Summer 2023

Regional Water Resources Plan – North West

Strategic Environmental Assessment

Appendix H: Study Area C – Environmental Review

Tionscadal Éireann Project Ireland 2040

6 CLEAN WATER AND SANITATION

Data disclaimer: This document uses best available data at time of writing. As data relating to population forecasts and trends are based on information gathered before the Covid 19 Pandemic, monitoring and feedback will be used to capture any updates. The National Water Resources Plan will also align to relevant updates in applicable policy. In December 2022, the Water Services (Amendment) (No. 2) Act, 2022 was signed into law. This act provides that, from the 31 December 2022, Irish Water will only be known as Uisce Éireann. It also provides that, from that date, all references in any enactment, legal proceedings or other document to Irish Water shall be construed as references to Uisce Éireann only. The SEA Environmental Report and Appendices, including this Environmental Review reflect this transition from Irish Water to Uisce Éireann.

Baseline data included in the draft RWRP-NW has been incorporated from numerous sources including but not limited to; National Planning Framework, Central Statistics Office, Regional Spatial and Economic Strategies, Local Authority data sets, Regional Assembly data sets and Uisce Éireann data sets. Data sources are detailed in the relevant sections of the draft RWRP-NW. The year 2019 was selected as the base year to align with the planning period (2019-2025) of the NWRP.

Limitation: This report has been prepared on behalf of, and for the exclusive use of Jacobs' Client (Irish Water), and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

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1 Introduction and Background

1 Introduction and Background

This Study Area Environmental Review forms part of the SEA Environmental Report for the Regional Water Resources Plan (RWRP) for the North West Region (referred to as the Regional Plan). The Regional Plan includes seven individual study area reviews (SAA-G) as appendices.

This Study Area C Environmental Review includes:

- Context for the Study Area Environmental Review;
- Environmental baseline;
- Environmental assessment for the options screening process and feasible options;
- Assessment of the alternatives considered and the Preferred Approach;
- Cumulative effects assessment; and
- Recommendations for implementation, including mitigation and monitoring.

This Environmental Review summarises the environmental assessment undertaken for Study Area C (SA-C) within the North West Region for the options and approaches considered and as outlined in the Study Area C Technical Report (draft RWRP-NW Appendix 3). This Environmental Review applies the Strategic Environmental Assessment (SEA) objectives and environmental assessment methodology set out in the NWRP Framework Plan (Framework Plan).

Environmental Reviews have been undertaken for each study area and form appendices to the SEA Environmental Report for the Regional Plan as part of Phase 2 of the National Water Resources Plan (NWRP). Phase 1 in the development of the NWRP was the preparation of the Framework Plan, which was adopted in Spring 2021 following SEA, Appropriate Assessment (AA) and extensive public consultation. Two regional plans, the RWRP for the Eastern and Midlands region and the RWRP for the South West region have been taken through a consultation process and have been finalised and adopted. The RWRP for the North West region, which this Environmental Review supports as part of the SEA documentation, is expected to be adopted in Summer 2023. The RWRP for the South East is currently underway, is out for public consultation, and will be the final region for the Phase 2 NWRP. The Framework Plan, Regional Plans and supporting documentation are available at https://www.water.ie/projects/strategic-plans/national-water-resources/.

1.1 Options Assessment Methodology

The Options Assessment Methodology as adopted in the Framework Plan and implemented as part of the RWRP-NW provides a framework to identify potential solutions to address identified need. The key stages of the process are illustrated in Figure 1.1 and summarised below:

1) Identifying need – based on SDB and/or Drinking Water Safety Plan Barrier Assessment;
2) Scoping of the study area (Water Resource Zones (WRZs)) – understanding the study area and the existing conditions of assets, supply and demand issues; as well as environmental constraints and opportunities;
3) Identifying potential options for consideration relevant to the study area;
4) Coarse screening – assessing the unconstrained options and eliminate any that will not be viable;
5) Further option definition, information collection and preliminary costing;

6) Fine screening – options assessment and scoring against the key criteria with further removal of options identified as unviable and development of feasible options for costing and scoring assessment update;
7) Approach appraisal – comparison and assessment of combinations of options identified to meet the predicted supply demand deficit to determine the Preferred Approach; and
8) Monitoring and Feedback – a process for monitoring the implementation of the plan and responding to changes to policy and guidelines and to information changes which will feed into the 5 year plan cycle and includes an annual review to identify actions required within the plan cycle.

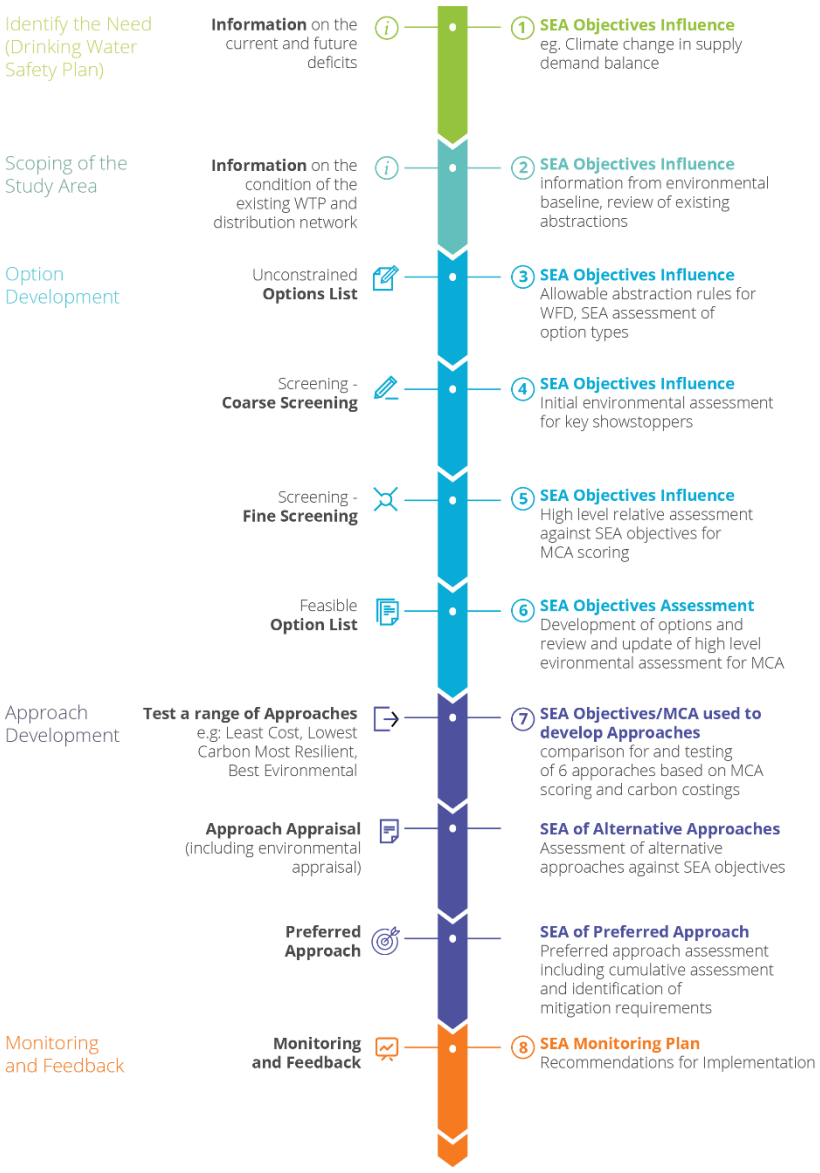

Figure 1.1 Option and Approach Development Process

1.2 Regional Plan Strategic Environmental Assessment

The four RWRPs, implementing Phase 2 of the NWRP, are each subject to a separate SEA process. The study area assessments will follow the outline methodology established by the Framework Plan. The SEA Environmental Reports are being published for consultation alongside the draft Regional Plans for each of the four regions. As indicated above, this consultation process has been completed for three of the regions and the South East Region, which is currently in consultation, is the final region in the Phase 2 NWRP.

Each of the Study Area Environmental Reviews, are presented as appendices to the SEA Environmental Reports, and include:

- Introduction for SEA, Water Framework Directive (Council Directive 2000/60/EC) (WFD) and AA applied at the study area level;
- Environmental baseline context;
- Environmental assessment for the options screening process and feasible options;
- Assessment of the alternatives considered and the Preferred Approach;
- Cumulative effects assessment between options within each study area and with proposed developments in the study area; and
- Recommendations for implementation, including mitigation and monitoring.

1.3 Study Area: Strategic Environmental Assessment

The set of SEA objectives developed at the Phase 1 scoping stage have been refined and finalised following consultation (see Table 1.1). These objectives have been influenced by the plans, policies and programmes review, the baseline trends and pressures identified, and the scope of the assessment as defined and consulted on in the Regional Plan SEA scoping report.

Table 1.1 SEA Objectives

SEA Topic	SEA Objective
Population, economy, tourism and recreation, and human health	Protect and, where possible, contribute to enhancement of human health and wellbeing and to prevent restrictions to recreation and amenity facilities in providing water services.
Water environment	Water quality and resources Prevent deterioration of the WFD status of waterbodies with regard to both water quality and quantity due to Uisce Éireann's activities. Contribute towards the "no deterioration" WFD condition and, where possible, to the improvement of waterbody status for rivers, lakes, transitional and coastal waters, and groundwater to at least 'Good' status.
	Flood risk Protect and, where possible, reduce risk from ground water and surface water flooding as a result of Uisce Éireann's activities.
Biodiversity	Protect and, where possible, enhance terrestrial, aquatic and soil biodiversity; particularly regarding European sites and protected species in providing water services.
Material assets	Minimise resource use and waste generation from, new or upgraded, existing water services infrastructure and management of residuals from drinking water treatment - to protect human health and the ecological status of waterbodies. Minimise impacts on other material assets and existing water abstractions.

SEA Topic	SEA Objective
Landscape and visual amenity	Protect and, where possible, enhance designated landscapes in providing water services.
Climate change	Climate change mitigation Minimise contributions to climate change emissions to air (including greenhouse gas emissions) as a result of Uisce Éireann's activities.
	Climate change adaptation Promote the resilience of the environment, water supply and treatment infrastructure to the effects of climate change.
Cultural heritage	Protect and, where possible, enhance cultural heritage resources in providing water services.
Geology and soils	Protect soils and geological heritage sites and, where possible, contribute towards the appropriate management of soil quality and quantity.

The SEA informs the development of the approaches and is undertaken on the various alternative approaches considered and the Preferred Approaches identified, along with cumulative impact assessment and identification of 'in-combination' effects.

The Regional Plan SEA Environmental Report was completed only after all study area reports for the North West region were available. At that point, Uisce Éireann conducted an exercise as part of the development of the overall relevant Regional Plan to assess the cumulative and in-combination impacts of the Preferred Approaches identified for each study area within the North West region. The conclusions of that cumulative assessment are presented in the SEA Environmental Report for the North West region.

If appropriate, the Preferred Approach identified for SA-C will have been modified prior to finalisation of the Regional Plan Technical Report and Environmental Review to take into account the conclusions of that cumulative assessment and identification of in-combination effects. The SEA for each of the Regional Plans in turn includes a cumulative assessment of the Preferred Approaches identified in the Regional Plan, in combination with the effects of the Preferred Approaches for each other region (to the extent that data was available and recognising that each Regional Plan is at a different stage of development).

1.4 Study Area: Water Framework Directive

Requirements under the WFD to avoid deterioration in waterbody status or objectives has been incorporated into the allowable abstraction constraints for new option abstractions. WFD requirements are also included in the SEA objectives for the assessment (see Table 1.1). Baseline data in relation to the WFD is presented in section 2.2.1 and a summary of the assessment for SA-C is provided in chapter 8 of this review.

1.5 Study Area: Appropriate Assessment

An AA was required for the Framework Plan to comply with the EU Habitats Directive (92/43/EEC) and is relevant to development of the Regional Plans, including the component study areas.

AA issues will be addressed in a separate Natura Impact Statement (NIS) for the Regional Plan, which will support the overall AA process that Uisce Éireann is required to carry out. Habitats Directive requirements have been integrated into the options development process and conclusions from the NIS for SA-C are provided in chapter 9 of this review.

1.6 Study Area C

The North West Region is subdivided into seven study areas based on factors such as:

- Groundwater body boundaries;
- Surface water sub-catchments;
- Geographical features;
- WRZ boundaries;
- Local authority functional areas; and
- Appropriate size for an efficient reporting structure.

This appendix reports on SA-C, the location of SA-C in relation to the North West Region is shown in Figure 1.2.

Study Area C lies within the counties of Mayo (including Achill Island), Sligo, Leitrim, Cavan, and Roscommon and its total area is approximately 5,150km^2. There are three principal settlements (with a population of over 10,000) within SA-C, namely Sligo, Castlebar, and Ballina (CSO, 2016a), as shown in Figure 1.3.

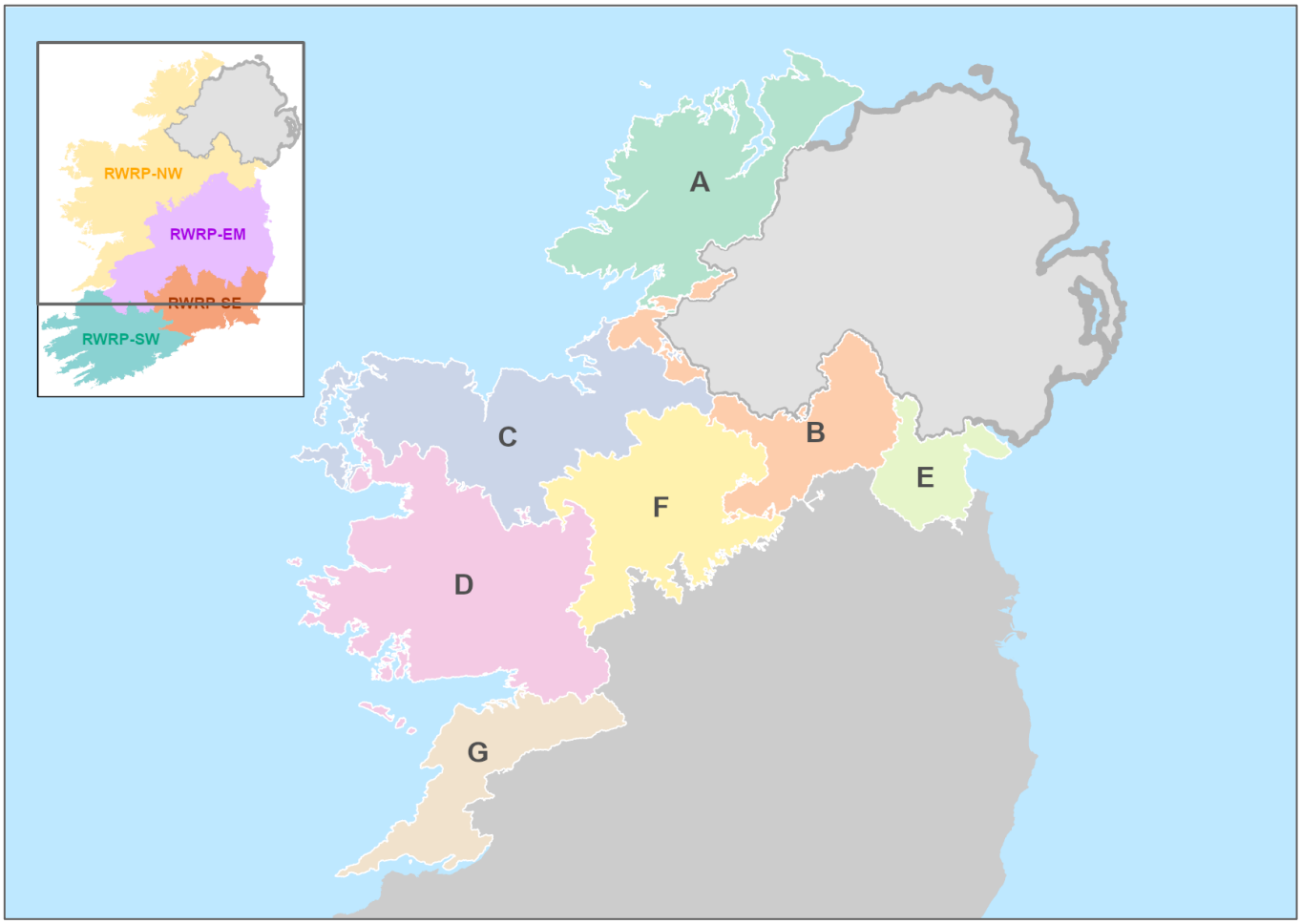

Figure 1.2 North West Region Study Areas

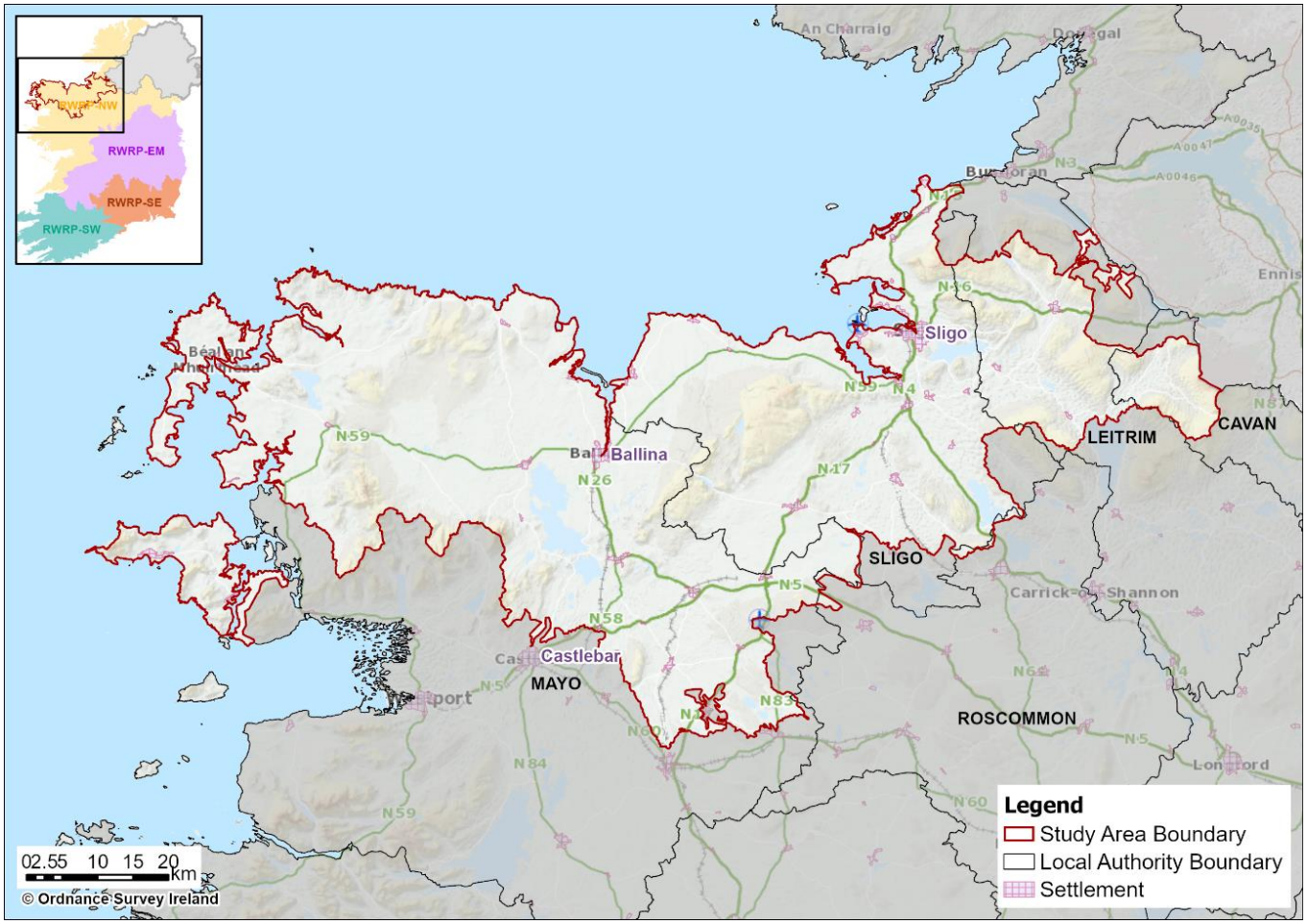

Figure 1.3 Study Area C

2 Study Area C Environmental Baseline Context

2 Study Area C Environmental Baseline Context

This chapter provides environmental baseline information for SA-C regarding the following key environmental topics in the SEA:

- Population, Economy, Tourism and Recreation, and Human Health;
- Water Environment;
- Biodiversity, Flora and Fauna;
- Material Assets;
- Landscape and Visual Amenity;
- Air Quality and Noise;
- Climate Change;
- Cultural Heritage;
- Geology and Soils; and
- Summary of key issues and trends over the plan period within the study area.

The baseline environment considers key indicators characterising the current situation in the study area and how these aspects are likely to develop over the Framework Plan's implementation period. This includes issues relating to pressures on the environment or the sensitivity of the environment to change. This chapter is intended to support and add to the baseline environmental information for the Regional Plan SEA Environmental Report, as context for the option appraisal and programme selection.

The baseline assessment also addresses the environmental aspects of Stages 1 and 2 of the options assessment methodology:

- Stage 1 Identifying need – based on SDB and/or Drinking Water Safety Plan Barrier Assessment; and
- Stage 2 Scoping of the study area (WRZs) – understanding WRZ's within the study area and the existing conditions of assets, supply and demand issues as well as environmental constraints and opportunities.

2.1 Population, Economy, Tourism and Recreation, and Human Health

2.1.1 Population

Table 2.1 provides a general overview of the WRZ's population and the projected percentage change in population between 2019 and 2044. The estimated population currently living in each WRZ has been based on the 2016 Census data. The 2016 population was assigned to District Metering Areas (DMAs) by mapping the Central Statistics Office (CSO) data to DMA boundaries. Uisce Éireann have projected the 2016 population forward to 2019 using the growth projections in the National Planning Framework, updated information from the Regional Spatial and Economic Strategies, and Local Authority Planning sections (where available). The full 2022 Census data was not available at the time of the SDB analysis, however, Uisce Éireann will update the SDB with the 2022 census data when published. Updated data and information will be incorporated via the monitoring and feedback process as set out in section 8.3.8 of the Framework Plan.

Table 2.1 Overview of the Population within the WRZs of SA-C

WRZ Reference Number and Name	Total Population Served (2019)*	% Population Change (2019-2044)*
2200SC0005 - Achill	2,417	15.3
2200SC0004 - Ballina	21,599	25.0
2200SC0006 - Ceide Fields	0	0
2200SC0008 - Charlestown	1,178	15.3
0200SC0003 - Dowra PWS (GWS Import)	94	15.3
2200SC0007 - Erris RWSS	3,963	15.3
2200SC0011 - Foxford	1,598	15.3
2200SC0012 - Kilkelly	1,032	15.3
2200SC0014 - Kiltimagh PWS	1,648	15.3
2200SC0019 - Knock Airport	1	15.3
2700SC0002 - Lough Easkey Regional Water Supply	6,068	15.3
2700SC0001 - Lough Talt Regional Water Supply	13,269	14.1
1700SC0003 - North Leitrim Regional Water Supply	6,145	15.3
2700SC0003 - North Sligo Regional Water Supply	4,691	23.4
2700SC0005 - Riverstown Public Water Supply	530	15.3
2700SC0004 - Sligo Town & Environs	30,862	34.6
2200SC0018 - Swinford	1,694	15.3

2.1.2 Economy and Employment

SA-C had a below average household disposable income per person in 2019 (CSO, 2022), and an unemployment rate of 4% in the Border region, and 3.8% in the West region of the country (CSO, 2023a).

