward Look Environment Agency (2007) Soil: A Precious Resource: Strategy for Protecting, Managing and Restoring Soil Defra (2009) Safeguarding our Soils – A Strategy for England Natural England (2011) UK Geodiversity Action Plan MHCLG (2019) National Planning Policy Framework *Regional/local:* National Character Area (NCA) profiles Environment Agency and Defra, (2015) River Basin Management Plan South West River Basin District Environment Agency and Defra, (2015) River Basin Management Plan Severn River Basin District
Air and climate	Reduce greenhouse gas emissions. Targets include bringing the UK's greenhouse gas emissions to net zero by 2050 and make the city of Bristol Carbon neutral by 2030. Reduce the effects of air pollution on ecosystems. Improve overall air quality. Minimise energy consumption, support the use of	*International:* European Commission (2005) Thematic Strategy on Air Pollution European Commission (2008) Ambient Air Quality Directive (2008/50/EC) European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC) The Paris Agreement (2016), Cancun Agreement (2011) and Kyoto Agreement (1997) *National:* The Climate Change Act 2008 DECC (2007) Energy White Paper: Meeting the Energy Challenge

	sustainable/renewable energy and improve resilience to climate change. Sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Need for adaptive measures to respond to likely climate change impacts on water supply and demand.	Defra (2007) The Air Quality Strategy for England, Scotland and Wales Defra (2007) Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt Defra (2008), England Biodiversity Strategy – climate change adaptation principles The Climate Change Act 2008 English Heritage (2008) Climate Change and the Historic Environment Department of Energy and Climate Change (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity DECC (2007) Energy White Paper: Meeting the Energy Challenge DECC (2011) National Policy Statements for Energy Infrastructure DECC (2011) Planning Our Electric Future; A White Paper for Secure, Affordable and Low Carbon Electricity Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report The Energy Act 2013 Defra (2013) The National Adaptation Programme: Making the country resilient to a changing climate. HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment UKCP (2018): UK Climate Projections 2018 Natural England National Character Area (NCA) Profiles *Regional/Local:* Bristol City Council (2019) Air Quality Annual Status Report Bristol City Council Mayor's Climate Emergency Action Plan (2019) South Gloucestershire Air Quality Annual Status Report (2019) South Gloucestershire Council: Local Greenhouse Gas Report (2019/2020) North Somerset Air Quality Status Report 2018 North Somerset Climate Emergency Strategy 2019
Archaeology and cultural heritage	Built development in the vicinity of historic buildings and Scheduled Monuments could have implications for the setting and/or built fabric. Ensure active management of the Region's environmental and cultural assets. Ensure effects resulting from changes to water level (surface	*International:* The World Heritage Convention (UNESCO) 1972 – A Global Instrument for the Protection of Cultural and Natural Heritage. The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention 1985) The European Convention on the Protection of Archaeological Heritage (Valletta Convention 1992) European Commission (2007), Floods Directive (2007/60/EC) *National:*

	or sub-surface) on all historical and cultural assets are avoided. Consider effects on important wetland areas with potential for paleo-environmental deposits. Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlements. Conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations.	Planning (Listed Buildings and Conservation Areas) Act 1990 Defra (2004) The First Soil Action Plan for England Department for Culture, Media and Sport (2001) The Historic Environment – A Force for the Future (2001) English Heritage (2008), Climate Change and the Historic Environment Defra (2011) The Natural Choice: Securing the Value of Nature, The Natural Environment White Paper Defra (2011) UK National Ecosystem Assessment Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment Historic England (2015) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Historic England (2016) Climate Change and the Historic Environment Historic England (2020) Heritage at Risk HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment MHCLG (2019) National Planning Policy Framework *Local* Bristol City Council: Our Inherited City: Heritage Statement Guidance: 2020 Individual Conservation Area Appraisals South Gloucestershire Local Plan: Policies, Sites and Policies Plan Adopted November 2017
Landscape and visual amenity	Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside). Abstraction and low river flows could negatively affect landscape and visual amenity. Enhance the value of the countryside by protecting the natural environment for this and future generations. Take account of the different roles and character of different areas, promoting the vitality of main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it.	*International:* Council of Europe (2000) European Landscape Convention (Florence Convention) Council of Europe (2006) European Landscape Convention *National:* Wildlife and Countryside Act 1981 (as amended) The Countryside and Rights of Way (CRoW) Act (2000) Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment MHCLG (2019) National Planning Policy Framework *Regional/Local:* Cotswolds AONB Management Plan 2018-2023 Mendip Hills AONB Management Plan 2019-2024 Natural England National Character Area (NCA) Profiles

	Ensure good access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders. This includes protecting National Trails and Public Rights of Way. Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders.	

2.3 Environmental Baseline Review

2.3.1 Introduction

An essential part of the SEA process is to identify the current environmental baseline conditions and their likely evolution during the life of the plan (in this case, a maximum of 5 years). It is only with knowledge of existing conditions that the impacts of the Drought Plan can be identified, mitigated and subsequently monitored. The SEA will consider the effect of alternative drought plan measures against the baseline environmental and social conditions that would exist in drought conditions when the measures would be implemented.

The SEA Regulations requires that the evolution of baseline conditions across the area affected by the plan (that would take place with or without implementation of the plan) is identified. This is useful when determining impact significance, particularly with regards to baseline conditions that may already be improving or worsening and the rate of such change.

The full baseline assessment and the likely future trends for the environmental issues being considered (where information is available) is presented in **Appendix C**. This has drawn on data for the South West of England, and specifically those areas that lie within the Bristol Water supply area. Baseline data given below have been drawn from a variety of sources, including a number of the plans, policies and programmes reviewed as part of the SEA process given in Section 2.2. The key issues arising from the review of baseline conditions are summarised below.

2.3.2 Limitations of the data and assumptions made

Information used in the baseline relates to the South West of England. As such, this baseline information may not identify the more localised issues that may be against the general trends of the regions. For example, this may include pockets of deprivation in relatively affluent areas or any localised differences in environmental quality.

Data have generally been sourced from national or regional bodies, where information is collected for regions of the UK. Whilst this allows for a more effective comparison between regional and national averages, reliance on these data sets has in some cases meant that information is a number of years old.

2.3.3 Key Issues

Biodiversity, Fauna and Flora Key Issues

The key sustainability issues arising from the baseline assessment for biodiversity, fauna and flora are

- The need to protect or enhance the region's biodiversity, particularly within designated sites, protected species and habitats of principal importance.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors.
- The need to control and reduce the spread of Invasive Non-Native Species (INNS)
- The need to recognise the importance of enabling wildlife to adapt to climate change.
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.
- The need to deliver an increase in the Bristol Water biodiversity index.

Population and Human Health Key Issues

The key sustainability issues arising from the baseline assessment for population and human health are:

- The need to ensure water supplies remain affordable especially for deprived or vulnerable communities, reflecting the importance of water for health and wellbeing.
- The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.
- The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures.
- The need to ensure water quantity and quality is maintained for a range of uses including tourism, recreation, navigation and other uses such as agriculture.
- The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists for access to green infrastructure and the natural and historic environment, as well as protecting and enhancing recreational resources.
- The need to accommodate an increasing population and local housing growth through provision of essential services including water supply.
- Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and wellbeing and the economy.

Material Assets and Resource Use Key Issues

The key sustainability issues arising from the baseline assessment for material assets and resource use are:

- The need to minimise the consumption of resources, including water and energy.
- The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill.
- The need to continue to reduce leakage from the water supply system to help reduce demand for water.
- The need to continue to encourage more efficient water use by consumers.

Water Key Issues

The key issues arising from the baseline assessment for water are:

- The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant).
- The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters.
- The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.
- The need to ensure that people understand the value of water.

Soil, Geology and Land Use Key Issues

The key sustainability issues arising from the baseline assessment for soil, geology and land use are:

- The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health.

- The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources).

Air and Climate Key Issues

The key sustainability issues arising from the baseline assessment for air and climate are:

- The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards.
- The need to reduce greenhouse gas emissions (industrial processes and transport).
- The need to adapt to the impacts of climate change, for example through sustainable water resource management, water use efficiencies, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities afforded by climate change.

Archaeology and Cultural Heritage Key Issues

The key sustainability issues arising from the baseline assessment for archaeology and cultural heritage are:

- The need to conserve or enhance sites of archaeological importance and cultural heritage interest, and their setting, particularly those which are sensitive to the water environment.
- The need to protect water-dependent heritage sites during drought conditions.

Landscape and Visual Amenity Key Issues

The key sustainability issues arising from the baseline assessment for landscape and visual amenity are:

- The need to protect and improve the natural beauty of Areas of Outstanding Natural Beauty (AONBs) and other areas of natural beauty.
- The need to protect and improve the character of landscapes and townscapes.

Inter-relationships

There are inter-relationships between the SEA topics and all objectives assessed during the SEA process. These include impacts of changes to water flows and quality on biodiversity, the economy, recreation, tourism, navigation, cultural heritage and landscape. Inter-relationships that result in changes to individual effects are considered by evaluation of synergistic effects throughout the assessment.

The key sustainability issue arising is:

- The need to consider the inter-relationships between topics.

3 Methodology

3.1 Introduction

This section outlines the approach to carrying out the assessments to identify the environmental and social effects of the potential measures considered for the Bristol Water Draft Drought Plan.

The environmental and social assessment of the alternative Drought Plan measures are 'objectives-led'. Establishing assessment objectives is a recognised way of considering the environmental effects of a plan and comparing the effects of alternatives. SEA objectives are often derived from environmental and social objectives established in law, policy or other plans and programmes, or from a review of baseline information and environmental problems (based on the SEA topics in Section 2.3).

