Jersey Water
for Island life

APPENDIX J:

Strategic Environmental Assessment

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1. Introduction

1.1 Purpose of this document

This is the Strategic Environmental Assessment (SEA) Report of the Jersey Water (JW) Water Resource and Demand Management Plan (WRDMP). The WRDMP and SEA Environmental Report takes on board the comments received from the Scoping consultation exercise with various Government of Jersey departments. This SEA Report identifies the anticipated likely environmental effects of implementing the WRDMP.

Whilst Jersey Water are not required under any statutory or legislative context to carry out SEA of their plans or projects, they recognise the value added to planning through the application of SEA processes and have committed to its undertaking. In this instance the approach has been undertaken in the 'spirit of SEA' and where possible aligns with the steps set out under the UK 'Environmental Assessment of Plans and Programmes Regulations' 2004[1].

1.2 Jersey Water

Jersey Water (JW) has a responsibility to maintain secure, high quality, reliable and affordable water supplies to its customers over the long-term and which are resilient to potential future events. Current water supplies are provided by an integrated water resource system comprising of reservoirs and stream abstractions, groundwater boreholes and through La Rosiere desalination plant. The water provided from these different water sources is treated at two water treatment works for supply to customers through an interlinked network of water distribution pipes. Jersey Water currently supply an average of around 19 million litres of water per day to some 39,000 homes and 3,400 commercial properties across Jersey.

1.3 The background and need for the WRDMP

Water companies in England and Wales have a statutory duty to prepare a Water Resource Management Plan and a Drought Plan every 5 years. Although Jersey Water is not regulated in the same way and has no statutory requirement to publish such plans, Jersey Water recognises the benefits of taking a long-term view of water supply provision and managing supplies during drought conditions. Jersey Water have therefore developed a Water Resources and Drought Management Plan ('WRDMP' or 'the Plan') to update and refresh their previous WRDMP that was prepared in 2021 (WRDMP21).

This WRDMP considers long-term planning for water resources and how essential water supplies can be maintained during future drought events. This is important to consider for long-term pressures such as demographic changes and climate change. Long-term planning encourages the early identification of new resources necessary to maintain reliable water supplies when demand for water in Jersey is growing. It enables Jersey Water to include for an appropriate amount of time to undertake key tasks such as feasibility investigations, planning and construction that are required to successfully develop any measures by the time they are needed in future, to reduce the risks of supply shortfalls during future drought conditions. A 40-year planning period has been adopted for the plan to 2065.

As the sole provider of treated water to the Island, Jersey Water is subject to comprehensive regulation. Whilst having to comply with all of the applicable laws and regulations in force in Jersey, including relevant Government of

[1] https://www.legislation.gov.uk/uksi/2004/1633/contents

Jersey planning activities, the following are pertinent to the collection, treatment and distribution of water on the Island:

- The Water (Jersey) Law 1972;
- The Water Pollution (Jersey) Law 2000; and
- The Water Resources (Jersey) Law 2007.

1.4 Jersey Water WRDMP Objectives

Jersey Waters WRDMP focuses on how they are going to ensure the reliable supply of water that meets drinking water quality standards to their customers whilst safeguarding public health. They also recognise the importance of securing water supplies for their commercial customers in both the public and private sector to help support the future economic growth of Jersey. The key objectives of the WRDMP are to:

- Develop a robust evidence base to characterise the scale and complexity of the water resource and drought management challenges facing Jersey's water supplies over the next 40 years, including consideration of risks and uncertainties.
- Review the current components and trends in demand for water and to forecast the future water demand over the next 40 years, taking account of the latest population and housing growth projections for the island.
- Assess the reliable supply of water available in drought conditions of different severities, taking account of the risks to future water supply availability over the next 40 years, such as from the impacts of climate change.
- Assess the key water supply resilience risks and uncertainties over the next 40 years.
- Quantify the water supply-demand balance over the next 40 years to assess the future vulnerability to drought and other pressures affecting the reliability of water supply provision.
- Consider a range of alternative options to maintain water supply reliability, including temporary drought management measures alongside permanent measures to manage demand or augment supply reliability.
- Carry out multi-criteria appraisal of alternative programmes of measures to balance supply and demand to inform decision-making on the preferred plan to secure future supply reliability for our customers.
- Provide an 'adaptive plan' as detailed in the latest UK guidance that considers the strategic risks and options to produce a robust and resilient best-value plan.

1.5 WRDMP Planning

1.5.1 Optioneering

Jersey Water developed and applied a multi-criteria appraisal process, see Figure 1-1, to evaluate a wide range of options to address the forecast supply deficit, as set out in Chapter 8 of the WRDMP. The options were subject to a number of staged appraisals that helped shortlist an initial unconstrained list of 111 separate options (55 supply-side options, 42 customer, distribution and production-side options and 14 drought management options) to a shortlist of feasible options (nine supply-side options, eight customer, distribution and production-side options and nine drought management options), as set out in Table 1-1 and 1-2.

The options were screened against a number of criteria and were considered in greater detail as the screening process progressed. The screening criteria included:

- Feasibility and risk;
- Engineering and Cost;
- Performance and resilience;
- Operational; and
- Environmental.

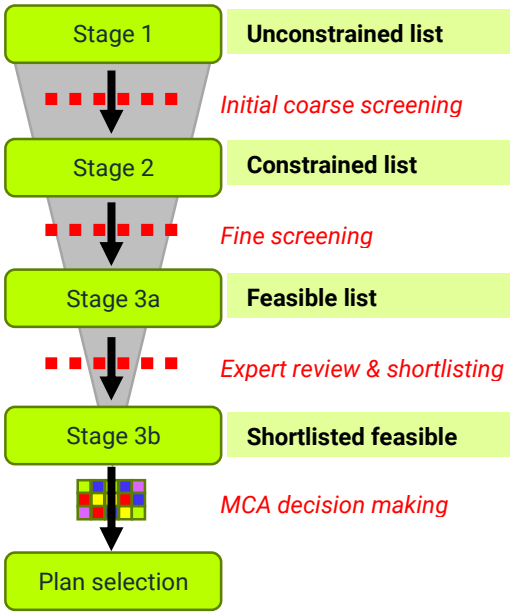

Figure 1-1 - Option Appraisal Process[2]

Table 1-1 - Final feasible option shortlist[3]

Option Nr	Option	Supply benefit or demand saving	Option type
Supply-side options			
S101	New stream abstraction (Fernlands)	0.04 Ml/d	New source (3 options)
S15d	New groundwater abstraction: d. Pont Marquet	0.5 Ml/d	
S9	La Rosière desalination plant extension	5.4 Ml/d	
S103	New storage reservoir option Trinity reservoir.	0.6 Ml/d	Increase storage

[2] Figure 8-1 WRDMP Main Report
[3] Table 8-3 WRDMP Main Report

S24b	Expansion of Val de la Mare reservoir (new dam)	2.2 Ml/d	(3 options)
S18	Bellozanne indirect treated effluent water reuse scheme	5.7 Ml/d	
S14	Raw water infrastructure system enhancements (La Hague -Queens Valley)	0.6 Ml/d	Supply resilience (2 options)
S-B1	Basket 1: Catchment Measures	0 Ml/d *	
S-B2	Basket 2: Treatment enhancement to target PFAS contaminated sources	0.56 Ml/d	Removal of water quality constraints (1 option)
Customer, distribution and production-side options (Demand-side options)			
D-LMS	Leakage Management Software	0.31 Ml/d	Leakage related options (5 options)
D-APM	Advanced Pressure Management	0.16 Ml/d	
D-MRS1, 2, 3	Mains renewal / replacement	0.07 Ml/d (each)	
D-AT	Additional Leakage Technician	0.11 Ml/d	
D-AL	AI Acoustic Logging	0.1 Ml/d	
D-B11	Smart Metering (Start 2026)	0.15 Ml/d	Metering (2 options)
D-B12	Smart Metering (Start 2029)	0.15 Ml/d	
D-B3	Planning regulation and rain/grey water reuse - residential and commercial	Nominal	Regulation change (1 option)

** - Option S-B1 offers limited DO benefit but provides a benefit to source resilience.*

Table 1-2 - Temporary Drought Management Options

Option Nr	Option	Potential benefit
Temporary drought management options		
DM2	Water rationing	In the order of 15% reduction to average dry year demand
DM3	Temporary desalination	In the region of 1-2Ml/d
DM5	Temporary PFAS treatment	Potentially enabling the full raw water output from the borehole to be realised. Although the resultant deployable output benefit has not been assessed
DM6	Customer awareness	The demand reduction factors associated with each formal intervention for demand reduction are:
DM7	Temporary water use ban (TWUB) – Non essential Use Ban (NEUB): Lite	

DM8	Temporary water use ban (TWUB) – Non essential Use Ban (NEUB): Extensive	• TUBs: 3% during October - May (i.e. 97% of demand remains) and 8% during June – September (92% of the demand remains). • NEUBs: 4.5% during October - May (95.5% of demand remains), 9.5% during June & August – September (90.5% of the demand remains) and 10.5% during July (89.5% of the demand remains). These reductions are already allowed for the in the DO calculation
DM14	Water tankering on island	Maintaining customer supply using tankers has the potential to address localised supply shortfalls and have limited impact on customer experience. However, a large scale application of tankering would likely need to be supported by another option to provide water for tanker transportation whilst existing sources are low. In contrast to other measures with greater impact to customers tankering is thought to offer limited benefit to promoting customer demand reduction behaviours at times of reduced water availability. Combined with reliability concerns and extent of operations necessary, this option can only be considered a means of managing localised supply shortfalls, likely limited to key and critical customers, in conjunction with other drought management measures.
DM15	Reduced level of service (frequency of restrictions)	Planning to provide a lower level of service and the acknowledgment of implementing service restrictions more frequently may reduce the investment and interventions needs to maintain the supply-demand balance.
DM16	Reduced level of service (pressure)	The reduction in pressure would mean reduced outflows at customer taps resulting in less water use for time dependant activities such as leaving taps running whilst carrying out ablutions. Reduced pressure in the network may also result in the reduction of water lost through leakage.

1.5.2 Decision Making Approach

The final feasible list of options to come out of the option appraisal were then taken forward to the programme appraisal process to select a preferred plan. As set out in Chapter 9 of the WRDMP, Jersey Water followed a process to determine a preferred best value adaptive plan. The approach followed latest best practice guidelines and entailed:

1. Producing a least cost plan;
2. Producing a best value plan;
3. Sensitivity testing; and
4. Consolidating and summarising outputs.

1.5.3 Least Cost planning

Jersey Water used an investment model to select the mix of options that would solve the supply demand balance for the least cost over the planning horizon.

1.5.4 Best Value planning

The latest best practice guidelines for decision-making in WRDMPs (used by water companies in England and Wales) require companies to develop a 'best-value' plan rather than simply the least cost plan'[4]. The planning guidelines state that a best value plan "considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society".

Delivering an effective best-value plan therefore requires careful selection and formulation of the objectives and metrics against which value can be measured. The high-level objectives were taken from Jersey Water's five key business strategy pillars, and a range of value criteria and metrics were formulated to map to these pillars (see Figure 1-1). This shows that alongside cost and the constraint to satisfy the supply demand balance, Jersey Water developed metrics to denote Resilience benefits as well as Environmental and Social benefits.

The best-value runs that maximise resilience and environmental objectives are largely consistent with the least cost outputs but suggest a couple of key points:

- The Pont Marquet borehole scheme and Fernlands are cost-efficient ways of adding resilience in all futures.
- Smart metering and catchment measures have environmental and social benefits in all futures.

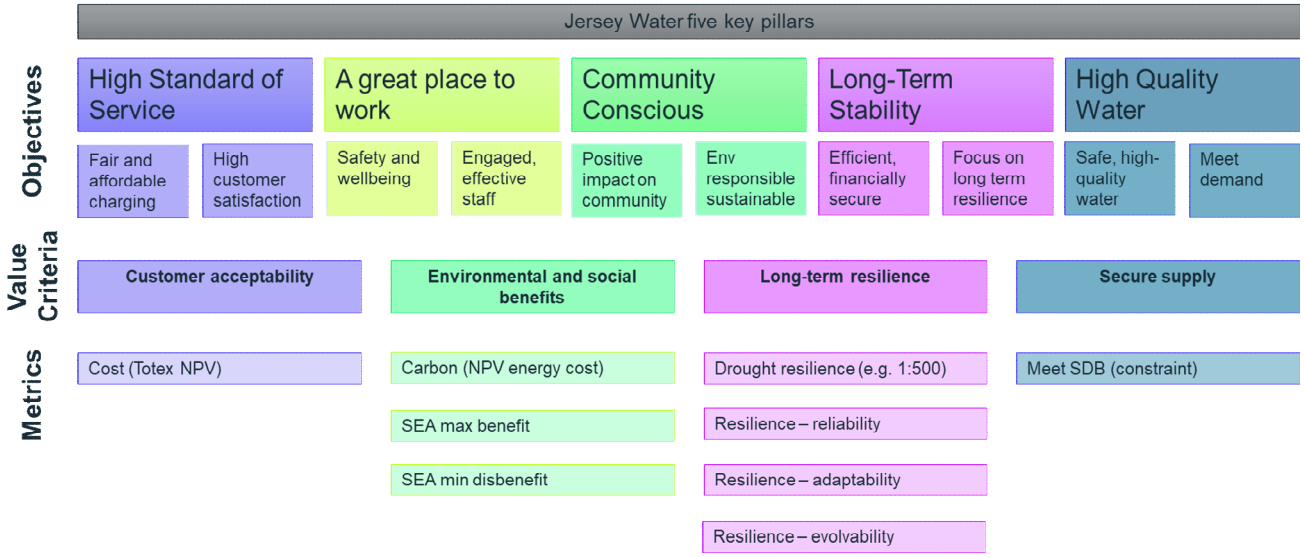

Figure 1-2 - Value criteria and metrics aligned to Jersey Water's strategic objectives[5]

1.5.5 Optimisation / Alternative Plans

To determine the best value plan, the modelling optimisation objective was changed from minimising cost (as in the least cost planning scenario) to maximising benefit, defined either as maximising the resilience (Max Resilience)

[4] Water Resource Planning Guidelines, April 2023
[5] Figure 9-3 WRDMP Main Report

score or the SEA score (Max SEA). A cost constraint was put on the "maximising benefit" runs to remain within either 10% or 20% of the least cost strategy.

The options selected in the Max Resilience plan are largely consistent with the least cost strategy, however some options were brought forward to be implemented in the short term (immediate no regrets period) e.g. the PFAS response as well as the Fernlands abstraction scheme.

The options selected in the Max SEA plan are again largely consistent with the least cost plan, but with the addition of continuing ongoing Jersey Water's catchment measures and proceeding with smart metering trials and roll-out in the short term (immediate no regrets period).

1.5.6 Scenario planning

It is not possible to predict exactly what will happen in the future and producing a best-value plan that responds to just one future cannot guarantee it will be the optimal strategy if an alternative future occurs. For this plan Jersey Water made a distinction between the identification and use of scenarios and sensitivity tests as follows:

- **Scenarios** – these describe the interplay of major drivers for change or uncertainty that are likely to have a significant and long-term impact on our supply-demand balance. Examples of these drivers include:
  - Population or demographics – changes in birth and death rates, employment or migration trends
  - Societal values – trends in customer priorities and/or water use behaviour (although this can be difficult to forecast in a meaningful way)
  - Climate change – long-term changes in the weather that influence water supply availability, and to a lesser extent, demand for water
- **Sensitivity tests** – these test the impact of specific policies, stresses, shocks or uncertainties, otherwise sometimes termed "what-if" tests. Rather than being designed to cover a range of potential outcomes these are often binary tests such as whether a specific option is available or not.

Combinations of future uncertainties can quickly multiply so it is necessary to seek a balance between considering the key drivers and producing outputs that are meaningful and can be readily understood. When assessing the drivers considered in the scenario framework, Jersey Water have therefore focused on the impacts of the primary drivers of climate change and population growth (albeit with some variation around customer behaviour for water).

Figure 1-3 illustrates the scenario build up and selection process to identify five scenarios to be taken forward for decision making using our investment model. These scenarios were selected to cover the range of plausible supply-demand balance futures and are characterised as follows:

5. **Very Benign** – this represents a very low population growth future (<= nil migration) and low climate change impacts
6. **Benign** – this represents a future with low population (limited net migration) and low to medium climate change impacts
7. **Mid-Range** – the mid-range future spans a range of possible combinations that could include high climate change impacts but low population growth, low climate change impacts but high population growth or medium population and climate change impacts
8. **Plausible Adverse** – this represents a future with likely high population growth (>= +325 net migration) and medium to high climate change
9. **Reasonable Worst** – this represents a future with high population growth (>= +700 net migration) and high climate change impacts

Together the Plausible Adverse and Reasonable Worst futures are sometimes referred to as the "more adverse futures" in subsequent section of this document.

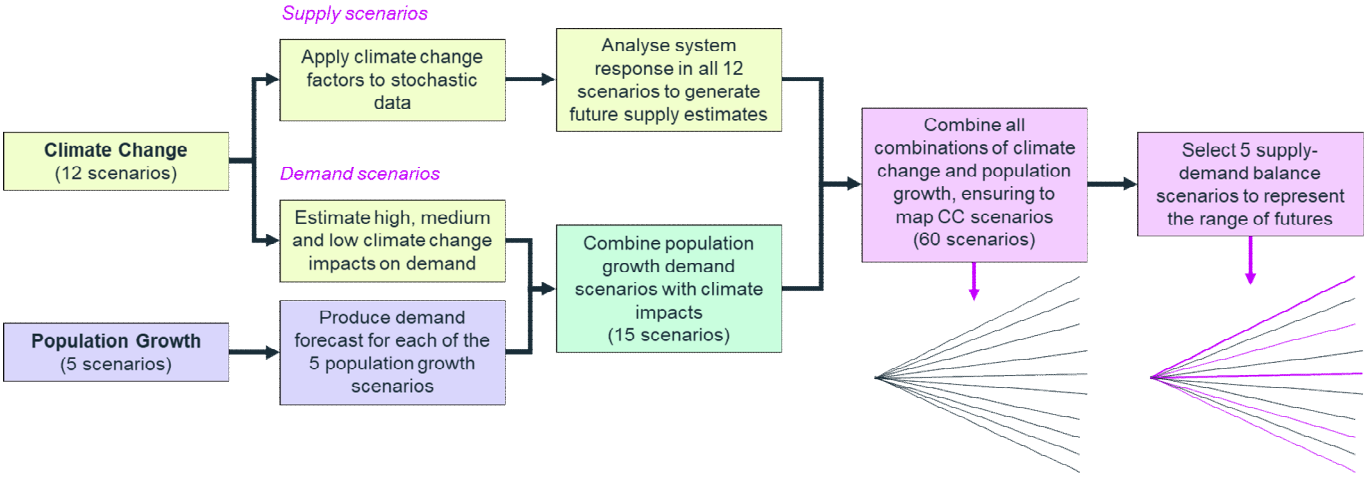

Figure 1-3 – Scenario build up and selection[6]

To determine the preferred plan, Jersey Water have reviewed the outputs from each of the five scenarios used in the least cost modelling and the maximised benefits best value planning runs to identify which options are selected and when. These portfolios of options are then split into three time-based categories:

- **Immediate no regrets options** – these are implemented immediately and, in all (or most) futures, (i.e. they are options that should be implemented regardless of what the future looks like – they are least regrets options)
- **High chance short/medium term options** – these are options that are often selected in the short to medium term in the Mid-Range, Plausible Adverse and Reasonable Worst futures. We suggest that where necessary further investigations are started to facilitate timely implementation of these options if required in future.
- **Potential long-term solutions** – these are options which are only selected towards the end of the plan and only in the two most adverse futures, and hence there should be sufficient time to implement them in future should they be required.

1.5.7 Adaptive Strategy

In recognising uncertainties set out in section 1.5.6 which would likely have material impact on SEA outcomes as well as other uncertainties that impact on WRDMP decision making, Jersey Water have sought to adopt an adaptive planning approach. An adaptive plan is a framework which allows consideration of multiple preferred programmes or options dependent on future uncertainties and outcomes. Jersey Water have developed their scenario framework consisting of the five water resources futures to integrate these adaptive strategies within the core framework of their plan development. The adaptive preferred plan presented in Figure 1-4 demonstrates resilience afforded to adverse future scenarios.

Figure 1-4 also illustrates the preferred adaptive strategy based on the conclusions of the least cost and best value planning, and from the sensitivity tests on the preferred plan. This shows that under this strategy the immediate actions are enough to provide a robust and resilient service in the Mid-Range and Benign futures. However, if Jersey Water are in a more adverse future (Plausible Adverse or Reasonable Worst), then further options may be needed including a second large resource option such as the Bellozanne water reuse plant or a 2nd desalination scheme. The West-East transfer scheme may be utilised to slightly delay the need for this, however in a more adverse future delaying the decision on a second large resource may increase the risk of future deficits during a drought. This

[6] Figure 7-3 WRDMP Main Report

suggests the prudence of undertaking feasibility studies and investigations in the short term to reduce lead-in times for such a scheme if in an Adverse future.

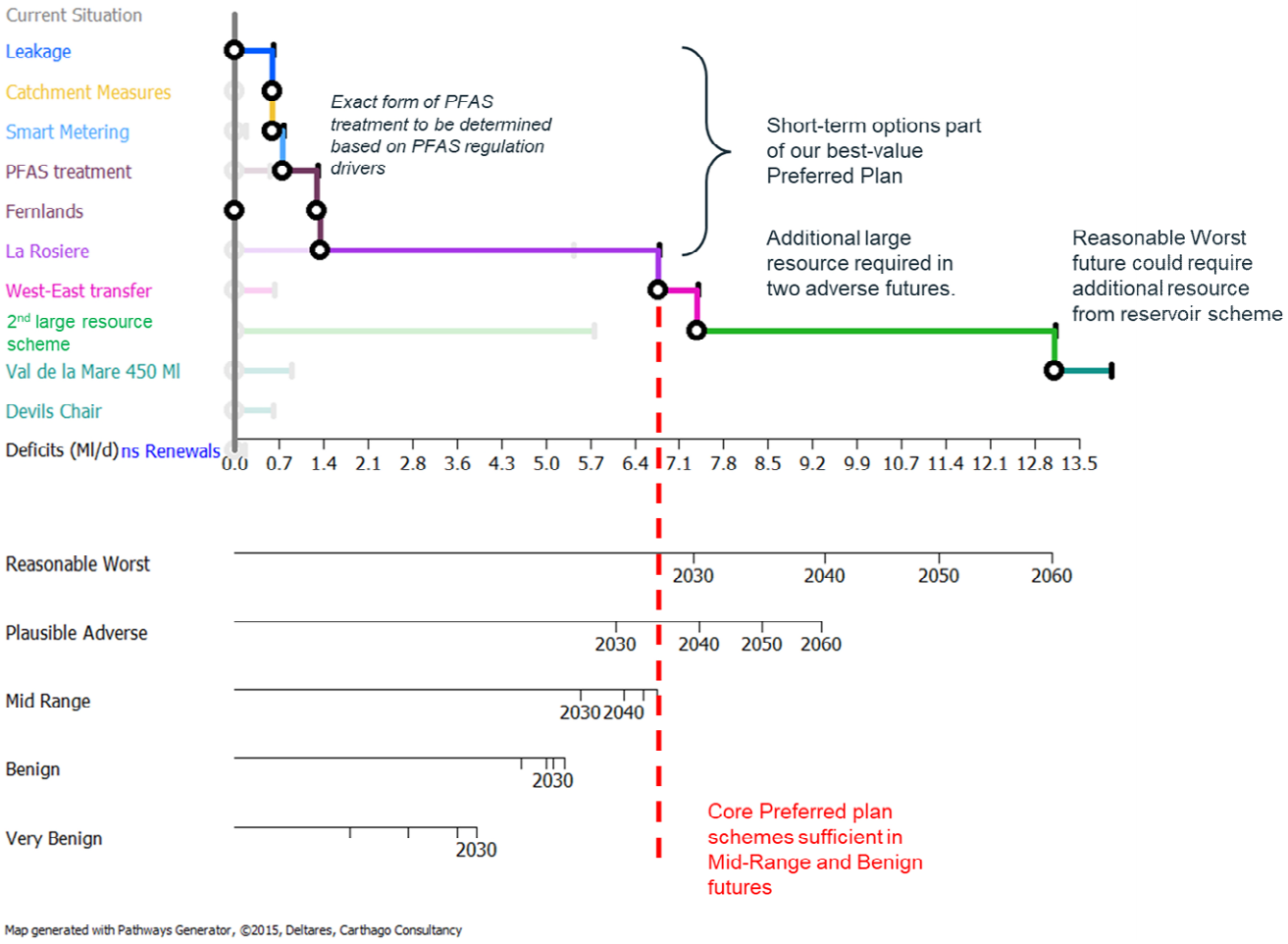

Figure 1-4 – Illustration of our adaptive preferred plan. This shows that our short-term core plan scheme are resilient to all but an Adverse future[7]

[7] Figure 10-7 WRDMP Main Report

2. Approach to the SEA

2.1 Introduction to SEA

Due to the various options contained in the WRDMP and their potential for these to have significant effects on the environment, it has been decided that SEA is undertaken in broad alignment with the European Directive 2001/42/EC 'on the assessment of certain plans and programmes on the environment' (the 'SEA Directive'). This Directive came into force in the UK on 20 July 2004 through the Environmental Assessment of Plans and Programmes Regulations 2004. The Directive applies to a variety of plans and programmes including water resource planning and planning for droughts. While the United Kingdom has now left the EU, these SEA Regulations still apply to a wide range of plans and programmes, including water resource management plans, and modifications to them.