Population increase and expected economic growth has meant that housing and sustainable urban development have been made a priority for the National Development Programme; therefore, to supply the demand there is an aim to increase housing stock. The number of new dwellings completed in Q1 2023 was 339 for the Border region, and 434 for the West region (CSO, 2023b).

2.1.3 Tourism and Recreation

Tourism in SA-C has an important role, particularly in rural areas, with the National Planning Framework (NPF) stating that tourism is a key aspect of rural job creation now and in the future (Government of Ireland, 2018). The county of Mayo has been described as "*the jewel of the Wild Atlantic Way*", with captivating coastlines and hidden landscapes, and a number of activities and attractions to explore (Visit Mayo, 2022).

Additionally, the study area is located along Ireland's Wild Atlantic Way, which is a tourism development strategy that aims to achieve greater visibility for the west coast of Ireland and is Ireland's first long-distance touring route (Fáilte Ireland, 2020).

Ireland's natural heritage is also recognised as an important tourism asset by the Department of Transport, Tourism and Sport (2019). For SA-C, the national park of note in SA-C is Wild Nephin National Park. Rivers, loughs and coastal areas all make an important contribution to tourism and recreational opportunities and support important fisheries.

2.1.4 Human Health

Table 2.2 provides well-being indicators for the Border and West regions within Ireland. Improvements in air quality, access to good quality drinking water and participation in recreational activities can all have a positive influence on human health and well-being.

Table 2.2 Well-Being Indicators for the Border and West Regions within Ireland

Region	Life Expectancy (CSO, 2020a)	Participation in Sports, Fitness or Recreational Physical Activities (% of Persons Aged 15+) (CSO, 2020b)	Air Quality (EPA, 2021)
Border	Male: 79.5 Female: 83.5	35%	Good
West	Male: 78.7 Female: 84.5	56%	Good

A key issue for public health is reliable access to good quality drinking water. Regulated water service providers have to ensure appropriate standards of supply and be able to cope with drought conditions, peak events, and maintenance of assets. This requires adequate reserve capacity in Uisce Éireann's supplies to provide a 1 in 50 Level of Service. At present, not all supplies within this study area provide the required levels of reserve capacity. Due to the limited historical monitoring of these supplies, particularly in relation to groundwater, this will need to be studied further. Table 2.3 lists the areas supplied by the Water Treatment Plants (WTPs) in SA-C.

Table 2.3 Areas Supplied by the WTPs in SA-C

Water Treatment Plants	Water Resource Zone	Local Authority Supplied
Achill WTP	2200SC0005 - Achill	Mayo
Crossmolina WTP, Lisglennon WTP and Wherrew WTP	2200SC0004 - Ballina	Mayo
Ceide Fields WTP	2200SC0006 - Ceide Fields	Mayo
Charlestown WTP	2200SC0008 - Charlestown	Mayo
Erris WTP	2200SC0007 - Erris RWSS	Mayo
Foxford WTP	2200SC0011 - Foxford	Mayo
Kilkelly WTP	2200SC0012 - Kilkelly	Mayo

Water Treatment Plants	Water Resource Zone	Local Authority Supplied
Kiltimagh WTP	2200SC0014 - Kiltimagh PWS	Mayo
Knock Airport WTP	2200SC0019 - Knock Airport	Mayo
Lough Easkey WTP	2700SC0002 - Lough Easkey Regional Water Supply	Sligo
Lough Talt WTP	2700SC0001 - Lough Talt Regional Water Supply	Sligo
Lough Gill (Moneyduff) WTP	1700SC0003 - North Leitrim Regional Water Supply	Leitrim
North Sligo (Ardnaglass) WTP	2700SC0003 - North Sligo Regional Water Supply	Sligo
Riverstown WTP	2700SC0005 - Riverstown Public Water Supply	Sligo
Foxes Den WTP and Kilsellagh WTP	2700SC0004 - Sligo Town & Environs	Sligo
Swinford WTP	2200SC0018 - Swinford	Mayo

Currently for day-to-day operations, 14 out of 17 of the WRZs in the area have a current and future projected SDB deficit (based on a 'Do Minimum' approach – see section 4.5 for further clarification). While sufficient on normal weather conditions, several would fail in drought. The North Sligo WRZ source has a large SDB Deficit and is subject to significant abstraction issues during summer and dry weather periods, with water levels lowering at higher abstraction rates.

Poor water quality can be linked to risks to health. The Barrier Assessment 17 of the 19 WTPs within the study area at high risk of failing to achieve the Uisce Éireann's conservative Barrier Assessment standards; particularly in relation to barrier and viruses (Barrier 1) (see Table 2.1 in the SA-C Technical Report).

The "quality need" identified through the Barrier Assessment is not an indicator of compliance with the Drinking Water Regulations. It is an internal Uisce Éireann assessment of the need to invest in areas of the Uisce Éireann asset base through resource planning, to ensure that potential risks or emerging risks to supplies are addressed. Currently, there are no WRZs on the EPA Remedial Action List within SA-C. Uisce Éireann is currently progressing immediate corrective action in relation to a number of supplies within SA-C in advance of the NWRP. Details of these are included in the SA-C Technical Report.

2.2 Water Environment

This topic covers geomorphology, WFD, flood risk, surface water quality and groundwater receptors. Figure 2.1 shows the water environment, including the WRZs, the WFD water catchment boundaries, the WTPs and the waterbodies in SA-C.

Table 2.4 provides a summary of the WFD catchments within SA-C.

Table 2.4 Catchments within SA-C (EPA, 2020)

WFD Catchments	Total Catchment Area (km²)	Catchment Area within SA-C (km²)
Blacksod-Broadhaven	1,298	1,290
Erne	3,441	31
Erriff-Clew Bay	1,509	20
Moy & Killala Bay	2,352	2,031
Sligo Bay & Drowse	1,606	1,545
Upper Shannon (26A)	604	230
Upper Shannon (26B)	674	0.5

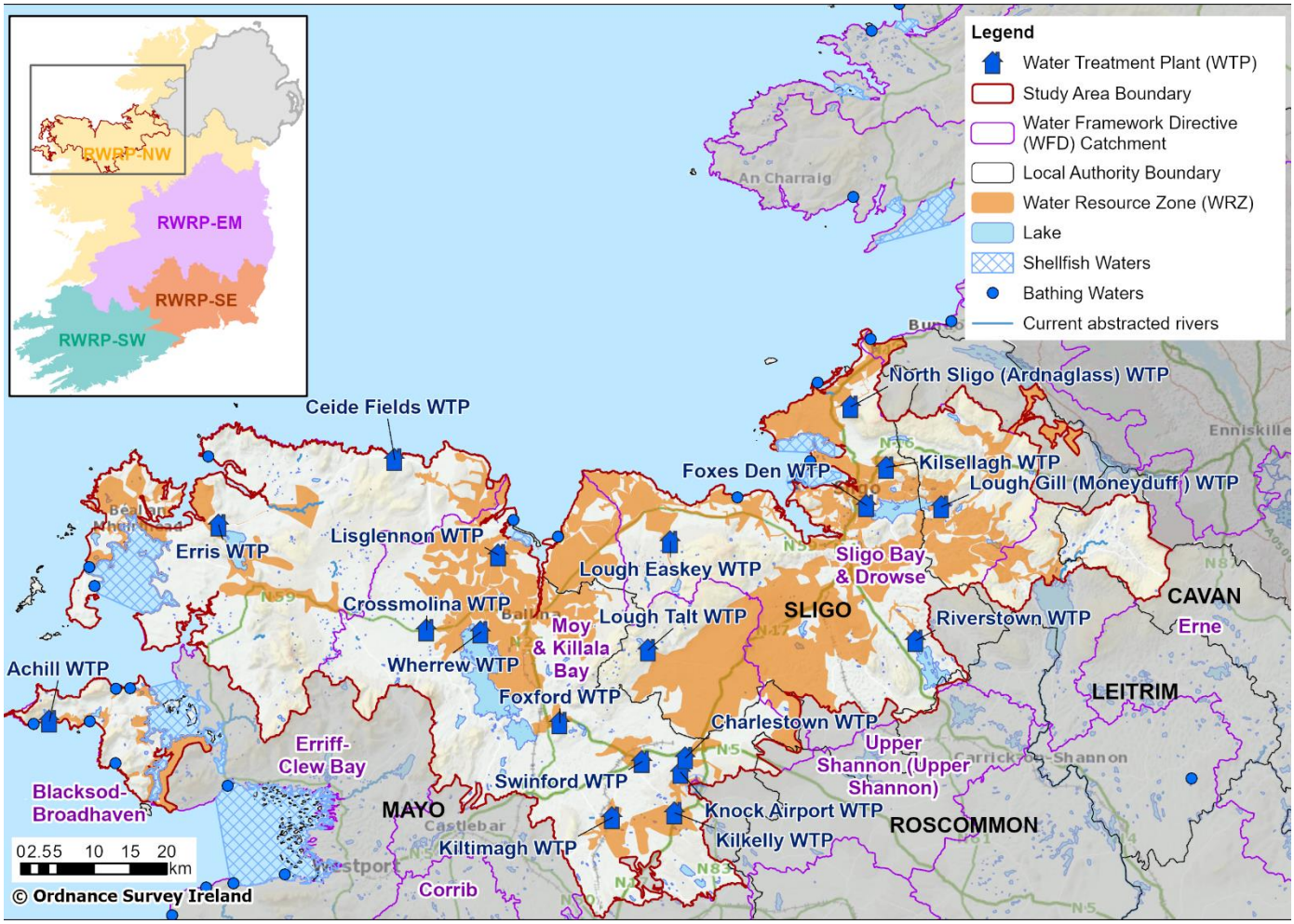

Figure 2.1 Water Environment of SA-C

2.2.1 Water Framework Directive

Under the WFD, Ireland must ensure that all waterbodies achieve 'Good' status by 2027. In addition, under the legislation, any modification to a WFD waterbody should not lead to deterioration in either the overall status or any of the WFD water quality parameters.

At the end of 2022, the government passed the Water Environment (Abstractions and Associated Impoundments) Act, 2022 (the Abstractions Act) which will ensure that national abstractions align with

the requirements of the Water Framework Directive. The Abstractions Act has not yet commenced and the associated regulations and guidelines which will further detail the types of assessment and national methodology to be used have not yet been published and are not yet in place.

Whilst the regulations and guidelines for the new abstraction regime are being developed, Uisce Éireann are assessing existing abstractions to identify surface water sites that may exceed future abstraction thresholds (see Appendix C of the Framework Plan for assessment methodology). Uisce Éireann have taken a precautionary approach based on their current understanding of how proposed abstraction legislation might be applied. This assessment suggests that certain schemes may be subject to reductions in abstraction under the new legislation; however, this will ultimately determined by the EPA based on the project level information before them.

As there are very few long duration flow records for Uisce Éireann's abstractions and for waterbodies within Ireland, Uisce Éireann lacks comprehensive data to fully understand the impact of the new legislation on these sources. Information is not currently stored centrally as it was historically collected and collated by Local Authorities. Uisce Éireann is building a telemetry system which will aid bringing all this data together, but this will take time. Therefore, improved monitoring and gathering better data is a priority.

On an interim basis, Uisce Éireann has developed an initial desktop assessment based on available information (see SA-C Technical Report). Over the coming years, Uisce Éireann will work with the environmental regulator, the EPA and the Geological Survey of Ireland, to develop desktop and site investigation systems to better understand the sustainability of its groundwater sources.

To understand the potential impact of the pending Abstraction Legislation on the SA-C Supplies, Uisce Éireann have assessed the potential impacts on their fourteen surface water abstractions: Moneyduff Lough Gill Intake (North Leitrim Regional Water Supply), Accorymore Lake Intake (Achill), Lough Conn (2 WTPs, Ballina), Carramore Lough (Erris RWSS), Lough Muck Intake (Foxford), Kilimagh (Kiltimagh PWS), Carrowcanada Spring (Stream) (Swinford), Foxes Den Intake Site (Sligo Town & Environs), Lough Talt (Lough Talt Regional Water Supply), Lough Easkey (Lough Easkey Regional Water Supply), Gortnaleck (North Sligo Regional Water Supply), Lyle (North Sligo Regional Water Supply), Kilsellagh Impounding Reservoir (Sligo Town & Environs).

Based on this initial assessment, the volumes of water abstracted at: Accorymore Lake Intake (Achill), Lough Muck Intake (Foxford), Carrowcanada Spring (Stream) (Swinford), Lough Talt (Lough Talt Regional Water Supply), Lough Easkey (Lough Easkey Regional Water Supply), Gortnaleck (North Sligo Regional Water Supply), Lyle (North Sligo Regional Water Supply), Foxes Den Intake Site (Sligo Town & Environs) and Kilsellagh Impounding Reservoir (Sligo Town & Environs) may not meet sustainability guidelines during dry weather flows. However, under the proposed regulatory regime, this will be adjudicated by the EPA.

Uisce Éireann has taken a conservative approach in identifying sustainable abstractions for new options (described in section 3.2) and has applied a sensitivity assessment that considers proposals against potential for future sustainability related reductions in volume (section 5.4).

The Department of Housing, Planning and Local Government's (2019a) public consultation document, regarding the significant water management issues, has been considered by Uisce Éireann. Therefore, the pressures, and the relevant priority 'Areas for Action' are provided below and in Table 2.7.

There are four WFD catchments in SA-C and the total number of surface and groundwater waterbodies within SA-C are provided in Table 2.5 below.

Table 2.5 WFD Waterbodies within SA-C (EPA, 2023a)

Waterbody Type	Water Catchments	Number of Waterbodies	Number of Waterbodies Rated Below Moderate
Rivers	Blacksod-Broadhaven	58	4
	Erne	11	0
	Erriff-Clew Bay	3	0
	Moy & Killala Bay	106	3
	Sligo Bay & Drowse	69	8
	Upper Shannon (26A and 26B)	11	0
Lakes	Blacksod-Broadhaven	13	0
	Erne	19	3
	Erriff-Clew Bay	0	0
	Moy & Killala Bay	17	0
	Sligo Bay & Drowse	0	0
	Upper Shannon (26A and 26B)	4	0
Transitional and Coastal	N/A	22	0
Groundwater	N/A	70	0

The predominant pressures, and the percentage of 'at risk' waterbodies impacted by them, in the latest catchment summaries (catchments.ie, 2021a, 2021b, 2021c, 2021d, 2021e, 2021f and 2021g) are:

- Blacksod-Broadhaven: Agriculture (80%) and Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (40%);
- Erne: Agriculture (84%) and Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (20%);
- Erriff-Clew Bay: Agriculture (30%) and Forestry (30%);
- Moy & Kilalla Bay: Hydromorphology (69%) and Agriculture (30%);
- Sligo Bay & Drowse: Agriculture (61%); Forestry (32%); and Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (26%);
- Upper Shannon (26A): Agriculture (45%), Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (36%) and Hydromorphology (27%); and
- Upper Shannon (26B): Hydromorphology (58%), Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (50%) and Agriculture (42%).

The Cullies_040 river, Erne_020 river, Corconnelly lake, Gill SO lake and Grange (Sligo)_010 waterbodies are at particular risk of abstraction in SA-C. Table 2.6 includes a summary of the 'at risk' waterbodies within SA-C.

Table 2.6 Summary of 'At Risk' Waterbodies in SA-C (EPA, 2023b)

Waterbody Type	Water Catchments	Number of Waterbodies Identified as 'At Risk'	Surface Waterbodies Status 'At Risk' Due to Abstraction Pressure*
Rivers	Blacksod-Broadhaven	7	3
	Erne	2	
	Erriff-Clew Bay	1	
	Moy & Killala Bay	29	
	Sligo Bay & Drowse	24	
	Upper Shannon (26A and 26B)	3	
Lakes	Blacksod-Broadhaven	3	5
	Erne	7	
	Erriff-Clew Bay	0	
	Moy & Killala Bay	2	
	Sligo Bay & Drowse	0	
	Upper Shannon (26A and 26B)	1	
Transitional and Coastal	N/A	4	0
Groundwater	N/A	4	N/A
Total		**87**	**8**

To meet WFD objectives, it has been recognised that there is a need to prioritise and focus efforts to address issues through identifying 'Areas for Action'. The reasons for selection of the 'Areas for Action' within the sub-catchments of SA-C are listed in Table 2.7. Note that the 'Areas for Action' included in Table 2.7 are from the WFD cycle 3 River Basin Management Plan (RBMP).

Table 2.7 'Areas for Action' within SA-C (catchments.ie, 2022)

Areas for Action	Key Reasons for Selection
Ballinglen	• There are a number of SACs and SPAs located within or intersecting the area which need to achieve High water quality status • Ballinglen_010 and Ballinglen_020 are currently at moderate status due to the low number of fish • The Killerduff_010, Cabintown_010 and Knockboha_010 are not monitored by EPA and are therefore classified as unassigned, and their ecological status is unknown.

Areas for Action	Key Reasons for Selection
Bellawaddy	• A deterioration in the water quality of Bellawaddy River was observed • It discharges to a bathing water at Enniscrone, Co. Sligo, which is an important tourist location for the county • The remaining rivers and streams were selected because there is no existing water quality information available for the water bodies.
Carrowmore Lake	• Carrowmore Lake need to achieve Good water quality Status however is achieving currently Moderate status as the plant community needs to improve for ecological status to be returned to Good status • The main potential sources of pollution in the Carrowmore catchment are from agriculture and forestry, with potential for sediment inputs also from peat cutting which is predominately done by machine
Castlebar/Lannagh	• Walshpool lake is part of the Blue Dot Catchments Programme meaning it requires special protection • A number of waterbodies in the area are currently at Moderate or Poor water quality and ecological status • There are a number of sources of pollution in the Castlebar Lannagh Area of Action
Cloonlavis/Glore	• Local authority currently working to address water quality issues associated with agriculture • Deteriorated waterbodies • One At Risk High Ecological Status objective waterbody • One waterbody failing to meet protected area objectives for drinking water (MCPA) • Two At Risk waterbodies with protected area objectives for Salmon • Subcatchment headwaters – which eventually lead to the River Moy
Duff	• Duff River is a Blue Dot River • A recent deterioration in the water quality for the Duff River was noticed • Waterbodies in the catchment are very sensitive to pollution
Glencar Lake	• Part of a number of SACs and SPAs for wildlife • Glencar Lake waterbody is currently at Moderate status. Levels of phosphorous in the lake may be too high. This type of lake is very sensitive to even small increases in phosphorous. • Invasive species zebra mussel infestation
Glenree	• Glenree River is a Blue Dot River • River saw a decline in water quality from High to Good between 2010 and 2013 but has since returned to High between 2016-2019

Areas for Action	Key Reasons for Selection
	• Main causes for water decline may be related to peat extraction, forestry and anthropogenic pressures (with a focus on windfarms),
Lough Allen	• Part of a number of SACs and SPAs for wildlife • A number of waterbodies in the area are currently at Moderate or Poor water quality and ecological status • The water quality of a number of waterbodies in the area is unknown
Lough Conn and Lough Cullin	• Lough Cullin is important for both tourism and drinking water • Both Lough Conn and Lough Cullin are part of a number of important fisheries • The Addergoole river and Lough Cullin deteriorated in water quality as well as the Crumlin River which is currently failing to meet its High status objective.
Lough Gill	• Part of a number of SACs and SPAs for wildlife • The Lough Gill waterbody is currently at Moderate status and The Garavogue waterbody is at Poor status.
Lough Key	• Needs to achieve Good water quality status • Water quality of a number of waterbodies within the catchment is unknown • Boyle_040 and Lough Key deteriorated from Good to Moderate status
Lough Melvin and Drowes	• The Drowes_010 waterbody, which flows into Donegal Bay which is a protected area water dependant habitat, has recently deteriorated in water quality. • Lough Melvin is not meeting its water quality objective. The lake is also a protected area for drinking water • A previous catchment management plan was established for this area which can be built on and may inform and focus investigation. • There are six unassigned river water bodies that flow into Lough Melvin which do not have any information or data available. It is important to determine the water quality to determine if they are impacting Lough Melvin. • This is a cross border catchment which requires a cross agency approach.
Nephin Beg/Owengarve	• Needs to achieve Good water quality status • Deterioration of a number of waterbodies from Good to Moderate or Poor • Water quality of a number of waterbodies within the catchment is unknown, but with aims to build up data to assess their quality

Areas for Action	Key Reasons for Selection
Newport	• The Glenisland River and Skerdagh River are also part of the Blue Dot Catchments Programme • Waterbodies within the catchment are not reaching High status and are suffering significant decline
Roo	• The upper section of the river is designated a Blue Dot site meaning it requires special protection • Lough Mc Nean Upper is designated as a pNHA (a protected site of national importance) with a very small section of the designated pNHA falling within the Roo Area for Action catchment • The Roo_010 is currently at moderate status and the reason is unknown • Potential sources of pollution in the Roo may be related to agriculture and failing septic tanks
Tubbercurry	• Building on planned improvements at Tubbercurry WWTP. • The river catchment picked are at the start of the wider Moy river catchment. • One 'At Risk' High Ecological Status objective water body (rivers with potential for pristine water quality) • One river that has deteriorated in water quality since last monitored.
Unshin	• Three of the waterbodies in the PAA have shown a decline in water quality • 2 waterbodies designated are designated Blue Dot Sites however their water quality has declined • The Owenmore has a Protected Area objective that is not being met.
Upper and Lower Deel (Crossmolina)	• High priority for the Inland Fisheries Ireland due to deterioration in water quality affecting fish stock • Potential for peatland restoration in the upper section and water bodies failing to meet protected area objectives for the White-clawed Crayfish.
Upper Bonet	• There are two rivers that the quality has declined. Both rivers have a High Ecological Status objective (have potential to be pristine waters) • Important salmon breeding grounds. • Multiple pollution sources which can be investigated at the same time. • Possibility of things improving quickly.
Yellow (Ballinamore)	• Water body was at Good status in the 10-12 monitoring cycle. • Single significant pressure identified. • Possibility of quick win and fast improvements

2.2.2 Flood Risk

Flood risk is considered as part of the options appraisal; however, many options are at a conceptual stage and there is insufficient information to differentiate between options on the basis of flood risk when design details, siting and routing are still to be determined. Both surface water and ground water flood risk will need to be considered further as part of the development of option design and for assessment at project level.

The Office of Public Works (OPW) has been implementing the European Communities (Assessment and Management of Flood Risks) Regulations 2010 mainly through the Catchment Flood Risk Assessment and Management (CFRAM) Programme, through which draft Flood Risk Management Plans have been developed. Approximately 300 'Areas for Further Assessment' have been established along with a range of measures to reduce or manage the flood risk within each catchment. CRFAMS mapping for all Areas for Further Assessment is available to view on the CFRAMS website (OPW, 2018). Figure 5.4 in the SEA Environmental Report (Appendix A) provides a summary of surface water and groundwater flood risk from the OPW CFRAMS data for the region including SA-C.

For existing water infrastructure assets such as WTPs, flood risk vulnerability is considered in decisions on need to rationalise and decommission assets.

Any options which are progressed and require planning permission will require a Flood Risk Assessment to be completed in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009).

2.3 Climate Change

Ireland's climate is heavily influenced by the Atlantic Ocean. Consequently, Ireland has a milder climate that has less extreme temperature variation compared with other countries at a similar latitude. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence. Winters tend to be cool and windy, while summers are generally mild and less windy (Met Éireann, 2019).