An assessment framework of objectives has been developed based on:

- The key policy messages and environmental and social protection objectives identified in the review of policies, and other plans and programmes (see Section 2.2). It is important that the assessment takes these objectives into account as this will help to highlight any area where the Drought Plan will help or hinder the achievement of the objectives of other plans (e.g. at local, national and international level – see review of Plans, Policies and Programmes in Section 2.2).
- The current state of the environment in the assessment area and the key environmental issues identified (see Section 2.3 and **Appendix C**).

3.2 Assessment Methodology and SEA Framework

SEA objectives are set out in Error! Reference source not found. alongside the key messages identified from the review of policies, plans and programmes and the key issues from the review of baseline information. The following sections describe how Bristol Water has used these SEA objectives in the assessment of the environmental and social effects of the potential Drought Plan measures. By assessing each measure against the objectives, it is more apparent where measures might have an adverse or beneficial effect, and where measures could be developed to reduce potential impacts or enhance beneficial effects.

At least one objective has been included under the SEA Biodiversity, Flora and Fauna topic and the Water topic to enable integration of the findings of any HRA and WFD assessments into the SEA, respectively.

As well as the overall SEA objectives, a number of key questions have been developed for each SEA topic. These key questions have been used to prompt the assessment and ensure it considers all the relevant aspects. The assessment of each drought measure has included consideration of the following information:

- Details of each potential measure;
- Likelihood and predicted frequency of deployment of the measure;
- Construction (where applicable) and operational/implementation details;
- Benefits to the water supply-demand position in a drought (taking uncertainty into account); and
- Key elements of the baseline environment, such as location of designated sites, priority habitats and species, landscape areas or heritage assets, etc.

Table 3.1: SEA Objectives and Assessment Approach

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
Biodiversity, fauna and flora	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites and priority habitats and species, whilst taking into account future climate change. Promote a catchment-wide approach to water use to ensure better protection of biodiversity. To achieve favourable condition for priority habitats and species, including UK NERC habitats and species. Avoidance of activities likely to cause irreversible damage to natural heritage. Support well-functioning ecosystems, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species. Strengthen the connections between people and nature and realise the value of biodiversity. Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contributes to the economy and therefore should be protected and, where possible, enhanced. To seek opportunities for biodiversity net gain from	The need to protect or enhance the region's biodiversity, particularly within designated sites, protected species and habitats of principal importance. The need to avoid activities likely to cause irreversible damage to natural heritage. The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors. The need to control and reduce the spread of Invasive Non-Native Species (INNS). The need to recognise the importance of enabling wildlife to adapt to climate change. The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species and to enhance natural capital.	• Will it contribute to favourable condition or favourable conservation status of the most important sites for nature conservation (SAC, SPA, Ramsar, SSSI)? • Will it have Likely Significant Effects on Natura 2000 sites (with reference to HRA undertaken in parallel)? Or will it cause significant harm to a SSSI or priority habitat? • Will it protect and enhance aquatic, transitional and terrestrial priority species and habitats? • Will it ensure maintenance or support provision of fish passage with respect to migratory fish functioning habitat connectivity? • Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities? • Will it promote wildlife's ability to adapt to climate change? • Will it affect WFD compliance e.g. good ecological potential/status? • Will it contribute to improvements

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
	infrastructure development. Avoidance of activities likely to cause the spread of Invasive Non-Native Species (INNS)	ecosystem services. The need to deliver an increase in the Bristol Water biodiversity index.		to Bristol Water's Biodiversity Index? • Will it protect or enhance natural capital and ecosystem services?
			1.2 To avoid introducing or spreading INNS.	• Will it limit, reduce or increase the risk of spread of Non-Native Species (INNS)?
Population and human health	Water resources play an important role in supporting the health and recreational needs of local communities and businesses. Effective water resource management can create opportunities for regeneration, tourism and the wider economy. The issue of water supply is becoming a development constraint in some areas, which is recognised as an issue in the National Planning Policy Framework To ensure all communities have a clean, safe and attractive environment in which people can take pride. To ensure secure, safe, reliable, dependable, sustainable and affordable supplies of water are provided for all communities. Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities.	The need to ensure water supplies remain affordable especially for deprived or vulnerable communities, reflecting the importance of water for health and wellbeing. The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas. The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures. The need to ensure water	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Will it help to ensure provision of access to a secure resilient and affordable supply of drinking water? Will it help to protect or improve drinking water quality? Will it raise awareness of the importance and value of the water environment for health and well-being? Will it assist in ensuring provision of essential services to support health and well-being?
			2.2 To protect and enhance the water environment for other users including recreation, tourism and navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Will it protect or enhance opportunities for recreation and tourist activities such as public rights of way, including navigation? Will it help to promote healthy communities and protect from risks to health and wellbeing (for example through nuisance or resulting from traffic or transport changes, disruption to safe and reliable water /sewerage services)?

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
		quantity and quality is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture. The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to, protecting and enhancing recreation resources, green infrastructure and the natural and historic environment. The need to accommodate an increasing population. Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and wellbeing and the economy.		Does it protect and enhance the green infrastructure network?
			2.3 To promote a sustainable economy with good access to essential services, including a resilient, high quality and affordable supply of water.	Will it assist in ensuring provision of essential services to good access to essential services?

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
Material assets and resource use	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources. Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, whilst seeking to maintain a healthy water environment. Accelerating the transition to sustainable forms for energy and achieving regional renewable energy deployment targets. Minimise the production of waste, ensure waste management is in line with the 'waste hierarchy', and eliminate waste sent to landfill.	The need to minimise the consumption of resources, including water and energy. The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill. The need to continue to reduce leakage from the water supply system to help reduce demand for water. The need to encourage efficient water use.	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Will it help to minimise the demand for resources? Will it minimise the use of energy and promote energy efficiency? Will it make use of existing infrastructure? Will it help to encourage sustainable design or use of sustainable materials (e.g. supplied from local resources)? Will it reduce the amount of waste generated and increase the proportion sent to reuse or recycling?
			3.2 To promote and secure the efficient and sustainable use of water to ensure resilient water supplies for people and businesses.	Will it enable efficient water use and ensure maintenance of water supplies? Will it help to minimise the demand for water?
Water	Promote sustainable water resource management, including a reduction in water consumption. Maintain and improve water quality (surface waters, groundwater and bathing water). Expand the scope of water quality protection measures to all waters, surface waters and groundwater.	The need to further improve the quality of the regions river, estuarine and coastal waters taking into account WFD objectives. The need to maintain the quantity and quality of groundwater resources taking	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats.	Will it lead to a change in river flows, wetted width or river level? Will it alter the flow regime or residence time of surface waters? Will it lead to changes in groundwater levels and recharge? Will it contribute towards improving the awareness of water sustainability and its true value?

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
	Improve the quality of the water environment and the ecology which it supports and continue to provide high levels of drinking water quality. Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions. Prevent deterioration of waterbody status. Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. Promote measures to enable and sustain long term improvement in water efficiency. Encourage more efficient use of water and promote awareness of water sustainability.	into account WFD objectives. The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters. The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply. The need to ensure that people understand the value of water.		Will it promote measures to enable improvements in water efficiency and assist in reducing water abstraction? Will it lead to a temporary or permanent deterioration to WFD water body status?
			4.2 To protect and enhance surface and groundwater quality and protect and enhance estuarine waterbodies.	Will it present a risk to water quality of groundwater, surface water or estuarine waters? Will it affect WFD compliance (supporting elements to Good Ecological Potential/Status including hydromorphology) Will it prevent water pollution? Will it affect WFD protected areas?
			4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions and services that rely on water resources	Will it achieve an appropriate balance of supply with other functions and services (including agriculture and navigation)? Will it ensure sustainable abstractions, taking account of water resources availability status?
Soil, geology and land use	Maintain the quality and diversity of geology (including geological SSSIs) and soils, including geomorphology and geomorphological processes. These can be lost or damaged by insensitive development. Ensure that soils will be protected and managed to optimise the varied functions they perform for society (e.g. supporting agriculture and	The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health. The need to manage the land	5.1 To protect and enhance geology, geomorphology and the quality and quantity of soils.	Will it avoid damage to and protect geologically important sites (e.g. geological SSSIs)? Will it protect and enhance geomorphology and geomorphological processes? Will it protect and enhance the quality of soils? Will it ensure efficient use of land (e.g.