These SEA Regulations still reflect the overarching objective of the SEA Directive which is:

"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, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans…which are likely to have significant effects on the environment." (Article 1)

The main requirements introduced by the SEA Regulations are that:

- the findings of the SEA are published in an Environmental Report (ER), which sets out the significant effects of the draft plan;
- consultation is undertaken on the plan and the ER;
- the results of consultation are taken into account in decision-making relating to the adoption of the plan; and
- information on how the results of the SEA have been taken into account is made available to the public.

2.1.1 Geographical and Temporal Scope

Jersey Water are responsible for the supply of water across the Island of Jersey, an area of approximately 120km^2. This is achieved via two Water Treatment Works situated centrally on the Island at Handois and Augrès and six raw water storage reservoirs strategically placed across the Island (at Val de la Mare, Dannemarche, Queen's Valley, Millbrook, Handois and Grands Vaux), see Figure 2-1. Raw water is supplied via a combination of ground water resources, stream abstractions and through the La Rosière Desalination Plant. Of note in 2016 (commissioned in 2017) the plant underwent a significant upgrade increasing its output capacity from 5.4Ml/day to 10.8Ml/d, which is approximately half of the Islands daily demands for water.

Jersey Water supplies treated mains water to over 90% of the population of Jersey and operate 20 sites across the Island.

The WRDMP sets out how Jersey Water will maintain secure supplies to its customers over the next 40 years from 2025.

Figure 2-1 - Jersey Water Supply Area

2.1.2 Technical Scope

The SEA Directive and the SEA regulations require that the likely significant effects on the environment are assessed, considering the following factors and interrelationship between them:

- Biodiversity;
- Population;
- Human health (covering noise issues among other effects on local communities and public health);
- Fauna and flora;
- Soil;
- Water;
- Air;
- Noise;
- Climatic factors;
- Material assets (covering infrastructure, waste and other assets);
- Cultural heritage including architectural and archaeological heritage; and
- Landscape.

2.1.3 Reporting, Consultation and meeting SEA Regulations

There are no statutory consultees in Jersey for water resource planning. However, the WRDMP has been shared with regulators and key island stakeholders to ensure they are informed of Jersey Water's approach to long-term strategic planning for the island in areas such as provision of infrastructure, planning policy, and population growth.

Two consultation periods involving the relevant stakeholders / authorities and, in the latter period, the public, are also set out in the SEA Regulations. The consultation periods relate to:

- **Scoping**: The SEA Regs require the responsible authority to send details of the plan or programme to each consultation authority so that they may form a view on the scope, level of detail and appropriate consultation period of the Environmental Report. The SEA scope for Jersey Waters WRDMP was sent to key stakeholders within the Government of Jersey. The scoping consultation is complete and ran from 21st June 2024 to 9th July 2024.
- **The Environmental Report**: The responsible authority is required to invite the consultation authorities and the public to express their opinions on this Environmental Report and the plan or programme to which it relates.

The responses from the Scoping Report consultation exercise have been used to inform the SEA and have helped refine the WRDMP. The Scoping Report and the comments received, together with how these comments have been addressed in the preparation of this SEA Report, are set out in Annex A to this report.

3. SEA Methodology

3.1 Introduction

SEA is a process that follows a number of sequential stages. This report has been structured to reflect the way in which work has been undertaken, presenting a logical progression through the various tasks meet broad alignment with the SEA requirements.

The work presented in this report represents the findings of Stage A and Stage B. This Report forms Stage C of the SEA process.

The approach to SEA was based on a range of guidance documents, including of note, the following:

- Department for Communities and Local Government (2005). A Practical Guide to the Strategic Environmental Assessment Directive;
- Environment Agency, Natural Resources Wales, Defra, OFWAT (2022) Water Resource Planning Guideline; and
- Environmental Assessments for Water Resources Planning, UKWIR, 2021.

3.2 Stage A – Setting the context and establishing the baseline

3.2.1 Other relevant legislation, plans and programmes

The WRDMP will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local and combined authorities, by statutory agencies and other bodies with plan making responsibilities. Legislation is a further driver that sets the framework for the WRDMP, both directly and indirectly. Relevant legislation, plans and programmes have been identified and considered to inform the preparation of this Environmental Report (see Annex C).

3.2.2 Baseline information and key issues

To predict accurately how WRDMP proposals will affect the current baseline, it is first important to understand its current state and then examine the likely evolution of the environment without the implementation of the plan. Baseline information provides the basis for understanding existing local environmental, economic and social issues, and alternative ways of dealing with them; formulating objectives to address these issues and predicting and monitoring effects.

Key environmental issues, across the Island of Jersey have been identified as a result of the analysis of the baseline data and the review of other plans and programmes. The identification of these issues helped focus the SEA processes on the aspects that really matter. Implications to WRDMP development and opportunities for how the WRDMP could assist in addressing these issues were also identified.

A summary of the baseline and key environmental issues is presented in Chapter 4 of this report. The full baseline review is available as Annex B.

It is important to note that no issues were Scoped out at the Scoping stage of this assessment.

3.2.3 Developing the SEA Framework

A set of SEA Objectives has been developed, against which the proposals in the WRDMP could be assessed.

For each objective, assessment aid questions were set out to form the SEA framework. The assessment aid questions provided a clarification of the intended interpretation of each objective to support direction of change sought through the implementation of the WRDMP. The questions have guided the WRDMP assessment process.

The framework has been refined and localised through consultation on the Scoping Report of WRDMP. The SEA Objectives and assessment aid questions are presented in Chapter 5 of this report. It is important to note that the decision aid questions developed enable a 'like for like' comparison in the decision-making process ensuring that a common level of detail has been applied to each option.

3.3 Stage B – Developing alternatives

3.3.1 Developing, refining and appraising strategic alternatives

Stage B of SEA involves developing, refining and appraising strategic alternatives and assessing the effects of the preferred plan, which was done iteratively throughout the plan development. In developing the WRDMP, and as set out in Chapter 1.5 of this report, JW identified a wide range of possible investment options that could address the water supply demand deficit in the supply region. These options differ significantly in scale, cost and reliability and include options to reduce demand for water (e.g. water efficiency measures and leakage reduction) and options to increase supply (e.g. storage reservoirs, reusing water, desalination of sea water, abstraction from groundwater and rivers).

In respect of Stage B and in order to determine the environmental effects of the options (including alternative options) for the WRDMP, the SEA adopted a Staged assessment approach, aligning to the option appraisal screening stages (see Figure 1-1).

3.3.1.1 Environmental Assessment Stage 1 (unconstrained) and Stage 2 (constrained):

The unconstrained list of options were put through coarse screening so as to discard options that were infeasible or impractical to deliver in Jersey. Environmental considerations at this stage included evaluation of option type anticipated impacts including, but not limited to, flood risk, climate impacts and impact to designated sites, irreplaceable habitats, sites with high heritage / amenity value and the water environment. In addition, indicative carbon impact was also considered. Where options were assessed as having an over-riding constraint or performed very poorly against most criteria, they were rejected and were not taken forward into the constrained options list.

Options which passed through the coarse screening evaluation stage formed a "constrained options" list. These options were then subject to a greater level of evaluation against a more detailed set of "fine screening" evaluation criteria that built on the high-level criteria used at the coarse screening stage. Environmental considerations reflected a high-level SEA guided assessment of option 'types'. The constrained options were grouped into parent 'option types' and generic impacts (beneficial and adverse) against SEA objectives presented in Option Type proformas. In addition, a qualitative appraisal of embodied and operational carbon was also considered. This information was then summated and included in the wider WRDMP options appraisal process.

It is worth noting that the environmental assessment to be undertaken at this stage was limited by the option detail available, including design, location and programme for delivery. As such impacts presented were necessarily generic. These 'option types' assessments are included in Annex E.

3.3.1.2 Environmental Assessment Stage 3a (feasible list) and 3b (shortlisted feasible)

Following the application of fine screening, the feasible set of options were examined in greater detail as the options were sometimes refined or re-engineered and the evaluation criteria were therefore re-applied in an iterative way to derive a final feasible list of options. Environmental Assessment at Stage 3 reflected the undertaking of SEA of individual options that make up the feasible list from which the alternative and preferred plans could be derived. Options were, for the most part, associated with sufficient design detail so as to allow a locational based assessment that considered, for example, proximity to sensitive receptors. Stage 3 adopts the full SEA Framework, utilising SEA objectives, assigned datasets and a defined scoring system based on a qualitative scale of minor, moderate, major positive and minor, moderate, major negative, and neutral (set out in Section 3.3.2). The effects of each option were assessed using this scale and a narrative justification provided.

The assessment is split into construction effects and operational effects at this stage. This recognises that options tend to have both positive and negative effects under an SEA objective. Rather than trading these effects to cancel each other out, both positive and negative scoring are used to show the potential mix of effects.

Potential mitigation and enhancement measures can also be identified as part of the Stage 3 assessment process and feed back to the options development team as part of an iterative process. Options with major and moderate negative effects can be highlighted for the attribution of appropriate mitigation. Alternatively, these options can be flagged for rejection.

The final feasible option shortlist was then taken forward into the investment model in order to derive the preferred best value plan and alternative plans (least cost, max resilience and max SEA).

3.3.2 Assessing the effects of the WRDMP

Assessing the significance of predicted effects is essentially a matter of judgement. There are a number of factors that will determine the significance of an effect, e.g. its scale and permanence and the nature and sensitivity of the receptor. It is very important that judgements of significance are systematically documented, in terms of the characteristics of the effect which are deemed to make it significant and whether and what uncertainty and assumptions are associated with the judgement. The assessment of significance also includes information on how the effect may be avoided or its severity reduced.

In the current practice of SEA, the prediction and evaluation of effects can be often based on a qualitative seven-point scale in easily understood terms. In general, this assessment has adopted the scale shown in Table 3-1 to assess the significance of effects of the Options in WRDMP. The rationale for assessing the significance of effect for each of the 13 SEA objectives has been provided in Annex F.4.

Table 3-1 - Assessment Scaling

Assessment Scale	Assessment Category	Significance of Effect
+++	Major beneficial	Significant
++	Moderate beneficial	
+	Slight beneficial	Not Significant
0	Neutral or no obvious effect	
-	Slight adverse	
--	Moderate adverse	Significant
---	Major adverse	

Moderate and major beneficial and adverse effects (and combination of this type of effect) have been considered of significance, whereas no effect and slight beneficial and adverse effects (and combination of this type of effect) have been considered non-significant.

As part of the assessment of the WRDMP, a number of mitigation measures (recommendations) are set out in Chapter 8 and also within the Assessment Tables in Annex F.

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting significant adverse environmental effects that have been identified. A range of measures applying one or more of these approaches has been considered in mitigating any significant adverse effects predicted as a result of implementing the WRDMP. In addition, measures aimed at enhancing positive effects have also been considered. All such measures are generally referred to as mitigation measures.

However, the emphasis of the assessments has been in the first instance on proactive avoidance of adverse effects. Once alternative options or approaches to avoiding an effect have been examined, then ways of reducing the scale/importance of the effect have been examined and proposed.

Mitigation can take a wide range of forms, including:

- Refining intervention measures to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation stage;
- Identifying issues to be addressed in project environmental impact assessments for certain projects or types of projects; and
- Proposals for changing other plans and programmes.

The assessment also considered cumulative, indirect (secondary) and synergistic effects of the WRDMP as outlined in the following section.

3.3.3 Secondary and Cumulative effects assessment

The SEA Regulations require that the assessment of effects include secondary, cumulative and synergistic effects.

Secondary or indirect effects are effects that are not a direct result of the plan but occur away from the original effect or as a result of the complex pathway e.g. a development that changes a water table and thus affects the ecology of a nearby wetland. These effects are not cumulative and have been identified and assessed primarily through the examination of the relationship between various objectives during the Assessment of Effects.

Cumulative effects arise where several proposals individually may or may not have a significant effect, but in-combination have a significant effect due to spatial crowding or temporal overlap between plans, proposals and actions and repeated removal or addition of resources due to proposals and actions. Cumulative effects can be:

- Additive - the simple sum of all the effects;
- Neutralising - where effects counteract each other to reduce the overall effect; and
- Synergistic - is the effect of two or more effects acting together which is greater than the simple sum of the effects when acting alone. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

Cumulative effects assessment is a systematic procedure for identifying and evaluating the significance of effects from multiple activities. The analysis of the causes, pathways and consequences of these effects is an essential part of the process.

Cumulative (including additive, neutralising and synergistic) effects have been considered throughout the entire SEA process, as described below:

- Identification of key environmental issues as part of the review of relevant strategies, plans and programmes and baseline data analysis.
- Establishing the nature of likely cumulative effects, causes and receptors.
- Identifying key receptors in the process of collecting baseline information and information on how these have changed with time, and how they are likely to change without the implementation of the WRDMP.
- The development of SEA objectives and assessment aid questions has been influenced by cumulative effects identified through the process above and SEA objectives that consider cumulative effects have been identified.

It is important to note that, as a strategic level assessment, and in order to remain proportionate to the level of detail available in the WRDMP, including the option detail, the approach taken for cumulative assessment is necessarily high level. Uncertainties regarding programme, including construction timeline and with design detail including precise location for both interventions within the WRDMP and with other plans and projects reduce the level of confidence that can be attributed to cumulative assessment at this stage. It is then to be recognised that further cumulative assessment will need to be undertaken at the project level.

3.3.4 Monitoring the effects of the WRDMP implementation

The SEA has indicated a series of possible monitoring indicators that could be implemented through the WRDMP.

It is anticipated that the monitoring programme will cover significant environmental effects and which will involve measuring indicators that will enable the establishment of a causal link between the implementation of the WRDMP and the likely significant effects (both positive and negative) being monitored. This will allow identification at an early stage of unforeseen adverse effects and allow appropriate remedial action to be undertaken.

The SEA monitoring indicators are presented in Chapter 10 of this report.

3.4 Stage C – Preparing the SEA Report

This SEA Environmental Report has been prepared to accompany the WRDMP. It is to be noted that this SEA is being published for information only, and not for a further period of public consultation.

3.5 Stage D – Consulting on the WRDMP and SEA Environmental Report

There are no statutory consultees in Jersey for water resource planning. However, the plan has been shared with regulators and key island stakeholders to ensure they are informed of our approach to long-term strategic planning for the island in areas such as provision of infrastructure, planning policy, and population growth.

Although there is no statutory requirement to consult on the Plan, Jersey Water are also keen to engage and consult with our customers and stakeholders on the measures set out in this Plan. They intend to publish the WRDMP on their website during summer 2025 to provide the opportunity for customer and stakeholder comment.

3.5.1 Post Adoption Statement

Following adoption of the WRDMP, a statement (separate document) is typically prepared that sets out how the SEA Environmental Report has influenced the WRDMP and how statutory consultation responses have been addressed. As this is a non-statutory SEA and then not subject to consultation, no Post Adoption Statement will be prepared for the WRDMP.

3.6 Relationships with other Policies, Plans and Programmes

Jersey Water recognise the merits to undertaking a robust SEA for the WRDMP. For this reason, an SEA process which closely aligns with the requirements of the SEA Regulations is being undertaken to inform and influence the development of the WRDMP. To that end, the following information is to be provided:

"The degree to which the plan or programme influences other plans and programmes including those in a hierarchy" (Schedule 1);

"Its relationship with other relevant plans and programmes" (Schedule 2); and

"The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation." (Schedule 2)

The WRDMP will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local authorities, statutory agencies and other bodies with plan making responsibilities.

Therefore, the SEA needs to set out the relationship between the WRDMP and relevant legislation, other relevant plans and programmes and the environmental protection objectives established across the Island of Jersey. This ensures that the objectives in the Scoping Report generally adhere to, and are not in conflict with, objectives found in other plans, programmes and legislation and also assists in the setting of objectives for the SEA. It can also be used to ascertain potential conflicts between objectives, which will need to be addressed as part of the process.

Those plans, programmes and legislation of particular note to the WRDMP have been listed in Annex C and include Jersey Waters own relevant corporate plans and strategies.

4. Baseline information and key environmental issues

4.1 Introduction

The SEA Regulations state that the Environmental Report should provide information on:

"The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme" and "The environmental characteristics of areas likely to be significantly affected" (Schedule 2)

and

"Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC on the conservation of wild birds and the Habitats Directive " (Schedule 2).

In order to assess the potential environmental sustainability effects of the WRDMP on Jersey, it is therefore necessary to establish a baseline against which predicted effects can be assessed, and then to identify issues and trends that are related to each of the environmental, social and economic interests that may be affected by, or affect, the proposed plan. As such, it is first important to understand the current state of the baseline and then examine the likely evolution of the environment without the implementation of the plan.

4.2 Data collection methodology

The most efficient way to collate relevant baseline data is using indicators. This ensures that the data collation is both focused and effective. The identification of relevant indicators has taken place alongside the assessment of other relevant plans, policies and programmes, the identification of environmental sustainability issues and development of the SEA framework.

The baseline information in this chapter was collected from published sources, including but not limited to the following sources:

- Bridging Island Strategy and supporting Sustainability Appraisal
- Bridging Island Plan Interactive Web App
- Air Quality Monitoring Annual Report
- Biodiversity: A Strategy for Jersey
- States of Jersey Island Plan 2011
- Future Jersey 2017-2023
- Jersey Water: Water Resources and Drought Management Plan
- Jersey Water: Water Quality Report 2023

References to all relevant baseline information is provided in the Annex B.

It should be noted that the SEA process does not require the collection of primary data, but relies on the analysis of existing information. As such, where data gaps exist this is highlighted in this report.

Indicators have been selected for their ability to provide objective data that will, over time, offer an insight into general trends taking place. Throughout the assessment process the following issues will need to be addressed:

- What is the current situation, including trends over time?
- How far is the current situation from known thresholds, objectives or targets?
- Are particularly sensitive or important elements of the environment, economy or society affected?
- Are the problems of a large or small scale, reversible or irreversible, permanent or temporary, direct or indirect?
- How difficult would it be to prevent, reduce or compensate for any negative effect?
- Have there been, or will there be, any significant cumulative or synergistic effects over time?

The datasets used to form environmental baseline are presented in Table 4-1 below.

Table 4-1 - Datasets used in Environmental Baseline

Topic	Environmental datasets used to form environmental baseline
1. Biodiversity	Areas of special protection (ASP), Sites of Special Interest (SSI); Environmentally sensitive areas (ecological), Ramsar sites, Marine protection areas
2. Cultural Heritage	Historic Buildings, Listed Buildings, Listed Places, Areas of architectural and historic interest, Urban Conservation Areas, Areas of Archaeological Potential
3. Landscape	Landscape and Seascape Character Areas, Green Zone, Jersey's Coastal National Park, Strategic countryside access site,
4. Air Quality	Air Quality Monitoring Annual Report, Airport noise zones
5. Community Health and Wellbeing	Tourism Destination Zone, Sports and leisure enhancement area, Strategic countryside access site, Protected Open Space, Parish, Airport public safety zones, Sites for youth community facilities, Our Hospital development site, Supported housing sites, Sites safeguarded for educational use, Sites safeguarded for open space
6. Geology and Soils	Geological Sites of Special Interest (SSI), Built up area, Safeguarding minerals site,
7. Water Quality and Resources	Water Pollution Safeguarding Zone / Area, Shoreline Zone, Marine Zone
8. Flood Risk	Flood data, Coastal and Inland Flood Risk Zones
9. Infrastructure / Material Assets	Waste Management Site, Port of St Helier operational area, Jersey Airport operations area, Town centre, Intertidal aquaculture box, Protected industrial site, Safety zone for hazardous installations, Affordable housing sites, Core retail areas, Eastern cycle route network, Les Quennevais centre, Primary route network, Sustainable Transport Zones

4.3 Data limitations

It is to be noted that option development is in most cases at an outline or preliminary stage and as such may be subject to change or further development. In some instances, option routes (e.g. new transfers) or locations (e.g. new treatment works) are not sufficiently developed and point or coordinate data has been used to represent

indicative locations. Each option assessment significance of effect has been attributed with a 'certainty' classification that reflects limitations in locational understanding, data availability and reliability among other considerations that have an impact on the certainty of effect.

4.4 Future baseline

The SEA Regulations require that "the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the Plan or Programme" is identified. Prediction of future trends depends on a wide range of global, national and regional factors and decision making. Key trends have been identified as part of the analysis of key issues and opportunities.

4.5 Key issues and opportunities

SEA notes a need for the Environmental Report to provide information on:

"Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC on the conservation of wild birds and the Habitats Directive." (Schedule 2)

The key environmental sustainability issues have been identified from the review of baseline information and other plans and programmes. These key issues are summarised in Table 4-2 below. This table also provides a discussion on the implications/opportunities of such issues to the WRDMP and provides clear links to the proposed SEA Objectives. The analysis of key sustainability issues has influenced the development of the SEA Framework (see Section 5), in particular in formulating decision making questions.