In June 2019, the government agreed to support the adoption of a net zero target by 2050 at EU level, and to pursue a trajectory of emissions reduction nationally which is in line with reaching net zero in Ireland by 2050.

Section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended in 2021) sets a new "national climate objective" for Ireland, which provides that:

"*The State shall, so as to reduce the extent of further global warming, pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy.*"

The amended Act requires public authorities, including Uisce Éireann, to,so far as practicable, perform their functions in a manner consistent with the furtherance of the national climate objective and the relevant national and sectoral plans and strategies to mitigate greenhouse gas emissions and adapt to the effects of climate change.

The Department of the Environment, Climate and Communications' Climate Action Plan (CAP) 2023 published December 2022, replacing CAP 2021, commits to achieving a 51% reduction in overall greenhouse gas emissions by 2030 and reaching net zero carbon emissions by 2050. The aim is for more sustainable growth and to create a resilient, vibrant and sustainable country. The CAP defines a roadmap to this goal and initiates a set of policy actions to achieve this. A detailed sectoral roadmap has

also been set out, which is designed to deliver a cumulative reduction in emissions, over the period 2023 to 2030. CAP 2023 updates existing targets with renewable energy to provide 80% of electricity by 2030 and sets targets for sectors, including a target of 9 Gigawatts from onshore wind, 8 from solar, and at least 5 of offshore wind energy by 2030 (Department of the Environment, Climate and Communications, 2023).

In addition, Ireland has a sectoral climate adaptation plan for the 'Water Quality and Water Services Infrastructure' sector. A summary of the report's findings is included in Table 2.8.

Table 2.8 Summary of Key Points from the 'Water Quality and Water Services Infrastructure' Sectoral Climate Change Plan (Department of Housing, Planning and Local Government, 2019b)

Summary	
Key Points	• Protecting and improving water quality and improving water services infrastructure are major challenges in Ireland • Climate change-induced threats will increase the scale of these challenges • Risks to water quality and water infrastructure arise from changing rainfall patterns and different annual temperature profiles. The frequency and intensity of storms and sea level rise are also considered
The challenges: Water services infrastructure	• Increased surface and sewer flooding leading to pollution, water and wastewater service interruptions • Reduced availability of water resources • Hot weather increasing the demand for water • Increased drawdown from reservoirs in the autumn/winter for flood capacity, leading to resource issues • Business continuity impacts or interruptions for water services providers
Primary adaptive measures	• Fully adopt the 'integrated catchment management' approach • Improve treatment capacity and network functions for water services infrastructure • Water resource planning and conservation – on both supply and demand sides • Include climate measures in monitoring programmes and research • Many of these proposed adaptation actions are already underway through existing and scheduled water sector plans and programmes

There are four aims that local authorities are required to include in their climate adaptation strategies (Department of Communications, Climate Action and Environment, 2018):

- Mainstream Adaptation: That climate change adaptation is a core consideration and is mainstreamed in all functions and activities across the local authority. In addition, ensure that

local authority is well placed to benefit from economic development opportunities that may emerge due to a commitment to climate change adaptation and community resilience;

- Informed decision making: That effective and informed decision making is based on a reliable and robust evidence base of the key impacts, risks and vulnerabilities of the area. This will support long term financial planning, effective management of risks and help to prioritise actions;
- Building Resilience: That the needs of vulnerable communities are prioritised and addressed, encourage awareness to reduce and adapt to anticipated impacts of climate change, and promote a sustainable and robust action response; and
- Capitalising on Opportunities: Projected changes in climate may result in additional benefits and opportunities for the local area and these should be explored and capitalised upon to maximise the use of resources and influence positive behavioural changes.

In addition to these high-level aims, each local authority is required to identify the key risks to their area; these are provided in Table 2.9.

Table 2.9 Climate Change Risks Identified by Local Authorities in SA-C

County	Key Risk Areas
Mayo (Mayo County Council, 2019)	• Extreme precipitation • Increased temperature extremes • Increased intensity and frequency of wind/storms • Increased frequency and intensity of coastal inundation and erosion • Changes to distribution and phenology of plant and animal species
Sligo (Sligo Country Council, 2019)	• Increasing temperatures across all seasons • Drought and water shortages in spring and summer • Increased occurrence of extreme precipitation events in winter • Increase in frequency of extreme wind conditions • Reductions in frost and snow • Increase in duration of phenological cycle • Increased frequency and intensity of coastal inundation and erosion
Leitrim (Leitrim County Council, 2019)	• Increase in the frequency and intensity of rainfall • Flooding • Droughts and water shortages • Increased frequency and intensity of storms and high wind events • Increased temperatures
Cavan (Cavan County Council, 2019)	• Increased storms and intensity of rainfall • Flooding

County	Key Risk Areas
	• Drought events and water shortages • Increased temperature extremes • Increased risk of new pests and diseases • Adverse impacts on water quality • Changes to distribution and phenology of plant and animal species
Roscommon (Roscommon County Council, 2019)	• Extreme Rainfall • Strong winds • Higher temperatures and droughts • Lower temperatures and snowfall

Climate change is expected to influence weather conditions, such as frequency of droughts and extreme events such as storms, and is likely to affect habitats and species, water availability for supply and water demand and water quality. For SA-C, not all supplies within the study area meet the required levels of reserve capacity. As evidenced in the 2018 and 2020 drought, there is the potential for this deficit to affect access to water in the future. This situation could further deteriorate over time due to climate change driven reductions in water resources.

A key aspect of Uisce Éireann's strategy is to 'Supply Smarter', by improving the quality, resilience and security of their supply through infrastructural improvements. One of the high-level goals taken from the national level is building resilience, with water services being a key factor.

Supporting environmental resilience to climate change will also be an important consideration for the future with additional benefits for supply resilience.

2.4 Biodiversity, Flora and Fauna

2.4.1 Designated Sites

Within SA-C there are a number of European, national and locally designated sites, including Special Protected Areas (SPAs), Special Areas of Conservation (SACs), National Parks, Nature Reserves, and proposed Natural Heritage Areas (see Table 2.10 and Figure 2.2 – note that an index key for Figure 2.2 is provided in Appendix C). The European sites (SPAs and SACs), and the potential impacts on them, are discussed in more detail in the NIS.

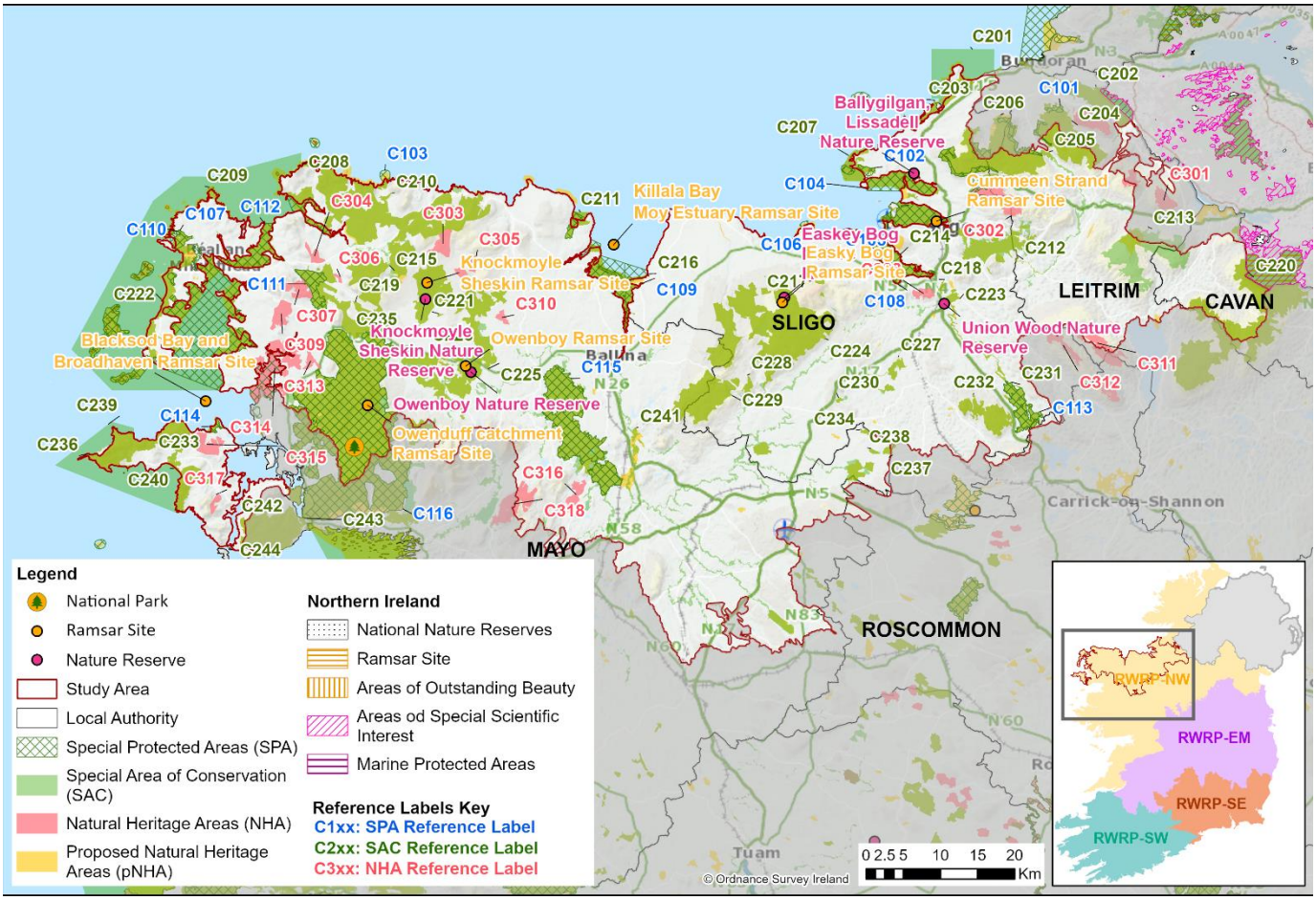

Figure 2.2 Designated Sites in SA-C

Table 2.10 Designated Sites within SA-C (NPWS, 2023)

Receptor	Name	Total Number
Special Protected Area (SPA)	Drumcliff Bay SPA	16
	Cummeen Strand SPA	
	Killala Bay/Moy Estuary SPA	
	Lough Arrow SPA	
	Carrowmore Lake SPA	
	Illanmaster SPA	
	Termoncarragh Lake and Annagh Machair SPA	
	Owenduff/Nephin Complex SPA	
	Ballysadare Bay SPA	
	Aughris Head SPA	
	Sligo/Leitrim Uplands SPA	
	Mullet Peninsula SPA	
	Lough Conn and Lough Cullin SPA	
	Ballintemple and Ballygilgan SPA	

Receptor	Name	Total Number
	Doogort Machair SPA	
	Blacksod Bay/Broad Haven SPA	
Special Area of Conservation (SAC)	Lough Melvin SAC	44
	Killala Bay/Moy Estuary SAC	
	Mullet/Blacksod Bay Complex SAC	
	Broadhaven Bay SAC	
	Carrowmore Lake Complex SAC	
	Glenamoy Bog Complex SAC	
	Lough Gall Bog SAC	
	Owenduff/Nephin Complex SAC	
	Slieve Fyagh Bog SAC	
	Cuilcagh - Anierin Uplands SAC	
	Ballysadare Bay SAC	
	Ben Bulben, Gleniff And Glenade Complex SAC	
	Bunduff Lough And Machair/Trawalua/Mullaghmore SAC	
	Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	
	Lough Hoe Bog SAC	
	Lough Nabrickkeagh Bog SAC	
	Templehouse And Cloonacleigha Loughs SAC	
	Turloughmore (Sligo) SAC	
	Arroo Mountain SAC	
	Bellacorick Bog Complex SAC	
	Croaghaun/Slievemore SAC	
	Lough Gill SAC	
	Ox Mountains Bogs SAC	
	Boleybrack Mountain SAC	
	Lough Dahybaun SAC	
	River Moy SAC	
	Knockalongy and Knockachree Cliffs SAC	
	Glenade Lough SAC	
	Doogort Machair/Lough Doo SAC	
	Cloonakillina Lough SAC	

Receptor	Name	Total Number
	Doocastle Turlough SAC	
	Union Wood SAC	
	Corraun Plateau SAC	
	Bricklieve Mountains and Keishcorran SAC	
	Streedagh Point Dunes SAC	
	Achill Head SAC	
	Lackan Saltmarsh and Kilcummin Head SAC	
	Flughany Bog SAC	
	Lough Arrow SAC	
	Bellacorick Iron Flush SAC	
	Erris Head SAC	
	Keel Machair/Menaun Cliffs SAC	
	Unshin River SAC	
	West Connacht Coast SAC	
Ramsar Sites	Blacksod Bay and Broadhaven	7
	Cummeen Strand	
	Easky Bog	
	Killala Bay/Moy Estuary	
	Knockmoyle/Sheskin	
	Owenboy	
	Owenduff catchment	
Nature Reserves	Ballygilgan (Lissadell) Nature Reserve	5
	Easkey Bog Nature Reserve	
	Knockmoyle Sheskin Nature Reserve	
	Owenboy Nature Reserve	
	Union Wood Nature Reserve	
National Parks	Wild Nephin National Park	1
Natural Heritage Areas (NHAs)	Bangor Erris Bog NHA	18
	Pollatomish Bog NHA	
	Tristia Bog NHA	
	Tullaghan Bay And Bog NHA	
	Ummerantarry Bog NHA	

Receptor	Name	Total Number
	Slieveward Bog NHA	
	Corry Mountain Bog NHA	
	Doogort East Bog NHA	
	Croaghmoyle Mountain NHA	
	Dough/Thur Mountains NHA	
	Inagh Bog NHA	
	Sraheens Bog NHA	
	Carrane Hill Bog NHA	
	Glenturk More Bog NHA	
	Cunnagher More Bog NHA	
	Forrew Bog NHA	
	Crockauns/Keelogyboy Bogs NHA	
	Ederglen Bog NHA	
Proposed Natural Heritage Areas (pNHAs)	See Figure 2.2	75

2.4.2 Habitats

Table 2.11 lists the percentage of the study area, and the number of hectares, covered by each habitat within SA-C; as reported in the Corine land use dataset[1].

Table 2.11 Habitat Areas for SA-C (EPA, 2018)

Habitat	Ha	% of Study Area
Agricultural Land		
Pastures	183,897	35.75%
Land principally occupied by agriculture, with significant areas of natural vegetation	66,829	12.99%
Complex cultivation patterns	108	0.02%
Non-irrigated arable land	33	0.01%
Natural Habitats		
Peat bogs	166,994	32.46%
Water bodies	11,211	2.18%

[1] Since the land cover analysis was undertaken for the NWRP, OSI has published the National Land Cover Map. The analysis will be updated as part of the data review process as outlined in section 9 of the draft RWRP-SE. The National Land Cover data is identified as a source of baseline information in the SEA monitoring plan to be used for project development and assessments going forward

Habitat	Ha	% of Study Area
Moors and heathland	9,641	1.87%
Natural grasslands	3,555	0.69%
Beaches, dunes, sands	1,676	0.33%
Inland marshes	1,300	0.25%
Sparsely vegetated areas	1,137	0.22%
Intertidal flats	319	0.06%
Salt marshes	318	0.06%
Bare rocks	309	0.06%
Estuaries	29	0.01%
Coastal lagoons	1	0.00%
Forest		
Coniferous forest	30,889	6.00%
Transitional woodland-shrub	23,682	4.60%
Broad-leaved forest	3,600	0.70%
Mixed forest	2,651	0.52%

Particularly relevant habitats that depend on the water quality and/or quantity in SA-C are:

- Oligotrophic waters containing very few minerals of sandy plains;
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea;*
- Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.;
- Natural dystrophic lakes and ponds;
- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation;
- Bog habitats – Active raised bogs, degraded raised bogs still capable of natural regeneration, *Rhynchosporion* depressions, transition mires and quaking bog habitats;
- Alkaline fens;
- Groundwater dependant terrestrial habitats, such as petrifying springs with tufa formation and blanket bogs;
- Northern Atlantic wet heaths with *Erica tetralix;*
- Turlough ecosystems;
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*);
- Machairs; and
- Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho–Batrachion* vegetation.

2.4.3 Species

The key species (Nelson et al, 2019) of concern within SA-C include:

- Otter (*Lutra lutra*);
- Fish species - Atlantic Salmon (*Salmo salar*), Lamprey species;

- Killarney Fern (*Trichomanes speciosum*);
- White-clawed Crayfish (*Austropotamobius pallipes*);
- Marsh Fritillary (*Euphydryas aurinia*);
- Slender Naiad (*Najas flexilis*);
- Narrow-mouthed Whorl Snail (*Vertigo angustior*);
- Slender green feather-moss (*Hamatocaulis vernicosus*);
- Geyer's Whorl Snail (*Vertigo geyeri*);
- Petalwort (*Petalophyllum ralfsii*);
- Marsh Saxifrage (*Saxifraga hirculus*);
- 'Qualifying interest' bird species e.g. peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*), corncrake (*Crex crex*) and chough (*Pyrrhocorax pyrrhocorax*); and
- Waterbirds of 'qualifying interest' e.g. Brent goose (*Branta bernicla*), whooper swan (*Cygnus cygnus*), Greenland white-fronted goose (*Anser albifrons flavirostris*) and winter migratory waders.

The key invasive species to consider (National Biodiversity Data Centre, 2021) for developing options within SA-C include:

Animals:

- American mink (*Mustela/Neovison vison*);
- Brown rat (*Rattus norvegicus*);
- Canada goose (*Branta canadensis*);
- Grey squirrel (*Sciurus carolinensis*);
- Greylag goose (*Anser anser*);
- Roach (*Rutilus rutilus*);
- Ruddy duck (*Oxyura jamaicensis*);
- Wild boar (*Sus scrofa*); and
- Zebra mussel (*Dreissena polymorpha*).

Plants:

- Brazilian giant-rhubarb (*Gunnera manicata*);
- Curly waterweed (*Lagarosiphon major*);
- Dwarf eel-grass (*Zostera japonica*);
- Fringed water-lily (*Nymphoides peltata*);
- Giant hogweed (*Heracleum mantegazzianum*);
- Giant knotweed (*Fallopia Sachalinensis*);
- Giant-rhubarb (*Gunnera tinctoria*);
- Himalayan/Indian balsam (*Impatiens glandulifera*);
- Himalayan knotweed (*Persicaria wallichii*);
- Japanese knotweed (*Fallopia japonica*);
- Large-flowered waterweed (*Egeria densa*);
- Rhododendron (*Rhododendron ponticum*);
- Salmonberry (*Rubus spectabilis*);
- Sea-buckthorn (*Hippophae rhamnoides*);
- Spanish bluebell (*Hyacinthoides hispanica*);
- Three-cornered leek (*Allium triquetrum*);
- Waterweeds (*Elodea* spp.); and

- Wireweed (*Sargassum muticum*).

2.5 Material Assets

Material assets are considered to be the natural and built assets (non-cultural assets) required to enable a society to function as a place to live and work, in giving them material value.

Some of the natural assets within SA-C are listed in Table 2.12, such as agricultural land and bog areas.

Built assets include transport and communications infrastructure, and other developed areas, including existing water supply infrastructure (see Figure 2.1 and Figure 2.3). These assets all need to be taken into account in new water resource developments.

In addition, water resources and water quality are influenced by urban, agricultural and forestry activity within river and groundwater catchments. This can affect the availability and quality of water for supply.

Uisce Éireann has 19 WTPs in SA-C, meeting the average demand of 52.6 Ml/d in 2019.

There are no canals or ports of national or regional significance in SA-C. There is one airport of local significance, namely Belmullet Aerodrome. Other significant transport infrastructure includes the main road network (particularly the N5, N17, N26, and N59).

Any new infrastructure considered for SA-C will need to take existing as well as planned land zoning and local development into consideration.

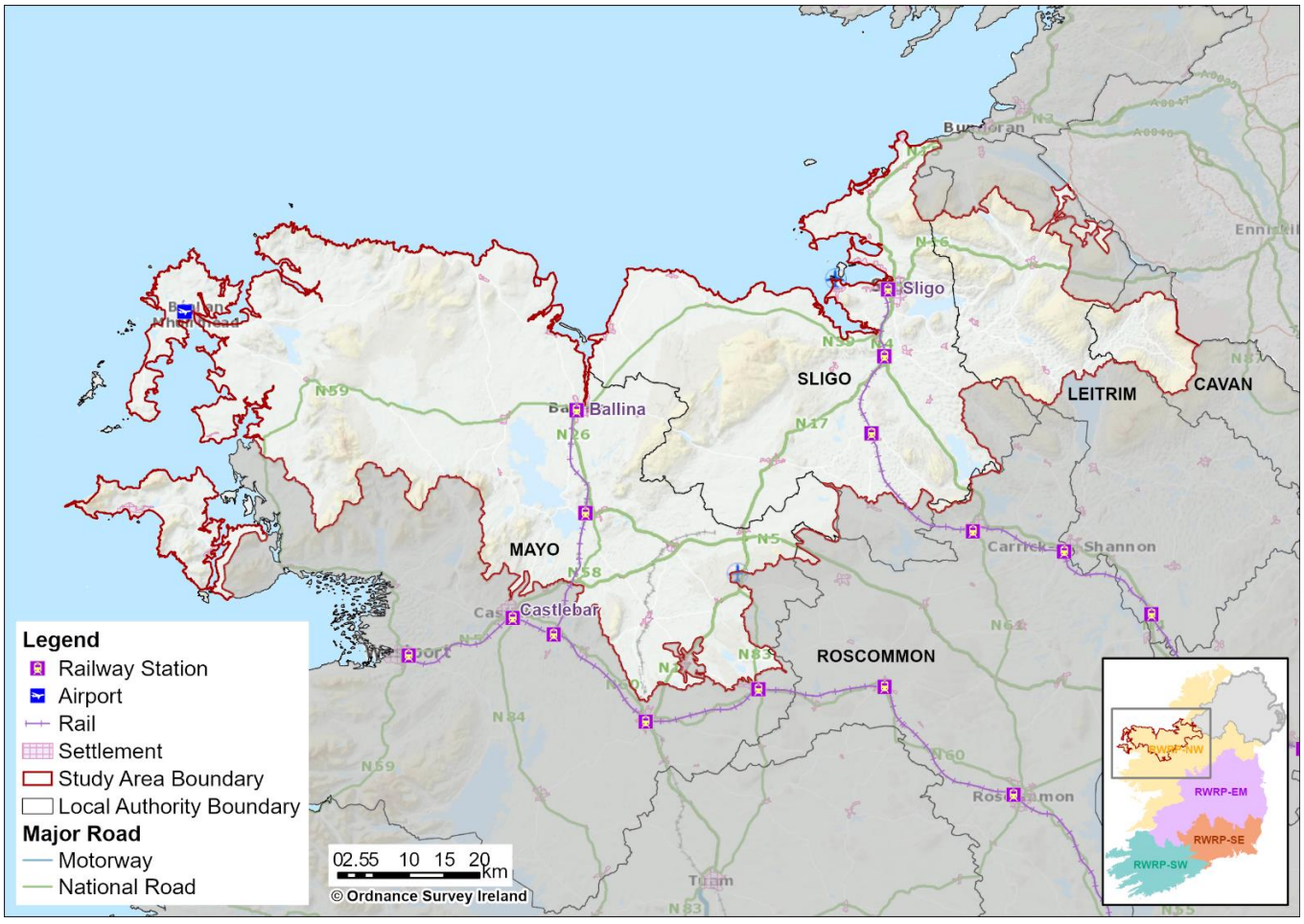

Figure 2.3 Transport Infrastructure in SA-C

Table 2.12 Land Use within SA-C (EPA, 2018)[2]

Land use	Ha	% of Study Area	Comparison to Overall North West Region %
Agriculture	250,867	48.77%	57.28%
Urban	4,387	0.85%	1.18%
Natural Habitats	196,491	38.20%	31.76%
Forest	60,822	11.82%	9.47%
Industry	501	0.10%	0.07%
Other	1,316	0.26%	0.24%

Proposals for other strategic developments within SA-C are considered for the assessment. These are primarily identified from the National Planning Framework and from myProjectIreland, where any relevant projects for the study area are included (other local developments may also be included that are not listed in myProjectIreland if they are considered to be of an appropriate scale). Small scale housing and business development are not considered for this plan level assessment.