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
	forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development. Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change. Promote mixed use developments and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.	more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources).		make use of previously developed land)? Will it contribute towards a catchment-wide approach to land management?
Air and Climate	Reduce greenhouse gas emissions. Targets include bringing the UK's greenhouse gas emissions to net zero by 2050 and make the city of Bristol carbon neutral by 2030. Reduce the effects of air pollution on ecosystems. Improve overall air quality. Minimise energy consumption, support the use of sustainable/renewable energy and improve resilience to climate change. Sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts	The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards. The need to reduce greenhouse gas emissions (industrial processes and transport). The need to adapt to the impacts of climate change, both present and future, for example through, sustainable water resource management, water use efficiencies,	6.1 To reduce air pollutant emissions.	Will it reduce or minimise air pollutant emissions? Will it increase emissions to air in an areas sensitive to emissions (e.g. in proximity to an AQMA or to sensitive habitat or more deprived area)?
			6.2 To reduce greenhouse gas emissions.	Will it reduce or minimise greenhouse gas emissions? Will it result in an increase in greenhouse gas emissions over and above that that would be produced to supply an equivalent quantity of water in non-drought conditions?
			6.3 To adapt and improve resilience to the	Will it reduce vulnerability or increase resilience to

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
	on air quality from individual sites in local areas. Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Need for adaptive measures to respond to likely climate change impacts on water supply and demand.	specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities afforded by climate change.	present and future threats of climate change.	risks associated with climate change effects (e.g. drought)? Will it create opportunities to benefit from potential effects of climate change? Will it improve resilience/adaptability to likely effects of climate change, e.g. by increasing water storage capacity, or transferring water from areas with surplus? Will it make use of renewable energy?
Archaeology and cultural heritage	Built development in the vicinity of historic buildings and Scheduled Monuments could have implications for the setting and/or built fabric. Ensure active management of the Region's environmental and cultural assets. Ensure effects resulting from changes to water level (surface or sub-surface) on all historical and cultural assets are avoided. Consider effects on important wetland areas with potential for paleo-environmental deposits. Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlements.	The need to conserve or enhance sites of archaeological importance and cultural heritage interest, and their settings, particularly those which are sensitive to the water environment.	7.1 To conserve and enhance the historic environment, heritage assets and their settings and protect archaeologically important sites.	Will it avoid damage to and protect the historic environment, heritage assets and their settings, places and spaces that enhance local distinctiveness? Will it maintain and enhance the historic environment, including palaeo-environmental deposits? Will the hydrological setting of water-dependent assets be altered, such as important wetland areas with potential for paleo-environmental deposits? Will it improve access, value, understanding or enjoyment of heritage assets and culturally/historically important assets in the region?

SEA topic	Policies, plans and programmes - key messages	Baseline - key issues	SEA objective	Key questions
	Conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations.			
Landscape and visual amenity	Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside). Abstraction and low river flows could negatively affect landscape and visual amenity. Enhance the value of the countryside by protecting the natural environment for this and future generations. Take account of the different roles and character of different areas, promoting the vitality of main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving communities within it. Ensure good access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders. This includes protecting National Trails and Public Rights of Way. Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders. This includes protecting National trails and Public Rights of Way.	The need to protect and improve the natural beauty of the region's AONBs and other areas of natural beauty. The need to protect and improve the character of landscapes and townscapes.	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	Will it avoid adverse effects and enhance designated landscapes? Will it help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness? Will it improve access to valued areas of landscape character?

3.3 Primary Assessment

The appraisal framework set out in Error! Reference source not found. has been used to assess each of the potential Drought Plan measures against the SEA objectives (as set out in Error! Reference source not found.). The assessment findings have been used, alongside the findings of the HRA and WFD compliance assessment, to inform the selection and phasing of measures for inclusion in Bristol Water's Drought Plan.

The appraisal framework table presented Error! Reference source not found. and is structured as follows:

- The first and second columns of Error! Reference source not found. set out the SEA topics and objectives.
- The third column will be populated during the assessment with a commentary and evaluation of the impact of each alternative measure on the objectives for each topic, with reference to the key questions set out above in Error! Reference source not found.**.** The assessment will assume the implementation of standard best practice in implementing the measures and any defined mitigation measures (which will be clearly set out) so that the significance of effects relates to the residual effects after mitigation in line with the ODPM Practical Guide and UKWIR SEA national guidance. The mitigation measures for any identified adverse effects will be explicitly identified within the appraisal framework. The fourth column will identify the magnitude of the effect on a scale of low, medium and high.
- The value and sensitivity of the receptor(s) will be identified in the fifth column on a scale of low, medium and high.
- The scale of the effect, which might relate to either geographical scale or the size of the population affected, will be identified in the sixth column on a scale of small, medium to large.
- The significance of effect will include consideration of the nature of the impact, likelihood, duration and permanence (seventh, eighth and ninth columns of Error! Reference source not found.**)** in compliance with criteria for determining the likely significance of effects specified in the SEA Regulations Part 2, Regulation 9(2a) and Schedule 1. With respect to duration, short-term impacts will be defined as those that last for up to six months, medium term impacts are those that extend for six months to two years whilst long term impacts are assessed as those that continue for greater than two years.
- The residual adverse and beneficial effects (after application of best practice approaches and any appropriate and explicit mitigation measures) will be identified in the tenth and eleventh columns respectively. These will be identified separately so as to avoid mixing adverse and beneficial effects, in line with SEA best practice.

Where qualitative and/or quantitative information is available for any Drought Plan measure (e.g. from the HRA), this has been used to inform the assessment. Objectives or key questions that are not supported by available data or information have been evaluated using spatial analysis, professional judgement and appropriate assessment guidelines relating to that topic/objective.

The SEA appraisal framework has been used to capture the assessment for each Drought Plan measure.

Varying levels of uncertainty are inherent within the assessment process. The assessment has sought to minimise uncertainty through the application of expert judgement. The level of uncertainty for each SEA objective is included in the appraisal framework. Where there is significant uncertainty which precludes an effects assessment category being assigned for a particular SEA objective, an "uncertain" residual effects assessment label has been applied to that specific SEA objective.

Table 3.2: SEA Appraisal Framework to be Completed for each Potential Drought Plan Measure

Topic	SEA objective	Potential residual effect on sensitive receptors (after consideration of identified mitigation or enhancement measures	Scale of effect: (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Residual Adverse Effect	Residual Beneficial Effect
Biodiversity, fauna and flora	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species and to enhance natural capital.									
	1.2 To avoid introducing or spreading INNS.									
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).									
	2.2 To protect and enhance the water environment for other users including recreation, tourism and navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).									
	2.3 To promote a sustainable economy with good access to essential services, including a resilient, high quality and affordable supply of water.									

Topic	SEA objective	Potential residual effect on sensitive receptors (after consideration of identified mitigation or enhancement measures	Scale of effect: (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Residual Adverse Effect	Residual Beneficial Effect
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.									
	3.2 To promote and secure the efficient and sustainable use of water to ensure resilient water supplies for people and businesses.									
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats.									
	4.2 To protect and enhance surface and groundwater quality and protect and enhance estuarine waterbodies.									
	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions and services that rely on water resources									

Topic	SEA objective	Potential residual effect on sensitive receptors (after consideration of identified mitigation or enhancement measures	Scale of effect: (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Residual Adverse Effect	Residual Beneficial Effect
Soil, geology and land use	5.1 To protect and enhance geology, geomorphology and the quality and quantity of soils.									
Air and Climate	6.1 To reduce air pollutant emissions.									
	6.2 To reduce greenhouse gas emissions.									
	6.3 To adapt and improve resilience to the present and future threats of climate change.									
Archaeology and cultural heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and protect archaeologically important sites.									
Landscape and visual amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.									

The SEA appraisal framework has been used to capture the assessment for each drought plan measure. The results of the assessments are summarised in Section 4 and detailed in **Appendix D**.

For each SEA objective, a residual effects assessment is determined against a significance matrix (**Error! Reference source not found.**) which takes account of the value and sensitivity of the receptor (e.g. species, air quality, river water quality, landscape value, heritage feature) and the magnitude of the assessed effect. This significance matrix comprises effects from 'major beneficial' to 'major adverse'. Hatching has been added to the box signifying low magnitude and high receptor value/sensitivity as this could result in a greater than 'moderate' effects being assigned dependent on the sensitivity and value of the receptor. This colour coding will be used to complete the columns for residual effects in the appraisal framework.

The resulting significance of effects have been used in the selection of measures for inclusion in the Drought Plan and subsequent phasing of the selected measures.

Figure 3.1: Significance Matrix used to Assess Effects of each Drought Plan Measure on each SEA objective

Significance of Effect		Value/sensitivity of receptor		
		High	Medium	Low
Effect magnitude (includes scale of effect)	High	Major Beneficial / Major Adverse	Major Beneficial / Major Adverse	Moderate Beneficial / Moderate Adverse
	Medium	Major Beneficial / Major Adverse	Moderate Beneficial / Moderate Adverse	Minor Beneficial / Minor Adverse
	Low		Minor Beneficial / Minor Adverse	Negligible

= Significance of effect dependent on value/sensitivity of receptor and magnitude

3.3.1 General Significance Definitions

The general definitions for 'significance' ratings as identified in the table above are provided below:

Major - effects represent key factors in the decision-making process. They are generally associated with sites and features of international, national or regional importance. If adverse, such resources/features are generally those which cannot be replaced or relocated.

Moderate - effects are likely to be important considerations at a regional or district scale. If adverse, they are likely to be of potential concern.

Minor - effects are not likely to be decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.

Negligible - effects which are not perceptible, being within normal bounds of variation or the margin of forecasting error.

For the **'high' effect magnitude** (top row), a major effect significance is assigned for both high and medium value receptors to reflect the magnitude of the effect.

For the **'low' effect magnitude and 'high' value receptor** (bottom left box), the significance of effect could be minor, moderate or major dependent on the precise nature of the impact or benefit.

All options – both supply augmentation measures and demand management measures – have been assessed to the same level of detail, and in line with the SEA legislative requirements, national SEA guidance and the UKWIR SEA guidance. The level of detail developed for the environmental assessment of each measure is consistent with the strategic nature of SEA. Further detailed assessment would be required to support any future actual applications for any drought permits or drought orders.

3.3.2 Summarising the Effects Assessment

The completed appraisal framework table for each Drought Plan measure is presented in full in **Appendix D**. A summary of the assessment is presented Section 4 using a colour-coded visual evaluation (VE) matrix. An example of the proposed VE matrix is given in **Table.3.3**. For each measure, the VE matrix summarises the likely significance of effects (which are detailed in the completed appraisal framework tables in **Appendix D**).