Table 4-2 - Key Issues, Implications and Opportunities for Jersey WRDMP

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
Biodiversity There are four Ramsar sites in proximity to the Island of Jersey, one of which bounds its south east coastline ('South East Coast of Jersey' Ramsar). Jerseys biogeographical position is noted to produce great biodiversity, a rich and diverse range of biotopes and some uncommon species assemblages. Threats to the Ramsar sites include habitat decline due to pollution and climate change, conflict of use from fishing, other commercial and recreational use, alien invasive species and limited jurisdiction. A total of 19 Sites of Special Ecological Interest have been designated in Jersey. Of note the condition of SSIs has seen an increase in the overall favourable condition of protected areas between 2011 and 2015 which indicates that the protected sites have met agreed objectives set for the features of interest. Approximately 20% of Jerseys key semi-natural habitats are protected by SSI designation so there is a large area of critical natural habitat that is not protected. Key species on the island have suffered from gradual decline and include butterfly and breeding birds including garden birds and wading birds. Bat species diversity and abundance has increased between 2011-2015. There are nine Environmentally Sensitive Areas which represent the main areas of the Islands habitats. Other smaller semi-natural areas or sites that are important to wildlife include Sites of Importance for Nature Conservation (SINC) and may include small sites of biodiversity value such as lichen-covered ancient roadside and field walls and banques that are home to rich wildlife communities. Les Mielles Nature Reserve is located on Jerseys western coast within part of the Jersey Coastal National Park. Many key habitats of local and international importance for the conservation of biological diversity are located within it. The Wildlife (Jersey) Law 2021 sets out wild animals, birds and plants to be protected, with different levels of protection applying depending on the conservation of the species. One of the latest species added to	The WRDMP should aim to protect and enhance all sites of biodiversity importance and should place a particular emphasis on protecting sites designated for nature conservation and geodiversity purposes. Consideration should be made of protected and priority species and their habitats, including local wildlife sites. This includes from threats arising from invasive non-native species (INNS). Opportunities for new habitat creation and enhancement associated with water resources should be explored. The WRDMP should support anticipated Biodiversity Net Gain objectives that will likely become established through future iterations of the Island Strategy. The WRDMP should avoid damage or loss to protected areas. Where possible the WRDMP should support the creation of cohesive habitat networks to help habitats and species adapt to the consequences of climate change, in particular. The WRDMP should consider opportunities to support of water-dependent designated sites and priority habitat/species to adapt to climate change more specifically.	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
the list are European eel. It will be important to consider these from an asset management perspective for the WRDMP. In respect of invasive species, it is noted that there are a wide range of pests, diseases and other non-native species in the Island, some of which displace native species and cause economic problems. This includes Japanese Knotweed, New Zealand pigmy weed, Hottentot fig and Sea lettuce. **Likely evolution of the baseline** Since 2006, the amount of land designated as ecological or geological SSI within Jersey has increased from 269.86 hectares in 2006 to 556 hectares in 2008. The Future Jersey ambition is to continue the trend in SSI designation, recognising the international commitments Jersey has made to conserve its special species, habitats and ecosystems. It is noted that the quality of Jerseys extensive marine waters and biodiversity within is very high however pressures on these natural resources arise from fishing and anticipated impacts of climate change. This is expected to affect species assemblages. It is noted that the next iteration of the Island Strategy will contain a framework for the application of Biodiversity Net Gain, which has not yet been formally established for the Island of Jersey. In doing so, this should improve habitat quality and availability and reduce pressures as a result of new development. Climate change will likely result in decline of some habitats and species, though may afford opportunities for other species, including invasive species. In respect of invasive species, there is a long-term target to limit the growth of sea lettuce by reducing nitrates from the land and the treatment works however it is likely that INNS pressures will increase as a result of climate change. It should be noted that there is current management of invasive species such as crayfish and terrapins in existing assets on the Island and these should also be considered within future water resource assets.		
Soils and Geology	Soil is a non-renewable resource and is vulnerable to erosion, degradation and contamination. In	To protect and enhance the functionality, quantity and

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
There are 21 Sites of Special Geological Interest and it is to be noted that there has been an increase in the overall favourable condition and amount of land designated as geological SSI within Jersey. There are a mix of land uses across Jersey, ranging from rural areas of open countryside or arable farmland and pasture to extensive heavily urbanised. There are also areas of suburban and urban fringe associated with the main towns and distinct pockets of 'isolated' urban development in the form of villages and small towns. It is likely that areas of land in Jersey have been contaminated by past industrial and other human activities, including former factories, storage depots and landfills. Land at the full range of potentially contaminated sites could be contaminated by a wide range of harmful substances such as oils and tars, heavy metals, asbestos and chemicals. By its nature, it is often very difficult to know where land has been contaminated previously or is currently suffering ongoing contamination. As such the number of known sites of contamination is likely to be only a very small fraction of the overall number of potentially contaminated sites. In respect of soil a total of 50% of Jersey area is farmed commercially, and while recent soil organic matter analysis suggests this to be within acceptable levels across the island as a whole (12%), farmland averages of 2.9% are markedly below the average. It is noted that an increase here to between 4-5% would take the Island average from an acceptable level to good or excellent. There are three mineral safeguarding areas (Ronez Quarry, La Gigoulande Quarry and Simon Sand and Gravel site). **Likely evolution of the baseline** The future Jersey ambition is to continue the trend in SSI designation which would act to formally protect a greater proportion of Jerseys important geological areas. It is likely that greenfield sites will experience increasing pressure for development in preference to the complexities of redeveloping previously developed and potentially contaminated sites. This could	addition, historic land uses may have contributed to contamination across large areas. The WRDMP should seek to make best use of areas that are already urbanised and provide an opportunity for regeneration / improvements to land quality. Where use of agricultural land is unavoidable, measures should be taken to avoid those areas of the highest quality and aim to protect soil and agricultural holdings through avoidance of impacts such as erosion, contamination or severance. The WRDMP must protect soils and geological SSIs as they are essential for achieving a range of important ecosystem services and functions. Dealing with the past pollution / contamination legacy is a major issue and should be addressed at all opportunities due to its ongoing environmental impact. The WRDMP should seek to avoid land that is covered by Mineral Safeguarding Area designations, to prevent the sterilisation of key mineral resources.	quality of soils and geologically designated sites

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
reduce available high quality soil resources and fail to realise the potential of existing capacity within existing urban and previously developed areas. Remediation of contamination is likely to remain sporadic and reflective of individual site requirements		
Water Jersey is divided into eight inland Water Management Areas (WMA). The status of the surface and groundwater in each WMA is scientifically assessed as 'good', 'moderate' or 'poor'. In 2014, all eight WMAs were assessed as 'poor' for groundwater quality. Half were also rated as 'poor' for surface water quality. The status assessment has confirmed the issues concerning nitrates in the Island, with more than 80% of stream catchment water bodies failing to achieve 'good' status for nitrates, and six of the eight WMA's classified as 'at risk' for pesticides. The issue of nitrate in Jersey's groundwater was highlighted by the initial BGS study, as they found that 60% of the samples taken had concentrations of nitrate greater than the EC maximum admissible concentration (MAC) for drinking water. Since 1990 there has been an overall steady decline in the number of samples that have exceeded 50mg/l of nitrate. However, 30% of samples still exceed the EC MAC. One of the main sources of nitrates in surface and groundwaters comes from agricultural activities. In terms of marine water quality, since 2008 all of Jersey's bathing waters have based the European Bathing Water Imperative Standard. In 2015, 81% passed the Guide Standard, which is more stringent. In 2023, Jersey Water had zero failures in their treated drinking water for nitrate or pesticides. For more than a decade, their drinking water has been compliant with the nitrate standard and, for the 7th consecutive year, compliant with the pesticide standard. There are therefore notable pressures on water resources with resulting impacts on waterbodies. It is to be noted that approximately 10% of the Island's population are not connected to mains water and rely on a private supply.	The WRDMP options should maximise opportunities to improve waterbody status through the suite of options proposed. Improving network and preventing leaks and bursts is a key outcome of many of the options contained within the WRDMP and the plan should seek out areas that stand to benefit most from such interventions. Pollution prevention should also be sought during construction through robust construction management plans and pollution prevention plans The WRDMP should also seek to reduce the need for drought permits / orders through the suite of options proposed.	To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
Likely evolution of the baseline Maintained and improving - Surface and ground water quality is predicted to increase through legislation and greater public awareness. Projected economic and population growth may place further pressure on the region's water resource quantity (surface and groundwater) and water resource dependent environments.		
Air Air pollution impacts on public health, the natural environment and the economy. Jersey's air quality typically meets international standards for the vast majority of the year due to the Island's prevailing weather and the absence of major industrial activity. In 2022, 100% of the 23 non-automatic diffusion tube monitoring sites had no breaches. In addition, the automatic monitoring site at Beresford Street Market met the EC Directive limit value (and AQS objective) for the 1-hour mean NO_2 concentration (with 0 of 18 allowed 1-hour exceedances). Breaches can occur where a change in weather pattern over a period of time causes higher pollution than usual in that area, before returning to expected conditions. Poor air and noise quality is generally associated with urban/industrial areas and major road infrastructure. The source of noise in these areas is predominately roads. **Likely evolution of the baseline** Improving - air quality is generally improving as industrial practices, energy sources and tighter environmental legislation have contributed to reductions in pollutants. While air quality is generally improving, new development, economic growth and tourism may lead to increased car journeys and congestion could lead to localised air quality effects.	The options within the WRDMP have the potential to impact air quality and noise. This could include the generation of air pollutants and noise from treatment plants and there is also likely to be effects from the construction phase. The Plan should meet Government targets for air quality and noise and be reflective of appropriate legislation and should consider ecological receptors alongside human receptors. There is also potential for the WRDMP to mitigate any increases in air pollutants as a result of the options and improve air quality in the region.	To reduce and minimise air and noise emissions.
Greenhouse gas emissions	The WRDMP must work to minimise water demand from households and businesses as this will result in reduced need to abstract, treat and transport	To achieve the Government of Jerseys target of

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
Jersey aims to reduce emissions in 2050 by 80% compared with 1990 levels and will achieve this by using secure, affordable and sustainable energy. In 2021, Jersey emitted 358,425 tCO2eq. This is roughly 3.5 tCO2eq per person. Between 1990 and 2021, emissions in Jersey have decreased by 46%. This reduction is largely due to a decrease in emissions from energy supply. Transport sector emissions accounts for 40.9% of total emissions in the 2021 inventory. Between 1990 and 2021, emissions in the transport sector have decreased by 27.5%. 48% of carbon dioxide emissions came from the transport sector, with passenger cars being the biggest source. Government of Jersey declared a climate emergency in May 2019 and made carbon neutral commitments, specifically that the Island becomes carbon-neutral jurisdiction by 2030. **Likely evolution of the baseline** Carbon and other GHG emissions will continue to be emitted, however regulations and government legislation and incentives will continue to promote the reduction in emissions through commitments to net zero. There is potential for an increased need for wastewater treatments as a result of water quality standards combined with population increase. Given the energy intensity of wastewater treatment, the water industry CO_2 emissions may increase as a result of increased water consumption leading to increased volumes of wastewater requiring treatment and further contribute to GHG emissions.	water (and also less wastewater to treat) and consequently lesser carbon emissions. The options within WRDMP have the potential to result in carbon emissions during the construction and operation phase which will further contribute to climate change. The impact of such emissions should be considered through the optioneering and design processes. WRDMP should also ensure that opportunities are taken for maximising tree planting. Amongst other benefits, such as flood protection, biodiversity enhancement and recreation, careful tree species selection can contribute to carbon sequestration by absorbing increased amounts of CO_2 from the atmosphere.	becoming a carbon-neutral jurisdiction by 2030
Adaptation to a changing climate The State of the Environment (2011-2015) report for Jersey confirms that local climate trends are deviating from the 30 year norm and are in line with global climate change predictions: air and sea temperatures are rising; the growing season is lengthening; both summers and winters are wetter; cold spells are shorter and warm spells are longer. Within the State of the Environment Report (2011-2015), eight indicators have been chosen that reflect climate change impacts of direct relevance to the Island: • Increasing average air temperature	A greater degree of resilience will have to be incorporated into the WRDMP optioneering and design processes to increased river, surface and groundwater flooding due to extreme winter rainfall events and increase in winter mean rainfall as well as increased coastal flooding and erosion damage due to sea level rise and storms sea level rise and the potential risks posed by increased heatwaves, wildfires, reduced water availability and soil desiccation due to increased summer temperatures and reduction in summer mean rainfall.	To reduce vulnerability built infrastructure to climate change risks and hazards To reduce or manage flood risk, taking climate change into account

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
• Extended growing season • Increasing volumes of winter rainfall • Increasing volumes of summer rainfall • Increasing number of heavy rainfall days • Decreasing number of cold spells • Increasing number of warm spells • Increasing sea temperature Climate change will increase the risks of coastal flooding and erosion in Jersey. The seawalls and coastal defences around Jersey will provide less protection from flooding as sea levels rise and will require adaptation. **Likely evolution of the baseline** The climate is expected to continue to change with annual average temperatures projected to increase, particularly in summer. Winters are projected to be wetter and summers drier. Climate change is projected to result in more extreme weather events, potentially causing or exacerbating periods of drought which alongside population and economic growth will impact water availability.	There is a need to manage the risks associated with flooding over the infrastructure's lifetime, without increasing the flood risk elsewhere and identifying opportunities to reduce the risk overall, including through working with nature based solutions. There are multiple benefits associated with the use of nature based solutions to reduce vulnerability such as tree planting or peat restoration. Flood risk should be considered in any design and the implementation of multi-functional green infrastructure including SuDS and other similar appropriate measures or new approaches should be considered and encouraged where feasible. This should include Natural Flood Management and other means of increasing flood storage capacity. WRDMP should seek to explore the possibilities for creating blue infrastructure which can both help to manage localised flood risk and simultaneously create new habitats. There is also a need to manage risks related to periods of limited water availability. It is possible limitations of abstraction could mean water infrastructure may have to cease to operate for periods of time and abstraction could cause environmental damage, including for sites with legal habitats and water protections.	
Landscapes The Coastal National Park covers an area of 1,925 hectares (16% of the Island) as well as the offshore reefs and islets above mean high water, including: the southwest headlands, St Ouen's Bay, the north coast, St Catherine's Bay, part of Grouville Bay as well as the offshore reefs and islets of Les Écréhous (Paternosters and Les Dirouilles) and Le Plateau des	There is potential for the options within WRDMP to have an impact on the landscape. This could include temporary construction effects and permanent effects associated with infrastructure which could affect visual amenity or the character of the area. WRDMP should seek to preserve and enhance the character of the region's landscape and seascape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
Minquiers. Many of these areas share overlapping designations with Ramsar Sites. The areas of the countryside which are outside the Coastal National Park are now defined as 'Green Zone' and includes those areas of the countryside which have an intact character and comprise an important range of environmental features needing a high level of protection. • The main escarpments of St Clement, Grouville, Ouaisné, and St Brelade's Bay; • The wooded valleys of St Peter's, Waterworks, Bellozanne, Grands Vaux, Vallée des Vaux, Fern and Queen's Valleys, amongst others; and • The interior agricultural land, to the north. There are a range of pressures on landscape, many of which are altering landscapes in a direction which could be regarded as inconsistent with the traditional landscape vernacular of the area. These changes are a reflection of pressures associated with urbanisation, changes to agriculture, reduced tranquillity, loss of habitats and forests, etc. In an effort to preserve the best landscapes the Coastal National Park and Green Zones have been designated. **Likely evolution of the baseline** Stable - Many of the region's most exceptional landscape and townscapes benefit from protection through designations that will persist in the absence of the WRDMP. In general terms, modern design / landscaping principles and interested parties expectations are promoting a renewed focus on the quality of scheme design and this trend is likely to continue, though risks from increased urbanisation and infrastructure development remain.	by ensuring that its integrity and valuable natural open space is not lost. WRDMP should also aim to ensure that sensitive areas are avoided and respect particular landscape settings, with consideration made of design quality in both an urban, rural or sea setting. Opportunities for landscape enhancement should be explored, e.g. through sympathetic design and enhancements to existing landscape improvement areas, new planting opportunities. Where a scheme would involve physical development within the National park or Green Zones or a wider area for which a Countryside character appraisal has been undertaken, the design of the scheme should take account of relevant guidance for the character area.	
Cultural Heritage A rich variety of heritage assets and archaeological remains survive above and below ground in Jersey, along its shoreline, and within its waters. The heritage assets and archaeological remains vary	WRDMP should aim to protect and preserve designated and non-designated heritage assets and their contexts and settings. The options within WRDMP have the potential to directly or indirect impact the historic environment	To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
enormously in their state of preservation and in the extent of their appeal to the public. Upstanding remains are familiar enough; represented by dolmens and coastal forts and castles, but less obvious archaeological remains are also to be found in the Island. Archaeological sites of value include[8]: • Palaeolithic site at La Cotte de St Brelade; • Neolithic sites such as the passage graves at La Hougue Bie and La Hougue des Géonnais; and • Iron age promontory forts at Frèmont and Le Câtel de Rozel. Sites and structures can be protected for their known or potential archaeological interest as[9]: • Listed building or place (which are Sites of Special Interest in law) • Areas of Archaeological Potential (AAP) The States of Jersey confirm records of 4,398 listed buildings or places. There are also 71 protected tree designations which serve to protect individual specimens and groups of trees. **Likely evolution of the baseline** Stable / Declining - Many historic structures are among the few surviving monuments to Jersey's medieval period. 'Fosses' and 'banques' are earth banks, sometimes dating back to the 14th century. They often have hedges or trees growing on top of them. Problems with these include: bulging and leaning, dry stone fallout, loose rock, mortar joint erosion, mudslides, plant damage, subsidence, tree root bulges, tree root overhangs and vehicle scouring.[10]	through effecting the asset's fabric or setting. It is to be noted that some heritage features can be affected by changes to hydrological conditions. Infrastructure should be sensitively designed to be sympathetic to existing character and quality and opportunities for improving settings should be examined. Where schemes would involve physical development that could affect previously undiscovered archaeological assets the design of the scheme and site selection should be informed by early investigation of the potential archaeological interest of the affected land.	

[8] Archaeology (gov.je)
[9] Archaeology (gov.je)
[10] Roadside walls, fosses and banques (gov.je)

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
Further, there are currently no Conservation Areas in Jersey, although the Minister for the Environment is seeking to establish a legislative framework to enable them to be identified and designated in the future. This would help to ensure protection of the built environment and heritage assets.		
Population and Human Health Jersey's resident population at the end of 2022 was estimated to be 103,200 people. The size of the resident population was unchanged from 2021 and has been relatively stable since 2018. Based on 2021 census data, the parishes of St Helier (35% of total population), St Saviour (13% of total population) and St Brelade (11% of total population) are the most populated on the Island. Migration is a significant contributor to growth on the Island. The rate of natural growth has declined since 2011 (when it reached 390). During the three years 2019 to 2021 inclusive, net migration was outwards, with an average of 180 people leaving each year, over and above those arriving. This was the period which included the events of the UK leaving the EU and the Covid pandemic. Potential options within the WRDMP have the potential to result in temporary disturbance effects during the construction phase. There is also potential for impacts on the water or natural environment which could have impacts on recreation and wellbeing. Operationally, options within the WRMDP will need to ensure future supplies for the local population. **Likely evolution of the baseline** Stable / Uncertain – Population increases rely heavily on net inward migration noting that the rate of natural growth on the Island has declined since 2011. Water demand has the potential to increase, and further pressure will be placed on water resources within the region.	The options within WRDMP have the potential to result in temporary disturbance effects during the construction phase and disturbance effects for the local community must be prevented. There is also potential for impacts on the water or natural environment which could have impacts on recreation and wellbeing. WRDMP should aim to protect public health and promote well being. There is an opportunity for WRDMP to engage with the local community and maximise opportunities for recreation through enhancing access and the condition of the water environment, greenspaces or areas of the natural environment. Thus, improving the inclusivity of and connection to the local natural environment. WRDMP also has the opportunity to ensure a resilient and reliable potable water supply for customers now and in the future, through continuing to increase awareness of water conservation and adapting to climate change so that there is enough water for a growing population and to support economic growth.	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing To maintain and enhance tourism and recreation

Key Environmental Issue	Implications / Opportunities for the WRDMP	SEA Objective
Water available for consumptive use may also be affected by climate change whereby access to water is limited. Climate change may manifest through more frequent droughts or floods.		
Material Assets Approximately 24% of the Island of Jersey is built-up, with a further 52% dedicated to cultivation and around 18% comprising natural environment. The largest settlement is the town of St Helier, which includes a central business district. Outside of the town, many live in suburban and rural settlements accessed along main roads leading out of town. Jersey has a road network consisting of 346 miles of roads and operates a public bus network. Jersey also has an airport and a number of ports, operated by Ports of Jersey. Jersey imports 95% of its power from France. 35% of the imported power derives from hydro-electric sources and 65% from nuclear sources. Jersey Water supply water from two water treatment works, fed predominantly from rainfall-dependant surface water sources. The water is collected and stored in six reservoirs. A desalination plant also produces up to 10.8 million litres per day (around half of the Islands average daily use). Around 10% of the population is served by water abstracted from private sources. The Jersey recycling rate was 27% in 2020, equivalent to 27,926 tonnes of non-inert material. Household and commercial rubbish that has not been separated for recycling is delivered to the Energy Recovery Facility at La Collette for processing. This forms part of the islands solid waste strategy which delivers a partnership between local energy recovery and recycling. **Likely evolution of the baseline** Regeneration and future investment and demand are likely to increase the number and quality of material assets such as housing, transport infrastructure, waste facilities, and community facilities.	WRDMP has the opportunity to consider the efficiency in the use of resources within the option development and reduce the use of energy, materials and prevent waste generation through the promotion of low/zero carbon energy, use of recycled or secondary materials and furthering concepts of circular economy. WRDMP area contains important transport links which could be affected during construction works. There is also significant water and wastewater treatment infrastructure across the area operated by Jersey Water and Government of Jersey respectively.	To minimise resource use and waste production To avoid negative effects on built assets and infrastructure

5. SEA Framework

5.1 Introduction

Following good practice, a number of bespoke SEA objectives have been developed for the WRDMP. These SEA objectives reflect the environmental sustainability objectives the WRDMP should be aiming to achieve and the areas that the WRDMP is expected to impact upon or have an influence on. The expectation is that even though some objectives may not be within the WRDMP direct remit, the WRDMP should be able to influence the direction of change through setting out clear policies and approaches which could inform the work of WRDMP partners and other stakeholders.

5.2 Assessment Framework

The SEA Framework is a key component in completing the SEA, through providing a set of SEA objectives against which the performance of the WRDMP can be predicted and evaluated.

An SEA Framework of 13 objectives and associated decision-making / assessment aid questions (see Table 5-1) has been drawn up for the assessment of WRDMP, developed through the analysis of baseline information and identification of key environmental sustainability issues and opportunities, as well as the review of relevant plans, policies and legislation.

In order to assess how each aspect of the WRDMP performs against each of the SEA objectives, a series of decision-making criteria / assessment aid questions have also been developed. The decision-making criteria are a way of guiding the assessment. They are not the only considerations to be taken into account when determining likely effects arising from the WRDMP, as it is unlikely that every relevant question can be known at this stage. But they do provide a useful starting point and a transparent structure to help demonstrate how the assessment of the effects arising from the implementation of the WRDMP will be undertaken. As the SEA progresses, they will also help in the development of a set of indicators to be included in the monitoring programme at a later stage of the assessment process.

In addition to the Plans, Programme and Policies review and baseline review, established SEA Objectives identified in the All Companies Working Group SEA Core Objective Identification Report and those listed in the Bridging Island Plan Sustainability Appraisal have been considered in deriving the SEA Framework. This has acted to steer the SEA Framework along recognised issues and opportunities pertinent to water resource planning and in Jersey.