Table 2.13 gives an overview of the project developments which are available from myProjectIreland (2022) for SA-C[3]. The myProjectIreland map focuses mainly on major projects with costs over €20 million. The map also includes all projects supported to date under the Government's Urban and Rural Regeneration Funds and reflects the full portfolio of projects in the pipeline at present.

Table 2.13 Proposed New Developments

Development		
Áras Scéalta an Atlantaigh - Visitor Centre and Tourism Hub	GTeic Hubs - Location #4 of 6 - Gaoth Sáile	Sligo Central Sterile Services Department
Ballina Innovation Quarter	N5 Westport to Turlough	Sligo Cultural Plaza
Ballina-Castlebar-Westport Interurban Greenway - Viaduct, Westport - Moy Cycle Bridge Ballina	International Mountain Biking Project - Location #3 of 4 - Coolaney	Sligo Greenway - Bellaghy - Charlestown - Collooney
Ballisodare Regeneration 2021	IT Sligo - Refurbishment of K&L Blocks	Sligo Hospital Redevelopment Phase 1
City Campus Sligo Hub	IT Sligo Extension to Central Campus	Sligo Leitrim Northern Counties Railway Greenway - Sligo Town to Blacklion, Co. Cavan
Clew Bay Greenway - Achill Sound and Extension to Bannacurry	LILY	Sligo Public Realm

[2] Since the land cover analysis was undertaken for the NWRP, OSI has published the National Land Cover Map. The analysis will be updated as part of the data review process as outlined in section 9 of the draft RWRP-SE. The National Land Cover data is identified as a source of baseline information in the SEA monitoring plan to be used for project development and assessments going forward.

[3] Note that the myProjectIreland dataset was taken at a fixed point in time to allow for assessment of cumulative effects. The date for SAC being the 15/04/22.

Development		
Crossmolina Flood Relief Scheme	Manorhamilton Public Realm improvement works including re-imagining employment and Enterprise Lands	Sligo University Hospital Ward Development
Dromahair Regeneration Project	National Centre of Excellence for Surfing	St Marys Secondary School, Ballina, Co. Mayo - 64520M
Eastern Garavogue Bridge and Approach Road	O'Connell Street Enhancement	The Cliff Bath House
Eastern Garavogue Bridge and Approach Road (Department of Transport element)	Rathellen, Finisklin, Co. Sligo	The Public Realm Enhancement of the villages of Strandhill and Rosses Point.
GTeic Hubs - Location #2 of 6 - Greannaí	Rehins Fort, Ballina	Tubbercurry Regeneration Project 2020
GTeic Hubs - Location #3 of 6 - Eachleim	Robbers' Lane, Maugheraboy, Sligo	Ursuline Convent, Sligo

2.6 Landscape and Visual Amenity

The National Landscape Strategy 2015-2025 is in the process of being implemented and will be Ireland's vehicle for complying with the EU Landscape Convention. Landscape assessment guidance is also available from the local authorities. This will be taken into account when identifying landscape character areas and protected areas at the project level in the future. Table 2.14 shows the sensitivity and value of the Landscape Character Areas (LCAs) within each of the counties listed within the study area[4].

The value of the landscape in SA-C is reflected in baseline data sections 2.1.3 (Tourism and Recreation), 2.4 (Biodiversity, Flora and Fauna) and 2.8 (Cultural Heritage).

Water supply infrastructure development will need to take account of sensitive landscapes and views. This will need to include culturally important areas, townscapes, natural areas and areas and views of importance for tourism and recreation.

Table 2.14 Value and Sensitivity of Landscape Character Areas in the Counties of SA-C (Ordnance Survey Ireland. n.d.)

Landscape Character Area	Sensitivity	Value
County: Cavan (Cavan County Council)		
No values or sensitivity information available		
County: Leitrim (Leitrim County Council)		
No values or sensitivity information available		
County: Mayo (Mayo County Council)		

[4] As with all the baseline information, the LCA information will be updated as part of regular reviews

Landscape Character Area	Sensitivity	Value
No values or sensitivity information available		
County: Roscommon (Roscommon County Council, 2014)		
Lough Allen and Arigna foothills	High	Very High
Upper Shannon and Derreenannagh Drumlin Belt	High	Very High
Lough Corry Drumlin Basin	High	Very High
Kilglass Drumlin Lakelands	High	Very High
Slieve Bawn and Feirish Bogland Basin	High	Very High
Upper Lough Ree Bogland	High	Very High
Mid Lough Ree Pastureland	High	Very High
Lower Lough Ree and Athlone Environs	High	Very High
Cloonown and Shannon Callows	High	Very High
Suck River Source and Lough O'Flynn Boglands and Esker Ridges	High	High
Castlerea and Upper Suck Valley	High	High
Athleague and Lower Suck Valley	High	High
Suck Callows	High	High
Arigna Mountains	High	Very High
Lough Meelagh Drumlins	High	Very High
Lough Key and Boyle River Network	High	Exceptional
Boyle and Curlew Mountains	High	Very High
Plains of Boyle	Medium	Moderate
Elphin Drumlins	Medium	Moderate
Breedoge Bogland Basin	Medium	Moderate
Mullaghnashee Wet Farmland Plateau	Medium	Moderate
Cloona Lough and Lung River Bogland basin	Medium	Moderate
Ballaghaderreen and Bockagh Hill Uplands	Medium	Moderate
Ballinlough Bogland and Esker Ridges	Medium	Moderate
Cloonfad Hills and Esker Ridges	Medium	Moderate
Cloonfad Bog and Upland	Medium	Moderate
Castlerea Raised Bogland	High	High
Tulsk and Rathcroghan Plateau	High	Exceptional
Strokestown Drumlin and Turlough Belt	Medium	Moderate

Landscape Character Area	Sensitivity	Value
Oran Undulating Open Farmland	Medium	Moderate
Scramoge River Basin	Medium	Moderate
Roscommon Town and Hinterland	High	High
Skrine Hill and Limestone Pavement	High	High
Lough Funshinagh, Stone Wall Grasslands and Esker Ridges	Medium	Moderate
Brideswell Esker Belt	Medium	Moderate
Ballydangan Pastures	Medium	Moderate
County: Sligo (Sligo County Council)		
No values or sensitivity information available		

2.6.1 Seascape

The Regional Seascape Character Assessment for Ireland (2020) presents the Regional Seascape Character Areas (SCAs) for the entire Republic of Ireland. An SCA is defined as "*an area of sea, coastline and land, as perceived by people, whose character results from the actions and interactions of land with sea, by natural and/or human factors*". The assessment identifies two SCAs in SA-C; Atlantic North Mayo and Galway, and Sligo Bay.

2.7 Air Quality and Noise

2.7.1 Air Quality

Air quality is monitored and managed using Air Quality Zones and air monitoring sites, the air quality index rating of the area within SA-C is rated as 'good'.

In general, the water industry is not a major contributor to air quality issues, although there is potential for local pollution through Uisce Éireann vehicles, generator plants and drinking water residuals treatment facilities. There is a requirement to comply with air pollution regulations and also to identify potential opportunities for reducing emissions. Air quality will be a consideration at the project level, for example, through scheme construction management and scheme design and operation.

2.7.2 Noise

The main areas that experience noise pollution are likely to be areas along the main roads, particularly around the N5, N17, N26, and N59.

Water infrastructure development is not expected to add significantly to noise pollution. Construction noise will be considered through scheme construction management and design for local receptors and for sensitive receptors in close proximity. Noise pollution will also be managed through the planning process with conditions included in planning permissions.

2.8 Cultural Heritage

Within SA-C, there are numerous designated and non-designated cultural heritage assets inventoried in the Record of Monuments and Places, the Sites and Monuments Record, the Record of Protected Structures, and the National Inventory of Architectural Heritage (NIAH) (see Table 2.15).

Figure 2.4 shows the location of the individual cultural heritage records from the National Monuments Service and the NIAH. Given the number of small sites, these can be better viewed on the Department of Culture, Heritage and the Gaeltacht's (2020) 'Historic Environment Viewer' website.

There are also potentially unknown, undesignated archaeological and architectural remains throughout Ireland. Water supply can affect cultural heritage through, direct loss or construction of infrastructure involving disturbance of soils, above ground structures close to existing heritage sites affecting setting or changes due abstraction changing drainage and affecting interests within wetland sites.

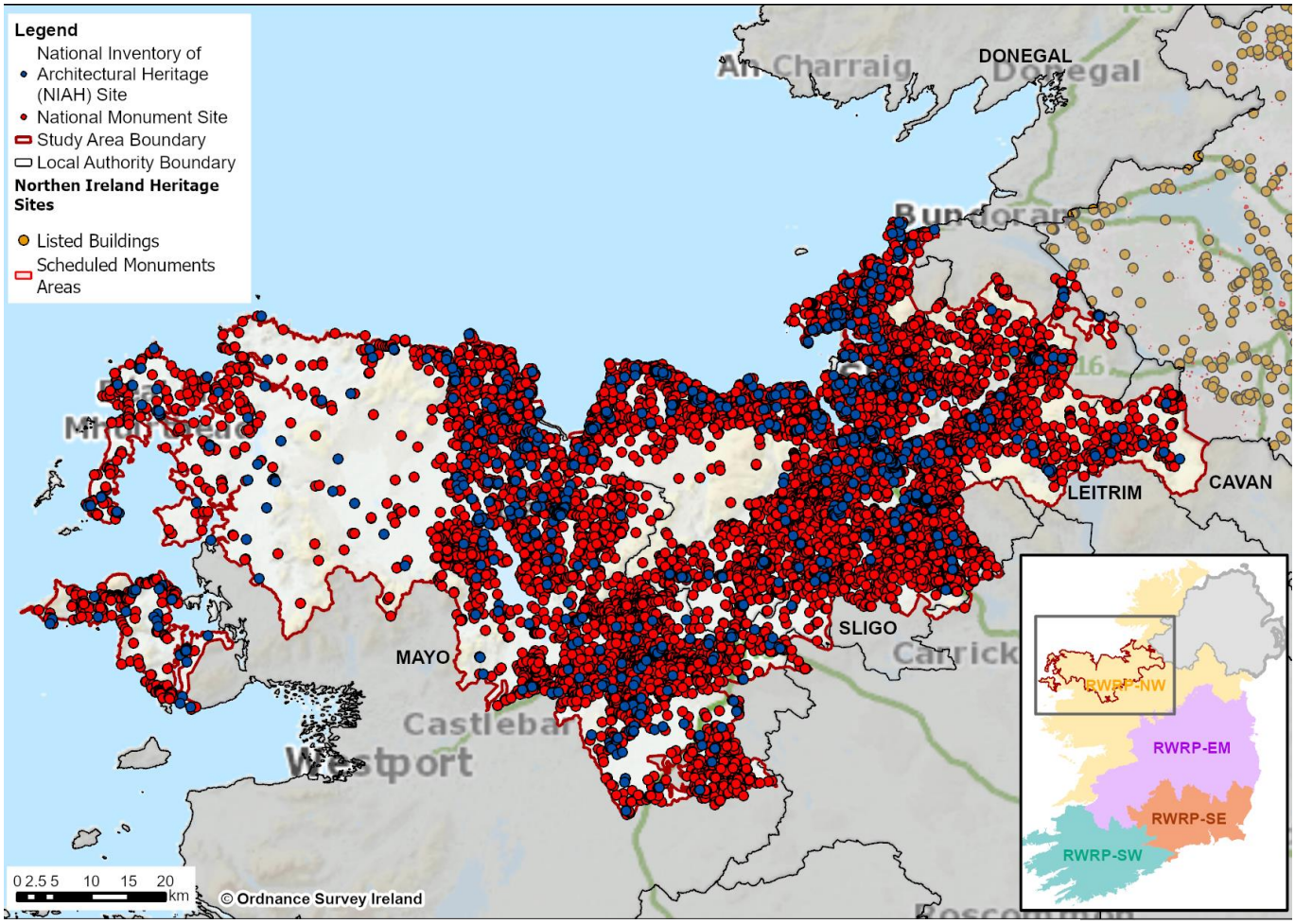

Figure 2.4 SA-C Cultural Heritage Assets

Table 2.15 Cultural Heritage Assets within SA-C

Assets	Total Number
National Monuments Service Sites	11,396
National Inventory of Architectural Heritage Sites	1,535
Sites and Monuments Record Zones	7,058

2.9 Geology and Soils

Table 2.12 lists the land uses within SA-C. SA-C predominantly has a peat soil type with smaller areas of fine loam soil (EPA, 2019).

The geology and soils in the environment are fundamental for the quality and quantity of water in the area through differences in drainage, chemical composition, filtration and soil type, topography and

resultant land use. Land use has significant impact on water quantity and quality. Groundwater supply depends on the type of aquifers in the area, as they determine the system's ability to store and transmit groundwater. The regionally and locally important aquifers with resource potential for SA-C are shown in Figure 2.5.

The karst forms a key regionally important aquifer in some areas. The pure bedded limestones in this area are flat lying and extensive and stretch from North Clare to Mayo. The karstification present in the Northwestern Plateau (counties Sligo, Leitrim and Cavan) is similar to the Burren, but more dissected.

Groundwater flow in the lesser productive Dinantian Shales and Limestones circulates primarily though fissures as these rocks do not show significant intergranular permeability. These rocks occur primarily in counties Sligo and Leitrim, and are predominantly interbedded shales and limestones, with little or no sandstone content. There are also large swathes of Dinantian (Lower Carboniferous) Impure Limestones and are interleaved with the Pure Bedded Limestones. The limestones are often characterised by the occurrence of chert and shale bands and are generally less productive than the Pure Bedded Limestones. Precambrian rocks consist mainly of gneisses, schists (pelites and psammites), quartzites, and marbles and can be found in northwest County Mayo and the Ox Mountains in County Sligo. There are smaller representation of Dinantian Sandstones (Lm), where zones of higher permeability may be found nearer faults and in the upper weathered fractured zone of the top 10-30m.

Important geological and geomorphological sites could be identified for protection as NHAs, however, until designation is confirmed, these sites are classified as Irish Geological Heritage Sites (IGHS). There are over 900 IGHS identified around Ireland, 92 of which have the potential to constrain water resource options in SA-C.

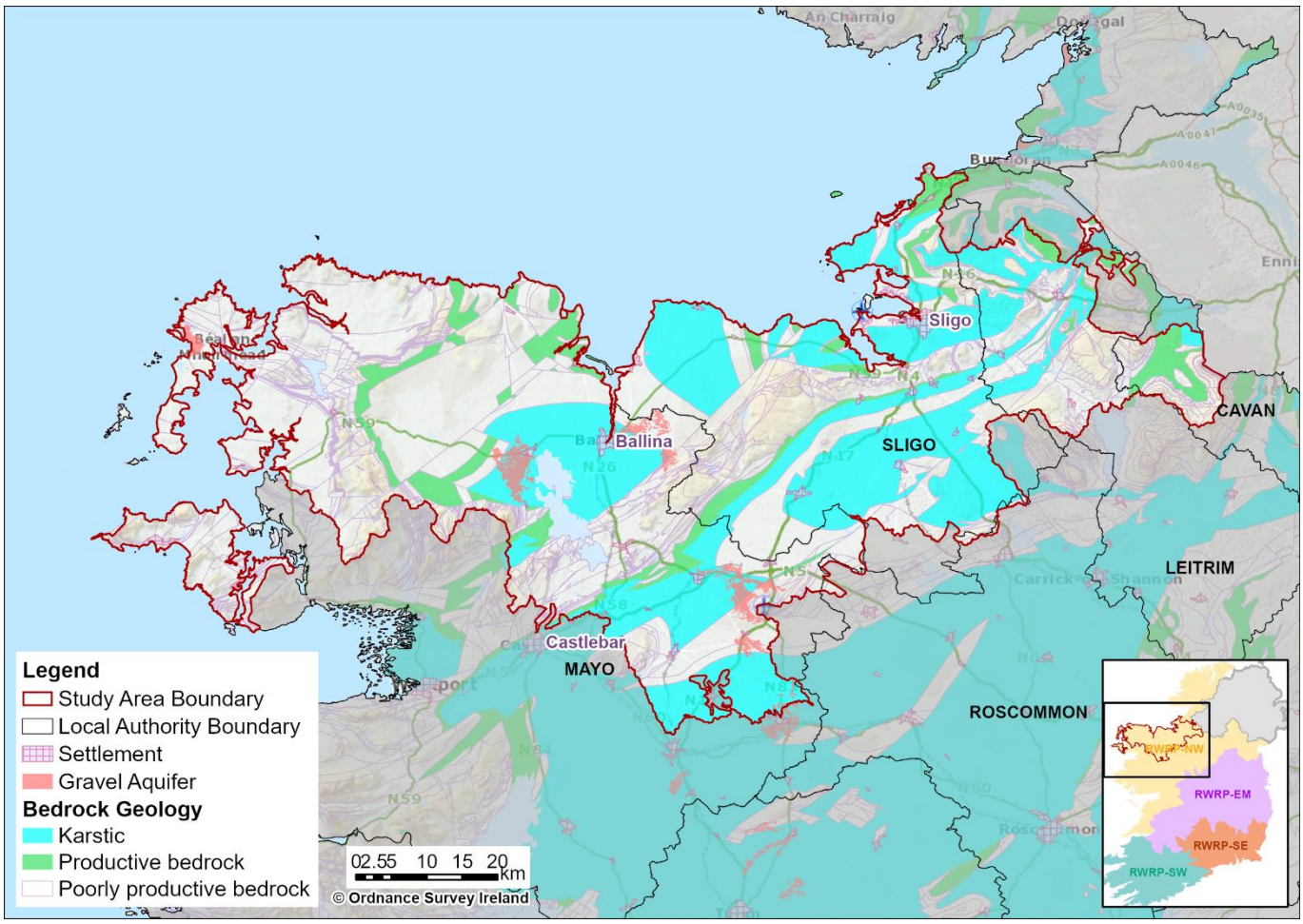

Figure 2.5 SA-C Hydrogeology

2.10 Summary of Key Issues and Trends over the Plan Period

All aspects of the environment will need to be considered as individual schemes are taken forward for further design and implementation. However, the key issues relevant for strategic water planning identified within SA-C are listed in Table 2.16.

Table 2.16 Summary of Key Issues and Trends Over the Plan Period

SEA Topic	Issues and Opportunities	Interrelated Topics
Population, Economy, Tourism and Recreation, and Human Health	**Issues:** Increasing population and the increased stress of climate change on water quality and water resources could affect health and well-being. **Opportunities**: Uisce Éireann will put in place plans to assess water quality and measures to address risks as part of the Regional Plan Uisce Éireann has ongoing activities to improve the Supply Demand Balance in SA-C, including, leakage management and water conservation measures. Raising awareness of the importance of water conservation and efficiency measures, and the value of the environment for health and wellbeing, can play an	Climate change, biodiversity, water environment, material assets and landscape and visual amenity

SEA Topic	Issues and Opportunities	Interrelated Topics
	important part in water planning. Valuing access to environment for recreation.	
Water Environment	**Issues**: The proposed abstraction licensing, aligned to WFD requirements, will require many current abstractions to be licensed and may limit future abstraction or involve significant conditions being imposed at associated sites. For SA-C, some of the existing abstractions may not meet sustainability guidelines in the medium term; specifically, during drought periods. On an interim basis, Uisce Éireann has developed an initial conservative assessment based on available information (see SA-C Technical Report). This has been used to inform options identification and appraisal. Uisce Éireann will update its sustainability analysis and impact on their baseline Supply Demand Balance (SDB) calculations when regulatory assessment for the new legislation is undertaken. **Opportunities:** To take account of identified pressure on the water environment in the selection of solutions for SA-C.	Biodiversity and climate change
Biodiversity, Flora and Fauna	**Issues:** Study Area C has a number of designated sites, including several water dependent Special Areas of Conservation (SAC) such as the River Moy SAC, Lough Gill SAC and Carrowmore Lake Complex SAC. There are no waterbodies designated for *Margaritifera* (Freshwater Pearl Mussel) but there are several waterbodies across the study area with WFD High Status Objectives. It is also considered especially important to avoid the loss of irreplaceable or rare habitats and increasing pressure on vulnerable species; potentially through direct land take or indirect such as through increased abstraction pressure	Water resources, water quality and climate change
Material Assets	**Issues:** WTP assets and network infrastructure requiring improvement or replacement **Opportunities**: Improvements to support reliability of access to good quality water.	Health and wellbeing
Landscape and Visual Amenity	**Issues:** Potential for climate change to affect land use and habitats and influencing landscape quality and amenity.	Biodiversity and geology and soils, climate change, health and wellbeing
Air Quality and Noise	No specific issues identified for the baseline for SA-C.	Health and wellbeing
Climate Change	**Issues**: Climate change issues regarding sea level rise, flooding, extreme weather events and changes in seasonal weather patterns. Climate change has been	Biodiversity and water environment

SEA Topic	Issues and Opportunities	Interrelated Topics
	taken into account in supply forecasts and additional risks to infrastructure and operations will need to be taken into account in planning for drought and freeze/thaw events; and in detailed scheme design and network operation. **Opportunities:** Additional management to minimise impact on supply and the environment, vulnerability to climate change and drought is required.	
Cultural Heritage	**Issues:** Known cultural heritage and archaeological assets and potential unknown archaeological assets.	Health and wellbeing
Geology and Soils	**Issues**: General need for good soil conservation and retention of nutrients and carbon in soil resources **Opportunities:** Potential benefits from soil conservation for biodiversity, water quality and water retention also.	Biodiversity, water quality, landscape and climate change
Additional interrelated aspects	**Issues**: Poor water quality requiring additional water treatment and affecting aquatic biodiversity. **Opportunities:** Potential for catchment management initiatives leading to habitat, water retention, water quality enhancement and soil quality have the potential to provide wider benefits for environmental resilience and water supply; although this has not been specifically studied in this study area.	

3 Environmental Assessment – Options Appraisal

3 Environmental Assessment – Options Appraisal

This chapter provides a summary of the environmental assessment of options considered in the study area, including the option identification and screening process, and assessment of options used in approach development.

3.1 Overview

Uisce Éireann applied its Options Assessment Methodology from the Framework Plan to identify potential solutions to meet the needs identified in the SA-C WRZs.

The general methodology, and how environmental assessment is included, is outlined in the SEA Environmental Report prepared in relation to the Framework Plan. That report identifies SEA objectives and assessment criteria and provides a framework for integrating the environmental assessment of options and combinations of options into a phased appraisal process which also takes account of other criteria such as feasibility, deliverability, resilience and cost.