Table.3.3 Example of a Visual Evaluation Matrix

Drought Plan measure	*SEA Objective beneficial and adverse effects*																*Summary commentary of effects*
	1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	6.3	7.1	8.1	
Measure 1																	[*summary commentary*]
Measure 2																	[*summary commentary*]

Legend:

Significance of Effect	Colour	
Major Beneficial		Dark green
Moderate Beneficial		Mid green
Minor Beneficial		Light green
Negligible		Pale blue
Minor Adverse		Yellow
Moderate Adverse		Orange
Major Adverse		Red
NOT APPLICABLE		None

3.4 Secondary, Cumulative and Synergistic Environmental Effects Assessment

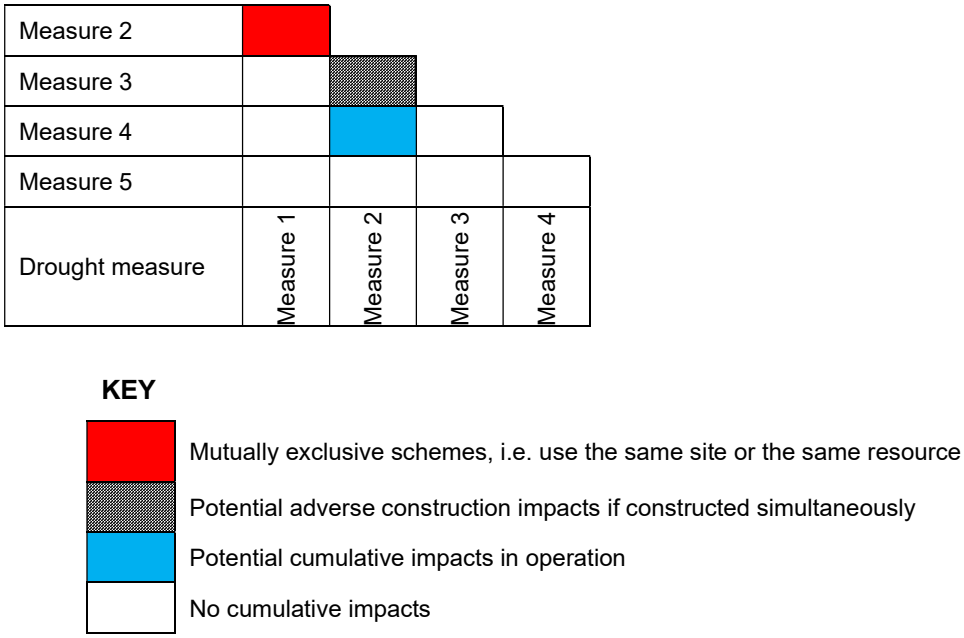
Schedule 2(6) of the SEA Regulations requires the assessment of "The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects…." From here on in "cumulative effects" is taken to include secondary and synergistic effects.

A cumulative effects assessment has been carried out in order to identify if different measures are mutually exclusive or whether combinations of measures might lead to greater adverse impacts (or beneficial effects), because the combination of options that would be deployed in any one drought event cannot be pre-determined. This involved examining the likely significant effects of each of the drought

measures individually, in combination with each other, and in combination with the implementation of other plans and programmes.

A matrix (see **Figure 3.2**) has been used to help consider interactions between the measures. In assessing these effects, consideration was given to other factors which may affect the receiving environment during implementation of the measures.

Figure 3.2 Cumulative Effects Assessment Matrix



The following cumulative effects assessments have been undertaken:

- An assessment of cumulative effects of measures that could potentially be implemented at the same time. Mutually exclusive measures (e.g. those that draw upon the same resource or use the same site) will also be identified.
- Assessment of cumulative effects of the Draft Drought Plan with the Bristol Water WRMP 2019, other water company Drought Plans and WRMPs, Environment Agency Drought Plans (and any other drought plans prepared by other bodies, such as the Canal & River Trust).
- Assessment of potential cumulative effects of the Bristol Water Draft Drought Plan with any other identified relevant programmes, plans and projects that may be in place / implemented during the period of the Drought Plan. This includes relevant Local Authority plans. It is anticipated that whilst the Drought Plan is still active, local authorities will also begin to invest in Nature Recovery Networks and associated plans. While these plans are not available at the time of preparing the SEA, once produced the Nature Recovery Plans will need to be considered in future when implementing any Drought Plan measure.

3.5 Limitations of the Assessment

Drought Plans comprise a basket of measures, the implementation of which are dependent on the particular drought conditions experienced and are subject to temporal, spatial and other factors. The exact timing of implementation of drought measures will not be known until a drought is experienced. Consequently, one of the limitations of the cumulative or in-combination assessment of Bristol Water's Drought Plan is that whilst an environmental appraisal of each measure can be undertaken, the lack of predictability of which measures will be implemented in any particular drought event means that it may be impossible to provide a definitive cumulative assessment of the impacts for a possible future drought event.

Cumulative assessments have been undertaken assuming as a worst case that the implementation of measures could occur simultaneously. Spatial proximity and therefore potential impacts on a common receptor is the primary consideration (e.g. the same designated area or reach of river).

Due to the uncertainty of timing of implementation of drought measures, the findings of the SEA will need to be reviewed during an actual drought and a cumulative assessment made of the measures proposed for implementation at that time, based on the findings of the cumulative assessments set out in this Environmental Report.

4 Assessment Findings

4.1 Drought Plan Measures Under Consideration

The demand management measures which have been assessed are shown in **Table 1.1**. The supply augmentation measures which have been assessed are shown in **Table 1.2**.

4.2 Assessment of Measures Against SEA Objectives

Assessment of the potential drought plan measures has been carried out in accordance with the methodology described earlier in Section 3. Appraisal framework assessment tables have been completed for each drought measure and are presented in full in **Appendix D**. A summary of the assessments are presented in Sections 4.3 and 4.4 as colour-coded visual evaluation (VE) tables. For each drought plan measure and each SEA topic, the VE table summarises the significance of residual effects. The colour coding represents a range from major adverse effects in red through to major beneficial effects in dark green. The definitions of these significance levels have been set out earlier in Section 3.3.1.

Legend:

Significance of Effect	Colour	
Major Beneficial		Dark green
Moderate Beneficial		Mid green
Minor Beneficial		Light green
Negligible		Pale blue
Minor Adverse		Yellow
Moderate Adverse		Orange
Major Adverse		Red
NOT APPLICABLE		None

4.3 Assessment Findings – Demand Management Measures

A visual evaluation summary of the SEA conclusions for each of the demand management measures is provided in **Table 4.1**. The detailed appraisal tables are provided in **Appendix D**.

Demand management measures typically provide moderate beneficial effects such as helping to protect and enhance health and well-being through maintaining water supplies for essential use and promoting efficient and sustainable use of water. Major adverse effects have been identified with respect to demand management measures that prohibit a wide range of non-essential water uses (adverse effects on the local economy and certain water-dependent businesses). There are also some minor adverse effects anticipated to be associated with emissions of greenhouse gases from enhanced leakage reduction programme activities.

Table.4.1 Visual evaluation summary for demand management measures

Objectives		SEA Topic: Biodiversity, fauna and flora		Population and human health			Material assets and resource use		Water			Soil, geology and land use	Air and Climate			Archaeology and cultural heritage	Landscape and visual amenity	Commentary
		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	6.3	7.1	8.1	
Appeals for restraint in water use	Adverse																	No adverse effects have been identified for this drought plan measure.
	Beneficial															Negligible beneficial	Negligible beneficial	Minor beneficial effects include reducing demand for water and securing essential supplies of water for customers/businesses. Reducing the demand for water will also have minor beneficial effects on maintaining surface water and groundwater levels/flows and sustainable management of abstraction. Reducing water demand will also help to improve the resilience of water supplies during the drought.
Increased leakage reduction and repair activity	Adverse																	Minor adverse effects identified are associated with temporary noise and traffic disruption from leak repair activities plus emissions to air (air pollutants and greenhouse gas emissions) as a result of construction activities and vehicle movements. All other adverse effects identified are negligible or not applicable. Effects are temporary and short-term in nature while works are carried out.
	Beneficial																	Minor beneficial effects have been identified with respect to sustainable provision of water through water savings and reduction in abstraction from the water environment. Reduced abstraction will contribute to reduced use of energy and associated greenhouse gas emissions. These effects are expected to be long term and permanent in nature.
Temporary Use Ban (TUB)	Adverse																	Minor adverse effects have been identified in terms of the effect of the ban on certain socio-economic uses of water such as watering of gardens and recreational spaces, as well as effects of the ban on some businesses that rely on water-using appliances/uses (e.g. sprinklers/hosepipes) in their line of work (e.g., landscaping/horticulture).
	Beneficial															Negligible beneficial	Negligible beneficial	Moderate beneficial effects include reducing the demand for water and securing essential water supplies for customers/businesses. Reducing the demand for water will also have minor beneficial effects on maintaining surface water and groundwater levels/flows and sustainable management of abstraction. Reducing water demand will help to improve the resilience of water supplies during the drought.
Drought Order to prohibit prescribed non-essential water uses (NEUB)	Adverse																	Major adverse effects on water-dependent but non-essential businesses/economy due to restrictions on water use, resulting in some business losses and loss of income for employees. Minor adverse effects are expected on certain recreational activities that are water-dependent, as well as the setting of some heritage assets and local visual amenities.
	Beneficial															Negligible beneficial	Negligible beneficial	Minor beneficial effects include a relatively small reduction in the demand for water, maintenance of water flows/levels, maintenance of essential water supplies to consumers in severe drought conditions.