It should be noted that, from an assessment perspective, all SEA objectives are considered equally important to be achieved by the WRDMP and that there is no inherent prioritisation of objectives. The ultimate aim is for the WRDMP to achieve net sustainability benefits.

It is also to be noted that there is a certain degree of cross-over of Assessment Aid Questions within the SEA Framework i.e. the same question may be asked across a number of Objectives. The rationale for this is that while the question may be the same, it is considered from a differing viewpoint and within a different context. This is the role of the Assessment Aid Questions i.e. to help consider all aspects of an Objective in arriving at an assessment of the performance.

Table 5-1 - SEA Objectives and decision aid questions for WRDMP

SEA Topic	SEA Objective	Decision aid questions
Biodiversity	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Will WRDMP: • Protect and enhance the integrity of designated sites and their qualifying features (ASPs, SSIs, Ramsar sites, MPAs etc) • Protect and enhance priority habitats and species, including surface and ground water-dependent habitats and species? • Affect the marine environment, habitats and species? • Contribute to the loss or gain in habitat connectivity at local, regional and at the Island scale? • Create or restore habitat delivering a net gain for biodiversity? • Avoid the possibility for INNS to be spread/ introduced?
Soil	To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	Will WRDMP: • Promote the efficient use of land? • Prevent soil erosion and retain soil stocks as a natural resource? • Involve use of brownfield or greenfield land? • Prevent mineral sterilisation? • Result in soil contamination or involve soil remediation? • Affect Environmentally sensitive areas of geological importance?
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	Will WRDMP: • Affect surface water quality or quantity? • Affect groundwater quality or quantity? • Affect estuarine or coastal water quality or quantity? • Reduce the flashy nature of surface waters? • Slow the flow in upper catchments and reduce soil losses to river systems? • Protect and enhance the environmental resilience of the water environment to climate change?
Air	To reduce and minimise air and noise emissions	Will WRDMP: • Minimise air emissions (pollutants and noise) that affect human health and biodiversity? • Promote enhancements to green infrastructure networks to help improve air quality?

SEA Topic	SEA Objective	Decision aid questions
Greenhouse Gas Emissions	To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	Will WRDMP: • Reduce direct and indirect emissions of all greenhouse gases, including carbon dioxide, during construction, operation and decommissioning of schemes? • Maximise supply of energy from low carbon/renewable energy sources / use of low carbon/renewable energy? • Maximise opportunities for making use of waste heat? • Use negative carbon emissions technologies to offset residual emissions such Nature Based Solutions? • Create new carbon sinks/removals through natural sequestration including that provided by green infrastructure and soils which contribute to carbon sequestration?
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	Will WRDMP: • Avoid development in areas likely to be affected by flooding or where this is not possible ensure that flooding can be managed throughout the lifetime of the infrastructure? • Avoid development in areas likely to be affected by coastal erosion or where this is not possible ensure that coastal change can be managed throughout the lifetime of the infrastructure? • Avoid development which would cause or exacerbate climate related issues such as freshwater and coastal squeeze? • Manage the risks associated to periods of limited water availability during droughts over the lifetime of the infrastructure? • Manage the risks associated with heatwaves and wildfires over the lifetime of the infrastructure? • Manage the risks of flooding and coastal erosion, particularly through working with nature-based solutions?
	To reduce or manage flood risk, taking climate change into account	Will WRDMP: • Avoid development in flood risk areas (whether existing or future) when possible? • Lead to infrastructure development that is flood resilient over its lifetime, considering the effects of climate change, without increasing the flood risk elsewhere and identifying opportunities to reduce the risk overall?
Landscape	To conserve, protect and enhance landscape,	Will WRDMP: • Protect the integrity; and conserve and enhance the natural beauty, landscape value and qualities of the Coastal National Park

SEA Topic	SEA Objective	Decision aid questions
	townscape and seascape character and visual amenity	• Protect the integrity; and conserve and enhance the landscape character of the Green Zone • Protect the integrity; and conserve and enhance the landscape and seascape value of the island's coast and marine environment, including its intertidal areas and surrounding waters, out to territorial limits • Affect the character of the landscape, townscape or seascape, including tranquillity and views? • Minimise noise and light pollution from construction and operational activities on residential amenity and on sensitive locations, receptors and views? • Improve access to the countryside? • Create or improve green infrastructure which contributes to access to the landscape?
Cultural Heritage	To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	Will WRDMP: • Protect and enhance listed buildings and their settings, sites and features? • Conserve and enhance the character and appearance of areas of architectural and historic interest and a distinctive sense of place
Population and Human Health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Will WRDMP: • Allow for green economic development? • Provide employment opportunities and economic diversity? • Minimise disturbance from noise, light, visual, and transport due to construction and operational activities? • Minimise disturbance to active travel (pedestrian and cycle routes) during construction and operational activities? • Secure resilient water supplies for the health and wellbeing of customers?
	To maintain and enhance tourism and recreation	Will WRDMP: • Affect terrestrial, freshwater or marine water resources that are used for tourism and recreation? • Maintain or enhance tourism in the region through the creation or improvement of terrestrial or water-based attractions? • Improve access to the natural environment for recreation, including those living within deprived areas? • Provide education or information resources for the public about the natural environment?

SEA Topic	SEA Objective	Decision aid questions
Material Assets	To minimise resource use and waste production	Will WRDMP: • Minimise the use of materials, energy and resources? • Promote water efficiency and encourage a reduction in water consumption? • Protect surface water resources? • Ensure that Jersey's fresh water resources and marine water resources are clean and sustainable? • Minimise the production of waste? • Promote sustainable waste management practices in line with the waste hierarchy? • Encourage the use of recycled and / or secondary materials? • Promote the use of low carbon materials and technologies? • Promote the use of local suppliers that use sustainably-sourced and locally produced materials?
	To avoid negative effects on built assets / infrastructure	Will WRDMP: • Reuse existing infrastructure? • Affect major built assets and infrastructure, including transport infrastructure, aquaculture and industrial sites?

6. Assessment of Alternatives

6.1 Introduction

Water resource planning is complicated and there is a lot of uncertainty, largely as it is an exercise in understanding the current water supply system that reflects past decision making processes, against future scenarios that are influenced by aspects such as climate change, population growth, changes in technology and economic outcomes.

6.2 Methodology for assessing Alternatives

Stage B of the SEA process normally involves the generation and assessment of plan options. This exercise is undertaken in part to fulfil the requirements of the SEA Regulations, which requires that the Environmental Report should consider:

'reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme' (SEA Regulations Part 3 Section 12 (2)b.

To assess the alternatives, comparison has been made of the options featuring in the Least Cost, Max Resilience and Max SEA plans to those in the Preferred Best Value Plan. **It is important to note that some of the options are common to all plans. Therefore, to allow robust comparison between alternatives, comment is focused on those options in the alternative plans that are not common to the Preferred Best Value Plan**.

The 'non common' options, both supply and demand, have been discussed as follows:

- The schemes selected in the Preferred Best Value Plan, but not in an alternative plan; and
- The schemes selected in an alternative plan, but not the Preferred Best Value Plan.

It is important to note that Drought measures have not been included in the alternative plan assessment as they feature in all plans; the preferred Best Value plan and its alternatives.

6.3 Consideration of Alternatives

The options considered to be feasible are set out in Table 6-1. Following assessment of the feasible options through the SEA Framework alternative and preferred plans were derived. The Plan in which the options are featured and at which stage (Immediate no regrets options, Short/Medium term options and Potential long-term solutions) is shown in Table 6-1.

Table 6-1 - Feasible Options and Plan they are featured in

Feasible Option Name	Plan			
	Preferred Plan	Least Cost	Max Resilience	Max SEA
Supply				
[S101] New stream abstraction (Fernlands)	(Immediate)	(Short/medium and Potential Long term)	(Immediate)	

[S103] New storage reservoir option Trinity reservoir.			(Potential long-term)	
[S24b] Expansion of Val de la Mare reservoir (new dam) 1200Ml				
[S24b] Expansion of Val de la Mare reservoir (new dam) 750Ml				
[S24b] Expansion of Val de la Mare reservoir (new dam) 450Ml	(Potential long-term)	(Potential long-term)		(Potential long-term)
[S15d] New groundwater abstraction: d. Pont Marquet				
[S9] La Rosière desalination plant extension	(Immediate)	(Immediate)	(Immediate)	(Immediate)
[S18] Bellozanne indirect treated effluent water reuse scheme	(Short/medium term)	(Short/medium term)	Short/medium	(Short/medium term)
[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)	(Short/medium term)	(Short/medium term)	(Potential long-term)	(Short/medium term)
Supply measures - Basket 1: Catchment Measures • -[S1] Groundwater catchment management measures • -[S2] Surface water catchment management measures: education and influencing of land owners and farmers • -[S3] Surface water catchment management measures: physical catchment land improvement activities	(Immediate)	(Potential long-term)	(Potential long-term)	(Immediate)
Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources: - [S114] As S27, but specifically targeting the PFAS contaminated sources. - [S6] Increased abstraction from St. Ouen's boreholes (PFAS removal required)	(Immediate)	(Short/medium term)	(Immediate)	(Short/medium term)
	Customer and Demand			
Demand measures - Basket 1: Smart metering and tariff updates	(Immediate)	(Short/medium term)	(Short/medium term)	(Immediate)
Demand measures - Basket 2: Educational Campaigns and related activities				
Demand measures - Basket 3: Planning Regulation changes				
Demand measures - Basket 4: Leakage detection and associated activities	(Immediate)	(Immediate)	(Immediate)	(Immediate)
Raw water (upstream) leakage reduction (flow metering of raw mains)				
Pressure reduction programme (Active pressure management)				

The Preferred Plan, Least Cost Plan and Maximum SEA Plan have the same options selected within them, albeit with some differences on the time scale of the options. The Maximum Resilience Plan also has similar options selected to the other plans, with the exception of Expansion of Val de la Mare reservoir (new dam) 450Ml and the inclusion of New storage reservoir option Trinity reservoir.

Further details on the options which are not featured in the Preferred Plan are included in Sections 6.3.1 to 6.3.2 below and scores during construction and operation summarised in Table 6-2 and Table 6-3. Full assessments for these options are also included in Annex F. The assessment for options selected under the Preferred Plan are discussed further in Section 7.

Table 6-2 - Construction Scores (Post Mitigation)

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils and geologically designated sites		To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance Jersey' s historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Supply																										
[S103] New storage reservoir option Trinity reservoir.	0	--	0	--	0	-	0	--	0	--	0	0	0	-	0	--	+	---	0	---	0	-	0	--	0	-
[S24b] Expansion of Val de la Mare reservoir (new dam) 1200Ml	0	--	0	--	0	-	0	--	0	--	0	0	0	-	0	-	+	-	0	-	0	-	0	-	0	-
[S24b] Expansion of Val de la Mare reservoir (new dam) 750Ml	0	--	0	--	0	-	0	--	0	--	0	0	0	-	0	-	+	-	0	-	0	-	0	-	0	-
[S15d] New groundwater abstraction: d. Pont Marquet	0	--	0	-	0	-	0	-	0	--	0	0	0	-	0	-	+	-	0	-	0	-	0	-	0	-
Customer and Demand																										
Demand measures - Basket 2: Educational Campaigns and related activities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Demand measures - Basket 3: Planning Regulation changes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Raw water (upstream) leakage reduction (flow metering of raw mains)	0	-	0	-	0	-	0	-	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	-	0	-
Pressure reduction programme (Active pressure management)	0	-	0	-	0	-	0	-	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	-	0	-

Table 6-3 - Operation Scores (Post Mitigation)

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils and geologically designated sites		To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Supply																										
[S103] New storage reservoir option Trinity reservoir.	+	-	0	-	+	-	0	-	0	-	+++	0	++	0	+	-	0	0	++	0	++	0	0	0	+	0
[S24b] Expansion of Val de la Mare reservoir (new dam) 1200Ml	0	-	0	-	++	-	0	-	0	-	++	0	+	0	0	-	0	-	++	0	0	0	0	0	+	0
[S24b] Expansion of Val de la Mare reservoir (new dam) 750Ml	0	-	0	-	++	-	0	-	0	-	++	0	+	0	0	-	0	-	++	0	0	0	0	0	+	0
[S15d] New groundwater abstraction: d. Pont Marquet	0	-	0	0	+	-	0	-	0	-	++	0	0	-	0	-	0	-	++	0	0	0	0	0	0	0
Customer and Demand																										
Demand measures - Basket 2: Educational Campaigns and related activities	+	0	+	0	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	+	0	0	0
Demand measures - Basket 3: Planning Regulation changes	+	0	0	0	++	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	+	0	+	0
Raw water (upstream) leakage reduction (flow metering of raw mains)	++	0	0	0	++	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	++	0	0	0
Pressure reduction programme (Active pressure management)	+	0	0	0	++	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	++	0	0	0

6.3.1 Supply Option featuring in Alternative Plans

6.3.1.1 [S103] New storage reservoir option Trinity reservoir

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S103] New storage reservoir option Trinity reservoir														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	--	--	-	--	--	0	-	--	---	---	-	--	-
Operation	Positive Residual Effects	+	0	+	0	0	+++	++	+	0	++	++	0	+
	Negative Residual Effects	-	-	-	-	-	0	0	-	0	0	0	0	0

This option involves a new raw water storage facility within the Grand Vaux valley to provide flood alleviation benefits to St Helier as well as benefits to public water supply. The main option elements include a new impounding dam, a drawdown tower, spillways and emergency discharge apparatus, acquisition of site around and including the approx. 15.5ha of land to be inundated, and nominally 1.4km of highway diversions around the inundated site.

During construction of this option, slight beneficial effects are anticipated in relation to Objective 9 (Cultural Heritage) as the potential for the excavation to impact buried archaeology would act to improve local archaeological understanding.

The construction of this option will likely produce significant (moderate and major) adverse effects in relation to eight SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as reservoir construction has the potential to result in permanent loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area.
- **Objective 2:** 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' as there will be permanent loss of soils within the footprint of the new reservoir.
- **Objective 4:** 'To reduce and minimise air and noise emissions' as moderate and temporary construction impacts on air and noise quality are anticipated.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities.
- **Objective 8**: 'To conserve, protect and enhance landscape, townscape and seascape character and visual amenity' due to the potential for significant deterioration of local landscape character and visual amenity.
- **Objective 9**: 'To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains' as there is potential for the excavation to impact buried archaeology.
- **Objective 10**: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' as a small number of residential properties within the area identified for inundation are expected to be flooded by the reservoir. This would result in displacement of people and livelihood, economic change and possible impact on social and health wellbeing for those affected. In respect of economic wellbeing, it is anticipated that the reservoir would result in the loss of productive agricultural land. As such impacts on farm holdings, including their ongoing viability and with respect to severance cannot be ruled out at this stage.

- **Objective 12**: 'To minimise resource use and waste production' as new infrastructure is required, and waste is likely to be generated.

Slight adverse effects are anticipated during construction in relation to Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 7 (Climate Factors) as there may be an increased risk of pollution incidents, Objective 11 (Population and Human Health) as there may be minimal and temporary disturbance on users of the reservoir and surrounding area, and Objective 13 (Material Assets) due to the potential for permanent loss of infrastructure.

In relation to operational effects, significant beneficial (moderate and major) effects are anticipated in relation to four SEA objectives:

- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would provide significant resilience to climate change risks such as prolonged droughts by increasing the volume of water retained and available for use during such periods.
- **Objective 7**: 'To reduce or manage flood risk, taking climate change into account' as the reservoir will provide flood storage capacity.
- **Objective 10:** 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' due to the creation of a new feature that would potentially attract walkers and encourage engagement with outdoor activities.
- **Objective 11:** 'To maintain and enhance tourism and recreation' as there is potential to attract recreational use of the area to the reservoir, providing a significant new recreational amenity that includes informal recreation such as angling, walking and bird watching.

In addition, slight beneficial effects are anticipated during operation in relation to Objective 1 (Biodiversity) due to the substantial habitat creation opportunities around the reservoir, Objective 3 (Water) as the option will provide a means of water storage and support a resilient supply of water, Objective 8 (Landscape) as land use change would be from a largely arable landscape to open water, with potential for woodlands and meadows, considered an enhancement in landscape feature, and Objective 13 (Material Assets) as the reservoir will improve resilience in respect of water supply infrastructure.

During operation, slight adverse effects are anticipated in relation to Objective 1 (Biodiversity) as changes in local hydrology to maintain the reservoir may increase pressures on water dependant habitat and species in the area, Objective 2 (Soil) as there will be permanent loss of soils within the footprint of the new reservoir, Objective 3 (Water) due to the potential for effects on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) due to minor permanent effects on noise and air quality, Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation and Objective 8 (Landscape) due to the potential for adverse effects on local landscape character and visual amenity.

6.3.1.2 Expansion of Val de la Mare reservoir (new dam) 1200Ml

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S24b] Expansion of Val de la Mare reservoir (new dam) 1200Ml														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	--	--	-	--	--	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	++	0	0	++	+	0	0	++	0	0	+
	Negative Residual Effects	-	-	-	-	-	0	0	-	-	0	0	0	0

This option involves the placement of a new dam downstream of Val de la Mare Reservoir. Two locations have nominally been selected in the valley from which the upstream volume has been estimated. If a new dam downstream of the existing dam is found to be viable, the main option elements would include a new dam, a new drawdown facility/tower, new spillways and emergency drawdown facilities, relocation / provision of a new pumping station, utility services and other facilities inundated by the extended reservoir, provision of new pipelines and shortening / removal of sections of pipeline, and demolition of the existing dam.

For the purpose of the cost appraisal and environmental assessment, the following sub-variants of this option have been considered:

i) 1200Ml volume, c.95m downstream of the existing dam to a TWL of 53mAOD

ii) 750Ml volume, c.95m downstream of the existing dam to a TWL of 50mAOD

iii) 450Ml volume, c.175m downstream of the existing dam to a TWL of 46mAOD.

This assessment considers the environmental impacts associated with option 1 - 1200Ml volume option.

During construction of this option, slight beneficial effects are anticipated in relation to Objective 9 (Cultural Heritage) as there is potential for the excavation of the pipeline to impact buried archaeology if present which may afford opportunity to improve archaeological understanding locally.

The construction of this option will likely produce significant (moderate) adverse effects in relation to four SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as reservoir construction has the potential to result in permanent loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area.
- **Objective 2**: 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' as there will be permanent loss of soils within the footprint of the new reservoir extent.
- **Objective 4**: 'To reduce and minimise air and noise emissions' as moderate and temporary construction impacts on air and noise quality are anticipated.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from operation (e.g. of pumping station).

Additionally, slight adverse effects are anticipated during construction in relation to Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 7 (Climate Factors) as there may be an increased risk of pollution incidents, Objective 8 (Landscape) due to the potential for significant deterioration of local landscape character and visual amenity, Objective 9 (Cultural Heritage) as construction may affect the setting of historic assets identified in close proximity to the option. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to disturbance to the local community and users of local community facilities, the potential for transport disruption and indirect impacts on recreation, such as through noise and dust generation, and Objectives 12 and 13 (Material Assets) as new infrastructure is required for option, the option is likely to generate waste and there may be minor effects on local roads.

In relation to operational effects, significant beneficial (moderate) effects are anticipated in relation to three SEA objectives:

- **Objective 3**: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' as the option will provide a significant means of increased water storage and supporting a more resilient supply of water.
- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would provide significant resilience to climate change risks such as prolonged droughts by increasing the volume of water retained and available for use during such periods.
- **Objective 10**: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' as improved resilience of supply to residents would be served indirectly by the reservoir.

In addition, slight beneficial effects are anticipated during operation in relation to Objective 7 (Climate Factors) due to the increased area available to help store flood flows and Objective 13 (Material Assets) as the works will improve an existing asset and will improve resilience in respect of water supply infrastructure.

During operation, there are anticipated to be a number of slight adverse effects in relation to Objective 1 (Biodiversity) as changes in local hydrology may increase pressures on water dependant habitat and species in the area, Objective 2 (Soil) as there will be permanent loss of soils within the footprint of the new reservoir extent, Objective 3 (Water) due to the potential for effects on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) as minor permanent effects on noise and air quality are expected, and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation (e.g. of pumping station). Slight adverse effects during operation also apply to Objective 8 (Landscape) due to the potential for changes to the landscape and Objective 9 (Cultural Heritage) due to permanent effects on the setting of historic assets identified in close proximity to the option.

6.3.1.3 Expansion of Val de la Mare reservoir (new dam) 750Ml

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S24b] Expansion of Val de la Mare reservoir (new dam) 750Ml														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	--	--	-	--	--	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	++	0	0	++	+	0	0	++	0	0	+
	Negative Residual Effects	-	-	-	-	-	0	0	-	-	0	0	0	0

This option involves the placement of a new dam downstream of Val de la Mare Reservoir. Two locations have nominally been selected in the valley from which the upstream volume has been estimated. If a new dam downstream of the existing dam is found to be viable, the main option elements would include a new dam, a new drawdown facility/tower, new spillways and emergency drawdown facilities, relocation / provision of a new pumping station, utility services and other facilities inundated by the extended reservoir, provision of new pipelines and shortening / removal of sections of pipeline, and demolition of the existing dam.

For the purpose of the cost appraisal and environmental assessment, the following sub-variants of this option have been considered:

i) 1200Ml volume, c.95m downstream of the existing dam to a TWL of 53mAOD

ii) 750Ml volume, c.95m downstream of the existing dam to a TWL of 50mAOD

iii) 450Ml volume, c.175m downstream of the existing dam to a TWL of 46mAOD.

This assessment considers the environmental impacts associated with option 2 - 750Ml volume option.

During construction of this option, slight beneficial effects are anticipated in relation to Objective 9 (Cultural Heritage) as there is potential for the excavation of the pipeline to impact buried archaeology if present which may afford opportunity to improve archaeological understanding locally.

The construction of this option will likely produce significant (moderate) adverse effects in relation to four SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as reservoir construction has the potential to result in permanent loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area.
- **Objective 2**: 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' as there will be permanent loss of soils within the footprint of the new reservoir extent.
- **Objective 4:** 'To reduce and minimise air and noise emissions' as moderate and temporary construction impacts on air and noise quality are anticipated.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from operation (e.g. of pumping station).

Additionally, slight adverse effects are anticipated during construction in relation to Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 7 (Climate Factors) as there may be an increased risk of pollution incidents, Objective 8 (Landscape) due to the potential for significant deterioration of local landscape character and visual amenity, Objective 9 (Cultural Heritage) as construction may affect the setting of historic assets identified in close proximity to the option. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to disturbance to the local community and users of local community facilities, the potential for transport disruption and indirect impacts on recreation, such as through noise and dust generation, and Objectives 12 and 13 (Material Assets) as new infrastructure is required for option, the option is likely to generate waste and there may be minor effects on local roads.

In relation to operational effects, significant beneficial (moderate) effects are anticipated in relation to three SEA objectives:

- **Objective 3**: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' as the option will provide a significant means of increased water storage and supporting a more resilient supply of water.

- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would provide significant resilience to climate change risks such as prolonged droughts by increasing the volume of water retained and available for use during such periods.
- **Objective 10**: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' as improved resilience of supply to residents would be served indirectly by the reservoir.

In addition, slight beneficial effects are anticipated during operation in relation to Objective 7 (Climate Factors) due to the increased area available to help store flood flows and Objective 13 (Material Assets) as the works will improve an existing asset and will improve resilience in respect of water supply infrastructure.