The Options Assessment Methodology covers eight stages. Stages 1 and 2 are covered through the needs and baseline assessments addressed in chapter 2 of this review. The key stages considered in this chapter for SA-C are Stages 3-6:

- Stage 3 Unconstrained options – to identify all the potential options to be considered to resolve water quality or quantity requirements;
- Stage 4 Coarse screening – to assess the unconstrained options and eliminate any that will not be viable and collect information to inform the next stage;
- Stage 5 Fine screening – options assessment and scoring against the key criteria to verify option feasibility and understand key risks and constraints; and
- Stage 6 Feasible option list – further option development encompassing costing and SEA assessment of options.

3.2 Stage 3: Unconstrained Options

Environmental and social assessment criteria are included at the earliest stages of the screening process. At the outset of the process, some fundamental rules are applied as part of option identification. For example, inter-catchment raw water transfers are excluded due to the high risk of transferring invasive non-native species (INNS) between catchments and potential conflict with WFD objectives.

WFD objectives have also been a key consideration at this stage through an internal sustainable abstraction risk review. This was a specialist review of groundwater bodies and surface water catchments that was undertaken as part of the option identification stage. UK Technical Advisory Group on the Water Framework Directive (UKTAG) guidance (UKTAG, 2013) on baseflows have been used for the purposes of this plan until Ireland specific standards come into place.

The application of these conservative abstraction standards to new options ensures that any new or increased abstractions from rivers are likely to support conservation objectives for the most sensitive environmental sites. For surface waterbodies, the allowable abstraction standard of 10% of Q95 has been applied, with the exception of waterbodies requiring ‘High’ status where a higher threshold of 5% of Q95 has been applied. Allowable abstraction standards for lakes are set at 5 or 10% of Q50 in line with this guidance (the NIS prepared in relation to the Framework Plan, sets out the approach in relation to Appropriate Assessment).

As mentioned previously, these are estimates applied for the purpose of strategic planning and are based on a conservative approach to what the new regulatory regime might require. The EPA will be the authority adjudicating the sustainability or otherwise of abstractions, once the regulations and guidelines for the new abstraction regime have been developed there will be more detailed site specific information.

For groundwater sources, the assessment includes a high level assessment taking account of a range of information available for existing site and in many cases limited information for new abstraction options This desktop assessment undertaken aimed to identify potential yield and the impact of the yield, including the steps described below.

3.2.1 Existing Groundwater Abstractions

Site specific data is taken into account where possible in assessing potential sustainable yield for increasing abstraction at existing sources. In some cases, however location, abstraction rate(s) and site configuration are often the minimum information available. The operational data provides useful information on the yield, and assumptions can be made around the average production from each site. It can be assumed the average abstraction value is an initial estimate of the yield. Most local authorities in the case of development of groundwater sources, would likely have drilled and sought the maximum yield possible through 72 hours pumping tests. This provides an initial yield. Additional information on performance in prolonged dry weather periods provides supporting information on yields. Data collected on site is used to improve the yield and impact estimates.

3.2.2 New Groundwater Abstractions

The Zone of Contribution (ZOC), the land area that contributes water to the well or spring, is defined and used to calculate a preliminary water balance for the source using the average abstraction rate and the annual average recharge rate as estimated from the Geological Survey Ireland (GSI) recharge maps. The water balance estimates the area needed to supply the yield and is then compared to the delineated ZOC. A WFD >30% recharge is applied as a guide for assessment in the fine screening assessment but is recognised to apply more to catchment scale abstraction impact assessments so at a very local abstraction scale it can overestimate the impacts for some sources.

Additional assessment is undertaken on potential preferred groundwater options to inform the SEA, taking into account site specific information and consideration of likely impacts on WFD and cumulative effects with existing groundwater abstractions.

Further work will need to be undertaken for groundwater options taken forward as part of abstraction licensing and the development of Drinking Water Safety Plans. This will include establishing detailed geoscientifically robust zones of contribution in line with GSI's Groundwater Protection Schemes (Department of Environment, Community and Local Government, GSI and EPA, 1999) and the EPA Advice Note Number 7, Source Protection and Catchment Management (EPA, 2013). This work will provide in-depth hydrogeological information on the source that will establish reliable and sustainable yields.

3.2.3 Sustainable Abstraction in Options Assessment

At the end of 2022, the government passed the Water Environment (Abstractions and Associated Impoundments) Act, 2022 (the Abstractions Act) which will ensure that national abstractions align with the requirements of the Water Framework Directive. The Abstractions Act has not yet commenced and the associated regulations and guidelines which will further detail the types of assessment and national methodology to be used have not yet been published and are not yet in place. Therefore, Uisce Éireann does not have full visibility of the future regulatory regime. As the objective of the plan is to achieve safe,

secure, reliable and sustainable supplies, any new abstractions proposed to be developed by Uisce Éireann as part of this plan will be based on conservative assessments of sustainable abstraction. This will ensure that water supplies continually improve in terms of environmental sustainability.

Based on initial desk-based assessments outlined above, Uisce Éireann developed an initial list of unconstrained options for new supplies, increases and upgrades to existing supplies. An unconstrained options review workshop was held with Uisce Éireann's Local Authority Water Services Partners to identify any additional unconstrained options that might be available based on local knowledge.

3.3 Stage 4: Coarse Screening

A total of 214 unconstrained options were identified for SA-C and subjected to coarse screening. The coarse screening process assessed the options against the criteria outlined in Table 3.1. This process is summarised in chapter 6 of the SEA Environmental Report for the RWRP-NW. The process allows the assessment of the unconstrained options to eliminate any that will not be viable. The focus at this stage is on options that would be difficult to mitigate, those with likely significant effects on European or nationally important sites, or options likely to lead to deterioration of waterbody WFD status.

Table 3.1 Coarse Screening Assessment Criteria

Criteria	Unconstrained Option Assessment Questions	
Resilience	Q1	Does the option address the supply-demand problem?
Deliverability and Flexibility	Q2	Is the option technically feasible?
	Q3	Can the risks and uncertainties associated with the option be mitigated to avoid failure of the option?
Sustainability (Environmental and Social Impacts)	Q4	Can significant impacts on known high level environmental constraints for example European/ international or nationally designated biodiversity, landscape, cultural heritage sites, WFD objectives or community assets, be avoided or minimised? If not, is mitigation likely to be possible?

Of the 214 unconstrained options, 78 were rejected after being analysed against the coarse screening criteria of resilience, deliverability and environment.

Sustainability reasons for rejecting options were identified for 53 options. Table 3.2 provides the options that were rejected on a sustainability basis and not considered suitable to address the deficit for the WRZs located in SA-C. The full rejection register, including those options rejected for other reasons, in both the coarse and fine screening (where applicable) is provided in Annex B of the SA-CTechnical Report.

Table 3.2 Coarse Screening Rejection Register

Option Reference	Option Description	Rejection Reasoning
SAC-114c	Interconnect Knock Airport WRZ with Lough Talt.	Abstracting the volume of water required is considered unfeasible. The overall plan required a significant length of the pipeline for relatively small supply. Therefore, this option did not meet the requirements of the
SAC-58x	New GW wellfield and supply deficit to Knock Airport WRZ (new regional WSS).	

Option Reference	Option Description	Rejection Reasoning
		Environmental, Resilience or Deliverability criteria.
SAC-17	WSZ near Lough Talt- extend Boyle & Boyle/Ardcarne supply into Lough Talt. New GW source required for Boyle & Boyle/Ardcarne scheme.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-28	Increase GW abstraction at Riverstown and supply spare capacity to Lough Talt WRZ.	
SAC-28a		
SAC-30	Interconnect Geevagh/Highwood & Castlebaldwin GWSs with Riverstown WRZ and supply deficit from GWSs.	
SAC-30a		
SAC-31	Rationalise Riverstown to Lough Talt for long term OPEX savings and improved resilience.	
SAC-31a	New GW abstraction in regionally karstified aquifer in Tobercurry to partly supply deficit in Lough Talt WRZ.	
SAC-43	Supply deficit from neighbouring GWS.	
SAC-54	Increase GW abstraction at Swinford and upgrade WTP	
SAC-54a	Increase SW abstraction at Swinford and upgrade WTP. Rationalise Foxford, Chalestown, Knock Airport, Kilkelly and Kiltimagh to Swinford - new Regional Water Supply Scheme.	
SAC-54b		
SAC-54c		
SAC-54d		
SAC-54e		
SAC-57a	Increase SW abstraction from Carrowcanada Spring to supply deficit at Swinford WRZ, upgrade WTP	
SAC-57b		
SAC-64	Rationalise Foxford to Swinford WRZ	
SAC-72	Rationalise Charlestown to Lough Talt WRZ	
SAC-79	Rationalise Kilkelly to Lough Talt WRZ.	
SAC-80	Rationalise Kilkelly to Swinford WRZ.	
SAC-98	New GW abstraction at Lough Easkey to supply deficit at Lough Easkey WRZ, upgrade WTP	
SAC-13a	Increase existing SW abstraction from Lough Muck to supply deficit at Foxford, upgrade WTP	Abstracting the volume of water required to make this a feasible option is considered

Option Reference	Option Description	Rejection Reasoning
SAC-18	New SW abstraction from the River Moy to supply deficit at Lough Talt WRZ, upgrade WTP	likely to result in the waterbody not achieving good WFD status. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-19	Recomission Bellanascarrow Lake source (old Ballymote supply).	
SAC-52	New SW abstraction from Glenade Lake and supply deficit to North Sligo RWSS WRZ.	
SAC-88a	Increase SW abstraction from Bunnahowna River to supply deficit at Mulranny WRZ, upgrade WTP	
SAC-88	Rationalise Achill Island to Mulranny WRZ.	
SAC-63	Increase SW abstraction from Lough Muck to supply deficit at Foxford, upgrade WTP.	
SAC-13	Interconnect Foxford and Lough Talt WRZs. Supply deficit from Foxford WRZ.	
SAC-115x	New SW abstraction from Glenade lake, upgrade Glenade WTP	
SAC-103	New SW abstraction from Ballysadare River and raw water pumped to Foxes Den WTP which would need expansion of plant capacity to treat new additional supply.	Does not meet WFD objectives as there is risk of transfer of invasive species across catchment with raw water transfers. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-104	New SW abstraction from Ballysadare River and expansion of Lough Gill abstraction and Foxes Den WTP capacity to treat from either river or lough. Based on conjunctive use approach of using new river/lough in combination to meet deficit i.e. utilise high river flows when available in winter months.	
SAC-105		
SAC-08	New SW abstraction at Lough Arrow and abandon Lough Talt source.	Lough Arrow is a WFD high status waterbody. Abstracting the volume of water required to make this a feasible option is likely to result in the waterbody not achieving high WFD status and also to result in a greater risk of having adverse effects on this European site. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-31b	Rationalise Riverstown to Lough Talt (Lough Arrow source) for long term OPEX savings and improved resilience.	
SAC-31c	New SW abstraction from Lough Arrow and abandon Lough Talt WTP.	
SAC-12	Part supply deficit from Lough Easkey.	Lough Easkey is a WFD high status waterbody. Abstracting the volume of water required to make this a feasible option is likely to result in the waterbody not achieving high WFD status and also to result in a
SAC-96	Increase SW abstraction from Lough Easkey to supply deficit at Lough Easkey WRZ, upgrade WTP	

Option Reference	Option Description	Rejection Reasoning
		greater risk of having adverse effects on this European site. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-16[1]	Maintain allowable abstraction at Lough Talt.	Lough Talt is a WFD high status waterbody. Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving high WFD status and also to result in a greater risk of having adverse effects on this European site. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-114x	Maintain allowable abstraction at Lough Talt.	
SAC-114a	Interconnect Swinford WRZ with Lough Talt.	
SAC-114b	Interconnect Charlestown WRZ with Lough Talt.	
SAC-114d	Interconnect Kilkelly WRZ with Lough Talt.	
SAC-114e	Interconnect Kiltimagh WRZ with Lough Talt.	
SAC-114f	Interconnect Foxford WRZ with Lough Talt.	
SAC-58	New GW wellfield and supply deficit to Swinford WRZ (new regional WSS).	The overall plan required a significant length of the pipeline for relatively small supply. Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAC-58c	New GW wellfield and supply deficit to Kilkelly WRZ(new regional WSS).	
SAC-58d	New GW wellfield and supply deficit to Kiltimagh WRZ (new regional WSS).	
SAC-58e	New GW wellfield and supply deficit to Foxford WRZ (new regional WSS).	
SAC-83	Refurbish old spring source.	This option included increasing the abstraction at Kilkelly Charlestown GWB to supply deficit at Kiltimagh WRZ. There is a great uncertainty around available yield, to meet the full demand requirement. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.

* In 2019 a 10 year planning permission was obtained to carry out an upgrade of the existing Lough Talt WTP to provide adequate treatment against cryptosporidium and THM. This was the first planning application in Ireland to be completed on the grounds of “Imperative Reasons of Overriding Public Interest” (IROPI) under the Habitats Directive. Uisce Éireann is committed to implementing the required Compensatory Measures required as part of this consent and to developing an alternative water source for this supply in the medium term. Accordingly, the Preferred Approach for this supply is to decommission the existing Lough Talt WTP and rationalise scheme to Ballina Water Resource Zone and increase abstraction from Lough Conn [option SAC-543].

3.4 Stage 5: Fine Screening

A total of 136 options passed the coarse screening stage; these options were subjected to further consideration as part of a multi-criteria assessment (MCA) at the fine screening stage.

The objective of the MCA and the fine screening process is to determine the potential benefits and impacts of the options across a range of key criteria. The MCA process allows a combination of issues to be considered together. This process can help indicate if one option will be overall more cost effective, environmentally sustainable, progressible, resilient or feasible when compared with other options. This process requires a desk-based analysis of the options and their potential benefits and impacts against the key criteria.

The environmental criteria are based on the SEA objectives in the form of screening questions. These questions have been developed to allow the performance of each option to be assessed against the SEA objectives. The list of questions developed to assess the environmental and social effects of the options and guidance on the MCA scoring for the fine screening is provided in the SEA Environmental Report Appendix B.

Summaries of the environmental assessment for options that passed the fine screening stage are grouped by option type and are included in Appendix A. These summaries combine the assessments against individual criteria to give an overall environmental topic score; this overall score is based on the worst score across each of the topic's criteria.

This is a high-level risk based assessment intended to support a comparison of options. Likely beneficial effects are represented by positive scores and likely adverse effects are represented by negative scores based on a seven-point scale.

No further options were rejected at fine screening in SA-C.

3.5 Stage 6: Feasible Options List

A total of 136 options were included as feasible options and were taken forward for Approach Development. The next step was to use the information collected for the fine screening assessment to inform the development of approaches to resolve the SDB deficit within each WRZ and across the study area.

Details of the feasible options identified for this study area, and the Preferred Approach selected, are provided in the SA-C Technical Report.

4

Environmental Assessment – Approach Development

4 Environmental Assessment – Approach Development

This chapter describes how the SEA was integrated into the development of potential approaches/combinations for meeting the SDB deficit at the WRZ level, then at the study area level, and how alternative approaches were considered and assessed.

4.1 Introduction to Approach Development

After the feasible options for the study area were identified the next step was to assess a range of possible SA combinations to resolve the supply deficit within each WRZ and across the study area as a whole. This chapter addresses Stage 7 in the assessment methodology.

An SA combination is a way of configuring an option, or options, to meet either an SDB deficit or water quality requirements. As set out in the Framework Plan, Uisce Éireann considers six SA approaches, which are the combinations rated as the best within the six categories summarised in Table 4.1. This process contributes to assessment of alternatives to meet plan objectives. Consideration of reasonable alternatives is an important part of meeting SEA regulatory requirements.

Table 4.1 The Six SA Approaches

SA Approaches Tested	Description	Policy Driver
Least Cost (LCo)	Lowest Net Present Value (NPV) cost in terms of Capital, Operational, Environmental and Social, and Carbon Costs	Public Spending Code
Best Appropriate Assessment (Best AA) (BA)	Lowest score against the European Sites (Biodiversity) sub criteria question based on assessing the option as having either no LSEs, LSEs that can be addressed with general/standard mitigation measures or LSEs that may be more difficult to mitigate. For options scoring -3, potential alternative higher scoring options are sought where possible.	Habitats Directive
Quickest Delivery (QD)	Based on an estimate of the time taken to bring an option into operation (including typical feasibility, consent, construction and commissioning durations) as identified at Fine Screening. This is particularly relevant where an option might be required to address an urgent Public Health issue (potential benefit for SEA Objective on population and public health).	Statutory Obligations under the Water Supply Act and Drinking Water Regulations
Best Environmental (BE)	This is the option or combination of options with the highest total score across the SEA objective criteria MCA questions. In addition, high risk -3 issues are considered against individual criteria focusing on long term operational effects.	SEA Directive and WFD

SA Approaches Tested	Description	Policy Driver
Most Resilient (MR)	This is the option or combination of options with the highest total score against the resilience criteria. (Link to SEA Objective for climate change adaptation for environment)	National Adaptation Plan
Lowest Carbon (LC)	This is the option or combination of options with the lowest embodied and operational carbon cost	Climate Change Strategy

These six SA approaches focus on different plan or environmental objectives. Three of the six SA approaches address environmental objectives;

- Best AA;
- Best Environmental; and
- Lowest Carbon approaches.

These are all focused on environmental criteria and are based on the environmental information and scoring undertaken for the MCA.

4.2 Stage 7: Approach Development Process

There are three stages in the Approach Development Process, these are summarised below and provided in more detail in section 7 of the RWRP-NW:

The **First Stage** is the Approach Appraisal at WRZ level. This stage assesses the feasible options for each WRZ and identifies the best performing option within each of the six Approach Types for the relevant WRZ. For example, the option or combination of options that would be classified as the Lowest Carbon Approach, would be that with the lowest carbon cost, based on comparative outline design. The best performing options within each Approach Category are then compared against one another using the 7-step process outlined in Figure 4.1. This process develops an initial Preferred Approach at WRZ level for all of the individual WRZs in the study area (the "WRZ Level Preferred Approach").

For the Best AA Approach, the scoring on the European Sites (Biodiversity) sub-criteria question refers to the possibility for Likely Significant Effects (LSEs). A Score of 0 equates to no LSEs. If an option is identified that meets the “Objectives of the Plan” and is assessed as having no potential impact on a European Site (zero or neutral score based on desktop assessment), it is automatically adopted as the Preferred Approach at WRZ level. Furthermore, because it is possible that all of the potential impacts identified at Plan level can be entirely ruled out through project level investigation and analysis or avoided through project level mitigation, options with potential for LSEs (score of -1 to -3 for biodiversity) may be progressed as the Preferred Approach. If potential impacts cannot be ruled out or avoided, then mitigation in the form of avoidance is provided for within the NWRP to protect European site(s). Should potential adverse effects on European sites be identified at the project level from a given option/Preferred Approach the NWRP will have identified other options[5] that could be progressed at the project level if required. Therefore, no project arising from the NWRP, with Adverse Effects on Site Integrity (AESI) identified at the project stage would be implemented. Scores of -1 to -3 equates to LSEs

[5] These options may not have progressed as the Preferred Approach initially as they may have scored significantly worse against other environmental, resilience or feasibility criteria (e.g. the best AA approach may identify an option that results in four times more carbon being produced or is twice as expensive).

being identified. Scores of -1 to -2 are LSEs that will not result in AESI with standard best practice project specific mitigation applied as these can be addressed with general/standard mitigation measures. Scores of -3 equates to LSEs that may be difficult to mitigate, but it is understood at plan level that mitigation would be achievable, noting that further project level assessments are required to confirm this.

The NIS provides more detail in the LSE and the AESI Tables: Appendices C-D. Any option with a score of -1 to -3 is taken forward to AA (Stage 2 of the AA process) and assessed within the NIS for the Regional Plan.

The **Second Stage** assesses whether there are any larger options (SA options also referred to as 'group' options) that might resolve deficits across multiple WRZs within a study area. Combinations are then developed using these SA options and WRZ Preferred options to create "SA Combinations".

The **Third Stage** compiles the SA Combinations that rank highest for each of the Six Approach Types to generate SA Approaches. The WRZ Level Approach and SA Approaches are then compared against each other using the 7-Step process in Figure 4.1 to generate the SA Preferred Approach.

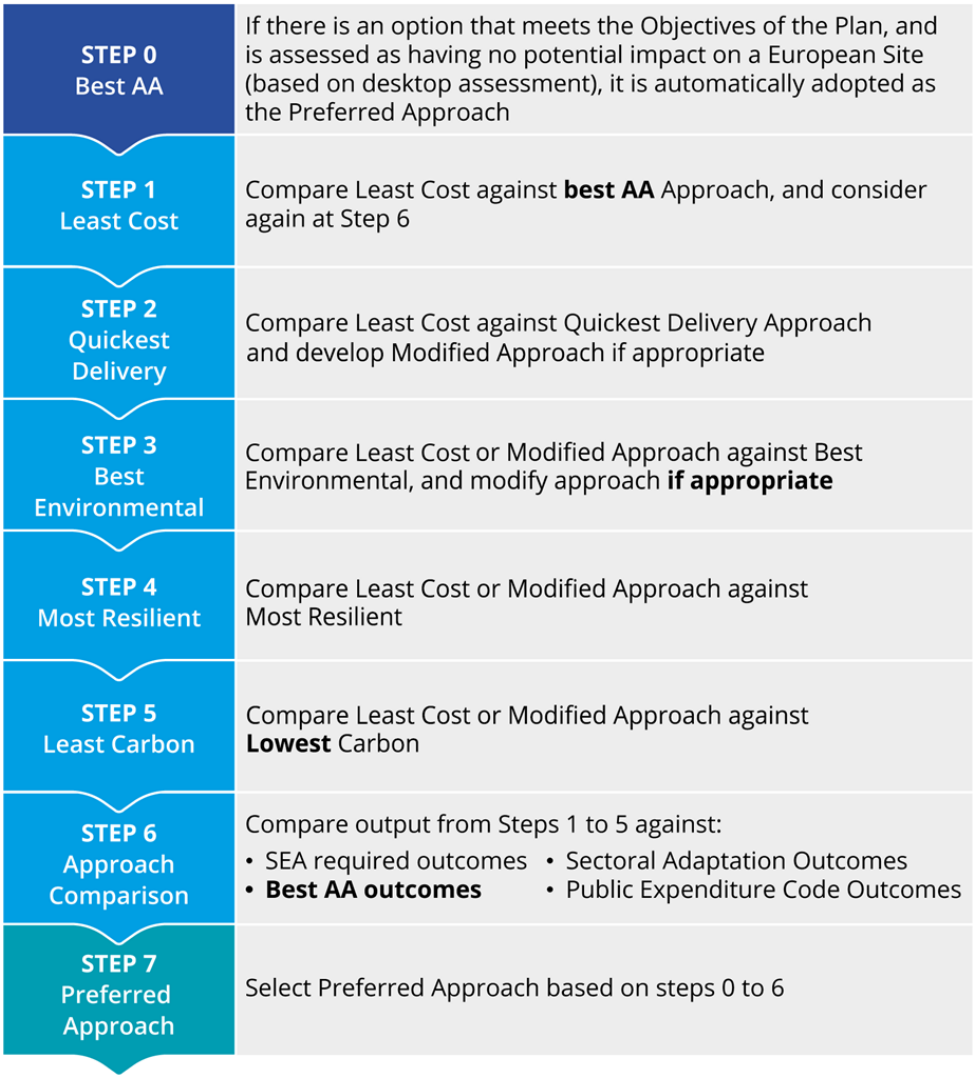

Figure 4.1 The 7 Step Process

4.2.1 Environmental Assessment in the Approach Development process

Combinations of feasible options are identified to balance the water demand and predicted baseline supply and address the remaining deficit over the plan period. The Approach Development process

allows Uisce Éireann to compare and optimise the options against different elements to create a range of approaches capable of meeting the deficit.