4.4 Assessment Findings – Supply augmentation measures

4.4.1 R24R Well option

A visual summary of the SEA conclusions for the R24R Well supply augmentation measure is provided in **Table 4.2**. The detailed appraisal table is provided in Appendix D. The appraisal has also been informed by the Habitats Regulations Assessment (HRA) conclusions and the Water Framework Directive compliance assessment.

The R24R Well source is the only supply augmentation measure that does not require a drought permit. The abstraction is already licensed (with a daily annual average abstraction limit of 4.11Ml/d and a reliable, dry year water supply of 2.4Ml/d as an annual average), but the source has not been used for more than 20 years. The proposed drought plan trigger for bringing the R24R Well source back into supply is as reservoir storage enters Drought Management Zone 4. It is the only supply augmentation measure that would require some construction activity, the lead in time for which is estimated to be approximately six months, although some pre-planning feasibility work has already been carried out. The measure would be used to aid the refill of Cheddar Reservoir with respect to a one-year drought and to provide support to the local supply area regarding a two-year drought.

As a result of the construction requirements for reinstating this source (principally, a 4.2km pipeline), there are certain construction-related effects that have been identified and which, in some cases, require specific mitigation (beyond standard construction good practice methods). The pipeline crosses many roads and the felling of some trees may be required. Therefore, there is potential for adverse effects with respect to the SEA topics 'Biodiversity Fauna and Flora', 'Population and Human Health', 'Landscape and Visual Amenity' and 'Archaeology and Cultural Heritage'. Protected species surveys should be undertaken and specific bat mitigation measures (as highlighted in the accompanying HRA report) with respect to Mendip Woodlands SAC and North Somerset and Mendip Bats SAC: this is discussed further in Section 7. Due to the construction requirements, along with the additional pumping and treatment requirements during operation, adverse effects have also been identified with respect the SEA topic 'Air and Climate'.

Once the source is in operation, effects on the water environment are anticipated to include Moderate adverse effects predicted with respect to the SEA Water topic. The operation of the abstraction has the potential to cause a major impact to fish, invertebrates and macrophytes, localised to the Stoke Brook, due to derogated flows, completely removed flows or delayed flows depending on the seasonality of the drought option implementation however this is uncertain due to limited ecological records within the Stoke Brook. There would be no impact to the groundwater from the operation of the Wellhead spring abstraction.

Table.4.2 Visual evaluation summary for R24R Well supply augmentation option

Objective		SEA Topic																Commentary
			Biodiversity, fauna and flora				Population and human health		Material assets and resource use		Water			Soil, geology and land use			Air and Climate		Archaeology and cultural heritage	Landscape and visual amenity	
		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	6.3	7.1	8.1	
R24R and R24Ra (Well Head)	Adverse																	Major adverse effects regarding the biodiversity, fauna and flora topic due to likely significant effects on North Somerset and Mendip Bats SAC. Moderate adverse effects are considered likely regarding fish and invertebrates within the River Axe downstream of the Stoke Brook confluence due to flow reduction caused by the abstraction. Minor adverse, short-term temporary effects have been predicted regarding population and human health relating to construction effects (e.g. nuisance); these will be mitigated as far as possible. Minor adverse effects have been predicted regarding water quality, soil, geology and land use and archaeology and cultural heritage topics; mitigation will be required to address some of these potential risks. The abstraction has the potential to lead to minor impacts on the Wells groundwater body. Moderate adverse, medium-term but reversible effects are predicted with respect to landscape and visual amenity due to construction effects within the Mendips AONB. Moderate adverse, short-term temporary effects are anticipated regarding air and climate due to the requirement for new infrastructure and energy use during construction and operation.
	Beneficial																	Minor beneficial effects are predicted with respect to population and human health as the implementation of the measure will help maintain essential public water supplies (provision of up to an additional 2.4 Ml/d of water) during drought conditions. Minor beneficial effects are also expected in regard to improved resilience of water supplies in drought.

4.4.2 Drought Permits

A visual summary of SEA conclusions for each of the drought permits considered for the Bristol Water Draft Drought Plan is provided in **Table.4.3**. The detailed appraisal tables are provided in **Appendix D**. The appraisals have been informed by the environmental assessments of each drought permit, the HRA conclusions and the Water Framework Directive (WFD) compliance assessment.

There are many similarities between the drought permits . Each one would provide a positive benefit in helping to sustain water levels within the respective reservoirs during a period of severe drought. In light of this, all of the drought permits will have minor beneficial effects with respect to 'Population and Human Health', as the drought permits will help to maintain essential public water supplies during drought conditions.

There are no construction requirements associated with any of the drought permits. All will result in a reduction in river flow or level due to a reduction in compensation flow/prescribed flow to downstream watercourses or increase abstraction from groundwater which will influence river flows. In all cases, the river flow and river level effects are of greatest significance in the upper reaches. These effects on flow and water level are considered to be of major significance and result in major adverse effects in relation to the SEA topic 'Biodiversity, fauna and flora'. In the lower reaches of the hydrological zone of influence associated with each permit, greater flow helps to lessen these effects and, in particular, the respective watercourses are level controlled by man-made structures in the rivers to varying degrees, which lessens the effects on river water level, although reductions in velocity would still occur.

The drought permits are, however, located in different catchments, and consequently the affected river reaches have different characteristics; in addition, the timing and duration of drought permit implementation differs. The Cheddar Reservoir permit involves a reduction to the prescribed flow in the Cheddar Yeo river from the required 6.8Ml/d during the period 1st December to 14th May to 3.4Ml/d. It would only be operated during this period and therefore for the remainder of the year (15th May to 30th November) the Cheddar Yeo would receive the required prescribed flow of 6.8Ml/d. The drought permit flow reduction would therefore take place during the cooler months of the year, which reduces the potential adverse effects with respect to water quality which would be greater in the warmer months of the year. The environmental assessment of this permit concluded there would be negligible-minor risks to water quality during implementation. The two impacted reaches are shorter than those associated with the other two drought permits although a number of sensitive receptors, including water crowfoot (*Ranunculus*), Atlantic salmon, brown/sea trout and European eel would be adversely impacted by implementation of this permit. The HRA Screening has concluded likely significant effects on the Severn Estuary Ramsar site due to potential impacts resulting from implementation of this permit on European eel migration. Following agreement on suitable mitigation measures it is considered that a conclusion of no adverse effects on the designated feature will be possible.

The Blagdon Reservoir drought permit compensation flow reduction to the Congresbury Yeo from 8.6Ml/d to 4.0Ml/d would impact a greater length of river relative to the Cheddar Reservoir drought permit . It would be operated in the summer and autumn period (15th May to 30th November), so the potential water quality effects would likely be of greater significance. Flow impacts decrease with distance downstream of the reservoir and in the lower impacted reach, the effects are limited to velocity reduction due to water level controls being in place in the river in this reach. Three of the identified water quality pressures in the hydrological zone of influence discharge into the Congresbury Yeo in close proximity to Blagdon Reservoir and therefore into the river reach where the proportional reduction in flow is at its greatest. The risk to water quality is consequently assessed as medium. During low flows, the limit of the hydrological zone of influence (velocity reduction only) would be at the tidal limit (the Severn Estuary). Sensitive receptors anticipated to be impacted by this drought permit include white clawed crayfish, water crowfoot (*Ranunculus*), Atlantic salmon, brown/sea trout, bullhead, brook/river/sea lamprey and European eel. The HRA Screening has concluded likely significant effects on the Severn Estuary SAC and Ramsar site due to potential impacts resulting from implementation of this option on European eel migration. The HRA screening also concluded likely significant effects on the North Somerset and Mendip Bats SAC due to potential impacts on bat foraging habitat. Following

agreement on suitable mitigation measures it is assumed that a conclusion of no adverse effects on these European sites will be possible.

The Chew Valley Reservoir drought permit compensation flow reductions would result in a hydrological zone of influence greater than that identified for the other two existing drought permits. The flow impacts include some reductions to river channel wetted width and velocity even in the lower impacted reaches. The Chew Valley Reservoir drought permit would also impact a number of sensitive receptors including white clawed crayfish, water crowfoot (*Ranunculus*), Atlantic salmon, brown/sea trout, bullhead, brook/river lamprey and European eel. The HRA Screening has concluded likely significant effects on the Severn Estuary SAC and Ramsar site due to potential impacts resulting from implementation of this permit on European eel migration. Following agreement on suitable mitigation measures it is assumed that a conclusion of no adverse effects on the designated feature will be possible.

The River Axe licence variation drought permit would result in impacts on river flow and level between the Axbridge abstraction location and the tidal limit at Brean Cross Sluice for two extra months compared to the baseline conditions. This drought permit will result in potentially a major impact on eel migration and moderate impact on other fish species and aquatic macroinvertebrates. The River Axe flows within 500m of the Mendip Hills AONB and there may be adverse impacts on the landscape associated with reduced flows in the river. Minor adverse effects on climate change emissions are also predicted, associated with the additional pumping of water from the River Axe. The HRA Screening has concluded likely significant effects on the Mendip Bats SAC, Mendip Grassland SAC and Severn Estuary Ramsar sites. Following agreement on suitable mitigation measures it is assumed that a conclusion of no adverse effects on these European sites will be possible.