During operation, there are anticipated to be a number of slight adverse effects in relation to Objective 1 (Biodiversity) as changes in local hydrology may increase pressures on water dependant habitat and species in the area, Objective 2 (Soil) as there will be permanent loss of soils within the footprint of the new reservoir extent, Objective 3 (Water) due to the potential for effects on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) as minor permanent effects on noise and air quality are expected, and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation (e.g. of pumping station). Slight adverse effects during operation also apply to Objective 8 (Landscape) due to the potential for changes to the landscape and Objective 9 (Cultural Heritage) due to permanent effects on the setting of historic assets identified in close proximity to the option.

6.3.1.4 [S15d] New groundwater abstraction: d. Pont Marquet

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S15d] New groundwater abstraction: d. Pont Marquet														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	--	-	-	-	--	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	++	0	0	0	++	0	0	0
	Negative Residual Effects	-	0	--	-	-	0	-	-	-	0	0	0	0

This option relates to the development of a new groundwater source at Pont Marquet, located to the south-west of the island near St Brelade. It seeks to install a total of two new boreholes to form a new groundwater source on the Jersey Water landholdings around the Pont Marquet raw water tank. There is the expectation that these sources will provide additional raw water supply to the tank through new pipelines and water is subsequently transferred to Val de la Mare reservoir using the existing Pont Marquet pumping station. The main option elements include two new boreholes, two new pipelines and a discharge into Pont Marquet tank.

During construction of this option, slight beneficial effects are anticipated in relation to Objective 9 (Cultural Heritage) as there is potential for the excavation of the pipeline to impact buried archaeology if present which may afford opportunity to improve archaeological understanding locally.

The construction of this option will likely produce significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as pipeline construction has the potential to result in loss or disturbance to designated or

non-designated habitat or species, including an Environmentally Sensitive Area, although this is anticipated to be limited to the construction phase if reinstated.

- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities.

Additionally, there are anticipated to be a number of slight adverse effects in relation to Objective 2 (Soil) due to the potential for disturbance to soils, Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 4 (Air) as minor and temporary construction impacts on air and noise quality are anticipated, Objective 7 (Climate Factors) due to an increased risk of pollution incidents, Objective 8 (Landscape) as impacts on visual amenity are anticipated, Objective 9 (Cultural Heritage) as construction may affect the setting of historic assets identified in close proximity to the pipeline route. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community and users of footpaths and other public rights of way, and Objectives 12 and 13 (Material Assets) as new infrastructure is required and the option is likely to generate waste. There are likely to be minor and temporary impacts on built assets / infrastructure.

In relation to operational effects, significant (moderate) beneficial effects are anticipated in relation to two SEA Objectives:

- **Objective 6:** 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would provide an additional source, thereby increasing resilience to drought conditions.
- **Objective 10:** 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' the option is anticipated to increase resilience of supply for residents.

During operation, slight beneficial effects apply to Objective 3 (Water) as the option will provide a new source therefore will contribute to a more resilient supply.

The operation of this option will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 3**: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' due to the potential for impacts on groundwater.

Additionally, slight adverse effects during operation apply to Objective 1 (Biodiversity) as there may be permanent loss of habitat or species, Objective 4 (Air) as minor and permanent impacts on air and noise quality are anticipated, Objective 5 (Greenhouse Gas Emissions) due to carbon generated from operation, Objective 7 (Climate Factors) due to minor contributions to an increased risk of flooding, Objective 8 (Landscape) due to non-significant impacts on the landscape, Objective 9 (Cultural Heritage) due to the potential for effects on the setting of historic assets.

6.3.2 Customer and Demand Option featuring in Alternative Plans

6.3.2.1 Demand measures - Basket 2: Educational Campaigns and related activities:

Educational campaign (Domestic):

- [D5] Targeted water conservation information (Domestic)
- [D6] Education and publicity programmes (Domestic)
- [D101] Educational campaign on private supplies (especially those for non-potable supply).

Audits and engagement post smart metering implementation:

- [D9] “Smart” water use audits (Domestic)
- [D10] “Smart"" customer engagement (Domestic)
- [D20] “Smart” water use audits (Commercial)
- [D21] “Smart"" customer engagement (Commercial)

Educational campaign (Commercial and industry):

- [D16] Targeted water conservation information (Commercial)
- [D17] Education and publicity programmes (Commercial)
- [D101] Educational campaign on private supplies (especially those for non-potable supply).
- [D102] Educational campaign regarding private supplies used for irrigation.

Water saving devices:

- [D7] Promotion of water saving devices (Domestic)
- [D18] Promotion of water saving devices (Commercial)

Customer and Demand Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Demand measures - Basket 2: Educational Campaigns and related activities														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	+	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with reduced demand for water and water being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Educational campaign regarding private supplies used for irrigation may have slight beneficial impact on soils (Objective 2). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected where increasing awareness through education campaigns reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to increased awareness through education campaigns will also reduce the use of resources and waste produced (Objective 12).

During the operation phase of this Option, it is anticipated that there will be no adverse effects on any of the SEA Objectives.

6.3.2.2 Demand measures - Basket 3: Planning Regulation changes:

Planning regulations and rain/grey water reuse (Residential):

- [D13] Planning regulation for new homes
- [D11] Rainwater harvesting (Residential)
- [D12] Greywater recycling (Residential)

Planning regulations and rain/grey water reuse (Commercial):

- [D24] Planning regulations for new commercial buildings
- [D22] Rainwater harvesting - Commercial
- [D23] Greywater recycling - Commercial

Customer and Demand Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Demand measures - Basket 3: Planning Regulation changes														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	++	+	+	+	0	0	0	+	0	+	+
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

Significant (moderate) adverse effects are anticipated during construction in relation to one SEA objective:

- **Objective 3:** 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' as the planning regulations and water reuse associated with the option will reduce resource pressures and protection of water resources which may reduce demand on water supplies and improve efficiency.

In relation to operational effects, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with water reuse and reduced demand for water. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) due to reduced resource pressures and protection of water resources. Where water demand is reduced and there is reduced treatment and pumping there will also be reduced air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected where measures reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to reduced water demand will reduce the use of resources and waste produced (Objective 12) and planning regulation changes for residential and commercial buildings may help to avoid negative effects on built assets / infrastructure (Objective 13).

During the operation phase of this Option, it is anticipated that there will be no adverse effects on any of the SEA Objectives.

6.3.2.3 [D105] Raw water (upstream) leakage reduction (flow metering of raw mains)

Customer and Demand Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Raw water (upstream) leakage reduction (flow metering of raw mains)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	0	0	0	-	0	-	-
Operation	Positive Residual Effects	++	0	++	+	+	+	0	0	0	+	0	++	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction due to the potential to disturb biodiversity and priority habitats, disturb contaminated material and impact on BMV agricultural land and disturb the water environment, although specific locations are unknown (Objective 1, 2 and 3). Construction (leakage works) is likely to have minor and temporary impacts on air and noise emissions (Objective 4) and carbon will be generated from materials used in the works (Objective 5). There is potential for slight negative effects during construction (leakage works) on the health and wellbeing of community (Objective 10). In terms of material assets, leakage works may include pipe rehabilitation schemes which would generate waste spoil, pipe lengths, subsurface fill and other materials and have the potential to impact built assets and infrastructure (Objective 12 and 13).

The operation of this option will likely result in significant (moderate) beneficial effects in relation to three SEA objectives:

- **Objective 1:** 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' reduced demand for water (through the various measures described including leakage control) leading to greater volumes being retained within the environment.
- **Objective 3**: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' due to the leakage reductions resulting in water being kept within the environment.
- **Objective 12**: 'To minimise resource use and waste production' as leakage works will reduce resource use and wastage.

In addition, slight beneficial effects are anticipated in relation to reduced air, noise and carbon emissions (Objectives 4 and 5) where reduced supply and treatment is required. Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due repairing existing infrastructure (Objective 6). Positive operational effects in relation to health and wellbeing are expected where measures secure a more resilient water supply (Objective 10).

6.3.2.4 [D35] Pressure reduction programme (Active pressure management)

Customer and Demand Option	SEA Objective												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Pressure reduction programme (Active pressure management)													

Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	0	0	0	-	0	-	-
Operation	Positive Residual Effects	+	0	++	+	+	+	0	0	0	+	0	++	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

An option such as this would typically involve making minor changes to the water distribution network. This could include improved fitting meters and dataloggers onto the network and installing pressure reducing valves (PRV) so that pressures can be varied / controlled in different parts of the system. Improved monitoring can help identify where there are leaks and by reducing pressure, less water will be lost when there is a leak. Any construction work associated with this type of option is generally small-scale, focused on existing buried pipes and potentially requiring the construction of new inspection chambers (typically small concrete or brick structures below ground).

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction due to the potential to disturb biodiversity and priority habitats, disturb contaminated material and impact on BMV agricultural land and disturb the water environment, although specific locations are unknown (Objective 1, 2 and 3). Construction (pressure reduction works) is likely to have minor and temporary impacts on air and noise emissions (Objective 4) and carbon will be generated from materials used in the works (Objective 5). There is potential for slight negative effects during construction (pressure reduction works) on the health and wellbeing of community (Objective 10). In terms of material assets, pressure reduction works may include fitting meters or new inspection chambers which would generate waste spoil, pipe lengths, subsurface fill and other materials and have the potential to impact built assets and infrastructure (Objective 12 and 13).

The operation of this option will likely result in significant (moderate) beneficial effects in relation to two SEA objectives:

- **Objective 3:** 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' due to the pressure reduction works resulting in water being kept within the environment.
- **Objective 12**: 'To minimise resource use and waste production' as pressure reduction works will reduce resource use and wastage.

In addition, slight adverse effects are anticipated in relation to biodiversity where when there is a leak, greater volumes are being retained within the environment due to the works (Objective 1).Slight beneficial effects are expected due to reduced air, noise and carbon emissions (Objectives 4 and 5) where reduced supply and treatment is required. Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due repairing existing infrastructure (Objective 6). Positive operational effects in relation to health and wellbeing are expected where measures secure a more resilient water supply (Objective 10).

During the operation phase of this Option, it is anticipated that there will be no adverse effects on any of the SEA Objectives.

7. Assessment of WRDMP Options

In order to maintain secure, high quality, reliable and affordable water supplies to its customers over the long-term and which are resilient to potential future events, Jersey Water has developed a series of Options for enabling supplies have been identified and included within the Plan.

Stage B2 of the SEA process normally involves the generation and assessment of plan options. This exercise is undertaken in part to fulfil the requirements of the SEA Regulations, which requires that the Environmental Report should consider:

'*reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme*' (SEA Regulations Part 3 Section 12 (2)b).

7.1 Preferred Best Value Plan

As noted in Section 1.5, Jersey Water developed and applied a multi-criteria appraisal process to evaluate a wide range of alternative options to address the forecast supply deficit, which considered the following:

- Feasibility & risk
- Engineering & cost
- Performance & resilience
- Operational
- Environmental

In terms of environmental consideration, this involved incorporation of the assessment and scores summarised in Section 7.2 of this report.

Extensive investment modelling and testing was carried out and outcomes were provided for least cost modelling and best-value planning which included maximising resilience and maximising SEA benefits. It was found that the best-value runs that maximise resilience and environmental objectives are largely consistent with the least cost outputs but suggest a couple of key points:

- The Pont Marquet borehole scheme and Fernlands are cost-efficient ways of adding resilience in all futures.
- Smart metering and catchment measures have environmental and social benefits in all futures.

Based on these findings, Jersey Water propose their core short-term strategy includes:

- Base leakage reduction strategy (schedule of activities from start of plan)
- La Rosière desalination plant extension to be effective from 2030
- Continuation and enhancement of ongoing catchment measures (driven by environmental and social objectives)
- Roll-out of smart metering (driven by environmental and social objectives). We are currently undertaking a pilot study in this area and therefore will confirm the effectiveness, scale and speed of potential roll-out following depending on the findings of this study.
- Implementation of the Fernlands stream abstraction scheme (driven by resilience objectives)
- A PFAS targeted solution by 2030, exact solution dependent on resolving uncertainty around PFAS regulation. This will improve overall resilience as well as responding to the outstanding uncertainty over the level of PFAS regulation we will be held to.

As part of this they have accepted that there may be a risk of deficits in an extreme 1 in 500-year type event for the first 10 years (up to 2035) and a severe 1 in 100 type of drought event for the first 5 years (up to 2030).

Figure 7-1 summarises the Preferred Plan.

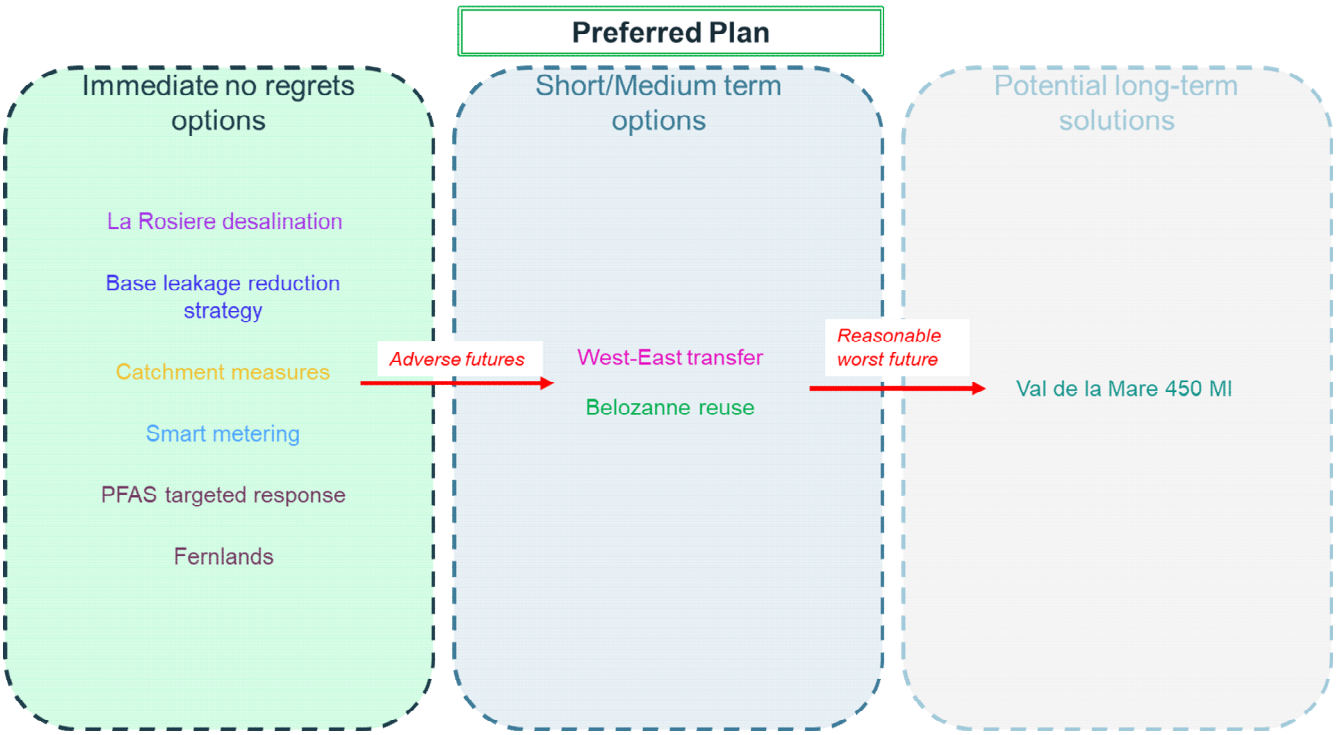

Figure 7-1 - Summary of components of preferred plan

In regards to the scope of the SEA, assessment includes for each of the three time-based categories i.e. environmental assessment has been undertaken for options under the immediate no regrets, high chance short/medium term and for potential long-term solutions. It is important however to recognise that, in respect of those options featuring later in the plan period (medium and long-term options particularly), the level of confidence attributed to environmental assessment is necessarily reduced. This reflects uncertainties regarding future baseline conditions and the effects of, for example climate change and population change.

7.2 Option Summary

The following tables provide an overview of the assessment 'scores' for all of the Options in the Preferred Plan considered within the SEA, for both the construction and operation phases (post mitigation). The assessment findings of each option is then discussed in turn, with full detail provided in Annex F.

Table 7-1 - Construction Scores (Post Mitigation)

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils and geologically designated sites		To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Supply																										
[S101] New stream abstraction (Fernlands)	0	--	0	-	0	-	0	-	0	--	0	0	0	-	0	-	+	-	0	-	0	-	0	-	0	-
[S24b] Expansion of Val de la Mare reservoir (new dam) 450Ml	0	--	0	--	0	-	0	--	0	--	0	0	0	-	0	-	+	--	0	-	0	-	0	-	0	-
[S9] La Rosière desalination plant extension	0	-	0	0	0	-	0	-	0	--	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-
[S18] Bellozanne indirect treated effluent water reuse scheme	0	-	0	--	0	-	0	-	0	--	0	0	0	-	0	-	+	--	0	-	0	-	0	-	0	--
[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)	0	-	0	-	0	-	0	-	0	-	0	0	0	-	0	-	+	--	0	-	0	-	0	-	0	-
Supply measures - Basket 1: Catchment Measures -[S1] Groundwater catchment management measures -[S2] Surface water catchment management measures: education and influencing of land owners and farmers -[S3] Surface water catchment management measures: physical catchment land improvement activities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources: - [S114] As S27, but specifically targeting the PFAS contaminated sources. - [S6] Increased abstraction from St. Ouen's boreholes (PFAS removal required)	0	--	0	-	0	-	0	-	0	--	0	0	0	-	0	-	0	--	0	-	0	-	0	-	0	-
Customer and Demand																										
Demand measures - Basket 1: Smart metering and tariff updates	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils and geologically designated sites		To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Demand measures - Basket 4: Leakage detection and associated activities	0	-	0	-	0	-	0	-	0	-	0	0	0	0	0	0	0	0	0	-	0	0	0	-	0	-
Drought Management																										
Drought - Water Rationing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought - Temporary desalination	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Drought - Temp PFAS treatment	0	-	0	-	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Drought - Customer awareness	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought – TWUB – NEUB (lite)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought – RTWUB – NEUB (extensive)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought – Water tankering on island	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought - Reduce levels of service	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DM16] Drought - Reduce levels of service (pressure)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 7-2 - Operation Scores (Post Mitigation)

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils and geologically designated sites		To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Supply																										
[S101] New stream abstraction (Fernlands)	0	-	0	0	+	-	0	-	0	-	++	0	0	-	0	-	0	-	++	0	0	0	0	0	0	0
[S24b] Expansion of Val de la Mare reservoir (new dam) 450Ml	0	-	0	--	+	-	0	-	0	-	++	0	+	0	0	-	0	-	++	0	0	0	0	0	+	0
[S9] La Rosière desalination plant extension	0	-	0	0	+	-	0	-	0	--	++	0	0	0	0	0	0	0	+	0	0	0	0	-	0	0
[S18] Bellozanne indirect treated effluent water reuse scheme	0	--	0	0	++	-	0	--	0	-	++	0	0	-	0	-	0	-	0	-	0	-	++	-	0	0
[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)	0	0	0	0	+	0	0	0	0	-	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Supply measures - Basket 1: Catchment Measures -[S1] Groundwater catchment management measures -[S2] Surface water catchment management measures: education and influencing of land owners and farmers -[S3] Surface water catchment management measures: physical catchment land improvement activities	++	0	++	0	++	0	+	0	+	0	++	0	++	0	+	0	+	0	++	0	+	0	+	0	+	0
Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources: - [S114] As S27, but specifically targeting the PFAS contaminated sources. - [S6] Increased abstraction from St. Ouen's boreholes (PFAS removal required)	0	-	0	0	+	-	0	-	0	-	+	0	0	-	0	-	0	-	+	0	0	0	0	-	0	0
Customer and Demand																										
Demand measures - Basket 1: Smart metering and tariff updates	+	0	0	0	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	+	0	0	0

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils and geologically designated sites		To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Demand measures - Basket 4: Leakage detection and associated activities	++	0	0	0	++	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	++	0	0	0
Drought Management																										
Drought - Water Rationing	+	-	0	-	+	0	+	0	+	0	+	0	+	0	0	-	0	0	0	--	0	--	+	0	0	-
Drought - Temporary desalination	0	-	0	0	+	-	0	-	0	-	+	0	0	0	0	0	0	0	+	0	0	0	0	-	0	0
Drought - Temp PFAS treatment	0	-	0	0	+	-	0	-	0	-	+	0	0	0	0	-	0	-	+	0	0	0	0	-	0	0
Drought - Customer awareness	+	0	0	0	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	+	0	0	0
Drought – TWUB – NEUB (lite)	+	-	0	-	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	0	0	0	+	0	0	0
Drought – RTWUB – NEUB (extensive)	+	-	0	-	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	-	0	-	+	0	0	-
Drought – Water tankering on island	0	-	0	0	0	-	0	-	0	-	+	0	0	0	0	0	0	0	+	0	+	0	0	-	0	0
Drought - Reduce levels of service	+	-	0	0	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	-	0	0	+	0	0	0
DM16] Drought - Reduce levels of service (pressure)	+	-	0	0	+	0	+	0	+	0	+	0	0	0	0	0	0	0	+	-	0	0	+	0	0	0

7.2.1 Supply Options

The following provides an overview of assessment results for Supply Side Options considered. Note that the assessment of significance is presented in terms of residual effects (i.e., after any additional mitigation is applied) in respect of construction and operation. A discussion on these assessment results follows, with full details of the assessment for each Option provided within Annex F.

7.2.1.1 [S101] New stream abstraction (Fernlands)

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S101] New stream abstraction (Fernlands)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	--	-	-	-	--	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	++	0	0	0	++	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	-	-	-	0	0	0	0

This option will introduce additional infrastructure that will enable a pumped inflow to Grands Vaux Reservoir from the Fernlands stream. Water from the Fernlands catchment can then be directed towards Grand Vaux reservoir whenever capacity exists. The additional raw water that is captured can then be used to supplement the raw water storage systems around the island or be transferred for treatment. The main option elements include a new diversion chamber, a new pumping station, new pipeline and a discharge point / outfall.

Construction of this option will likely produce slight beneficial effects in relation to Objective 9 (Cultural Heritage) due to the potential for the excavation of the pipeline to impact buried archaeology if present which may afford opportunity to improve archaeological understanding locally.

Construction will likely produce significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as pipeline construction has the potential to result in loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area, although this is anticipated to be limited to the construction phase if reinstated. There may be permanent loss of habitat or species following construction of the pumping station, although this is not anticipated to be significant.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities.

Slight adverse effects are anticipated during construction in relation to Objective 2 (Soil) due to the potential for disturbance to soils, Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 4 (Air) due to the potential for impacts on air and noise quality. Slight adverse effects also apply to Objective 7 (Climate Factors) as there may be an increase the risk of pollution incidents, Objective 8 (Landscape) due to the potential for impacts on visual amenity, Objective 9 (Cultural Heritage) as construction may affect the setting of historic assets identified in close proximity to the pipeline route, Objectives 10 and 11 (Population and Human Health) due to disturbance to the local community and users of the reservoir, and Objectives 12 and 13 (Material Assets) due to the generation of waste and minor and temporary impacts on infrastructure during construction.

In relation to operational effects, slight beneficial effects apply to Objective 3 (Water) as the option will strengthen network flexibility, reducing requirements on stressed waterbodies.