There are two strands of environmental information and assessment used in the Approach Development process. These are:

Environmental and social costs: these were based on a natural capital/ecosystems services framework and scoped to be relevant and achievable with the information available and to add to, rather than duplicate, the qualitative environmental assessment of the options. This included:

i. Climate regulation – woodland;
ii. Traffic impacts – opportunity cost of time due to road congestion from roadworks;
iii. Food – crops and livestock; and
iv. Carbon equivalent emissions tonnes (note total greenhouse gas emissions are expressed in terms of carbon equivalent emissions) including embodied and operational carbon were also calculated and costed.

The approach for calculating the elements i, ii, iii and iv are explained in the SEA Environmental Report Appendix E.

Carbon emissions (tCO_2e) and carbon costs are calculated alongside construction and operational costs. As part of the environmental assessment carbon efficiency has also been calculated to identify carbon emissions per ML of water supply.

Environmental assessment: this is qualitative assessment against the SEA objective for each option as part of the MCA scoring for the fine screening. These scores are based on assessing options in terms of potential adverse or beneficial effects and a seven-point scale is used from Major, Moderate or Minor Adverse, Neutral, to Minor, Moderate or Major Beneficial. These are reflected in numeric scores -3 to 0 to +3 and are used to assess option performance against the MCA scores. The scoring applied at fine screening is reviewed and updated based on the developed option descriptions and additional environmental analysis.

Carbon emissions (tCO_2e) were initially assessed through qualitative assessment for fine screening as this preceded option costing, however in the approach development process the carbon emissions as total Net Present Value (NPV) costs have been used to inform the Approach Development Process. Total life- time carbon emissions and carbon efficiency per ML have been used to inform the SEA assessment.

The general process is illustrated in Figure 4.2 below.

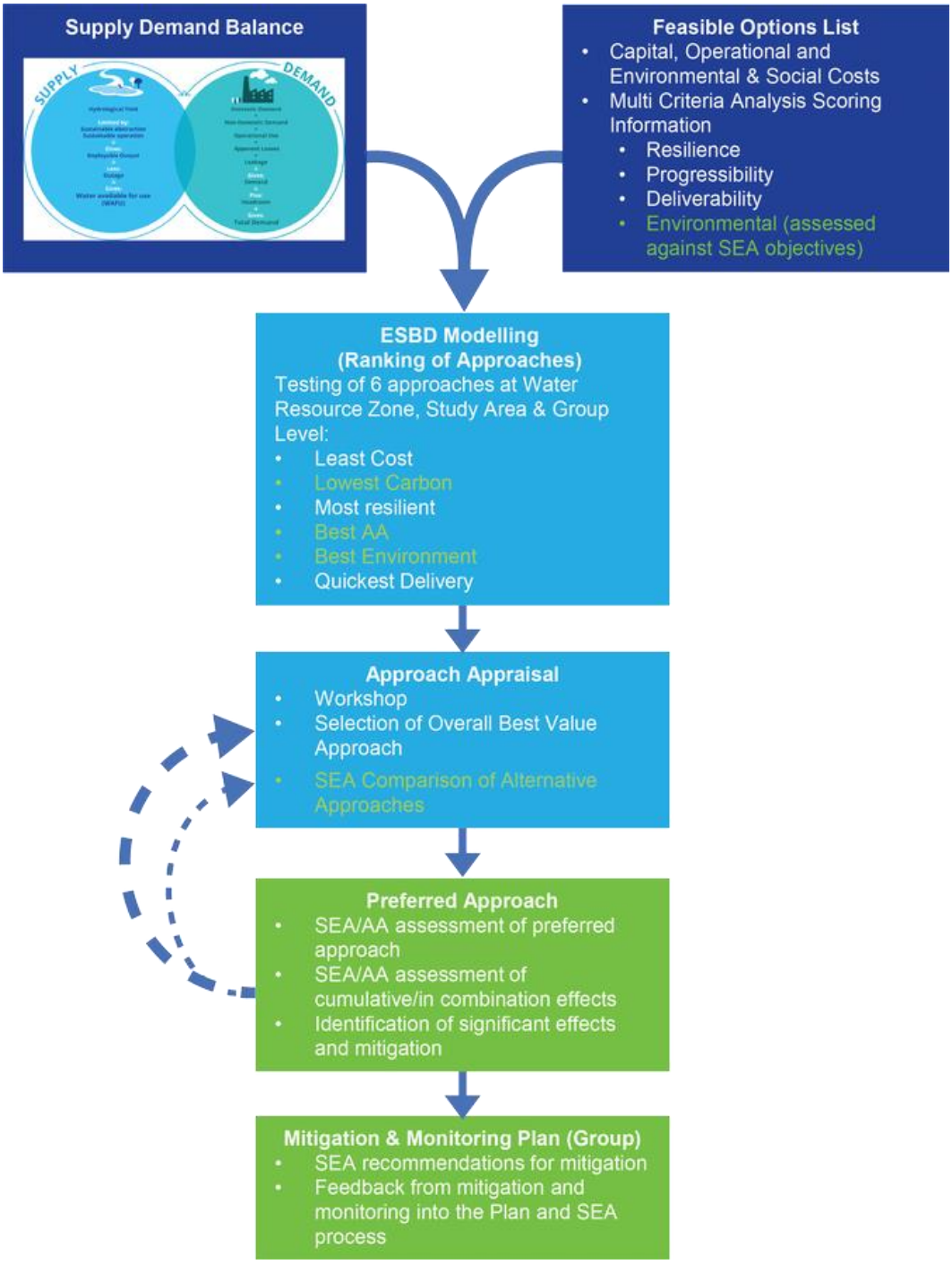

Figure 4.2 Approach Development Process

4.3 SA-C Approach Development Process

The approach assessment process was undertaken through structured workshops and reviews involving relevant environmental expertise (including ecologists, hydrogeologists, hydrologists and environmental scientists) and included Local Authority involvement and feedback. This process was supported by information on the feasible options; including the environmental assessment against SEA criteria in the MCA and the option costings. The options were then taken through the sequential testing (the 7 step process detailed in section 4.2, Figure 4.1 above) against the six SA categories (lowest carbon, best environmental, best AA, least cost, quickest delivery and most resilient) to identify the best overall options and combinations at WRZ and study area levels applying the three stages:

Stage 1 - comparing WRZ options and identify the preferred WRZ level approach. For SA-C there are 40 WRZ options and these are listed in Table 5.2 in the SA-C Technical Report, providing option reference numbers and the relevant WRZ. These options were taken through the 7 step process to identify the preferred WRZ approach.

Stage 2 - creating combinations of WRZ options and SA options (group options) for comparison. These are the possible SA combinations and are presented and ranked against the approach categories (see Table 4.4).

Stage 3 - selecting the Preferred Approach at study area level – this stage compares the WRZ level preferred approach and the SA combinations to determine the Preferred Approach that provides the best outcome for the study area. The best performing SA combinations under each of the six approach categories are identified and then compared using the 7 step process applied in the workshop to establish the Preferred Approach at study area level.

Performance ranking against the assessment criteria was based on the MCA scoring, including the fine screening environmental assessments, and costings. Further environmental assessment has also been undertaken to compare the alternative approaches in line with SEA requirements and this assessment is presented in Table 4.7 and Table 4.9 below.

For SA-C, a total of 12 combinations were compared and are presented in Table 4.2. The WRZ level preferred approach cannot meet the deficit for the study area as a whole, therefore, it has not been assessed and assigned a score in Table 4.2 for the purposes of determining the best performing alternative within each approach category. Note that the Preferred Approach selected at the end of the process has been outlined in red throughout this section.

Table 4.2 SA-C Summary of SA Combination of Performance against Approach Category

Category	WRZ Level Approach (Cannot meet the deficit)	SA Combination 1 (SA Option 1 and 15)	SA Combination 2 (SA Option 1)	SA Combination 3 (SA Option 10 and 15)	SA Combination 4 (SA Option 11 and 15)	SA Combination 5 (SA Option 15, 42 and 43)	SA Combination 6 (SA Option 3)	SA Combination 7 (SA Option 4)	SA Combination 8 (SA Option 5)	SA Combination 9 (SA Option 10)	SA Combination 10 (SA Option 11)	SA Combination 11 (SA Option 39)	SA Combination 12 (SA Option 43)
Least Cost						Best						Worst	
Quickest Delivery		Best**							Worst				
Number of -3 Biodiversity Scores		Two -3 Scores	Two -3 Scores	Two -3 Scores	Two -3 Scores	Two -3 Scores	Two -3 Scores	One -3 Scores	Two -3 Scores	Two -3 Scores	Two -3 Scores	Two -3 Scores	Two -3 Scores
Lowest Carbon						Best	Worst						
Most Resilient							Worst	Best					
Best Environmental								Best		Worst	Worst	Worst	

Key												
Ranked order (best to worst)	Best											Worst

*SA options are also known as SA grouped options

**Combinations 1, 3 and 4 all score the same against the quickest delivery criteria, however, combination 1 scores better against the least cost, lowest carbon and best environmental criteria. Therefore, combination 1 has been selected as the quickest delivery approach.

Through comparing the potential SA combinations, the best SA approach for each of the six approach categories was identified (also see section 5 of the Study Area Technical Report); these aligned as three approaches (see Table 4.3).

Table 4.3 Study Area Approach Categories

Category	SA Approach 1 (SA Combination 1) (QD)	SA Approach 2 (SA Combination 5) (LCo, LC)	SA Approach 3 (SA Combination 7) (BE, BA, MR)
Least cost (LCo)	-	✓	-
Quickest Delivery (QD)	✓	-	-
Best Environmental (BE)	-	-	✓
Most Resilient (MR)	-	-	✓
Lowest Carbon (LC)	-	✓	-
Best AA (BA)	-	-	✓

The WRZ options and SA options (group options) that make up each SA approach are listed in Table 4.4. More detailed descriptions of the options are provided in 0 and a full list of options for each approach is given in Appendix A of this report.

Table 4.4 Study Area Approaches

Options included	Do Minimum	Least Cost Approach (SA Approach 2) (SA combination 5)	Best Appropriate Assessment Approach (SA Approach 3) (SA combination 7)	Quickest Delivery Approach (SA Approach 1) (SA combination 1)	Best Environmental Approach (SA Approach 3) (SA combination 7)	Most Resilient Approach (SA Approach 3) (SA combination 7)	Lowest Carbon Approach (SA Approach 2) (SA combination 5)
SA options (Group options)	No options	**SA option 15:** 35, 35a **SA option 42:** 139, 140 **SA option 43:**	**SA option 4:** 05, 23, 40, 59, 69, 76, 97a	**SA option 1:** 01, 01a, 97 **SA option 15:** 35, 35a	**SA option 4:** 05, 23, 40, 59, 69, 76, 97a	**SA option 4:** 05, 23, 40, 59, 69, 76, 97a	**SA option 15:** 35, 35a **SA option 42:** 139, 140 **SA option 43:**

Options included	Do Minimum	Least Cost Approach (SA Approach 2) (SA combination 5)	Best Appropriate Assessment Approach (SA Approach 3) (SA combination 7)	Quickest Delivery Approach (SA Approach 1) (SA combination 1)	Best Environmental Approach (SA Approach 3) (SA combination 7)	Most Resilient Approach (SA Approach 3) (SA combination 7)	Lowest Carbon Approach (SA Approach 2) (SA combination 5)
		143, 144, 145					143, 144, 145
WRZ options	No options	39 44 67 73 86 101 108 131 137 138 142	44 58b 77 81 86 101 108 131 138 142	39 44 67 73 81 86 101 108 131 137 138 142	44 58b 77 81 86 101 108 131 138 142	44 58b 77 81 86 101 108 131 138 142	39 44 67 73 86 101 108 131 137 138 142

For the purposes of the Approach Development Process as set out in the SA Technical Report and for the purpose of the SEA comparison as set out in this Environmental Review, Uisce Éireann has only considered the options that were identified as the "best" performing options for each approach category. The identification of the approaches and 7 step process are outlined in detail in section 5 of the SA-C Technical Report.

Within SA-C, this resulted in three approaches being selected from the 12 SA combinations identified in Table 4.3, as they were identified as the best performing against the six approach categories - Least Cost, Best Environmental, Quickest Delivery, Most Resilient, Best AA and Lowest Carbon. This means that when comparing the three identified approaches against each other (representing the Stage 3 analysis for the selection of the Preferred Approach used in the workshop - see Table 4.5), their relative performance against categories they were not identified as “best” in Table 4.2 may be different. This is because Table 4.2 compares all of the combinations to give a wider ranking, whereas Table 4.5 only compares the best performing combinations that have been selected as approaches. For example, an option identified as the "worst" performer against a particular approach category in Table 4.5 may not be the overall worst performing option when considered alongside all of the combinations in Table 4.2..

Table 4.5 includes a summary of the MCA scoring and cost comparison used in the approach development for the each of the SA approaches identified as performing best against at least one of the approach categories.

The three stages identified above were applied through a final workshop with all of the background MCA and option costing information available for each option and the ranking from the Economic Balance of Supply and Demand (EBSD) tool.

Table 4.5 Summary of the MCA Scoring Costing for the SA Approaches

Category Criteria	SA Approach 1 (SA Combination 1) (QD)	SA Approach 2 (SA Combination 5) (LCo, LC)	SA Approach 3 (SA Combination 7) (BE, BA, MR)
Least Cost Score		Best	Worst
Quickest Delivery Score	Best	Worst	
Best AA Score	Two -3 Scores	Two -3 Scores	One -3 Score
Lowest Carbon Score		Best	Worst
Most Resilient Score	Worst		Best
Best Environmental Score	Worst		Best

Key		
Ranked order (best to worst) within the three selected approaches		
Worst		Best

4.4 Comparison of SA-C Approaches

An overall summary of the infrastructure components and abstractions for each of the SA approaches identified for SA-C is provided below in Table 4.6 and has been used to inform the environmental assessment.

Table 4.6 Study Area Approach Components Summary

Infrastructure Summary	Do Minimum	SA Approach 1 (SA Combination 1) (QD)	SA Approach 2 (SA Combination 5) (LCo, LC)	SA Approach 3 (SA Combination 7) (BE, BA, MR)
New pipeline network (km)	0	80	90	125
New WTPs	0	2	1	2
Upgrade WTPs	0	14	13	11
New / upgraded abstractions	0	10	8	7

Infrastructure Summary	Do Minimum	SA Approach 1 (SA Combination 1) (QD)	SA Approach 2 (SA Combination 5) (LCo, LC)	SA Approach 3 (SA Combination 7) (BE, BA, MR)
WTPs decommissioned	0	5	6	8
Abstractions abandoned	0	5	6	8
Raw Water Storage	0	0	0	0
Treated Water Storage	0	6	6	7

A comparative assessment of the three SA approaches based on the environmental option scores is summarised in Table 4.7 below. This covers:

- Scores across the options summed for all the sub-criteria against each SEA objective topic heading;
- Total numbers of -3 scores representing higher risk of effect, or likely greater requirement for mitigation, against each SEA objective topic heading; and
- Indication of the extent of difference in performance across the options to help identify if the differences between the SA approaches are small or large.

Table 4.7 Study Area Approach Comparison Summary

Topic	Total No. of	SA Approach 1 (SA Combination 1) (QD)	SA Approach 3 (SA Combination 5) (LCo, LC)	SA Approach 4 (SA Combination 7) (BE, BA, MR)	Range (Difference between Lowest and Highest Score)
Population, health, economy and recreation	-3 scores	No Difference			0
	MCA score	Worst		Best	4
Water Environment: quality and resources	-3 scores	Best		Worst	2
	MCA score	Worst		Best	6
Biodiversity, Flora and Fauna	-3 scores	Worst	Worst	Best	1
	MCA score	Worst		Best	22
Material Assets	-3 scores	No Difference			0
	MCA score	Worst		Best	4
	-3 scores	No Difference			0

Topic	Total No. of	SA Approach 1 (SA Combination 1) (QD)	SA Approach 3 (SA Combination 5) (LCo, LC)	SA Approach 4 (SA Combination 7) (BE, BA, MR)	Range (Difference between Lowest and Highest Score)
Landscape and Visual	MCA score	Worst	Best	Best	2
Climate Change	-3 scores	Best	Worst	Worst	1
	MCA score	Worst	Worst	Best	4
Culture, Heritage and Archaeology	-3 scores	No Difference			0
	MCA score	No Difference			0
Geology and Soils	-3 scores	No Difference			0
	MCA score	No Difference			0

Key		
MCA/No. of -3 scores against each criterion		
Worst		Best

*approaches are showing similar level of risk on climate change adaptation and therefore represented as no difference. However, carbon mitigation is covered separately based on estimated emissions and carbon cost (NPV). See lowest carbon approach.

** approaches are showing similar level of risk on culture, heritage and archaeology. Routing and siting is only indicative at this stage. Most options involving new construction include a level of risk to buried unknown archaeology, this would need to be investigated further at the project level.

4.4.1 SA Approach 1 (SA Combination 1) (QD)

SA approach 1, key comparison points:

- Identified as the best in the following categories: Quickest Delivery;
- Option types included:
    - SA options (group options): 1 surface water abstraction, WTP upgrade and rationalisation option, and 1 groundwater abstraction and rationalisation option; and
    - WRZ options: 4 groundwater abstraction options, 5 surface water abstraction options, 2 groundwater abstraction and interconnection options, 1 group water scheme option, and 1 groundwater storage and rationalisation option;
- Two -3 biodiversity scores associated with the option SAC-39 and SAC-138 abstractions which have the potential to directly impact Glenamoy Bog Complex SAC and River Unshin SAC respectively; and
- The key differences regarding infrastructure development for SA approach 1 include:
    - Higher number of new WTPs (same number as SA approach 3);

- Highest number of WTP upgrades;
- Highest number of new/upgraded abstractions;
- Lowest number of WTPs decommissioned and abstractions abandoned; and
- Lowest number of treater water storage facilities (same number as SA approach 2)

4.4.2 SA Approach 2 (SA Combination 5) (LC, LCo)

SA approach 2, key comparison points:

- Identified as the best in the following categories: Lowest Carbon and Least Cost;
- Option types included:
  - SA options (group options): 1 groundwater abstraction and rationalisation option, 1 surface water abstraction option, and 1 surface water abstraction and rationalisation option;
  - WRZ options: 4 groundwater abstraction options, 4 surface water abstraction options, 1 group water scheme option, 1 group water scheme and interconnection option, and 1 group water scheme and rationalisation option;
- Two -3 biodiversity scores associated with SAC-39 abstraction which has the potential to directly impact on Glenamoy Bog Complex SAC, and WRZ option 142 abstraction which has the potential to impact on Keel/Menaun Cliffs SAC; and
- The key differences regarding infrastructure development for SA approach 2 include:
  - Lowest number of new WTPs; and
  - Lowest number of treated water storage facilities (same number as SA approach 1).

4.4.3 SA Approach 3 (SA Combination 7) (BE, BA, MR)

SA approach 3, key comparison points:

- Identified as the best in the following categories: Best Environmental, Best AA and Most Resilient;
- Option types included:
  - SA option (group option): 1 surface water abstraction and rationalisation option;
  - WRZ options: 3 groundwater abstraction options, 5 surface water abstraction options, 1 group water scheme option, and 1 groundwater abstraction and interconnection option;
- One -3 biodiversity score associated with the SAC-142 abstraction which has the potential to impact on Keel/Menaun Cliffs SAC; and
- Compared to the other SA approaches, SA approach 3 requires:
  - Longest length of pipeline;
  - Highest number of new WTPs (same number as SA approaches 1);
  - Lowest number of WTP upgrades;
  - Lowest number of new/upgraded abstractions;
  - Highest number of WTPs decommissioned and abstractions abandoned; and
  - Highest number of treated water storage facilities.

4.5 SA-C Approach Assessment Comparison

The ‘Do Minimum’ approach is the ‘without plan’ approach, meaning that this is the approach that would occur without the NWRP. As a result, the ‘Do Minimum’ approach would only include reactive, unplanned interim measures to address failures in infrastructure.

The SDB shows a current deficit, applying the level of service in the area with the corresponding requirements for reserves, indicating operation of supplies with an SDB ranging from -21,338 m^3/d in 2019, to a projected maximum of -26,817 m^3/d in 2044 during dry conditions under a 'Do Minimum' scenario. As a result, public water supplies in this area are vulnerable, particularly under drought conditions. In addition, there may be ongoing reliability issues with the supplies and the situation is expected to further deteriorate due to climate change driven reductions in water resources and increased demand growth within the area. Table 4.8 shows the SDB for the WRZs in SA-C.

Table 4.8 Supply Demand Balance for SA-C

WRZ Name	WRZ Code	Population	Maximum Deficit m^3/day*	
			2019	2044
Riverstown Public Water Supply	2700SC0005	530	No Deficit	No Deficit
Sligo Town & Environs	2700SC0004	30,862	-897	-3,322
North Sligo Regional Water Supply	2700SC0003	4,691	-1,858	-2,126
Lough Easkey Regional Water Supply	2700SC0002	6,068	-266	-471
Lough Talt Regional Water Supply	2700SC0001	13,269	-5,114	-5,615
Knock Airport	2200SC0019	1	-15	-749
Swinford	2200SC0018	1,694	-1,032	-1,119
Kiltimagh PWS	2200SC0014	1,648	-412	-458
Kilkelly	2200SC0012	1,032	-613	-650
Foxford	2200SC0011	1,598	-20	-75
Charlestown	2200SC0008	1,178	-287	-377
Erris RWSS	2200SC0007	3,963	-124	-260
Ceide Fields	2200SC0006	0	-5	-6
Achill	2200SC0005	2,417	-1,853	-2,015
Ballina	2200SC0004	21,599	-3,095	-3,827
North Leitrim Regional Water Supply	1700SC0003	6,145	No Deficit	No Deficit
Dowra PWS (GWS Import)**	0200SC0003	94	N/A**	N/A**

*Based on the Dry Year Critical Period (DYCP) weather event planning scenario

**Note: This WRZ is supplied by a private Group Water Supply, therefore, the water available for use (WAFU) has not been verified for use in the SDB

An overall assessment and comparison of the SA approaches considered along with the 'Do Minimum' approach (a continuation of the current situation) is provided in Table 4.9 below.