The operation of the P05R licence variation drought permit is likely to reduce groundwater levels in within the Bristol Triassic and Bristol Airport Carboniferous Limestone WFD groundwater bodies which would require time after drought permit implementation to recover. As the River Kenn is fed via groundwater, this could also result in reduction in river flows from close to the source of the River Kenn to the tidal sluice at North End. The reduction in river flow velocities would result in a moderate impact to fish and invertebrates within the River Kenn, and minor impacts on macrophytes. The HRA Screening has concluded likely significant effects on the North Somerset and Bats SAC and on the Severn Estuary Ramsar sites. Following agreement on suitable mitigation measures it is assumed that a conclusion of no adverse effects on these European sites will be possible.

The increased abstraction under the P08R licence variation drought permit could lead to moderate reductions in surface water flow in Ozleworth Brook and the Little Avon. Lowering of the water levels and flow in Ozleworth Brook could result in moderate, temporary impacts to fish and invertebrates and minor impacts to macrophytes. The HRA Screening has concluded likely significant effects on the Severn Estuary SAC and Ramsar site. Following agreement on suitable mitigation measures it is assumed that a conclusion of no adverse effects on these European sites will be possible.

Table.4.3 Visual evaluation summary for drought permit measures

Objectives		SEA Topic															Commentary
		Biodiversity, fauna and flora		Population and human health			Material assets and resource use		Water			Soil, geology and land use	Air and Climate			Archaeology and cultural heritage	Landscape and visual amenity	
		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	6.3	7.1	8.1	
Reduction in compensation flow release from Blagdon Reservoir	Adverse																	Major adverse effects regarding the biodiversity, fauna and flora topic due to likely significant effects on North Somerset and Mendip Bats SAC and Severn Estuary SAC and Ramsar site. Major adverse, short-term temporary effects regarding the water topic are predicted due to reduction in river flow velocity, particularly in the upper reaches of the zone of hydrological influence. As a result of the flow impacts, there could be a short-term reduction in dilution capacity regarding a number of sewage treatment work discharges resulting in increased water quality pressure. Moderate adverse, short term temporary effects are predicted with respect to landscape and visual amenity due to water level changes to watercourses within the Mendips Hills AONB. Minor adverse effects may also arise in relation to soils, geology and land use.
	Beneficial																	Minor beneficial effects are predicted with respect to population and human health: implementation of the drought permit will help to maintain essential public water supplies (provision of up to an additional 4 Ml/d of water) during drought conditions. Minor beneficial effects are expected in regard to improved resilience of water supplies in drought. Moderate beneficial effects are expected regarding landscape and visual amenity due to maintenance of Blagdon Reservoir water levels within the Mendip Hills AONB.
Reduction in compensation flow release from Chew Reservoir	Adverse																	Major adverse effects regarding the biodiversity, fauna and flora topic due to likely significant effects on Severn Estuary SAC and Ramsar site. Major adverse, short-term temporary effects regarding the water topic are predicted due to reduction in river wetted width, depth and flow velocity, particularly in the upper reaches of the hydrological zone of influence. As a result of the flow impacts, there could be a short-term reduction in dilution capacity regarding a number of sewage treatment work discharges resulting in increased water quality pressure and increased risk of WFD deterioration. Moderate adverse, short term temporary effects are predicted with respect to landscape and visual amenity due to river level changes within the Mendips AONB. Effects concerning other SEA categories are considered to be minor or negligible, and temporary in nature.
	Beneficial																	Minor beneficial effects are predicted with respect to population and human health: implementation of the drought permit will help to maintain essential public water supplies (provision of up to an additional 7Ml/d or 3.4 Ml/d depending on time of year) during drought conditions. Minor beneficial effects are also expected in regard to improved resilience of water supplies in drought. Moderate beneficial effects are expected regarding landscape and visual amenity due to maintenance of Chew Reservoir water levels within the Mendip Hills AONB.

Reduction of prescribed flow at Cheddar Reservoir	Adverse																	Major adverse effects regarding the biodiversity, fauna and flora topic due to likely significant effects on Severn Estuary Ramsar site. Major adverse, short-term temporary effects regarding the water topic are predicted due to reduction in river flows, wetted width and depth in the upper reaches of the river Cheddar Yeo. Effects in the lower reaches (downstream of Hythe) of the river are limited to reductions in velocity only. As a result of the flow impacts, there would be a short-term reduction in dilution capacity regarding sewage treatment works discharges and resulting in increased water quality pressure and increased risk of WFD deterioration. Moderate adverse, short-term temporary effects are predicted with respect to landscape and visual amenity due to river level changes and effects within the Mendips AONB. Effects concerning the other SEA topics are considered to be minor or negligible, and temporary in nature.
	Beneficial																	Minor beneficial effects are predicted with respect to population and human health: implementation of the drought permit will help to maintain essential public water supplies (provision of up to an additional 3.4 Ml/d of water) during drought conditions. Minor beneficial effects are also expected in regard to improved resilience of water supplies in drought. Moderate beneficial effects are expected regarding landscape and visual amenity due to maintenance of Cheddar Reservoir water levels within the Mendip Hills AONB.
River Axe licence variation	Adverse																	Major, short-term adverse effects are anticipated on biodiversity due to likely significant effects on the Mendip Bats SAC, Mendip Grassland SAC and the Severn Estuary Ramsar site. Hydrological effects on the River Axe are assessed as being of a moderate magnitude but would be temporary and short-term. It could also result in adverse effects on the hydromorphology of the site, the severity of which would decrease with increasing distance from the abstraction point. Moderate, short term adverse effects are also anticipated to the fish populations in the River Axe resulting from a reduction in flow. In particular, there is the potential that a reduction in flow could result in a reduction in eel migration - designated as part of the Severn Estuary Ramsar site - as the ability of eel to pass in-stream barriers could become compromised. These impacts are anticipated to be short-lived. The River Axe flows within 500m of the Mendip Hills AONB and there may be adverse impacts on the landscape associated with reduced flows in the river. Minor adverse effects on climate change emissions are associated with the additional pumping of water from the River Axe.
	Beneficial																	The Cheddar Reservoir SSSI is designated for its overwintering bird population. Implementation of the licence variation would help to maintain water levels within the reservoir and therefore, if implemented during winter, there may be some minor beneficial effects on the designated bird species. As the SSSI is also within proximity of the Mendip Hills AONB, there are moderate beneficial effects on the landscape setting of the AONB resulting from the maintenance of water levels in Cheddar Reservoir. Implementation of the drought permit will help provide a secure, sustainable and resilient water supply for Bristol Water's customers and help sustain the local economy.

P05R temporary licence variation	Adverse																	Major, short-term adverse effects are anticipated on biodiversity due to likely significant effects on the North Somerset and Bats SAC and on the Severn Estuary Ramsar site. Implementation of the drought permit may also reduce velocity in the River Kenn, which in turn would result in moderate adverse effects to fish and invertebrate populations in the watercourse, and minor effects to macrophytes. Reduction in river flow velocities could increase the distribution of existing invasive species within the watercourse. Reduction in flow in the River Kenn is likely to manifest as a reduction in velocity rather than levels, due to an extensive weir network along the watercourse. Reductions in velocity may result in adverse impacts on angling. There is the potential for adverse effects on groundwater levels in the Bristol Triassic and Bristol Airport Carboniferous Limestone WFD groundwater bodies which would require time after drought permit implementation to recover. As the River Kenn is fed via groundwater, this could also result in reduction in river flows. Reduced flows may alter water quality and potentially lead to adverse effects on river geomorphology and ecosystem function.
	Beneficial																	Implementation of the drought permit would result in an increased supply of water during drought conditions, which could in turn help maintain public health and wellbeing. Implementation of the drought permit will help provide a secure, sustainable and resilient water supply for Bristol Water's customers and help sustain the local economy.
P08R (Ozleworth Brook) Temporary Licence Variation	Adverse																	Major, short term effects are anticipated on biodiversity due to likely significant effects on the Severn Estuary SAC and Ramsar site. Lowering of the water levels and flow in Ozleworth Brook could result in moderate impacts to fish and invertebrates and minor impacts to macrophytes. Implementation of the drought permit would affect river levels and flow in Ozleworth Brook down to the confluence with the River Little Avon. This could subsequently result in a tempoary reduction in the recreational value of the watercourse. The increased abstraction would draw down groundwater levels within the Inferior Oolite and Bridport Sands groundwater body, which could lead to moderate reductions in surface water flow in Ozleworth Brook and the Little Avon. Ecosystem function and the gemorphology of the watercourse may also be temporarily affected. The Little Avon flows through Berkeley Castle Registered Park/Garden and the Costwolds AONB, and therefore reductions in flow could result in moderate adverse effects on the setting of these designated site in the short term. Additional abstraction from Ozleworth Brook would result in a minor increase in greenhouse gas emissions due to increased water pumping and treatment.
	Beneficial																	Implementation of the drought permit would result in an increased supply of water during drought conditions, which could in turn help maintain public health and wellbeing. Implementation of the drought permit will help provide a secure, sustainable and resilient water supply for Bristol Water's customers and help sustain the local economy.

5 Cumulative Assessment

5.1 Introduction

The cumulative assessments presented in this section have been carried out in line with the methodology described earlier in Section 3.

5.2 Cumulative effects between drought measures

5.2.1 Cumulative effects of demand management measures

It is acknowledged that the demand management measures are sequential. In each case, the first demand management measure will always remain in place while the next measure is implemented but the effects between the different measures are not additive. No significant cumulative effects between the demand management measures have been identified.