During operation, there are anticipated to be a number of slight adverse effects in relation to Objective 1 (Biodiversity) as abstraction may increase pressures on water dependant habitat and species along or connected to Fernlands Stream, Objective 3 (Water) as there due to potential effects on Fernlands stream from the new abstraction, Objective 4 (Air) due to minor permanent effects on noise and air quality and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated during operation. Slight adverse effects also apply to Objective 7 (Climate Factors) due to a potential minor increase to the risk of pollution incidents, Objective 8 (Landscape) due to operation of a pumping station and Objective 9 (Cultural Heritage) due to the proximity of heritage assets.

The operation of this option will likely produce significant (moderate) beneficial effects in relation to two SEA objectives:

- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would provide an additional source, thereby increasing resilience to drought conditions.
- **Objective 10**: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' as it is anticipated that the new water abstraction would increase resilience of water supply for residents.

7.2.1.2 Expansion of Val de la Mare reservoir (new dam) 450Ml

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S24b] Expansion of Val de la Mare reservoir (new dam) 450Ml														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	--	--	-	--	--	0	-	-	--	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	++	+	0	0	++	0	0	+
	Negative Residual Effects	-	--	-	-	-	0	0	-	-	0	0	0	0

This option involves the placement of a new dam downstream of Val de la Mare Reservoir. Two locations have nominally been selected in the valley from which the upstream volume has been estimated. If a new dam downstream of the existing dam is found to be viable, the main option elements would include a new dam, a new drawdown facility/tower, new spillways and emergency drawdown facilities, relocation / provision of a new pumping station, utility services and other facilities inundated by the extended reservoir, provision of new pipelines and shortening / removal of sections of pipeline, and demolition of the existing dam.

For the purpose of the cost appraisal and environmental assessment, the following sub-variants of this option have been considered:

i) 1200Ml volume, c.95m downstream of the existing dam to a TWL of 53mAOD

ii) 750Ml volume, c.95m downstream of the existing dam to a TWL of 50mAOD

iii) 450Ml volume, c.175m downstream of the existing dam to a TWL of 46mAOD.

This assessment considers the environmental impacts associated with option 3 - 450Ml volume option.

During construction of this option, slight beneficial effects are anticipated in relation to Objective 9 (Cultural Heritage) as there is potential for the excavation of the pipeline to impact buried archaeology if present which may afford opportunity to improve archaeological understanding locally.

The construction of this option will likely produce significant (moderate) adverse effects in relation to five SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as reservoir construction has the potential to result in permanent loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area.
- **Objective 2**: 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' as there will be permanent loss of soils within the footprint of the new reservoir extent.
- **Objective 4**: 'To reduce and minimise air and noise emissions' as moderate and temporary construction impacts on air and noise quality are anticipated.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from operation (e.g. of pumping station).
- **Objective 9**: 'To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains' as the option may affect the setting of historic assets identified in close proximity.

Additionally, slight adverse effects are anticipated during construction in relation to Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 7 (Climate Factors) as there may be an increased risk of pollution incidents, and Objective 8 (Landscape) due to the potential for significant deterioration of local landscape character and visual amenity. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to disturbance to the local community and users of local community facilities, the potential for transport disruption and indirect impacts on recreation, such as through noise and dust generation, and Objectives 12 and 13 (Material Assets) as new infrastructure is required for option, the option is likely to generate waste and there may be minor effects on local roads.

In relation to operational effects, significant beneficial (moderate) effects are anticipated in relation to two SEA objectives:

- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would provide significant resilience to climate change risks such as prolonged droughts by increasing the volume of water retained and available for use during such periods.
- **Objective 10**: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' as improved resilience of supply to residents would be served indirectly by the reservoir.

In addition, slight beneficial effects are anticipated during operation in relation to Objective 3 (Water) as the option will provide a significant means of increased water storage and supporting a more resilient supply of water, Objective 7 (Climate Factors) due to the increased area available to help store flood flows and Objective 13 (Material Assets) as the works will improve an existing asset and will improve resilience in respect of water supply infrastructure.

Significant adverse (moderate) effects during operation are anticipated in relation to one SEA objective:

- **Objective 2**: 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' as significant and permanent loss of soils within the footprint of the new reservoir extent is expected due to the land take required for the area of inundation.

In addition, there are anticipated to be a number of slight adverse effects during operation in relation to Objective 1 (Biodiversity) as changes in local hydrology may increase pressures on water dependant habitat and species in the

area, Objective 3 (Water) due to the potential for effects on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) as minor permanent effects on noise and air quality are expected, and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation (e.g. of pumping station). Slight adverse effects during operation also apply to Objective 8 (Landscape) due to the potential for changes to the landscape and Objective 9 (Cultural Heritage) due to permanent effects on the setting of historic assets identified in close proximity to the option.

7.2.1.3 [S9] La Rosière desalination plant extension

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S9] La Rosière desalination plant extension														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	++	0	0	0	+	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	0	0	0	0	0	-	0

This option is to increase capacity of La Rosière desalination plant by a final additional new 5 Ml/d treatment stream. It is assumed that current delivery pipelines are adequately sized to sustain the increase in output. A new pumping station will likely be required, as well as other ancillary assets.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction in respect of Objective 1 (Biodiversity) due to the potential the potential to result in minimal disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area, Objective 3 (Water) due to the potential for adverse impacts on water quality and quantity, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated, and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities. Slight adverse effects during construction also apply to Objective 7 (Climate Factors) due to the increased risk of pollution incidents, Objective 8 (Landscape) due to impacts on visual amenity, Objective 9 (Cultural Heritage) as the option may temporarily affect the setting of historic assets, Objectives 10 and 11 (Population and Human Health) as minimal and temporary disturbance to the local community and users of footpaths and other public rights of way are anticipated, and Objectives 12 and 13 (Material Assets) as the option is likely to generate waste and result in minor and temporary impacts to built assets / infrastructure.

The operation of this option will likely produce significant (moderate) beneficial effects in relation to one SEA objective:

- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option affords resilience during periods of drought, which are anticipated to be exacerbated by climate change.

During operation of this option, slight beneficial effects are anticipated in relation to Objective 3 (Water) as the option is likely to improve resilience by using additional resources outside freshwater environment and Objective 10 (Population and Human Health) as it is anticipated that the new water abstraction would increase resilience of water supply for residents.

Slight adverse effects are anticipated during operation in respect of Objective 1 (Biodiversity) as discharge from the plant may put pressures on water dependant habitat and species, Objective 3 (Water) as there may be effects on

the water environment associated with discharges (hypersaline brine) from the plant, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated, Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation of the plant and Objective 12 (Material Assets) due to increased waste and resources during operation.

7.2.1.4 [S18] Bellozanne indirect treated effluent water reuse scheme

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S18] Bellozanne indirect treated effluent water reuse scheme														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	-	--	-	-	--	0	-	-	--	-	-	-	--
Operation	Positive Residual Effects	0	0	++	0	0	++	0	0	0	0	0	++	0
	Negative Residual Effects	--	0	-	-	-	0	-	-	-	-	-	-	0

This option involves the treatment and reuse of a portion of the treated final effluent from Bellozanne WwTW to augment water resources in Jersey. The option concept is to provide an effluent diversion or capture mechanism at the outlet of the Bellozanne WwTW (downstream of the existing UV disinfection channel) to enable some of the effluent to be pumped to a new enhanced treatment site. Collection and transfer of Bellozanne WwTW effluent will involve a new effluent collection system at the outlet of Bellozanne WwTW, a new pumping station, new pipeline and a new break pressure tank. Further/enhanced treatment of Bellozanne WwTW effluent will involve a new treatment site, including utilities, access and facilities. Transfer of raw water to Val de la Mare Reservoir requires new pipeline, a new break pressure tank, a new pumping station, and a new discharge arrangement into Val de la Mare reservoir. The waste disposal pipeline will require a new pumping station, new pipeline, and a chamber containing non-return valve and pressure sustaining valve.

Construction of this option will likely produce slight beneficial effects in relation to Objective 9 (Cultural Heritage) as it may temporarily affect the setting of historic assets intersected or in close proximity to the pipeline route.

Significant (moderate) adverse effects are anticipated during construction in relation to four SEA objectives:

- **Objective 2**: 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' due to the potential for temporary and limited potential for disturbance to soils and Geological SSIs.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities.
- **Objective 9**: 'To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains' as construction may temporarily affect the setting of historic assets intersected or in close proximity to the pipeline route.
- **Objective 13**: 'To avoid negative effects on built assets / infrastructure' due to the potential for moderate and temporary impacts on built assets / infrastructure.

In addition, slight adverse effects during construction are anticipated in respect of Objective 1 (Biodiversity) due to the potential to result in loss or disturbance to designated or non-designated habitat or species, including Environmentally Sensitive Areas. There may be minor permanent loss of habitat or species following construction

of the pumping stations and other permanent above ground infrastructure. Slight adverse effects are also expected in relation to Objective 3 (Water) as the increased risk of pollution incidents may have adverse impacts on water quality and quantity, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated, Objective 7 (Climate Factors) as there may be an increased risk of pollution incidents, and Objective 8 (Landscape) due to a risk of pollution incidents. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community and users of footpaths and other public rights of way, and Objective 12 (Material Assets) as new infrastructure is required for option and the option likely to generate waste.

The operation of this option will likely produce significant (moderate) beneficial effects in relation to three SEA objectives:

- **Objective 3**: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' as the scheme will facilitate water reuse, supporting water resources and allowing abstraction water for indirect potable reuse in supplementing the water supply to Val da la Mare Reservoir.
- **Objective 6:** 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the scheme is anticipated to provide considerable security of supply during extreme weather events associated with climate change including droughts by reutilising highly treated effluent. The increased network flexibility may also reduce the pressure to develop new sources in water stressed areas and therefore, contribute indirectly to supporting environmental resilience.
- **Objective 12**: 'To minimise resource use and waste production' as re-use of effluent that has been treated to a high standard will minimise resource and reduce waste production.

The operation of this option will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 1:** 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' as marine discharge outfall has potential to impact a Ramsar site.

Slight adverse effects during operation are anticipated in respect of Objective 3 (Water) as discharge outfall has potential to affect marine water quality through introduction of water with differing pH or chemical composition, Objective 4 (Air) due to minor and permanent impacts on noise and air quality, Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation, Objective 7 (Climate Factors) due to minor contributions to an increased risk of flooding, Objective 8 (Landscape) due to new above-ground infrastructure, Objective 9 (Cultural Heritage) as above ground infrastructure and associated infrastructure may affect the setting of historic assets intersected or in close proximity. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community. Also, the discharge in St Aubin's Bay may attribute negative association/perceptions with the use of the bay for recreational and other uses by the local community. Consequent impacts on tourism economy may also materialise. Slight adverse effects related to Objective 12 (Material Assets) are due to additional resource use associated with expanded treatment process and pumping requirements.

7.2.1.5 [S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0

	Negative Residual Effects	-	-	-	-	-	0	-	-	--	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	+	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	0	-	0	0	0	0	0	0	0	0

This option seeks to enhance the transfer mechanism of Val de la Mare reservoir to La Hague to Mont Gavey to Queens Valley reservoir by around 15 Ml/d additional capacity. The proposed asset enhancements would increase overall supply resilience and can be operated flexibly. They could be used in conjunction with any new sources of water, including helping to blend any desalination or effluent reuse scheme supplies with freshwater. The main option elements include Val de la Mare Reservoir to La Hague pumping station and La Hague to Mont Gavey tank, which will use existing infrastructure. Mont Gavey tank to Grand Vaux & Queens Valley reservoirs will require new pipeline.

It is anticipated that this option would result in slight beneficial effects in relation to Objective 9 (Cultural Heritage) as there is potential for the excavation of the pipeline to impact buried archaeology if present which may afford opportunity to improve archaeological understanding locally.

Significant (moderate) adverse effects are anticipated during construction in relation to one SEA objective:

- **Objective 9**: 'To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains' as the option may affect the setting of historic assets identified in close proximity to the pipeline route, these effects are anticipated to be temporary.

During construction, there are anticipated to be a number of slight adverse effects in relation to Objective 1 (Biodiversity) as pipeline construction has the potential to result in loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area, Objective 2 (Soil) due to the potential for temporary and limited disturbance to soils, Objective 3 (Water) as there is potential for adverse impacts on water quality and quantity due to an increased risk of pollution incidents, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated, and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities. Slight adverse effects also apply to Objective 7 (Climate Factors) as there may be an increased risk of pollution incidents, Objective 8 (Landscape) as impacts on visual amenity are anticipated, Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community and users of footpaths and other public rights of way, and Objectives 12 and 13 (Material Assets) as new infrastructure is required, the option likely to generate waste and there is likely to be minor and temporary impacts on built assets / infrastructure.

In relation to operational effects, no significant beneficial or adverse effects are anticipated. However, slight beneficial effects are anticipated in relation to Objective 3 (Water) as it is anticipated that the option will strengthen network flexibility by enabling transfers between areas of high water availability and lower availability therefore reducing abstraction requirements on stressed waterbodies and Objective 6 (Climate Factors) as the increased network flexibility and transfer capacity may reduce the pressure to develop new sources in water stressed areas and therefore, contribute indirectly to supporting environmental resilience.

Slight adverse effects are expected during operation of the option in relation to Objective 5 (Greenhouse Gas Emissions) as carbon will be generated.

7.2.1.6 Supply measures - Basket 1: Catchment Measures

- [S1] Groundwater catchment management measures

- [S2] Surface water catchment management measures: education and influencing of land owners and farmers
- [S3] Surface water catchment management measures: physical catchment land improvement activities

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Supply measures - Basket 1: Catchment Measures														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	++	++	++	+	+	++	++	+	+	++	+	+	+
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

This basket of option was considered previously as individual options S1, S2 and S3 in WRDMP21, but have been grouped for WRDM24 due to their similarity in nature.

This option focusses on implementing catchment management measures that broadly fall within three categories:

- Engagement and actions to benefit groundwater quality
- Engagement and actions to benefit surface water quality
- Physical catchment measures to benefit surface water quality

This option and its sub-components are not expected to result in any material additional reliable yield but will help secure existing reliable yield and enhance supply resilience, preventing a reduction of reliable yield due to water quality deterioration and reduce unplanned outage risks due to adverse water quality conditions.

Engagement with farmers and also with Jersey Airport in relation to runoff risks to the St Ouen's boreholes catchment) to protect, and where possible improve, groundwater quality.

It is understood that water quality protection measures are already in place at Jersey Airport, but additional measures could be necessary. This option aims to prevent a reduction of reliable yield due to water quality deterioration and reduce unplanned outage risks due to adverse water quality conditions.

Regarding agriculture, the Jersey Clean Water Action Group is currently already working with farmers to reduce the use of pesticides and improve farming practices to protect raw water supplies. Work has focussed on potato farming to date and Jersey Water has seen improvements in nitrate levels from the work of the Action Group.

Catchment management educational actions (e.g. engagement with farmers) to protect (and where possible improve) surface water quality.

Approaches to further increasing education and engagement with farmers to encourage use of water-friendly farming methods includes provision of information pamphlets/website pages, stakeholder meetings, promoting catchment management techniques through education/farm demonstration days and events, mobile visitor centres, employment of catchment advisors, a dedicated website and helpline, and on-line assistance/dedicated online forums. Work is already ongoing with farming groups, but further actions could be beneficial, principally in relation to nitrates and pesticides.

Physical catchment measures:

Implementation of physical catchment management measures to protect (and where possible improve) surface water quality.

Physical measures (with possible Jersey Water funding or financial contributions) may include chemical storage, cattle management fencing, reducing stocking density, removing soil compaction, farm steading design, tillage, woodland planting, wetland buffers and attenuation ponds.

This option has not previously been attempted and would extend Jersey Water's reach into supporting (either directly or indirectly) the introduction of physical measures on farms to reduce diffuse and point pollution risks.

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

The operation of this option will likely produce significant (moderate) beneficial effects in relation to six SEA objectives:

- **Objective 1:** 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' reduced resource pressures, protection of water resources which may increase availability for water dependant habitat and species. There may also be opportunities for biodiversity enhancement through physical measures including woodland planting, wetland buffers and attenuation ponds. The option will secure existing reliable yield and enhance supply resilience.
- **Objective 2**: 'To protect and enhance the functionality, quantity and quality of soils and geologically designated sites' through physical measures such as removing soil compaction.
- **Objective 3:** 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' for surface water and groundwater quality through the engagement, actions and physical measures proposed.
- **Objective 6**: 'To reduce vulnerability of built infrastructure to climate change risks and hazards' as the option would result in a reduction in carbon emissions associated with water supply/treatment. Further, the implementation of physical measures including woodland planting would also be beneficial.
- **Objective 7**: 'To reduce or manage flood risk, taking climate change into account' as where physical measures such as woodland planting, wetland buffers and attenuation ponds are introduced there may be reduced flood risk
- **Objective 10:** 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' due to the reduced risk of flooding and potential opportunity to increase recreational areas through physical measures such as woodland planting, wetland buffers and attenuation ponds.

Slight beneficial effects are also anticipated for air, noise and carbon emissions (Objectives 4 and 5) associated with water supply/treatment and the implementation of physical measures including woodland planting. There are anticipated to be long term benefits where physical measures such as woodland planting, wetland buffers and attenuation ponds are introduced and there will be changes to the landscape (Objective 8). The option as the potential to protect heritage assets downstream that may be at risk of flooding (Objective 9). Beneficial effects are also identified through the potential opportunity to increase recreational areas through physical measures such as woodland planting, wetland buffers and attenuation ponds (Objective 11). Slight adverse effects are expected for material assets (Objective 12 and 13) as measures will reduce resource use and wastage and reduced risk of flooding for built assets/infrastructure.

No adverse effects are anticipated during operation of the option.

7.2.1.7 Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	--	-	-	-	--	0	-	-	--	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	+	0	0	0	+	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	-	-	-	0	0	-	0

This option is a sub variant of the WRDMP21 option S27) that aimed to provide new raw water treatment facilities to address adverse raw water quality constraints at some surface water sources, reducing risk of outage and possibly increasing reliable yield. This option could include treatment of inflows before reservoir storage, in-reservoir treatment (e.g. algae control measures) and/or between the reservoir source and the inlet to a water treatment works. Other treatment options could include a Nitrate removal plant at Le Mourier in central Jersey using "Phoslock", noting that copper sulphate dosing is currently in operation.

It is anticipated that this option would not result in any significant or slight beneficial effects during its construction.

Significant (moderate) adverse effects are anticipated during construction in relation to three SEA objectives:

- **Objective 1**: 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' due to the potential to result in permanent loss or disturbance to designated or non-designated habitat or species, including an Environmentally Sensitive Area.
- **Objective 5**: 'To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030' as carbon will be generated from materials used to construct the new infrastructure (embodied carbon) and from construction activities.
- **Objective 9**: 'To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains' due to the potential to adversely affect intersected heritage assets, although permanent loss is not anticipated where the pipeline follows the existing roads. Construction may also affect the setting of historic assets identified in close proximity to the options.

During construction, a number of slight adverse effects are anticipated in relation to Objective 2 (Soil) as there is potential for temporary and limited disturbance to soils, Objective 3 (Water) as there is potential for adverse impacts on water quality and quantity due to the increased risk of pollution incidents, Objective 4 (Air) due to minor and temporary impacts on air and noise quality, Objective 7 (Climate Factors) due to an increased risk of pollution incidents and Objective 8 (Landscape) as impacts on visual amenity are possible. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community, users of local community facilities and users of footpaths and other public rights of way in the area, and Objectives 12 and 13 (Material Assets) as new infrastructure is required for the option, it is likely to generate waste and there are likely to be minor and temporary impacts on built assets / infrastructure.

The operation of this option is not anticipated to result in any significant beneficial or adverse effects. However, slight beneficial effects are expected in relation to Objective 3 (Water) as the option is expected to increase supply resilience, Objective 6 (Climate Factors) as the increased network supply resilience may reduce the pressure to develop new sources in water stressed areas and therefore, contribute indirectly to supporting environmental

resilience, and Objective 10 (Population and Human Health) as an improved resilience of supply to residents is anticipated.

In addition, slight adverse effects are anticipated in relation to Objective 1 (Biodiversity) as a change in local hydrology including increased abstraction may increase pressures on water dependant habitat and species in the area, Objective 3 (Water) due to the potential for effects of change in local hydrology including increased abstraction on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation (e.g. of pumping station). Slight adverse effects also apply to Objective 7 (Climate Factors) as flood risk may be increased slightly, Objective 8 (Landscape) due to new above-ground infrastructure, Objective 9 (Cultural Heritage) as effects on the setting of historic assets in close proximity to the option may continue through operation, and Objective 12 (Material Assets) as new infrastructure is required for the option and it is likely to result in increased waste and resources.

7.2.2 Customer and Demand

7.2.2.1 Demand measures - Basket 1: Smart metering and tariff updates:

- [D2] Smart meter installation
- [D3] Increased volumetric tariffs
- [D4] Incentive-based tariffs

Customer and Demand Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Demand measures - Basket 1: Smart metering and tariff updates														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	0	0	0	-	-	0	0	0	0	0	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with the outcome of more efficient use of water and water being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected through the increased awareness through metering and tariffs (Objective 10). Reduced abstraction, treatment and pumping will also reduce the use of resources and waste produced (Objective 12).

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. Slight adverse effects are anticipated in relation to air and carbon emissions associated with the operational fleet required to install meters and carbon generated from materials used to manufacture infrastructure associated with metering (embodied carbon) activities.

7.2.2.2 Demand measures - Basket 4: Leakage detection and associated activities:

- [D29] Enhanced leak detection and repair
- [D30] Increased DMA coverage
- [D31] Improved DMA monitoring
- [D32] Improved distribution monitoring and modelling
- [D104] Dedicated leakage management system

Customer and Demand Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Demand measures - Basket 4: Leakage detection and associated activities														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	0	0	0	-	0	-	-
Operation	Positive Residual Effects	++	0	++	+	+	+	0	0	0	+	0	++	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction due to the potential to disturb biodiversity and priority habitats, disturb contaminated material and impact on BMV agricultural land and disturb the water environment, although specific locations are unknown (Objective 1, 2 and 3). Construction (leakage works) is likely to have minor and temporary impacts on air and noise emissions (Objective 4) and carbon will be generated from materials used in the works (Objective 5). There is potential for slight negative effects during construction (leakage works) on the health and wellbeing of community (Objective 10). In terms of material assets, leakage works may include pipe rehabilitation schemes which would generate waste spoil, pipe lengths, subsurface fill and other materials and have the potential to impact built assets and infrastructure (Objective 12 and 13).

The operation of this option will likely result in significant (moderate) beneficial effects in relation to three SEA objectives:

- **Objective 1:** 'To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain' reduced demand for water (through the various measures described including leakage control) leading to greater volumes being retained within the environment.
- **Objective 3**: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats' due to the leakage reductions resulting in water being kept within the environment.
- **Objective 12**: 'To minimise resource use and waste production' as leakage works will reduce resource use and wastage.

In addition, slight adverse effects are anticipated in relation to reduced air, noise and carbon emissions (Objectives 4 and 5) where reduced supply and treatment is required. Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due repairing existing infrastructure (Objective 6). Positive operational effects in relation to health and wellbeing are expected where measures secure a more resilient water supply (Objective 10).