Table 4.9 Assessment of the SA Approaches and the 'Do Minimum' Approach

SEA Objectives	Phase (Construction (C) / Operation (O))	Do Minimum	SA Approach 1 (SA Combination 1) (QD)	SA Approach 2 (SA Combination 5) (LCo, LC)	SA Approach 3 (SA Combination 7) (BE, BA. MR)
1. Protect public health and promote wellbeing	C	0	-	-	--
	O	---	++	+	+
2. Protect and enhance biodiversity and contribute to resilient ecosystems	C	0	--	--	-
	O	--	--	--	-
3. To protect landscapes, townscapes and visual amenity	C	0	-	-	-
	O	0	0	0	+
4. Protect and where appropriate enhance, built and natural assets and reduce waste	C	0	--	-	--
	O	-	--	--	--
5. Reduce greenhouse gas emissions	C	0	--	-	--
	O	-	--	-	--
6. Contribute to environmental climate change resilience	C	0	-	0	-
	O	--	0	0	-
7. Protect and improve surface water and groundwater status	C	0	0	0	0
	O	--	--	--	-
	C	0	-	-	-

SEA Objectives	Phase (Construction (C) / Operation (O))	Do Minimum	SA Approach 1 (SA Combination 1) (QD)	SA Approach 2 (SA Combination 5) (LCo, LC)	SA Approach 3 (SA Combination 7) (BE, BA. MR)
8. Avoid flood risk	O	0	0	0	0
9. Protect and where appropriate, enhance cultural heritage assets	C	0	-	-	-
	O	0	0	0	0
10. Protect quality and function of soils	C	0	-	-	-
	O	0	0	0	0

Key			
Major beneficial	+++	Minor adverse	-
Moderate beneficial	++	Moderate adverse	--
Minor beneficial	+	Major adverse	---
Neutral	0		

The overall assessment of the approaches against the SEA objectives indicates that SA approach 3 is likely to have a more adverse health and wellbeing impact during construction due to more new infrastructure being required. SA approach 1 is likely to have a more beneficial health and wellbeing impact during operation due to there being more WTP upgrades included than in the other approaches. SA approach 3 is likely to have a less adverse biodiversity impact during construction and operation due to less construction being required in designated sites. SA approach 2 (identified as the Preferred Approach) is likely to have a less adverse materials and waste impact during construction due to less work being required on greenfield sites. SA approach 3 is likely to have a more beneficial landscape impact during operation due to more WTP decommissions being required. SA approach 3 has the potential for more adverse impacts to resilience during construction and operation due to more abstraction increase options. SA approach 1 has the potential for more adverse impacts to resilience during construction due to more rationalisation options.

Mitigation for the Preferred Approach is taken into account in the individual options assessments presented in chapter 5, identified in chapter 6 in terms of cumulative assessment and in chapter 7 for the SEA summary. All the approaches address the identified water supply quantity and quality requirements to secure a level of service important for public health and wellbeing compared with the ‘Do Minimum’.

4.5.1 Selection of the SA Preferred Approach

SA approach 5 has been selected through the 7 step process as the best performing approach overall across the different categories.

The SA Preferred Approach does not include any -3 Biodiversity score options. Therefore, no higher risk options for effects on European Sites are included in the Preferred Approach. For options identified as having some level of risk for LSEs, mitigation measures to address these are set out in the NIS and no AESI are identified.

5

SA-C Preferred Approach: Strategic Environmental Assessment

5 SA-C Preferred Approach Strategic Environmental Assessment

5.1 SA-C Preferred Approach Options

This chapter provides an environmental assessment of the proposed SA Preferred Approach as required by the SEA Directive and implementing Irish regulations. The environmental effects are considered for each option individually. Additional measures proposed to be taken forward along with these options are also considered. Cumulative effects for both the 'within plan' SA Preferred Approach and the cumulative effects with other proposed developments outside the Framework Plan are addressed in chapter 6.

The SA Preferred Approach consists of WRZ options for eleven of the WRZs in the study area. The other six WRZs, namely Kiltimagh PWS, Knock Airport, Kilkelly, Lough Talt, Ballina and Lough Easkey RWSS, are covered by SA option 15, SA option 42 and SA option 43. The SA options involve the following:

- SA option 15: This option proposes to increase the existing GW abstraction, upgrade Kilkelly WTP, rationalise Knock Airport to Kilkelly WRZ and decomission Knock Airport WTP;
- SA option 42: This option proposes to increase the existing abstraction from Lough Mask, decommission Kiltimagh WTP, upgrade Tourmakeady WTP and Knappagh WTP, and rationalise Kiltimagh to Lough Mask WRZ; and
- SA option 43: This option proposes to increase the existing abstraction from Lough Conn, decommission Lought Talt WTP and Lough Easkey WTP, upgrade Lisglennon WTP, Crossmolina WTP and Ballycastle WTP, and rationalise Lough Talt to Lisglennon WTP.

The SA Preferred Approach for the remaining WRZs involves new and increased groundwater/surface water abstractions, rationalisation and interconnection, and upgrades to existing WTPs.

Table 5.1 gives a breakdown of the options in SA-C and the associated abstractions.

Table 5.1 Preferred Approach Breakdown

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
SAC-143 (SA Option 43) Lough Talt 2700SC0001	Rationalise Lough Talt to Lisglennon WTP • SA option 43: Increase SW abstraction from Lough Conn. Upgrade Lisglennon for increased capacity and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easky to Lisglennon WTP • Existing SW source (Lough Conn). WFD status 2016-2021 – Good	9,917 m^3/d
SAC-144 (SA Option 43) Ballina 2200SC0004	Increase SW abstraction from Lough Conn. Upgrade Lisglennon WTP for increased capacity and maintain Wherrew WTP at current capacity • SA option 43: Increase SW abstraction from Lough Conn. Upgrade Lisglennon for increased capacity and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easkey to Lisglennon WTP. • Existing SW source (Lough Conn). WFD status 2016-2021 – Good	16,961 m^3/d

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
SAC-145 (SA Option 43) Lough Easkey RWSS 2700SC0002	Rationalise Lough Easkey to Lisglennon WTP • SA option 43: Increase SW abstraction from Lough Conn. Upgrade Lisglennon for increased capacity and maintain Wherrew WTP. Rationalise Lough Talt and Lough Easkey to Lisglennon WTP. • Existing SW source (Lough Conn). WFD status 2016 - 2021 – Good	4,504 m^3/d
SAC-35a (SA Option 15) Kilkelly 2200SC0012	Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP • SA Option 15: Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP and rationalise Knock Airport to Kilkelly (exploration of region required). • Existing GW source (Swinford Gravels). WFD status 2016-2021 – Good	822 m^3/d
SAC-35 (SA Option 15) Knock Airport 2200SC0019	Rationalise Knock Airport to Kilkelly WRZ • SA option 15: Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP and rationalise Knock Airport to Kilkelly (exploration of region required). • Existing GW source (Swinford Gravels). WFD status 2016-2021 – Good	822 m^3/d
SAC-39 Ceide Fields 2200SC0006	Increase GW abstraction (Belmullet GWB - poorly productive bedrock) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP • Increase GW abstraction to meet WRZ future deficit (DYCP 2044) • Existing GW source (Belmullet). WFD status 2016-2021 – Good	65 m^3/d
SAC-44 North Sligo Regional Water Supply 2700SC0003	New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH • New GW abstraction to meet WRZ future deficit (DYCP 2044) • Existing GW source (Grange East). WFD status 2016-2021 – Good	2,807 m^3/d
SAC-137 Swinford 2200SC0018	Rationalise Swinford to Kilaturley GWS • Existing GW source (Swinford Gravels). WFD status 2016-2021 – Good	1,304 m^3/d
SAC-67 Foxford	New GW abstraction to supply deficit at Foxford, upgrade WTP	1,238 m^3/d

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
2200SC0011	• New GW abstraction to meet WRZ future deficit (DYCP 2044) • Existing GW source (Foxford gravels). WFD status 2016-2021 – Good	
SAC-73 Charlestown 2200SC0008	Interconnect Killaturly GWS with Charlestown and supply deficit from GWS • Existing GW source (Swinford Gravels). WFD status 2016-2021 – Good	1,304 m^3/d
SAC-139 (SA Option 42) Kiltimagh PWS 2200SC0014	Rationalise Kiltimagh to Lough Mask WRZ • SA Option 42: Increase SW abstraction from Lough Mask and upgrade Lough Mask WTP • Existing SW source (Lough Mask LWB). WFD status 2016 -2021 – Good	1,191 m^3/d
SAC-140 (SA Option 42) Lough Mask 2200SC0001	Increase SW abstraction at Lough Mask and upgrade Tourmakeady WTP • SA Option 42: Increase SW abstraction from Lough Mask and upgrade Lough Mask WTP • Existing SW source (Lough Mask). WFD status 2013-2018 – Good	8,000 m^3/d
SAC-86 Erris RWSS 2200SC0007	Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP. • Increase SW abstraction from Carrowmore Lake and upgrade local WTP • Existing SW source (Carrowmore Lake). WFD status 2016 - 2021 – Moderate	4,385 m^3/d
SAC-142 Achill 2200SC0005	New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only. • New SW abstraction from Keel Lough • New SW source (Keel MO). WFD status 2016 - 2021 – Moderate	2,813 m^3/d
SAC-101 Sligo Town & Environs Foxes Den Public Water Supply 2700SC0004	Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit. • Increase existing abstraction at Lough Gill • Existing SW source (Lough Gill SO). WFD status 2016 - 2021 – Moderate	22,138 m^3/d

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
SAC-108 North Leitrim RWSS 1700SC0003	Upgrade Moneyduff WTP • Increase existing abstraction at Lough Gill • Existing SW source (Lough Gill SO). WFD status 2016 - 2021 – Poor	5,567 m^3/d
SAC-138 Riverstown 2700SC0005	Refurb existing spring and upgrade WTP for water quality improvements • Existing GW source (Ballymote) WFD status 2016 - 2021 – Good	417 m^3/d
SAC-131 Dowra 0200SC0003	Dowra PWS (GWS Import) - Keep supplying Dowra WRZ from Doobally GWS • Existing SW source (Naweleian Lake LWB). WFD status 2016 - 2021 – High	WRZ is supplied by a private Group Water Supply, therefore, the water available for use (WAFU) has not been verified for use in the SDB

*SA Options are the same as Group Options

The SA Preferred Approach options are shown in Figure 5.1, in relation to key environmental designations. Note that SA option 15,42 and 43 are labelled as SAC-515, 542 and 543.

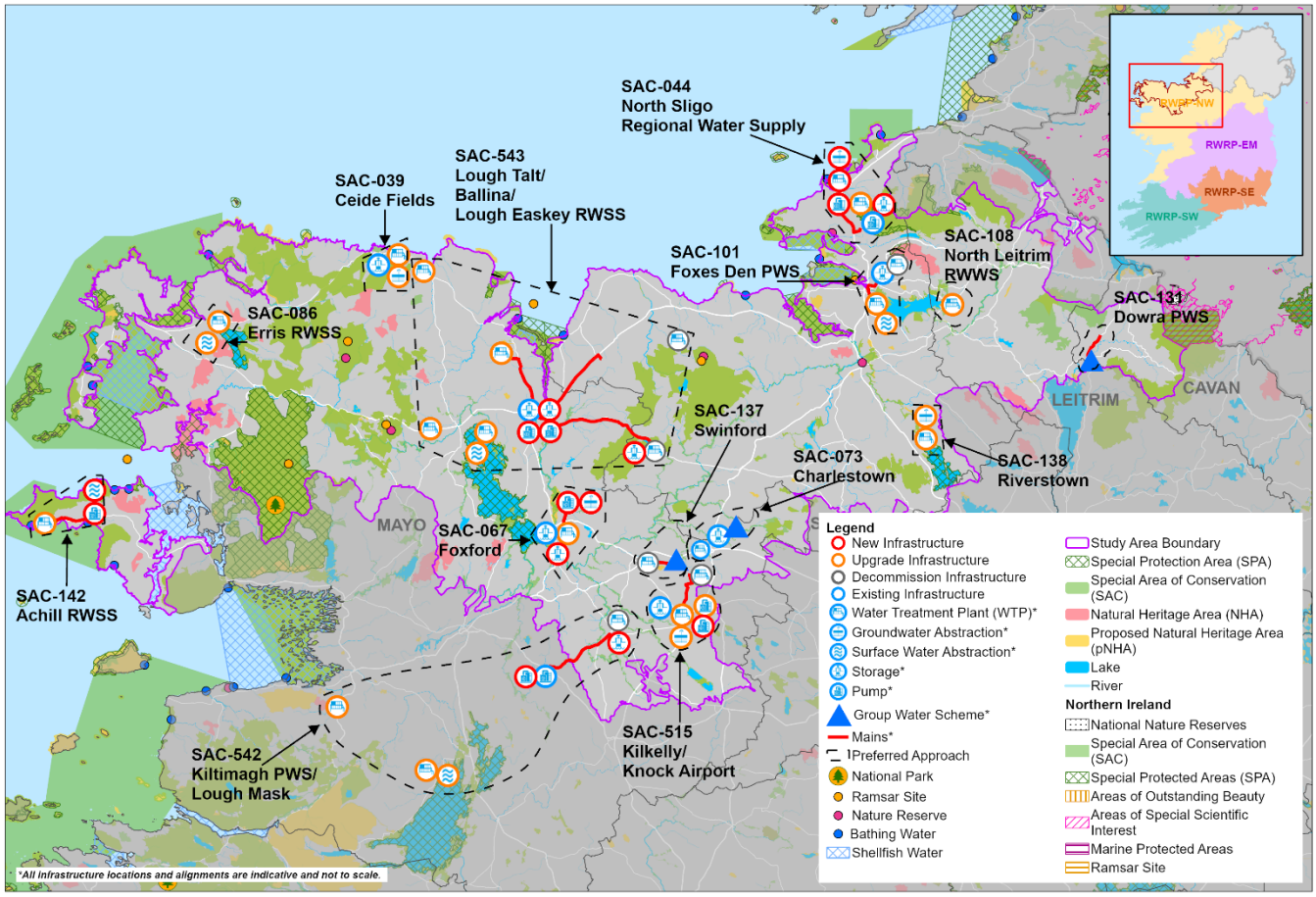

Figure 5.1 SA Preferred Approach and Key Environmental Designations

The SA Preferred Approach options have each been assessed against the SEA objectives, taking account of construction and operational phases, long term and short term, permanent and temporary, and indirect and direct impacts. Mitigation requirements to avoid or reduce effects have also been taken into consideration.Table 5.2 provides a breakdown of the infrastructural components and Table 5.3 provides an assessment summary of the options included in the SA Preferred Approach. Individual options assessments are available on request. The overall Preferred Approach assessment, including all the options combined, is summarised in Table 7.1.

Table 5.2 Component Table

Option Reference*	New / Refurbished Pipeline	New WTP	Upgrade WTPs	New / Upgraded Abstractions	WTPs Decommissioned	Abstractions Abandoned	Raw Water Storage	Treated Water Storage
SAC-039	-	-	✓	✓	-	-	-	-
SAC-044	✓	✓	✓	✓	-	-	-	✓
SAC-067	✓	-	✓	✓	-	-	-	✓
SAC-073	✓	-	✓	-	-	-	-	✓

Option Reference*	New / Refurbished Pipeline	New WTP	Upgrade WTPs	New / Upgraded Abstractions	WTPs Decommissioned	Abstractions Abandoned	Raw Water Storage	Treated Water Storage
SAC-086	-	-	✓	✓	-	-	-	-
SAC-101	✓	-	✓	✓	✓	✓	-	-
SAC-108	-	-	✓	-	-	-	-	-
SAC-131	✓	-	-	-	-	-	-	-
SAC-137	✓	-	-	-	✓	✓	-	-
SAC-138	-	-	✓	✓	-	-	-	-
SAC-142	✓	-	✓	✓	-	-	-	-
SA Option 15 (SAC-35 & 35a)	✓	-	✓	✓	✓	✓	-	-
SA Option 42 (SAC-139 & 140)	✓	-	-	-	✓	✓	-	✓
SA Option 43 (SAC-143, 144 & 145)	✓	-	✓	✓	✓	✓	-	-

*SA Options are the same as Group Options

Table 5.3 Options Assessment Summary

Option Reference*	Option Description	Phase	Protect Public Health and Promote Wellbeing (P1, P2, P3)	Protect and Enhance Biodiversity and Contribute to Resilient Ecosystems (B1, B2, B3, B4, B5)	To Protect Landscapes, Townscapes and Visual Amenity (L1)	Protect and Where Appropriate Enhance, Built and Natural Assets and Reduce Waste (M1, M2)	Reduce Greenhouse Gas Emissions (C1)	Contribute to Environmental Climate Change Resilience (R1, R2, R5)	Protect and Improve Surface Water and Groundwater Status (W1, W2, W3)	Avoid Flood Risk (W5)	Protect and Where Appropriate, Enhance Cultural Heritage Assets (CH1)	Protect Quality and Function of Soils (G1)
SA Option 43 (SAC-143, 144 & 145)	Increase abstraction from Lough Conn, rationalise Lough Easky to Lisglennon WTP, and rationalise Lough Talt to Lisglennon WTP	Construction	--	--	--	---	---	-	0	-	-	-
		Operation	++	-	+	0	---	-	-	0	0	0
SAC-39	Increase GW abstraction (Belmullet GWB (poorly productive bedrock) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP	Construction	-	-	0	0	0	--	0	0	0	0
		Operation	0	--	0	0	0	--	---	0	0	0

Option Reference*	Option Description	Phase	Protect Public Health and Promote Wellbeing (P1, P2, P3)	Protect and Enhance Biodiversity and Contribute to Resilient Ecosystems (B1, B2, B3, B4, B5)	To Protect Landscapes, Townscapes and Visual Amenity (L1)	Protect and Where Appropriate Enhance, Built and Natural Assets and Reduce Waste (M1, M2)	Reduce Greenhouse Gas Emissions (C1)	Contribute to Environmental Climate Change Resilience (R1, R2, R5)	Protect and Improve Surface Water and Groundwater Status (W1, W2, W3)	Avoid Flood Risk (W5)	Protect and Where Appropriate, Enhance Cultural Heritage Assets (CH1)	Protect Quality and Function of Soils (G1)
SA Option 15 (SAC-35 & 35a)	Rationalise Knock Airport to Kilkelly WRZ and increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP	Construction	-	--	-	-	-	--	0	0	-	-
		Operation	+	-	+	0	-	--	---	0	0	0
SAC-44	New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH	Construction	-	-	-	-	-	--	0	0	-	-
		Operation	+	--	-	-	-	--	--	0	0	0
SAC-137	Rationalise Swinford to Kilaturley GWS	Construction	-	-	-	-	0	0	0	0	-	-
		Operation	+	0	+	0	0	0	0	0	0	0

Option Reference*	Option Description	Phase	Protect Public Health and Promote Wellbeing (P1, P2, P3)	Protect and Enhance Biodiversity and Contribute to Resilient Ecosystems (B1, B2, B3, B4, B5)	To Protect Landscapes, Townscapes and Visual Amenity (L1)	Protect and Where Appropriate Enhance, Built and Natural Assets and Reduce Waste (M1, M2)	Reduce Greenhouse Gas Emissions (C1)	Contribute to Environmental Climate Change Resilience (R1, R2, R5)	Protect and Improve Surface Water and Groundwater Status (W1, W2, W3)	Avoid Flood Risk (W5)	Protect and Where Appropriate, Enhance Cultural Heritage Assets (CH1)	Protect Quality and Function of Soils (G1)
SAC-67	New GW abstraction to supply deficit at Foxford, upgrade WTP	Construction	-	-	-	-	-	-	0	0	-	-
		Operation	0	0	0	0	-	-	-	0	0	0
SAC-73	Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.	Construction	-	-	-	-	0	0	0	0	-	-
		Operation	+	--	0	0	0	0	0	0	0	0
SAC-86	Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP	Construction	-	-	0	-	0	-	0	0	0	0
		Operation	0	0	0	0	0	-	-	0	0	0

Option Reference*	Option Description	Phase	Protect Public Health and Promote Wellbeing (P1, P2, P3)	Protect and Enhance Biodiversity and Contribute to Resilient Ecosystems (B1, B2, B3, B4, B5)	To Protect Landscapes, Townscapes and Visual Amenity (L1)	Protect and Where Appropriate Enhance, Built and Natural Assets and Reduce Waste (M1, M2)	Reduce Greenhouse Gas Emissions (C1)	Contribute to Environmental Climate Change Resilience (R1, R2, R5)	Protect and Improve Surface Water and Groundwater Status (W1, W2, W3)	Avoid Flood Risk (W5)	Protect and Where Appropriate, Enhance Cultural Heritage Assets (CH1)	Protect Quality and Function of Soils (G1)
SA Option 42 (SAC-139 & 140)	Rationalise Kiltimagh to Lough Mask WRZ and increase SW abstraction at Lough Mask and upgrade Tourmakeady WTP	Construction	-	--	-	-	-	-	0	0	-	-
		Operation	+	-	+	0	-	-	-	0	0	0
SAC-142	New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	Construction	-	--	-	-	--	--	0	0	-	-
		Operation	0	--	0	0	--	--	--	0	0	0

Option Reference*	Option Description	Phase	Protect Public Health and Promote Wellbeing (P1, P2, P3)	Protect and Enhance Biodiversity and Contribute to Resilient Ecosystems (B1, B2, B3, B4, B5)	To Protect Landscapes, Townscapes and Visual Amenity (L1)	Protect and Where Appropriate Enhance, Built and Natural Assets and Reduce Waste (M1, M2)	Reduce Greenhouse Gas Emissions (C1)	Contribute to Environmental Climate Change Resilience (R1, R2, R5)	Protect and Improve Surface Water and Groundwater Status (W1, W2, W3)	Avoid Flood Risk (W5)	Protect and Where Appropriate, Enhance Cultural Heritage Assets (CH1)	Protect Quality and Function of Soils (G1)
SAC-101	Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.	Construction	--	--	-	-	--	-	0	0	-	-
		Operation	+	-	+	0	--	-	-	0	0	0
SAC-108	Upgrade Moneyduff WTP - no deficit	Construction	-	-	0	0	-	-	0	0	0	0
		Operation	0	--	0	0	-	-	-	0	0	0
SAC-138	Refurb existing spring and upgrade WTP for water quality improvements	Construction	-	-	0	0	0	--	0	0	0	0
		Operation	+	--	0	0	0	--	---	0	0	0

Option Reference*	Option Description	Phase	Protect Public Health and Promote Wellbeing (P1, P2, P3)	Protect and Enhance Biodiversity and Contribute to Resilient Ecosystems (B1, B2, B3, B4, B5)	To Protect Landscapes, Townscapes and Visual Amenity (L1)	Protect and Where Appropriate Enhance, Built and Natural Assets and Reduce Waste (M1, M2)	Reduce Greenhouse Gas Emissions (C1)	Contribute to Environmental Climate Change Resilience (R1, R2, R5)	Protect and Improve Surface Water and Groundwater Status (W1, W2, W3)	Avoid Flood Risk (W5)	Protect and Where Appropriate, Enhance Cultural Heritage Assets (CH1)	Protect Quality and Function of Soils (G1)
SAC-131	Keep supplying Dowra WRZ from Doobally GWS.	Construction	-	-	-	-	0	0	0	0	-	-
		Operation	0	--	0	0	0	0	0	0	0	0

*SA Options are the same as Group Options

**Total lifetime tCO_2e categories: minor beneficial = -ve negligible/neutral = <1000 minor = 1000 to <10,000, Moderate = 10,000 to <50,000, Major = 50,000+

5.2 Additional Measures

In addition to the SA Preferred Approach supply options, Uisce Éireann is already implementing measures across the three pillars of Lose Less, Use Less and Supply Smarter to improve the level of service to their customers in this study area. These are described in the SA-C Technical Report and include leakage reduction and water conservation.

5.2.1 Leakage Reduction

The leakage reduction measures across the public water supply are based on what Uisce Éireann assess to be both achievable and sustainable and include:

- Ongoing leakage management including active leakage control, pressure management, and find and fix activities to offset Natural Rate of Leakage Rise;
- Further net leakage reductions, to move towards achieving the national SELL target by 2034, in the WRZs: North Leitrim Regional Water Supply, Ballina, Achill, Ceide Fields, Charlestown, Lough Talt Regional Water Supply, Lough Easkey Regional Water Supply, North Sligo Regional Water Supply, and Sligo Town & Environs.