5.2.2 Cumulative effects with supply augmentation measures

Demand management measures serve to reduce pressure on water resources and will have a positive influence on both supply augmentation measures and drought permits by reducing customer demand for water, and therefore helping to reduce the abstraction of water from the environment.

5.3 Cumulative effects between supply augmentation measures and Drought Permit measures

The cumulative effects of the supply augmentation measures and drought permits with each other have been assessed and are summarised in the matrix presented in **Figure 5.1**. The assessments have been informed by the existing drought permit EARs, and mapping of affected river reaches and groundwater catchments.

Figure 5.1: Cumulative impacts matrix: supply augmentation measures and drought permits

Honeyhurst well							
Reduction of Blagdon Reservoir compensation flow							
Reduction of Chew Reservoir compensation flow							
Reduction of Cheddar Yeo prescribed flow							
River Axe licence variation							
Chelvey licence variation							
Alderley licence variation							
Supply side drought measures	Honeyhurst well	Reduction of Blagdon Reservoir compensation flow	Reduction of Chew Reservoir compensation flow	Reduction of Cheddar Yeo prescribed flow	River Axe licence variation	Chelvey licence variation	Alderley licence variation

	No cumulative impacts
	Mutually exclusive schemes, i.e. use the same site or the same resource
	Potential adverse construction impacts if constructed simultaneously
	Potential cumulative impacts in operation

Blagdon Reservoir/Chew Reservoir/P05R licence variation/P08R licence variation drought permits

Blagdon Reservoir and the compensation flow releases to the Congresbury Yeo are in a different catchment to all of the other supply augmentation and drought permit measures. Chew Valley Reservoir and its compensation flow releases to the River Chew are also in a different catchment to the other measures. The P05R licence variation drought permit is anticipated to influence the River Kenn catchment and the P08R licence variation drought permit is anticipated to influence Ozleworth Brook and Little Avon. Therefore no cumulative impacts from simultaneous operation of these drought permits are expected.

R24R Well drought measure and Cheddar Reservoir drought permits

The R24R Well drought permit would abstract from the Wells WFD groundwater body (GB40902G804700). It has been identified that there is a low risk of this reinstated abstraction having impacts on the dependent surface water body, the River Axe. The Cheddar Reservoir drought permit is anticipated to result in hydrological effects within the Cheddar Yeo that would extend to the confluence with the River Axe. Hydrological impacts on the River Axe downstream of the Cheddar Yeo confluence may result from simultaneous operation of both drought options. However, considering the hydrological impacts resulting from individual operation of these options no cumulative effects are anticipated.

R24R Well drought measure and River Axe licence variation drought permit

The River Axe licence variation drought permit is anticipated to influence the River Axe from the abstraction point at Brinscombe to the tidal limit and has been assessed as having moderate hydrological impacts. Therefore there are potential cumulative effects from implementation of both drought permits simultaneously on the River Axe from Brinscombe to the tidal limit. However the impact from the additional flow reduction related to the R24R Well drought measure will remain moderate as under the River Axe licence variation drought permit and as such no significant cumulative impacts are anticipated.

River Axe licence variation and Cheddar Ponds drought permits

The Cheddar Ponds drought permit environmental assessment has included a worst case scenario which assumed the Axe at Brinscombe abstraction was operating at maximum practical daily limit of 27Ml/d during the period November to April. Impacts on the River Axe under this scenario are assessed as minor. The River Axe licence variation drought permit would permit additional abstraction during October and May. Only the additional abstraction during May is relevant to the assessment of cumulative effects as the Cheddar Ponds drought period would only operation 1 December to 14 May. The hydrological impact of simultaneous operation of the Cheddar Ponds and River Axe licence variation drought permits for the additional 14 day period from 1-14 May would also remain a minor impact.

R24R Well drought measure, Cheddar Ponds and River Axe licence variation drought permits

There is the potential for cumulative adverse effects on the River Axe if the three drought measures were to be implemented concurrently. This scenario could only be in operation for a maximum of 14 days between 1-14 May. Impacts are not anticipated to be greater than the moderate impacts on the River Axe under the River Axe licence variation drought permit alone.

A monitoring programme will be required to address the risk of these potential cumulative adverse effects and demonstrate 'no deterioration' to the River Axe under the WFD.

5.4 Cumulative Effects with Other Bristol Water Activities

5.4.1 Bristol Water WRMP

Bristol Water published its current WRMP in 2019 (WRMP19). There are no supply augmentation schemes identified within Bristol Water's WRMP19. Demand management options such as reduction in leakage, reduction in raw water losses and increased household metering alongside further water efficiency activities will complement the demand management measures in the Draft Drought Plan, with moderate beneficial cumulative effects.

5.4.2 Bristol Water adaptive management trials under the WINEP

Bristol Water is in the process of implementing Water Industry National Environment Programme (WINEP) adaptive management trials at Blagdon Reservoir and Chew Valley Reservoir. These trials are assessing the environmental benefits to the rivers downstream of changing the compensation regimes from the reservoirs. They are being implemented over the period to 2024/25 and, depending on the findings of the trial, any permanent abstraction licence changes will be made after this period (during the period 2026-2030). The Drought Plan will be published before the trials are complete, so the consideration of the drought permits in this SEA reflect the situation whereby the existing abstraction licences will be the ones to be varied by any drought permit. The situation will be updated to reflect any changes in the licences in Bristol Water's next drought plan review which will likely be co-incident with decisions arising from the WINEP trials post 2025.

5.5 Cumulative Effects with Other Drought Plans

5.5.1 Environment Agency Drought Plans

The potential for cumulative effects of Bristol Water's Drought Plan with relevant Environment Agency's local and national drought plans has been assessed.

An overview of the process of using drought actions and triggers is provided in the Environment Agency drought plans. Actions described include communications (internal and external), monitoring and applying for drought orders in a limited number of situations.

External communications may have positive in-combination effects with Bristol Water's media/water efficiency campaign for customer restraint in water use, as drought communication messages may reinforce each other, thereby resulting in increased demand savings.

Potential Environment Agency environmental drought order actions do not have the potential for in-combination impacts with Bristol Water's drought management options as they relate to different river catchments.

5.5.2 Other Water Company Drought Plans

Assessment of the potential cumulative effects with drought management measures listed in neighbouring water companies' current Drought Plans has been undertaken. It should be noted that all water company Drought Plans are subject to review on the same timescales as the Bristol Water Drought Plan. The information used to carry out these assessments is the most up to date information available at the time of writing, but the assessments should be reviewed at the time of implementing any drought plan measures to ensure that no changes to neighbouring water company Drought Plans have been made in the intervening period, and that the assessment in this Environmental Report remains valid.

Wessex Water

Wessex Water indicates that it would deploy demand management measures including water efficiency campaigns to both domestic and business customers, increased leakage reduction, and temporary water use restrictions in a drought. These would complement the demand management measures included in Bristol Water's Drought Plan and any cumulative effects are likely to be beneficial.

Wessex Water provides five small bulk water supply exports to Bristol Water which supply discrete areas within the Bristol Water supply region. In its 2018 Drought Plan, Wessex Water identifies that it does not envisage the need to restrict these transfers during a drought and this assumed to continue during the life of the Bristol Water Drought Plan.

Supply augmentation measures in Wessex Water's Drought Plan relate to changing its strategy on the priority of where water is abstracted from and/or the distribution of water that is abstracted under normal conditions. No potential for in-combination or cumulative effects of these supply augmentation measures with the Bristol Water Drought Plan have been identified.

Use of standby water sources by Wessex Water is limited to a source near Bath that would only operate in times of dry weather. The abstraction has an existing licence to abstract up to 7 Ml/d from the River Avon. The operation of this source will not have cumulative effects with any of the supply augmentation measures or drought permits in the Bristol Water Drought Plan.

Wessex Water's Drought Plan includes a number of drought permits/orders that could be used in drought. The Bridgwater and Taunton Canal additional abstraction option would pump raw water from the canal to augment reservoir storage. The water abstracted from the canal under this option would otherwise flow into the tidal River Parratt. The Clatworthy Reservoir compensation flow reduction and Hele Bridge additional abstraction drought permits would affect flows in the River Tone, which flows into the River Parrett. The Sutton Bingham compensation flow reduction and Clifton Maybank additional abstraction drought permits could affect flows in the River Yeo (not the Cheddar Yeo or the Congresbury Yeo) which flows into the River Parrett. Bristol Water's drought permits and supply augmentation measures are not hydrologically linked to the River Parrett catchment and therefore no cumulative effects will arise.

Severn Trent Water

There is no potential for hydrological connectivity between supply augmentation measures or drought permits/orders in the Severn Trent Water Drought Plan and the Bristol Water Drought Plan supply augmentation measures or drought permits. Therefore no cumulative effects between the Bristol Water Drought Plan and Severn Trent Water Drought Plan are anticipated.

Thames Water

The boundary of the Thames Water supply area is over 150km away from Bristol Water's most northern supply augmentation measure and its drought permits. There is no potential for hydrological connectivity and no cumulative effects between the drought management measures in Bristol Water's Drought Plan and the measures included in the Thames Water Drought Plan.

5.6 Cumulative Effects with Other Plans and Projects

5.6.1 Water Resource Management Plans

Wessex Water

Wessex Water has no projected supply deficit and, as such, its WRMP19 proposes no supply augmentation options. No cumulative effects will therefore occur with Bristol Water's Drought Plan.

Severn Trent Water

There is no potential for hydrological connectivity and cumulative effects between the drought management measures in Bristol Water's Drought Plan and the supply augmentation measures contained in Severn Trent Water's WRMP19.