7.2.3 Drought Management

7.2.3.1 [DM2] Drought - Water rationing

Drought Management		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought - Water Rationing														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	+	0	0	0	0	+	0
	Negative Residual Effects	-	-	0	0	0	0	0	-	0	--	--	0	-

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with the outcome of more efficient use of water and water being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Reduced abstraction, treatment and pumping will also reduce the use of resources and waste produced (Objective 12).

The operation of this option will likely result in significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 10:** 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing' due to the restrictions on water supply to homes and businesses and disturbance this will cause.
- **Objective 11:** 'To maintain and enhance tourism and recreation' as there is potential for adverse effects on tourism assets such as gardens where watering or washing cannot to take place.

Slight adverse effects are anticipated in relation to biodiversity (Objective 1) as restrictions may affect watering plants and using hosepipes having minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. Water rationing may marginally impact soil quality through increased dust related erosion (Objective 2). Slight adverse effects are anticipated in terms of landscape and visual amenity associated if watering of private gardens, and use of ornamental fountains etc will be

restricted. Where buildings and other assets are not able to be washed/cleaned during the operation of this option slight adverse effects are anticipates (Objective 13).

7.2.3.2 [DM3] Drought - Temporary desalination

Drought Management		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought - Temporary desalination														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	+	0	0	0	+	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	0	0	0	0	0	-	0

Option will install additional temporary desalination treatment process at La Rosière (1-2 Ml/d capacity.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction or operation.

During construction no beneficial effects are anticipated, however slight adverse effects were identified across a number of objectives. There is potential to disturb biodiversity and priority habitats, and disturb the water environment through construction activities (Objective 1 and 3). Construction of the infrastructure is likely to have minor and temporary impacts on air and noise emissions (Objective 4) and carbon will be generated from materials used in the works (Objective 5). Works are within areas of High, Medium and Low Inland Flood Risk which may increase the risk of pollution incidents during construction (Objective 7). Slight adverse effects are anticipated for Objective 8 (Landscape) as impacts on visual amenity are possible and Objective 9 (Cultural Heritage) as construction may affect the setting of historic assets identified. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community, users of local community facilities and users of footpaths and other public rights of way in the area, and Objectives 12 and 13 (Material Assets) as new infrastructure is required for the option, it is likely to generate waste and there are likely to be minor and temporary impacts on built assets / infrastructure.

During operation slight beneficial effects are expected in relation to Objective 3 (Water) as the option is expected to increase supply resilience, Objective 6 (Climate Factors) as it affords resilience during periods of drought, which are anticipated to be exacerbated by climate change, and Objective 10 (Population and Human Health) as an improved resilience of supply to residents is anticipated.

In addition, slight adverse effects are anticipated in relation to Objective 1 (Biodiversity) as discharge from the plant may increase pressures on water dependant habitat and species in the area, Objective 3 (Water) due to the potential for effects of discharges (hypersaline brine) on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation (e.g. of the additional processes). Slight adverse effects are also anticipated for Objective 12 (Material Assets) as the additional processes are likely to result in increased waste and resources.

7.2.3.3 [DM5] Drought - Temp PFAS treatment

Drought Management	SEA Objective												
	1	2	3	4	5	6	7	8	9	10	11	12	13

Drought - Temp PFAS treatment

Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	+	0	0	0	+	0	0	0
	Negative Residual Effects	-	0	-	-	-	0	0	-	-	0	0	-	0

The option will install temporary PFAS treatment (GAC unit) at St Ouen's boreholes to increase borehole output.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction or operation.

During construction no beneficial effects are anticipated, however slight adverse effects were identified across a number of objectives.

During construction no beneficial effects are anticipated, however slight adverse effects were identified across a number of objectives. There is potential to disturb biodiversity and priority habitats, disturb soils and disturb the water environment through construction activities (Objective 1, 2 and 3). Construction of the infrastructure is likely to have minor and temporary impacts on air and noise emissions (Objective 4) and carbon will be generated from materials used in the works (Objective 5). Works are within areas of Low Inland Flood Risk which may increase the risk of pollution incidents during construction (Objective 7). Slight adverse effects are anticipated for Objective 8 (Landscape) as impacts on visual amenity are possible and Objective 9 (Cultural Heritage) as construction may affect the setting of historic assets identified. Slight adverse effects also apply to Objectives 10 and 11 (Population and Human Health) due to minimal and temporary disturbance to the local community, users of local community facilities and users of footpaths and other public rights of way in the area, and Objectives 12 and 13 (Material Assets) as new infrastructure is required for the option, it is likely to generate waste and there are likely to be minor and temporary impacts on built assets / infrastructure.

During operation slight beneficial effects are expected in relation to Objective 3 (Water) as the option is expected to increase supply resilience, Objective 6 (Climate Factors) as it affords resilience during periods of drought, which are anticipated to be exacerbated by climate change, and Objective 10 (Population and Human Health) as an improved resilience of supply to residents is anticipated.

In addition, slight adverse effects are anticipated in relation to Objective 1 (Biodiversity) as increased abstraction may increase pressures on water dependant habitat and species in the area, Objective 3 (Water) due to the potential for effects of change in local hydrology including increased abstraction on groundwater resources, water bodies and water dependant habitats, Objective 4 (Air) as minor and temporary impacts on air and noise quality are anticipated and Objective 5 (Greenhouse Gas Emissions) as carbon will be generated from operation (e.g. of the additional processes). Slight adverse effects are also anticipated for Objective 8 (Landscape) due to effects from to new above-ground infrastructure, Objective 9 (Cultural Heritage) from effects on the setting of historic assets identified in close proximity and Objective 12 (Material Assets) as the additional processes are likely to result in increased waste and resources.

7.2.3.4 [DM6] Drought - Customer awareness

Drought Management	SEA Objective												
	1	2	3	4	5	6	7	8	9	10	11	12	13

Drought - Customer awareness														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with reduced demand for water and water being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected where increasing awareness reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to increased awareness will also reduce the use of resources and waste produced (Objective 12).

During the operation phase of this Option, it is anticipated that there will be no adverse effects on any of the SEA Objectives.

7.2.3.5 [DM7] Drought - TWUB - NEUB (lite)

Drought Management		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought – TWUB – NEUB (lite)														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	-	-	0	0	0	0	0	0	0	0	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with reduced demand for water and water being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and

carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected where increasing awareness reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to will also reduce the use of resources and waste produced (Objective 12).

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. Slight adverse effects are anticipated in relation to biodiversity (Objective 1) as restrictions may affect watering plants and using hosepipes having minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. Water rationing may marginally impact soil quality through increased dust related erosion (Objective 2).

7.2.3.6 [DM8] Drought - RTWUB - NEUB (extensive)

Drought Management		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought – RTWUB – NEUB (extensive)														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	-	-	0	0	0	0	0	0	0	-	-	0	-

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with reduced demand for water and water being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected where increasing awareness reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to will also reduce the use of resources and waste produced (Objective 12).

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. Slight adverse effects are anticipated in relation to biodiversity (Objective 1) as restrictions may affect watering plants and using hosepipes having minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. Water rationing may marginally impact soil quality through increased dust related erosion (Objective 2). Slight adverse effects are anticipated for Population and Human Health (Objective 10 and 11) due to the disruption of the restrictions including on commercial uses which may have economic effects and tourism and recreation assets such as swimming pools, municipal parks and beach showers.

7.2.3.7 [S33 ->DM14] Drought - Water tankering on island

Drought Management	SEA Objective

		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought – Water tankering on island														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	0	0	0	0	0	+	0	0	0	+	+	0	0
	Negative Residual Effects	-	0	-	-	-	0	0	0	0	0	0	-	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with continued water supply. The option will maintain a supply of water during extreme weather events associated with climate change including droughts (Objective 6). Positive operational effects in relation to health and wellbeing are expected where a water supply is maintained in areas of the island experiencing supply shortfalls (Objective 10), including tourism and recreation assets (Objective 11).

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. Slight adverse effects are anticipated in relation to biodiversity were tankering of the water leads to increased disturbance (Objective 1). Adverse effects on the water environment are possible due to increased run off from hydrocarbons from the vehicles involved in tankering of treated water across the island (Objective 3). Slight adverse effects are anticipated for air, noise (Objective 4) and carbon emissions (Objective 5) as they are likely to be increased by the tankers involved in moving the water. Tankering of water across the island will also require the use of resources (Objective 12).

7.2.3.8 [S37 -> DM15] Drought - Reduce levels of service

Drought Management		**SEA Objective**												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought - Reduce levels of service														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	-	0	0	0	0	0	0	0	0	-	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with the conservation of water and it being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to

health and wellbeing are expected where increasing awareness reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to will also reduce the use of resources and waste produced (Objective 12).

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. Slight adverse effects are anticipated in relation to biodiversity (Objective 1) as restrictions may affect activities such as watering plants and using hosepipes having minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. Slight adverse effects are anticipated for health and well-being (Objective 10) due to the disruption of the reduced service and potential restriction on activities such as irrigation of gardens and allotments and use of water for recreational purposes.

7.2.3.9 [DM16] Drought - Reduce levels of service (pressure)

Drought Management		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Drought - Reduce levels of service (pressure)														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	+	0	+	0
	Negative Residual Effects	-	0	0	0	0	0	0	0	0	-	0	0	0

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with the conservation of water and it being kept within the environment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats and reduced pressures on water supplies (Objective 3). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced vulnerability of built infrastructure to climate change risks and hazards is anticipated due to the more efficient use of water (Objective 6). Positive operational effects in relation to health and wellbeing are expected where increasing awareness reduce the need for more disruptive action (Objective 10). Reduced abstraction, treatment and pumping due to will also reduce the use of resources and waste produced (Objective 12).

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. Slight adverse effects are anticipated in relation to biodiversity (Objective 1) as restrictions may affect activities such as watering plants and using hosepipes having minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. Slight adverse effects are anticipated for health and well-being (Objective 10) due to the disruption of the reduced service and potential restriction on activities such as irrigation of gardens and allotments and use of water for recreational purposes.

8. Mitigation

8.1 Introduction

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting any significant adverse environmental effects that have been identified. In practice, a range of measures applying one or more of these approaches is likely to be considered in mitigating any significant adverse effects predicted as a result of implementing the WRDMP. In addition, it is also important to consider measures aimed at enhancing positive effects. All such measures are generally referred to as mitigation measures.

However, the emphasis should be in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, should mitigation then examine ways of reducing the scale / importance of the effect.

Mitigation can take a wide range of forms, including:

- Refining Intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation phase;
- Identifying issues to be addressed in project assessment, such as Environmental Impact Assessment and the development of Environmental Management Plans for certain projects or types of project;
- Proposals for changing other plans and programmes; and
- Contingency arrangements for dealing with possible adverse effects.

8.2 Mitigation approaches applied through the SEA

A number of mitigation approaches have been used throughout the development of the WRDMP, in order to mitigate potential effects (significant or otherwise). Of note is that within a number of Options, 'embedded mitigation' has been considered. 'Embedded mitigation' is mitigation that has been incorporated into the development of the Option and is set out for each Option in Tables 8-1 to 8-24.

Through the SEA process, further 'additional mitigation' has also been identified and this is also set out in tables below. 'Additional mitigation' is mitigation that is required to address specific issues relating to significant effects (bolded in table below) in addition to 'embedded mitigation' and identified through the SEA process.

Table 8-1 - New stream abstraction (Fernlands)

[S101] New stream abstraction (Fernlands)	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant and also consider the potential for using trenchless pipe laying techniques in such areas. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to Ramsar site. ▪ During operation, monitoring of water levels to ensure no adverse effects on water dependant habitat and species
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Care of topsoil for future reuse and land reinstated upon completion.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation and monitoring likely required in respect of operational impact on Fernlands stream in respect of water quality / availability for dependant habitats.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.

[S101] New stream abstraction (Fernlands)	
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase is likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies. ▪ Design to avoid increasing hardstanding in areas of flood risk. ▪ The use of SuDs during operation would act to reduce the risk of flooding at the pumping station.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain. ▪ Careful siting of new pumping stations to include screening and reinstatement to be made along the pipeline route.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪ Archaeology Watching Brief may be required during the construction phase depending on the presence / absence of archaeology.
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Diversions to be in place during any anticipated closure of routes/prows. Minor and temporary effects are likely to still occur.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-2 - New storage reservoir option Trinity reservoir

[S103] New storage reservoir option Trinity reservoir	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. If loss is unavoidable, compensatory habitat elsewhere may be required. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to potential impacts on Ramsar site. ▪ During operation, monitoring of water levels may be required to ensure no adverse effects on water dependant habitat and species
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Reinstatement of land temporarily disturbed by the works needed to pre – construction standards. Permanent loss of soils is expected to be unavoidable.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation and monitoring likely required in respect of operational impact in respect of water quality / availability for dependant habitats.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Excavation activities may need to be accompanied by a Dust Management Plan. ▪ Consideration of air and noise quality in CEMP. Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.

[S103] New storage reservoir option Trinity reservoir	
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Best practicable means to manage flood risk during construction. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect watercourses.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain. ▪ Reservoir design to minimise potential impacts, including planting and screening respectively.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Further optioneering / realignment of the scheme should be considered to fully explore the potential for retention of the listed buildings and place. Where this is not possible an historic record of the feature should be made. ▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. Residual effects may remain due to potential loss of archaeological remains due to construction. ▪ A desk-based assessment of known heritage assets and potential for unknown archaeological remains should be undertaken. This will inform the need for any further archaeological investigation such as geophysical or building surveys trial trenching and archaeologica ▪ investigations. lPotential ground investigation works should be reviewed to inform the assessment of the potential for waterlogged remains to be present. ▪ The potential for public engagement and community involvement should be considered through option progression, e.g. community excavation.
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Consider amendment to the footprint of the reservoir to prevent impacts to residential properties and any other sensitive receptors. Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. This should be addressed in a CEMP. ▪ Loss of farms is however anticipated to be permanent and close and sensitive liaison will need to be made with affected residents / property owners – note that matters of financial compensation are outside the scope of this assessment. An Agricultural Impact Assessment should be considered to fully understand impacts on farm holdings as a result of permanent loss of land. ▪ Maximise opportunities to improve health and wellbeing of the local community. This might be achieved through investment in walking routes, bird watching facilities, scoping opportunities for on water activities, fishing and other ventures.

[S103] New storage reservoir option Trinity reservoir	
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Diversions to be in place during any anticipated closure of routes/prows. Minor and temporary effects are likely to still occur. ▪ Investigate possibility of inclusion of circular walking routes around reservoir and accessibility for boats/kayaks/stand up paddle boards to utilise facility
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. Potential for permanent loss remains.

Table 8-3 - Expansion of Val de la Mare reservoir (new dam) 1200Ml, 750Ml and 450Ml

Expansion of Val de la Mare reservoir (new dam) 1200Ml, 750Ml and 450Ml	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. If loss is unavoidable, compensatory habitat elsewhere may be required. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to Ramsar site. ▪ During operation, monitoring of water levels may be required to ensure no adverse effects on water dependant habitat and species
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Reinstatement of land temporarily disturbed by the works needed to pre – construction standards. Permanent loss of soils is expected to be unavoidable.

Expansion of Val de la Mare reservoir (new dam) 1200Ml, 750Ml and 450Ml	
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation and monitoring likely required in respect of operational impact in respect of water quality / availability for dependant habitats.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. ▪ Excavations may require an accompanying Dust Management Plan. ▪ Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Best practicable means to manage flood risk during construction. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect watercourses.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain. ▪ Reservoir expansion design to minimise potential impacts, including planting and screening respectively.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪ Further heritage assessment in respect of setting impacts to nearby heritage assets. Archaeology Watching Brief may be required during the construction phase depending on the presence / absence of archaeology.
To maintain and enhance the health and wellbeing of the local community,	▪ Construction to employ best practice techniques to ensure disruption to community and nearby residents is minimised. This may be facilitated through use of CEMP containing measures to reduce impact from noise, transport, visual and dust.

Expansion of Val de la Mare reservoir (new dam) 1200Ml, 750Ml and 450Ml	
including economic and social wellbeing	
To maintain and enhance tourism and recreation	▪ Construction to employ best practice techniques to ensure disruption to community and nearby residents is minimised. This may be facilitated through use of CEMP containing measures to reduce impact from noise, transport, visual and dust.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Implement best practice construction methods to minimise any effects on the transport network.

Table 8-4 - [S15d] New groundwater abstraction: d. Pont Marquet

[S15d] New groundwater abstraction: d. Pont Marquet	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant and also consider the potential for using trenchless pipe laying techniques in such areas. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to Ramsar site.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Care of topsoil for future reuse and land reinstated upon completion.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Operational effects may be mitigated through control of abstraction timing and volume

[S15d] New groundwater abstraction: d. Pont Marquet	
	▪ Further investigation is required in respect of abstraction impacts on groundwater quality and availability for dependant habitats
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase are likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies. Design to avoid increasing hardstanding in areas of flood risk.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain. ▪ Careful siting of any new infrastructure to include screening and reinstatement to be made along the pipeline route.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪ Archaeology Watching Brief may be required during the construction phase depending on the presence / absence of archaeology.
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.

[S15d] New groundwater abstraction: d. Pont Marquet	
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Diversions to be in place during any anticipated closure of routes/prows. Minor and temporary effects are likely to still occur.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-5 - La Rosière desalination plant extension

[S9] La Rosière desalination plant extension	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to discharge from the plant.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ None identified.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation in relation to discharge from the plant.

[S9] La Rosière desalination plant extension	
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. ▪ Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase is likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies. ▪ Design to avoid increasing hardstanding in areas of flood risk.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP.
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Minor and temporary effects are likely to still occur.

[S9] La Rosière desalination plant extension	
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-6 - Bellozanne indirect treated effluent water reuse scheme

[S18] Bellozanne indirect treated effluent water reuse scheme	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant and also consider the potential for using trenchless pipe laying techniques in such areas. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to Ramsar site.tOngoing monitoring regime to ensure discharges do not adversely impact on water quality.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Care of topsoil for future reuse and land reinstated upon completion. ▪ Best practice methods to be implemented to minimise disturbance effects on Geological SSIs.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation is required in respect of discharge impacts on water quality. ▪ Effluent will be treated to a suitable high stand through a new water reclamation facility. Ongoing monitoring regime to ensure discharges do not adversely impact on water quality. Agreement with regulatory authorities as to the required discharge standard.

[S18] Bellozanne indirect treated effluent water reuse scheme	
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. ▪ Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase are likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies. ▪ Design to avoid increasing hardstanding in areas of flood risk. ▪ The use of SuDs during operation would act to reduce the risk of flooding at pumping stations and other areas of new above ground infrastructure.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain. ▪ Careful siting of any new infrastructure to include screening and reinstatement to be made along the pipeline route.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Consider options to realign pipeline to avoid intersection with listed buildings and places. Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪ Further work likely to be required to determine significance of effect, depending on the presence or absence of buried archaeology and potential need for archaeological watching brief during construction – particularly in areas not previously developed. Residual effects may remain due to potential loss of archaeological remains due to construction.t Situation of above ground infrastructure to be sensitive to historic environment. ▪ Consider use of screening.

[S18] Bellozanne indirect treated effluent water reuse scheme	
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur. ▪ Consider trenchless techniques to minimise impacts on local community. Engage with local community and recreational bodies s to ensure effluent discharge within the bay does not adversely impact on its value.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Diversions to be in place during any anticipated closure of routes/prows. Minor and temporary effects are likely to still occur. ▪ Consider trenchless techniques to minimise impacts on tourism/recreation opportunities during construction. ▪ Engage with local community and recreational bodies s to ensure effluent discharge within the bay does not adversely impact on its value.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact. This may involve a Site Waste Management Plan and consideration of the waste hierarchy. ▪ Consider trenchless techniques during construction to reduce wastage.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. ▪ Consider use of trenchless techniques to avoid / minimise disruption to the road network.

Table 8-7 - Raw water infrastructure system enhancements (La Hague -Queens Valley)

[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant and also consider the potential for using trenchless pipe laying techniques in such areas. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to Ramsar site.

[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)	
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Care of topsoil for future reuse and land reinstated upon completion.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Consider use of directional drilling/ trenchless construction methods that avoid or limit open trench digging techniques.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. ▪ Consideration of air and noise quality in CEMP.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase are likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Consider options for realignment of pipeline to avoid intersection with designated heritage assets, particularly Le Hurel Farm Listed building. ▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪ Archaeology Watching Brief may be required during the construction phase. ▪ Further investigation may be required in regard to the assets intersected to determine how to mitigate potential significant impacts.

[S14] Raw water infrastructure system enhancements (La Hague -Queens Valley)	
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Diversions to be in place during any anticipated closure of routes/prows. Minor and temporary effects are likely to still occur.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-8 - Supply measures - Basket 1: Catchment Measures

Supply measures - Basket 1: Catchment Measures	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified

Supply measures - Basket 1: Catchment Measures	
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-9 - Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources

Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP. ▪ Further investigation required in relation to abstraction.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Care of topsoil for future reuse and land reinstated upon completion.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation in relation to the change in local hydrology including increased abstraction.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. ▪ Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified

Supply measures - Basket 2: Treatment enhancement to target PFAS contaminated sources	
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase is likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies. ▪ Design to avoid increasing hardstanding in areas of flood risk.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Minor and temporary effects are likely to still occur.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-10 - Demand measures - Basket 1: Smart metering and tariff updates

Demand measures - Basket 1: Smart metering and tariff updates
Embedded Mitigation considered in Option assessment
None Identified
Additional Mitigation derived in Option assessment

Demand measures - Basket 1: Smart metering and tariff updates	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• Consider use of electric vehicles to complete metering.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• Consider use of electric vehicles to complete metering.
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified

Demand measures - Basket 1: Smart metering and tariff updates	
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-11 - Demand measures - Basket 2: Educational Campaigns and related activities

Demand measures - Basket 2: Educational Campaigns and related activities	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• Consider use of electric vehicles to complete metering.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• Consider use of electric vehicles to complete metering.

Demand measures - Basket 2: Educational Campaigns and related activities	
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-12 - Demand measures - Basket 3: Planning Regulation changes

Demand measures - Basket 3: Planning Regulation changes
Embedded Mitigation considered in Option assessment
None Identified
Additional Mitigation derived in Option assessment

Demand measures - Basket 3: Planning Regulation changes	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified

Demand measures - Basket 3: Planning Regulation changes	
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-13 - Demand measures - Basket 4: Leakage detection and associated activities

Demand measures - Basket 4: Leakage detection and associated activities	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Ensure best practicable means to prevent loss of habitat during construction. Use of access shafts (or similar) for leakage works would be used to avoid ecologically sensitive locations.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Land reinstated upon completion of leakage works. Best practice construction measures to be implemented. Complete appropriate contaminated land investigations where necessary.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Measures to reduce pollution risk during construction associated with capital works may include implementation of CEMP.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures implemented during construction.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ None identified

Demand measures - Basket 4: Leakage detection and associated activities	
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase (leakage works) should still be implemented. This may include implementation of CEMP.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction (leakage works).
To maintain and enhance tourism and recreation	▪ None identified
To minimise resource use and waste production	▪ Consider use of Waste Management Plan and KPIs in respect of waste reuse for capital projects. ▪ Use of trenchless techniques where possible
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction (leakage works). However, minor and temporary effects are likely to still occur.