Thames Water

There are no measures that form part of the Thames Water WRMP19 with the potential to result in cumulative effects with the drought management measures in Bristol Water's Drought Plan.

5.6.2 Cumulative effects with any other identified relevant projects

River Basin Management Plans

Most of Bristol Water's supply areas falls within the Severn River Basin District River Basin Management Plan (RBMP). Part of the supply area (including Cheddar Reservoir) falls within the South West River Basin District RBMP.

Both the Severn River Basin District RBMP and the South West River Basin District RBMP describes the planned steps to implement the measures required to achieve the environmental objectives of the Water Framework Directive (WFD). The plans provide the framework for protecting and enhancing the water environment. The SEA of the Severn River Basin District RBMP and the SEA of the South West River Basin District RBMP determined that the plans were likely to have significant positive effects on the environment, particularly in respect of biodiversity and water and that any local negative effects would expect to be mitigated during implementation. No cumulative effects between the Severn River Basin District RBMP and the South West River Basin District RBMP and the Bristol Water Drought Plan measures have been identified.

National Policy Statements

National planning policy guidance (for developers and inspectors) is set out in National Policy Statements (NPSs). A number of these NPSs have been published and set out the definition, and in some cases the location, of Nationally Significant Infrastructure Projects (NSIPs). Of the twelve NPS only two detail the location of options (Wastewater Treatment (England only) and Nuclear Power EN-6) and therefore the potential for cumulative effects can only be identified with respect to these.

The National Policy Statement for Wastewater[13] states the policy of reducing demand for wastewater infrastructure by reducing domestic and industrial wastewater production and by implementation of Sustainable Urban Drainage Systems. Only two major infrastructure projects are put forward, both in the south east of the UK and therefore are not relevant to the Bristol Water Drought Plan; no cumulative effects are anticipated.

The Nuclear Power NPS (EN-6) sets out eight potentially suitable sites for the deployment of new nuclear power stations in England and Wales before the end of 2025. Of these sites, one site (Oldbury) is located within the Bristol Water supply area, whilst a second site (Hinkley Point) is located approximately 10km to the south-west of the Bristol Water supply area. The remaining sites are considered too distant from the Bristol Water supply area for in-combination effects to occur. Information from the NIP website[14] indicates that proposals for the Oldbury new nuclear power station

[13] Defra (2012) *National Policy Statement for Wastewater*. March 2012.
[14] https://infrastructure.planninginspectorate.gov.uk/

are currently at the Pre-Application stage. The project timings are uncertain as the shareholders of the promoter (Horizon) are seeking new owners, and it is currently assumed that work is unlikely to start during the period covered by Bristol Water's Drought Plan.

The proposals for the Hinkley Point C new nuclear power stations have been accepted and are described further below.

Hinkley Point C Connection (National Grid) will involve construction work that would mainly follow the M5 (10km -18km from any drought plan options) to Hinkley Point. Considering these distances, the potential for direct cumulative effects is considered unlikely. Construction will take place within the Mendip Hills AONB: R24R Well supply augmentation measure also involves small scale construction in the Mendip Hills AONB. There is therefore the potential for indirect cumulative effects to this receptor. However, construction effects for the R24R Well measure will either be contained within an existing Bristol Water operational site or a small linear corridor for the pipeline. Therefore, overall cumulative effects during any construction (if they were to coincide) are considered negligible.

The draft National Policy Statement for Water Resources Infrastructure[15]; sets out the need and policies for development of NSIPs for water resources in England. No NSIPs have currently been defined and as such no cumulative effects with the Bristol Water Drought Plan are anticipated.

Regional Plans

The development of the Water Resources West, Water Resources West Country and Water Resources South East Regional Plans will consider potential resource options in the Bristol Water supply area (e.g. the Cheddar 2 reservoir option). However as the regional planning is still at an early stage no cumulative effects with the Bristol Water Drought Plan are anticipated over the period of the current plan 2022-2027.

Local Authority Plans / Planning Applications

Relevant Local Plans have been reviewed to consider potential cumulative impacts with implementation of the drought measures in the Bristol Water Drought Plan. This has included review of the Mendip District Council Local Plan in relation to the R24R Well drought measure which includes a construction phase. There are no existing or planned local policy development proposals in the vicinity of the R24R construction zone. A review of the Mendip District Council planning portal has confirmed that any existing planning applications in the vicinity of the R24R site are small-scale and include development types such as conversions and change of use applications for existing agricultural buildings. No cumulative effects are therefore anticipated. No potential for additional cumulative effects with the remining Bristol Water Drought Plan options have been identified.

[15] Defra (2012) Draft *National Policy Statement for Water Resources*. November 2018.

6 Mitigation and Monitoring

6.1 Overview

Key stages of the SEA process include Task B5: *Mitigating adverse effects*, Task B6: *Proposing measures to monitor the environmental effects of plan or programme implementation* and Stage E: *Monitoring the significant effects of the plan or programme on the environment*. The sections below describe how these tasks have been addressed and how Bristol Water intends to ensure that mitigation measures are implemented for any adverse effects that are identified and the means by which the environmental performance of the Drought Plan can be assessed.

6.2 Mitigation Measures

Mitigation may be defined as a measure to limit the effect of an identified significant impact or, through the most successful application, avoid the adverse impact altogether, the latter being the preferred option.

Consideration of mitigation measures has been an integral part of the SEA process. The SEA appraisals have been based on residual impacts, i.e. those impacts likely to remain after the implementation of reasonable mitigation measures. Mitigation measures include adopting best practice construction methods for laying of new pipelines to avoid noise and dust nuisance, runoff of sediment to nearby streams and preventing pollution from plant and machinery; they also include carrying out monitoring of sensitive environments before commencing operational changes so that appropriate protection measures can be agreed to safeguard sensitive species or features.

Certain assumptions have been made regarding mitigation, notably:

- Where suitable mitigation measures are known and identified (e.g. as informed through existing EARs and other assessments) these have been taken into account, such that the resultant residual effect has been determined.
- In line with recommendations made in the UKWIR SEA Guidance[16], the SEA appraisals have assumed the implementation of reasonable mitigation measures, such as the use of good construction practice. This is particularly applicable to the R24R Well option where some construction work would be needed.

As described earlier, during implementation of a specific drought management measure, appropriate monitoring will be undertaken to track any potential environmental and/or social effects which will in turn trigger deployment of suitable and practicable mitigation measures as may be available.

Bristol Water will commission EARs for the additional drought permit options at P08R, P05R and River Axe, as well as for R24R Well prior to the Final Drought Plan. These assessments would include specification of appropriate mitigation measures where necessary to address any identified material adverse effects. This will ensure Bristol Water is 'permit ready' in relation to these measures if they remain in the Final Drought Plan.

The Stage 1 HRA Screening has identified likely significant effects on European sites in relation to bats, water birds, lamprey, European eel and brown trout, and sets out potential mitigation measures to be considered at Stage 2 Appropriate Assessment. The Appropriate Assessment will seek to identify mitigation measures that are capable of implementation and will reduce the impact to the lowest level possible. These measures will include both avoidance and reduction measures, with the former being the preferred option. Bristol Water will consult with Natural England and the Environment Agency to further develop these mitigation measures which will be documented in the Appropriate Assessment.

[16] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (prepared by Ricardo Energy & Environment for UKWIR).

6.3 Monitoring Requirements

Monitoring is required to track the environmental effects to show whether they are as predicted, to help identify any adverse impacts and trigger deployment of mitigation measures.

Bristol Water's Drought Plan includes a range of possible measures to allow Bristol Water to respond to a particular drought in the most appropriate way. It is impossible to predict in advance which and how many of the measures will be required to respond to each particular drought event. Correspondingly, it is therefore difficult to prescribe precise monitoring activities for the effects of the Drought Plan as whole, and it is more appropriate to consider monitoring requirements for drought management measures with significant environmental or social effects should they be implemented during an actual drought.

In relation to demand management measures, it is recommended that monitoring of customer effects is carried out during and after the implementation of any demand management measures to assess their effectiveness and confirm the effects predicted in this Environmental Report. This is likely to take the form of structured surveys with a statistically valid sample of household and/or non-household customers, as applicable. UK Water Industry Research (UKWIR) guidance is available on methods for assessing the effectiveness and impact of water use restrictions on customers.

As explained in Section 6.2 above, Bristol Water has committed to being 'permit ready' for the drought permits which are put forward in the final drought plan, subject to confirmation through work being carried out for the WRMP that they are still required. This includes updates of the existing EARs and production of EARs for the additional drought permits. The EARs will include monitoring requirements in relation to hydrology, water quality, hydromorphology and aquatic ecology commensurate with the scale and magnitude of the potential adverse effects (as set out in this Environmental Report).

Similarly, relevant environmental baseline data would need to be collated in respect of the R24R Well supply augmentation measure to help provide the context for monitoring before, during and after implementation of this measure in an actual drought to confirm the predicted effects set out in this Environmental Report.

The Stage 1 HRA Screening has identified likely significant effects on European sites in relation to bats, lamprey, European eel and brown trout, and sets out potential monitoring measures for bats and migratory fish. These proposals will be further developed during the Stage 2 HRA Appropriate Assessment.

The above information will, in turn, inform the preparation of the Environmental Monitoring Plan to accompany the Final Drought Plan.

7 Quality Assurance

ODPM Guidance on SEA contains a Quality Assurance checklist to help ensure that the requirements of the SEA Directive are met. The checklist is reproduced in **Appendix E**, demonstrating how this Environmental Report meets the requirements.

Appendices

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