Table 8-14 - [D105] Raw water (upstream) leakage reduction (flow metering of raw mains)

[D105] Raw water (upstream) leakage reduction (flow metering of raw mains)
Embedded Mitigation considered in Option assessment
None Identified
Additional Mitigation derived in Option assessment

[D105] Raw water (upstream) leakage reduction (flow metering of raw mains)	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Ensure best practicable means to prevent loss of habitat during construction. Use of access shafts (or similar) for leakage works would be used to avoid ecologically sensitive locations.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Land reinstated upon completion of leakage works. Best practice construction measures to be implemented. Complete appropriate contaminated land investigations where necessary.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Measures to reduce pollution risk during construction associated with capital works may include implementation of CEMP.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures implemented during construction.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase (leakage works) should still be implemented. This may include implementation of CEMP.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction (leakage works).

[D105] Raw water (upstream) leakage reduction (flow metering of raw mains)	
To maintain and enhance tourism and recreation	▪ None identified
To minimise resource use and waste production	▪ Consider use of Waste Management Plan and KPIs in respect of waste reuse for capital projects.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction (leakage works).

Table 8-15 - Pressure reduction programme (Active pressure management)

[D35] Pressure reduction programme (Active pressure management)	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Ensure best practicable means to prevent loss of habitat during construction. New infrastructure to avoid ecologically sensitive locations.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Land reinstated upon completion of pressure reduction works. Best practice construction measures to be implemented. Complete appropriate contaminated land investigations where necessary.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Measures to reduce pollution risk during construction associated with capital works may include implementation of CEMP.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures implemented during construction.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ None identified

[D35] Pressure reduction programme (Active pressure management)	
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase (pressure reduction works) should still be implemented. This may include implementation of CEMP.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction (leakage works).
To maintain and enhance tourism and recreation	▪ None identified
To minimise resource use and waste production	▪ Consider use of Waste Management Plan and KPIs in respect of waste reuse for capital projects.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction (leakage works).

Table 8-16 - Drought - Water Rationing

[DM2] Drought - Water Rationing
Embedded Mitigation considered in Option assessment
None Identified
Additional Mitigation derived in Option assessment

[DM2] Drought - Water Rationing	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.

[DM2] Drought - Water Rationing	
To maintain and enhance tourism and recreation	▪ Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-17 - Drought - Temporary desalination

[DM3] Drought - Temporary desalination	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. ▪ Further investigation may be required in relation to discharge from the plant.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ None identified.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation in relation to discharge from the plant may be required.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. ▪ Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.

[DM3] Drought - Temporary desalination	
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase is likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies. Design to avoid increasing hardstanding in areas of flood risk.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP.
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Minor and temporary effects are likely to still occur.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-18 - Drought - Temp PFAS treatment

[DM5] Drought - Temp PFAS treatment	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	▪ Best practice methods to be implemented to minimise disturbance effects. Ground will be reinstated and habitats replaced. ▪ Consider Tree Protection Plan that includes consideration of root protection measures where relevant. ▪ Consider the timing of construction works in relation to ecological windows and legislative requirements and consideration of biodiversity and designated sites and habitats in CEMP.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	▪ Care of topsoil for future reuse and land reinstated upon completion.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	▪ Best practice mitigation measures likely to be implemented during construction. This may be achieved through implementation of a CEMP which includes measures to protect waterbodies and minimise the likelihood of a pollution incident occurring. ▪ Further investigation in relation to the change in local hydrology including increased abstraction.
To reduce and minimise air and noise emissions	▪ Best practice mitigation measures likely to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes. Consideration of air and noise quality in CEMP. Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	▪ Acknowledging Jerseys energy supply is predominantly imported low carbon electricity from EDF in France (one third of which is from renewable hydropower sources and the other two thirds from low-carbon nuclear power), ensure use of renewable or hydrogen powered energy during construction and operation for energy supply and use of materials with lower embodied carbon. ▪ Carbon footprint study could help identify areas for carbon savings or alternative materials.
To reduce vulnerability of built infrastructure to climate change risks and hazards	▪ None identified
To reduce or manage flood risk, taking climate change into account	▪ Measures to reduce the impact on flooding during the construction phase is likely to be implemented. This may be achieved through implementation of a CEMP which includes measures such as the consideration of storm water runoff and dewatering operations to protect waterbodies.

[DM5] Drought - Temp PFAS treatment	
	▪ Design to avoid increasing hardstanding in areas of flood risk.
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	▪ Best practice measures to be implemented to minimise effects and CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction although temporary effects during construction may remain.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	▪ Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. ▪
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	▪ Best practice measures will likely be implemented to minimise disturbance during construction e.g. in relation to noise. This should be addressed in a CEMP. However, minor and temporary effects are likely to still occur.
To maintain and enhance tourism and recreation	▪ Best practice measures will likely be implemented to minimise disturbance during construction. Minor and temporary effects are likely to still occur.
To minimise resource use and waste production	▪ Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
To avoid negative effects on built assets / infrastructure	▪ Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

Table 8-19 - Drought - Customer awareness

[DM6] Drought - Customer awareness	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified

[DM6] Drought - Customer awareness	
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified

[DM6] Drought - Customer awareness	
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-20 - Drought - TWUB - NEUB (lite)

[DM7] Drought - TWUB - NEUB (lite)	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified

[DM7] Drought - TWUB - NEUB (lite)	
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-21 - Drought - RTWUB - NEUB (extensive)

[DM8] Drought - RTWUB - NEUB (extensive)	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified

[DM8] Drought - RTWUB - NEUB (extensive)	
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified

[DM8] Drought - RTWUB - NEUB (extensive)	
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-22 - Drought - Water tankering on island

[S33 ->DM14] Drought - Water tankering on island	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified

[S33 ->DM14] Drought - Water tankering on island	
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-23 - Drought - Reduce levels of service

[S37 -> DM15] Drought - Reduce levels of service	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified

[S37 -> DM15] Drought - Reduce levels of service	
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified
To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified

[S37 -> DM15] Drought - Reduce levels of service	
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

Table 8-24 - Drought - Reduce levels of service

[S37 -> DM15] Drought - Reduce levels of service	
Embedded Mitigation considered in Option assessment	
None Identified	
Additional Mitigation derived in Option assessment	
To protect and enhance biodiversity, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	• None identified
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	• None identified
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	• None identified
To reduce and minimise air and noise emissions	• None identified
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	• None identified

To reduce vulnerability of built infrastructure to climate change risks and hazards	• None identified
To reduce or manage flood risk, taking climate change into account	• None identified
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	• None identified
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	• None identified
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	• None identified
To maintain and enhance tourism and recreation	• None identified
To minimise resource use and waste production	• None identified
To avoid negative effects on built assets / infrastructure	• None identified

9. Cumulative, synergistic and indirect effects

9.1 Introduction

As noted in the SEA Directive, there is a requirement to consider secondary, cumulative and synergistic effects of implementation of the WRDMP. Secondary effects are effects that are not a direct result of the WRDMP, but which occur away from the original effect or as the result of a complex pathway. Cumulative effects arise where several proposals or elements individually may or may not have significant effect but in-combination have a significant effect due to spatial crowding or temporal overlap. Synergistic effects are when two or more effects act together to create an effect greater than the simple sum of the effects when acting alone.

9.2 Likely cumulative effects

It is considered that there is insufficient detail to robustly assess the potential for cumulative effects at this stage. Key information regarding construction timeline (and then potentially overlapping construction programmes) has not yet been established. This section then sets out commitments for further assessment and likely mitigation measures that would need to be considered in order to minimise effects across construction and operational phases.

9.3 In-plan cumulative effects

The results of the direct effects of the WRDMP options are discussed in Chapter 7. It is considered that the options may interact cumulatively across sustainability issues either through construction or operation.

9.3.1 Construction In-plan cumulative effects

It is considered that the potential for significant cumulative effects during the construction period is greatest where options are closest to each other and where they have overlapping construction periods. In such instances, there is greater likelihood of construction impacts such as dust, noise, water quality and light emissions, fragmentation, severance, construction traffic and impacts on amenity to act cumulatively on built and natural environment receptors.

In such cases necessary mitigation may include:

- Implementation of Construction Environmental Management Plan which would be expected to outline measures to protect the natural and built environment. For example, this would require the use of spill kits and other measures to be taken in the event of a pollution incident.
- Implementation of a Construction Dust Management Plan in order to minimise dust emissions
- Implementation of a Construction Traffic Management Plan in order to minimise disturbance during construction phase
- Effective engagement and consultation with affected residents and stakeholders

9.3.2 Operational In-plan cumulative effects

As with the construction phase, it is generally considered that where interventions are closest and operational periods overlapping, there is then greater potential to interact and give rise to cumulative effects. In respect of supply options it is however important to note that impacts on water quality and quantity may extend far beyond the

option location owing to the reach of waterbodies and hydrological connection. New abstraction sources may influence water quality and quantity far beyond the site of abstraction for example and then the potential for cumulative effects extends to a much greater area of influence.

Further consideration will need to be made at the planning and design stage in order to fully assess and mitigate potential cumulative effects during the operational phase. In respect of supply options, it is recommended that such assessment focuses on potential water quality and availability issues and potential impacts on water dependant habitats and species.

9.4 In-combination cumulative effects with other plans and projects

The cumulative effects of the WRDMP are difficult to accurately assess given the inherent uncertainties concerning future changes to baseline environmental conditions, future population and economic growth, the deliverability of major projects (e.g. infrastructure, housing and energy for example) and the complexities associated with water resource planning at the regional level. As such it is considered most practical to assess cumulative effects of options at the project level, as they arise, through the Environmental Impact Assessment process.

10. Monitoring

10.1 Introduction

The SEA Regulations state that the responsible authority 'shall monitor the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action' (Part 4 Post Adoption Procedures Regulation 17). In addition, the Environmental Report should provide information on a 'description of the measures envisaged concerning monitoring' (Schedule 2 Information for Environmental Reports).

In line with the SEA Regulations, monitoring will cover significant environmental effects and it will involve measuring indicators that will enable the establishment of a causal link between the implementation of the WRDMP and the likely significant effects (both positive and negative) being monitored. The SEA Regulations make clear that it is not necessary to monitor everything, or to monitor an effect indefinitely, rather monitoring should focus on those identified significant environmental effects. The DCLG guidance states that it is inappropriate to monitor everything, and monitoring proposals should be focused on the following areas:

- Identify potential breaches of international, national, or local legislation, recognised guidelines, or standards.
- Actions which may give rise to irreversible damage, with a view to identifying trends before such damage occurs.
- Where there was any uncertainty in the SEA and where monitoring would enable prevention or mitigation measures to be taken.

In short, it is the intention that the results of the monitoring will be of particular benefit to those involved with the further iterations of the WRDMP and if required, will allow early remediation to be undertaken of any identified adverse effects. Effective monitoring will also be a key component of ensuring that 'changes in direction' of the WRDMP, in light of the Adaptive planning approach, are done so with a full understanding of how the Plan is performing and what issues are arising.

10.2 Monitoring Plan

It should be noted that many of the effects identified that would arise from implementation of the Options contained within the WRDMP will be experienced during construction of infrastructure only and will not be experienced during operation of these facilities. In these circumstances monitoring will be restricted to the construction phase only.

It is also to be noted that as options are brought forward for development, further specific monitoring requirements may be incorporated in detailed designs and plans accompanying scheme development (including, where applicable, formal applications for any required environmental permits or abstraction licences, planning permission, as well as any scheme-specific environmental assessments). These will be discussed with relevant regulatory and statutory bodies and stakeholders to agree the appropriate scale and duration of such scheme-specific monitoring activities proportionate to the assessed environmental risks.

Table 10-1 - Proposed Monitoring

Objective	Overview of typical effect	Requirement for monitoring	Applicable in Construction (Frequency)	Applicable in Operation (Frequency)	Monitoring Action**
To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Construction and operation of the water supply network can have implications for biodiversity, for example through loss of habitat or disturbance to species. There is a potential that invasive species can spread through activities associated with moving water around the network, or through activities such as maintenance.	• Area (Ha) of designated site (including geological sites) directly affected by WRDMP Options	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required. This should include habitat or species impacts through hydrological connection.
		• Area or length of Priority Habitat affected / restored or created	Y (Pre and post construction)	N	Measure pre construction and review post construction.
		• Area of Green / Blue Infrastructure created	Y (Pre and post construction)	N	Measure pre construction and review post construction.
To protect and enhance the functionality, quantity and quality of soils and geologically designated sites	Soil is a non-renewable resource and is vulnerable to erosion, degradation and contamination. Valuable soil resources can be lost of degraded due to construction of water supply infrastructure. Pollution incidents during	• Area of good quality soils lost to WRMP Options	Y (Pre and post construction)	N	Measure pre construction and review post construction.
		• Total area of soil reinstated for agricultural use	Y (Pre and post construction)	N	Measure pre construction and review post construction to ensure completion or

	construction and operation can lead to contamination of the soil resource.				whether further work is required.
		• No. of pollution / contamination incidents during construction or operation of water supply infrastructure.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	Construction and operation of the water supply network can have a wider range of effects on the water environment, resulting in changes in water quantity within the environment, for example due to increased abstraction and water quality through pollution incidents.	• Changes in water quality condition (positive or negative) of relevant waterbodies.	Y (Monthly)	Y (Monthly)	Review monthly during construction and monthly during operation to ensure no adverse effects and whether further work is required.
		• No. of pollution incidents (both during construction and operation)	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
		• Continuation of monitoring at raw water intakes.	Y (Monthly)	Y (Monthly)	Review monthly during construction and monthly during operation to ensure no adverse effects and whether further work is required.
To reduce and minimise air and noise emissions	Construction or repair activities are likely to have implications for air and noise emissions. These could	• Scheme-specific monitoring during construction works / during operation (where applicable) would be monitored through an	Y (as directed by Environmental Management Plan)	Y (as directed by Environmental Management Plan)	Reviews to be carried out in line with Environmental Management Plan.

	include dust or other particulate matter generated by the activities themselves or the required plant and vehicles. Treatment and pumping of water is likely to lead to an increase in air and noise emissions. While most facilities will operate using energy mains supply, there may be a requirement for standby generators.	Environmental Management Plan agreed as part of the planning permission process			
		• Number of electric generators in use and period of usage.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
To achieve the Government of Jerseys target of becoming a carbon-neutral jurisdiction by 2030	As with air and noise, construction activities are likely to result in carbon emissions. Options would also result in embedded carbon, but also potentially ongoing emissions through the requirement for energy for pumping / treating water.	• Percentage of energy use from renewable sources	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
		• Renewable energy generated on Company property	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
		• Tonnes of embedded carbon in construction of Option	Y (Post Construction)	N	Review post construction.
		• Carbon emissions from Company operations	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up
		• Area (Ha) planted / restored for sequestration	Y	N	Measure pre construction and review post

			(Pre and post construction)		construction to ensure completion or whether further work is required.
		• Net greenhouse gas emissions per Ml (million litres) of treated water (kg CO2 equivalent emissions per Ml)	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up
		• Company fleet fuel consumption	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
To reduce vulnerability of built infrastructure to climate change risks and hazards	The climate is changing. This is anticipated to result in more extreme weather events which could disrupt or destroy infrastructure, including that related to water supply, on a more frequent basis.	• No. of days / hours when water infrastructure disrupted (loss of service) due to extreme weather events	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
To reduce or manage flood risk, taking climate change into account	Increased occurrence of extreme weather events due to a changing climate could increase flood risk, or increase the area at risk of flooding. Flood risk can also occur due to the increase in areas of hardstanding or loss of floodplain due to the construction of infrastructure, including that	• No. of days / hours when water infrastructure disrupted (loss of service) due to flooding •	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
		• Area (Ha) of flood plain lost	Y (Pre and post construction)	N	Measure pre construction and review post construction.

	related to water supply infrastructure.	• No. of projects where flood risk compensation was required or increase provided	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up
To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Construction activities can lead to effects on landscape or visual amenity, though reinstatement would remove these effects or provide opportunities to improve visual amenity. Options may lead to the creation of new infrastructure in the landscape.	• Area / length of Option located within areas designated for landscape protection •	Y (Pre and post construction)	N	Measure pre construction and review post construction.
		• Area / length of completed reinstatement	Y (Post Construction)	N	Review post construction.
To conserve, protect and enhance Jersey's historic environment and heritage assets, including archaeological remains	Construction activities can lead to effects on historic assets, including unknown artefacts though reinstatement would remove these effects or provide opportunities to improve the setting of these assets. Note that effects on archaeological remains cannot be undone. Dewatering of areas could damage buried assets. Archaeological investigation may provide opportunities to understand the past history of Jersey better.	• Number of listed building and places or other historic asset (designated & non-designated) harmed / damaged or conserved / enhanced by WRDMP Option	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
		• Length of pipeline routes realigned to avoid heritage assets	Y (Pre and post construction)	N	Measure pre construction and review post construction.
To maintain and enhance the health and wellbeing of the local	Construction activities could result in direct and indirect effects on health and wellbeing, as well as impact	• Monitoring to be discussed and agreed in light of prevailing conditions with relevant Health Officers of	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure

community, including economic and social wellbeing	on access to community facilities or provision of services.		Local Authorities in the Plan area, or any other relevant parties e.g. health or educational establishments. Consideration to be given to need for monitoring of air and noise emissions.			no adverse effects and whether further work is required.
		•	Number of days / hours when water supply to people on the vulnerable groups register is disrupted.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
		•	Duration of highways works	Y (Monthly)	N	Review monthly during operation to monitor and if activity needs to be stepped up
		•	Number of complaints relating to construction works	Y (Monthly)	N	Review monthly during construction to ensure no adverse effects and whether further work is required.
To maintain and enhance tourism and recreation	Construction and operation of WRDMP Options could affect both tourism and recreational facilities through direct disturbance or loss. This could be both temporary or permanent.	•	No net loss of important recreational / tourism amenity caused by WRDMP Option	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
		•	Generation of new recreational facilities	N	Y	Review upon operation of the option

				(Upon operation of the option)	
		• Area of greenfield / Open Space disturbed or lost	Y (Monthly and pre and post construction)	N	Review monthly during construction to ensure no adverse effects and whether further work is required. Review pre and post construction to determine greenfield / Open Space lost.
		• Km of PRoW / Walking Routes affected / lost / created by WRDMP Option	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
To minimise resource use and waste production	Construction and operation of WRDMP Options will likely require resource use (including valuable treated water) and generate waste production.	• Proportion of material reused on site	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
		• Proportion of recycled material used on site	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
		• Tonnes of construction waste sent to landfill as a proportion of total waste produced	Y (Monthly)	N	Review annually during operation to monitor and if

					activity needs to be stepped up
		• Tonnes of sludge sent to landfill	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
To avoid negative effects on built assets / infrastructure	Likely effects on built assets and infrastructure. This may include the maintenance and operation of public or private buildings, transport, amenity resource, machinery and plant. Major users such as hospitals, factories and food producers may be most susceptible unless protected.	• Number and nature of complaints to be measured and discussions to take place with sensitive operators in light of prevailing conditions.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
		• Complaints / incidence of strategic infrastructure disruption or loss of service	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.

11. Summary and Conclusions

The SEA carried out through the development of the WRDMP has been thorough and comprehensive. Assessment was made initially of an unconstrained option list and environmental issues were considered through all stages of the screening and option development process. The SEA team have closely liaised with, and provided to challenge to, the WRDMP team, when appropriate.

The Adaptive planning approach recognises the inherent uncertainties involved in water resource planning and consequently consists of five plausible 'futures' which were integrated into the core framework of the plan development. The essence of this approach is that the Plan can adapt depending on which of the potential future scenarios occurs. The plans considered are the Least Cost, Max Resilience, Max SEA and Preferred Plan.

Assessment of the options on Jersey Water's feasible list considered both the effects anticipated during construction and those which are anticipated to occur during operation of each option. A series of mitigation measures were also identified, with the aim of reducing or nullifying potential adverse effects, while aiming to maximising potential beneficial effects from each option.

It is anticipated that one supply option (Supply measures - Basket 1: Catchment Measures), one customer and demand option (Demand measures - Basket 1: Smart metering and tariff updates) and seven drought management options (Drought - Water Rationing; Drought - Temporary desalination; Drought - Temp PFAS treatment; Drought - Customer awareness; Drought – TWUB – NEUB (lite); Drought – RTWUB – NEUB (extensive); Drought – Water tankering on island; Drought - Reduce levels of service; and Drought - Reduce levels of service (pressure)) within the Preferred Plan will not require any construction activities. Construction activities are anticipated in relation to the implementation of all other Options, although for the most part where adverse or beneficial effects were identified they were not considered to be significant. However, moderate adverse effects were identified for a number of supply options across a number of objectives including Biodiversity, Soil, Air Quality, Greenhouse Gas Emissions, Cultural Heritage and Material Assets.

During operation, effects have been identified for all options, with significant adverse effects in relation to Expansion of Val de la Mare reservoir (new dam) 450Ml; La Rosière desalination plant extension; Bellozanne indirect treated effluent water reuse scheme; and Drought - Water Rationing. These significant adverse effects include permanent loss of soils, impacts on ecologically designated sites and disturbance to water supply at homes, businesses and tourist assets.

Significant beneficial effects in relation to New stream abstraction (Fernlands); Expansion of Val de la Mare reservoir (new dam) 450Ml; La Rosière desalination plant extension; Bellozanne indirect treated effluent water reuse scheme; Supply measures - Basket 1: Catchment Measures; and Raw water (upstream) leakage reduction (flow metering of raw mains) are anticipated during operation. Resilience to climate change risks, improved resilience of supply, supporting water resources, minimising waste and opportunities for biodiversity are examples of the significant beneficial effects anticipated.

In order to prevent, reduce or offset any significant adverse environmental effects that have been identified by the SEA, a number of mitigation approaches have been identified during the development of the WRDMP. Both 'embedded mitigation' and 'additional mitigation' has been considered. 'Embedded mitigation' is mitigation that has been incorporated into the development of an Option, further 'additional mitigation' has also been identified that could help to address specific issues relating to significant effects, in addition to 'embedded mitigation', as identified through the SEA process.

While many aspects of the WRDMP are anticipated to result in beneficial effects, it is important that Jersey Water understand the effect of implementation of the WRDMP, particularly in regard to those areas where significant adverse effects could occur. A series of monitoring measures have been noted through this SEA that could be incorporated into Environmental Management Plans for both the construction and operational phases of options, or

which could be applied across Jersey to help understand how implementing the WRDMP will interact with the Objectives of the SEA. This would allow early identification of unforeseen adverse effects, as well as crucially build up a bespoke, detailed database of evidence to inform consideration of future iterations of this adaptive plan.

In conclusion, Jersey Water have developed a Water Resources and Drought Management Plan (WRDMP) which has been subject to a set of thorough and comprehensive strategic environmental assessments. The assessments undertaken have been consistent in approach and resulted in iterative development of the Plan, thereby allowing the Plan to be developed in the context of a thorough understanding of the key environmental issues and constraints in the Jersey Water area. This allowed for a robust consideration of alternatives to the Plan and allowed identification of a Preferred set of options. The range and significance of potential effects to be anticipated from implementation of the WRDMP, including both beneficial and adverse, have been identified and mitigation proposed where appropriate or required. An emphasis on Demand Management will help to ensure that water can remain in the environment, unless absolutely needed for customer supplies. Monitoring will help to protect the environment by allowing early identification from unexpected effects and subsequent action to be taken, and will help inform future iterations of the Plan. Overall, it is considered that WRDMP represents a well-balanced approach, in terms of environmental performance, to providing water to the Jersey Water area.