5.2.2 Water Conservation

At present, Uisce Éireann is conducting pilot studies in relation to water conservation stewardship in businesses and is actively progressing water conservation messaging campaigns. During drought conditions in 2018, a Water Conservation Order was implemented, in order to protect their water supplies and reduce pressure on the natural environment during this period. Uisce Éireann will continue to promote 'Water Conservation Activities', collecting and monitoring data over a number of years to assess the benefits. As part of the Framework Plan, Uisce Éireann have not applied reductions to the SDB for unquantifiable water conservation gains. However, they do assume that any gain will offset consumer usage growth factors.

5.3 Interim Solutions

The SA-C Technical Report identifies potential interim solutions that allow shorter term interventions to be identified and prioritised, when needed. These are expected to be small scale, within site works and are not likely to give rise to significant environmental effects. However, they would need to be subject to relevant assessments, including AA screening as and when they are required.

5.4 Approach Uncertainty and Adaptability

A summary of the adaptability criteria and sensitivity analysis Uisce Éireann have undertaken for the SA-C Preferred Approach is provided in the SA-C Technical Report. A high-level assessment of what this could mean for the SEA is shown in Table 5.4.

Table 5.4 Study Area C Sensitivity Analysis and Environmental Impacts

Uncertainty	Likelihood	Increase (+)/ Decrease (-) in Deficit	Environmental Impacts Relative to Assessment of Preferred Approach Key: Green - Positive Amber - Negative
Sustainability	Moderate/High (as Uisce Éireann's current abstractions are large compared to the waterbodies from which they abstract)	+10,000 m^3/d	The impact of sustainability reductions would reduce the volumes that can be abstracted from Uisce Éireann's existing sources therefore increasing the SDB deficit. There are some surface water sources in Study Area C that would be impacted by sustainability reductions. However, the Preferred Approach is designed to rationalise and/or supplement these sources by supplying from larger, more resilient surface water and groundwater sources. This includes a regional solution to decommission the Lough Talt and Lough Easkey sources, and supply these schemes from Lough Conn and the decommissioning of the Lyle river source. Groundwater sustainability is more difficult to assess at desktop level, however, as the abstractions in SA-C are small in scale any impacts are likely to be minimal.
			The SA Preferred Approach addresses reductions and decommissions several abstractions that have the potential to be unsustainable. However, additional sustainability reductions could increase pressure for additional supply from outside the study area.
Climate Change	High (international climate change targets have not been met)	+600 m^3/d	Higher climate change scenarios would impact Uisce Éireann's existing supplies and result in decreased water availability at certain times of year. Although the likelihood of this scenario is high based on climate change adaptation to date, potential impacts may be mitigated against by optimising Uisce Éireann's operations on a more environmentally sustainable basis across the range of supplies. Regarding the existing and proposed new groundwater abstractions, there is more difficulty and uncertainty in assessing increased climate change impacts However, it is generally understood that groundwater will be more resilient than surface water sources.
			Although the Preferred Approach provides more operational flexibility to use less sensitive water sources, this could still result in more pressure on sources.

Uncertainty	Likelihood	Increase (+)/ Decrease (-) in Deficit	Environmental Impacts Relative to Assessment of Preferred Approach Key: Green - Positive Amber - Negative
Demand Growth	Low/Moderate (growth has been based on policy)	-26,817 m^3/d	The impact of lower than expected growth would reduce the SDB deficit and the overall need requirement. The SDB deficit is spread across fourteen of the seventeen WRZs in the area. This is driven by quality as well as quantity issues. In this rural area, growth is relatively low.
			This could allow lower than expected energy and carbon costs and lower increased abstraction requirements
Leakage Targets	Low (Uisce Éireann is focused on sustainability and aggressive leakage reduction)	+578 m^3/d	The impact of lower than expected leakage savings would increase the SDB deficit and the overall need requirement. Due to the length and condition of Uisce Éireann's networks, Uisce Éireann could potentially fail to achieve target leakage reductions within the timeframes set out. However, as Uisce Éireann is committed to achieving leakage reductions, the likely scenario would be an extension in the period of time taken to achieve leakage targets as opposed to accepting lower targets.
			This could increase carbon and the effects of abstraction pressure on the environment
	Moderate/High (Uisce Éireann is focused on sustainability and aggressive leakage reduction)	-11,961 m^3/d	Increased leakage savings beyond SELL would reduce the SDB deficit and the overall need requirement. The need drivers span across the WRZs in Study Area C and are driven by quality as well as availability issues.
			This could allow lower than expected energy and carbon emissions and lower increased abstraction requirements.

6 SEA Cumulative Effects for SA-C Preferred Approach

6 SEA Cumulative Effects for SA-C Preferred Approach

Secondary, cumulative and the synergistic nature of the effects of the SA-C Preferred Approach proposals are required to be considered as part of SEA. These include:

- 'Within plan' or 'in-combination' effects; and
- Interaction with other plans and programmes.

Cumulative effects are also considered for the proposals across the seven study areas within the North West Region and reported in the SEA Environmental Report of the Regional Plan. Further consideration of any inter regional cumulative effects will be addressed in each Regional Plan SEA sequentially.

6.1 Cumulative Effects 'Within Plan' for SA-C

The potential 'within plan' cumulative effects for SA-C are considered at the following different levels:

- Option level: Identification of mutually exclusive or dependent options – this was considered through the options screening and approach development process;
- SA approaches: Cumulative effects are taken into account in the selection of approaches for key aspects such as abstraction from the same waterbody through the sustainability rules applied for Uisce Éireann abstractions (see section 3.2);
- SA Preferred Approach: The combined effect of options within the SA Preferred Approach – these are addressed in this chapter; and
- The North West Region level: Considering combined effects from proposals in the seven study areas (see the SEA Environmental Report of the Regional Plan).

For cumulative effects to occur, there needs to be an overlap of temporal periods in some way for the impact and/or the effect. For example, two schemes being constructed at the same time could result in cumulative traffic movements, while two schemes being operated together could result in additional drawdown of groundwater levels. A precautionary approach has been taken for the cumulative effect's assessment, which assumes that all options could be constructed at the same time and then all options would be operated at the same time (Table 6.1). However, this is very unlikely to be the case for construction impacts due to budget resources and regulatory constraints.

The assessment has considered the cumulative effects across all environmental topics to identify those interactions that are likely to generate significant effects. These are likely to be around:

- Biodiversity – for example, a cumulative loss of habitats or changes to a habitat's quality through changes in water quality or groundwater levels;
- Water environment (surface water and groundwater WFD status) – for example, changes to water flow due to combined abstraction pressure;
- People and health – for example, disruption due to multiple construction works taking place at the same time;
- Landscape and visual – for example, if there are a number of options located close together that could alter the landscape character or views;
- Cultural heritage – for example if the same cultural heritage features are affected by above ground infrastructure in close proximity or the combined effect of loss to undesignated archaeological assets or from combined impacts resulting in additional changes to water levels affecting archaeological resources; and
- Climate change – combined carbon emissions for the approach as a whole have been considered through the approach selection process and are also reported here to identify

potential requirements for mitigation. Combined effects on climate change adaptation are also considered.

6.1.1 Cumulative Effects during Construction

In general, the SA Preferred Approach options are geographically spaced out and most are small scale construction works. Therefore, there are unlikely to be many cumulative effect interactions during construction.

Table 6.1 Potential In-Combination Effects between Preferred Options in SA-C

Preferred Approach Option References	SAC-39	SAC-44	SAC-67	SAC-73	SAC-86	SAC-101	SAC-108	SAC-131	SAC-137	SAC-138	SAC-142	SA Option 15	SA Option 42
SA Option 43			LCLC RM	RM					RM			RM	RM
SA Option 42			RM	RM					RM			RM	
SA Option 15			RM	RM					RM				
SAC-142													
SAC-138													
SAC-137			RM	RM N5									
SAC-131													
SAC-108						LG							
SAC-101		N15											
SAC-86													
SAC-73			RM										
SAC-67													
SAC-44													

Key	
Construction Phase	
Operation Phase	
Construction and Operation	
Lough Conn and Lough Cullin SPA	LCLC
Lough Gill SAC	LG
River Moy SAC	RM
N5 road	N5
N15 road	N15

There could be cumulative effects associated with construction in terms of traffic, noise and dust for the options located along the N5 and N15 roads (indicated as 'N5' and 'N15' in Table 6.1). These could be mitigated by standard mitigation measures such as planning construction traffic routes and movements and engaging with local residents about the disruption. With these standard good practice measures in place, there are unlikely to be significant cumulative effects.

With the construction of the SA-C Preferred Approach, there is potential for cumulative effects from disturbance (SAC-073 and SA options 42 and 43), spread of invasive and non-native species (SAC-073 and SA options 42 and 43), mortality (SAC-073, SAC-137 and SA options 42 and 43), and pollution (all options) impacts on River Moy SAC. This is shown in Table 6.1 as 'RM'. There is potential for cumulative effects from disturbance impacts on Lough Conn and Lough Cullin SPA if construction of options SAC-067 and SA option 43 of the SA-C Preferred Aprroach are concurrent. This is represented as 'LCLC' in Table 6.1. Lastly, there is potential for cumulative effects from habitat loss, pollution, mortality, disturbance and spread of invasive and non-native species impacts with the construction of the SA Preferred Approach, if SAC-101 and SAC-108 are concurrent. Cumulative effects can be managed by standard good practice mitigation, such as having buffers along the edge of the waterbody and having an emergency plan in place during construction. With these standard good practice measures in place, there are unlikely to be significant cumulative effects to designated sites. The impacts on the European designations are provided in the NIS and are also summarised in chapter 9 of this review. Any option specific mitigation measures are included in section 6.3.4 of the NIS.

6.1.2 Cumulative Effects during Operation

Due to the distances between options, the SEA identified, at a plan level, that there are unlikely to be significant cumulative effects outside of the hydrological connections. There is potential for cumulative effects during the operational phase of the SA Preferred Approach on Lough Gill S-C given that SAC-101 and SAC-108 have the potential for hydrological changes and water table impacts to the site. Both of the options include increasing surface water abstraction from Lough Gill. See Figure 6.1[6] for the Preferred Approach abstractions in SA-C.

The potential for cumulative effects on groundwater bodies have been considered in a hydrogeological assessment of the groundwater abstractions commissioned by Uisce Éireann (Irish Water, 2022). This hydrogeological assessment considers the abstraction quantities and proximities and concludes that five of the WFD groundwater bodies (Belmullet, Foxford, Grange East, Kilkelly Charlestown and Swinford) affected by abstractions have a good quantitative status, therefore, the likelihood of affecting their WFD objectives is low, and no interaction was identified with existing Uisce Éireann abstractions.

There could also be cumulative effects in terms of carbon across the SA Preferred Approach. The whole life carbon estimate (including construction and operation) for the SA Preferred Approach indicates increased contribution to carbon emissions related to carbon embodied in materials used for construction and through operational energy use and water treatment. Generally, in terms of carbon emissions, increase in carbon emissions can be considered a significant effect, as these add cumulatively across all developments and contribute to the national target for carbon. However, consideration also needs to be given to the additional water supply provided from the options and therefore the overall carbon efficiency in terms of carbon emissions per ML of supply is an appropriate metric and for SA-C this averages as 0.34 tCO_2e/ML (lifetime sum). Mitigation for carbon emissions could include increased sourcing of energy from renewable sources and improving energy efficiency. This could be undertaken alongside

[6] Note that an index key for Figure 6.1 is provided in Appendix C

leakage reduction and campaigns to raise awareness of measures to reduce water consumption (which in turn would reduce energy consumption). This could include the promotion of water efficient devices and working with planning authorities and developers to encourage new development to be water efficient.

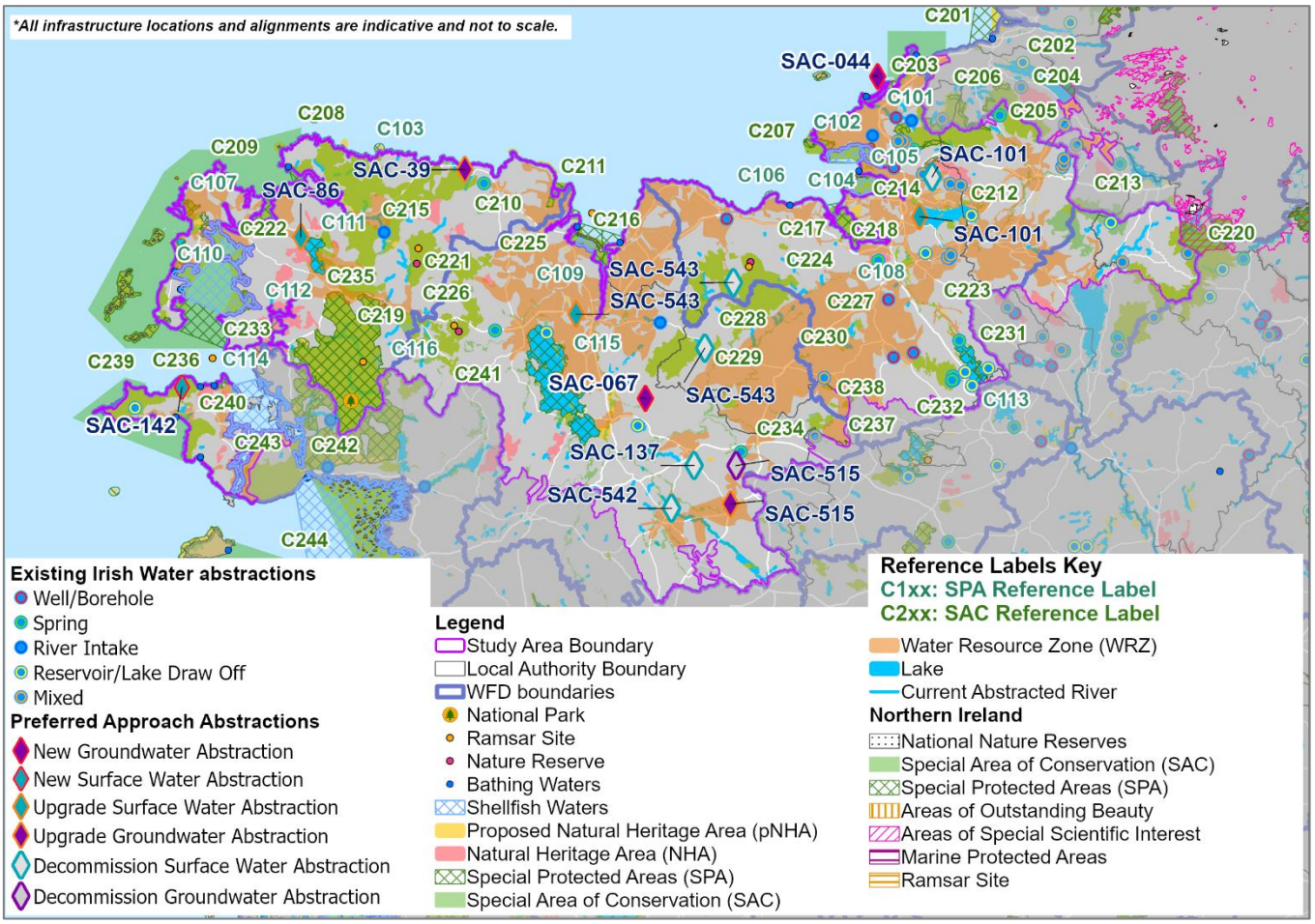

Figure 6.1 SA Preferred Approach Abstractions in SA-C

6.2 Cumulative Effects with Other Developments

The SA-C Preferred Approach has been assessed alongside other developments that could occur within the plan area. Potential cumulative effects could include increased traffic and noise. These could be mitigated by standard mitigation measures, such as planning construction traffic routes and informing local residents about the works. With these standard good practice measures in place, there are unlikely to be significant cumulative effects.

Table 6.2 shows that within SA-C there are numerous other developments near or in Sligo and Ballina. Other developments that were not considered further due to the small size of the developments from the SA Preferred Approach are the Sligo Central Sterile Services Department, Ballina Innovation Quarter and Gteic Hub projects.

6.2.1 Cumulative Effects during Construction

The projects in Ballina and Sligo could result in cumulative effects with the SA-C Preferred Approach if they were to be constructed at the same time. This is identified in Table 6.2 as ‘B’ and ‘S’ respectively. Projects in Ballina and Sligo include: Ballina-Castlebar-Westport Interurban Greenway, Rehins Fort and St Marys Secondary School; and City Campus Sligo Hub, IT Sligo, Rathellen, Finisklin, Robbers' Lane, Sligo Central Sterile Services Department, Sligo Cultural Plaza, Sligo Greenway, Sligo Hospital

Redevelopment, Sligo Leitrim Northern Counties Railway Greenway, Sligo Public Realm, Sligo University Hospital Ward Development and Ursuline Convent, respectively. There could also be cumulative effects if construction of N5 Westport to Turlough project and SAC-73 are concurrent. This is represented in Table 6.2 as 'N5'. Potential effects could include increased traffic and noise to the residential and commercial properties in Ballima and Sligo and along N5 road. These could be mitigated by standard mitigation measures, such as planning construction traffic routes and informing local residents about the works. With these standard good practice measures in place, there are unlikely to be significant cumulative effects.

The plan level assessment indicates that there is potential for cumulative effects on cultural heritage assets including archaeological resources related to the total extent of the ground works required, this will need to be considered further as detailed route alignments and site locations are determined along with approaches for more detailed desk studies, investigation and mitigation.

If construction of the SA-C Preferred Approach (SAC-67 and SA option 43) is concurrent with N5 Westport to Turlough and Rehins Fort, there is potential for disturbance impacts on Lough Conn and Lough Cullin SPA (both options) and Killala Bay/Moy Estuary S-C and SPA (only SA option 43). These are represented in Table 6.2 as 'LCLC' and 'KE'. Similarly, there could be potential for cumulative effects from disturbance impacts on Lough Mark SPA if construction of the SA-C Preferred Approach (SA Option 42) and N5 Westport to Turlough are concurrent (see Table 6.2 as 'LM').

There is also potential for cumulative effects on River Moy SAC if construction of the SAB Preferred Approach (SAC-67, SAC-73, SAC-137 and SA options 15, 42 and 43) is concurrent with Crossmolina Flood Relief Scheme, N5 Westport to Turlough, Rehins Fort and Tubbercurry Regeneration Project 2020. Impacts include pollution, mortality, disturbance and spread of invasive species. With the implementation of mitigation measures as outlined in section 6.3.3 of the NIS, there will be no adverse cumulative effects on the integrity of any of the SACs or SPAs mentioned.

Table 6.2 Potential Cumulative Effects between Preferred Options and Other Developments in SA-C

Preferred Approach Options														
Project Developments	**SAC-86**	**SAC-73**	**SAC-67**	**SAC-44**	**SAC-39**	**SAC-142**	**SAC-138**	**SAC-137**	**SAC-131**	**SAC-108**	**SAC-101**	**SA Option 15**	**SA Option 42**	**SA Option 43**
Áras Scéalta an Atlantaigh - Visitor Centre and Tourism Hub														
Ballina-Castlebar-Westport Interurban Greenway - Viaduct, Westport - Moy Cycle Bridge Ballina														B
Ballisodare Regeneration 2021														
City Campus Sligo Hub						S								
Clew Bay Greenway - Achill Sound and Extension to Bannacurry														
Crossmolina Flood Relief Scheme			RM	RM					RM			RM	RM	RM
Eastern Garavogue Bridge and Approach Road														
International Mountain Biking Project - Location #3 of 4 - Coolaney														
IT Sligo - Refurbishment of K&L Blocks						S								
IT Sligo Extension to Central Campus						S								
LILY														
Manorhamilton Public Realm improvement works including re-														

Preferred Approach Options														
Project Developments	**SAC-86**	**SAC-73**	**SAC-67**	**SAC-44**	**SAC-39**	**SAC-142**	**SAC-138**	**SAC-137**	**SAC-131**	**SAC-108**	**SAC-101**	**SA Option 15**	**SA Option 42**	**SA Option 43**
imagining employment and Enterprise Lands														
N5 Westport to Turlough			LCL C RM	RM N5					RM N5			RM	RM LM	LCL C RM KE
National Centre of Excellence for Surfing														
O'Connell Street Enhancement														
Rathellen, Finisklin, Co. Sligo						S								
Rehins Fort, Ballina			LCL C RM	RM					RM			RM	RM	LCL C RM KE B
Robbers' Lane, Maugheraboy, Sligo						S								
Sligo Central Sterile Services Department						S								
Sligo Cultural Plaza						S								

Preferred Approach Options														
Project Developments	**SAC-86**	**SAC-73**	**SAC-67**	**SAC-44**	**SAC-39**	**SAC-142**	**SAC-138**	**SAC-137**	**SAC-131**	**SAC-108**	**SAC-101**	**SA Option 15**	**SA Option 42**	**SA Option 43**
Sligo Greenway - Bellaghy - Charlestown - Collooney						S								
Sligo Hospital Redevelopment Phase 1						S								
Sligo Leitrim Northern Counties Railway Greenway - Sligo Town to Blacklion, Co. Cavan						S								
Sligo Public Realm						S								
Sligo University Hospital Ward Development						S								
St Marys Secondary School, Ballina, Co. Mayo - 64520M														B
The Cliff Bath House														
The Public Realm Enhancement of the villages of Strandhill and Rosses Point.														
Tubbercurry Regeneration Project 2020														RM
Ursuline Convent, Sligo						S								

Key	
Construction Phase	
Operation Phase	

Key	
Construction and Operation	
Lough Conn and Lough Cullin SPA	LCLC
River Moy SAC	RM
Lough Mask SPA	LM
Killala Bay/Moy Estuary SAC and SPA	KE
Ballina	B
Sligo	S

6.2.2 Cumulative Effects during Operation

There could be cumulative effects from habitat degradation and a reduction in flow and water availability on River Moy SAC with operation of Crossmolina Flood Relief Scheme, N5 Westport to Turlough, Rehins Fort and the SAB Preferred Approach (SAC-73). This is represented in Table 6.2 as 'RM'. With implementation of standard good practice measures there would be no adverse effects on the integrity of the European site.

The plan level assessment indicates that there could be cumulative effects in terms of carbon emissions, as all developments will generate carbon emissions from operation whether this is from routine maintenance activities to water treatment and the energy required for moving water. As outlined in section 6.1.2, any increase in carbon can be considered a significant effect, as these add cumulatively across all developments and contribute to the national target for carbon. The same mitigation measures suggested for the SA-C Preferred Approach apply, including increased sourcing of energy from renewable sources and raising awareness of measures to reduce water consumption (which in turn would reduce energy consumption). Working with third parties, including planning authorities and other developers, to identify water efficient measures and joint promotion of water issues would also further mitigate this effect.

7

Strategic Environmental Assessment Summary

7 Strategic Environmental Assessment Summary

SEA objectives have been taken into account at each stage of the approach development process for SA-C and a range of options and SA approaches have been considered and assessed, including a 'Do Minimum' approach.

Key beneficial impacts assessed include moderate beneficial effects regarding the upgrade of the Wherrew, Crossmolina and Ballycastle WTPs to improve quality of water supply for public health and local communities (SA option 43). There is also the potential for minor localised benefits associated with decommissioning of WTPs (SA option 43, SA option 15, SA option 42, SAC-131 & 101).

Key potential adverse impacts identified at plan level include:

- Moderate adverse effects against biodiversity during construction because there is the potential for the pollution of QI habitats and supporting habitats within designated sites for SA option 15 (River Moy SAC), SA option 42 (River Moy SAC, Lough Carra/Mask Complex SAC and Lough Mask SPA, Balla Turlough SAC), SA option 43 (River Moy SAC, Killala Bay/Moy Estuary SAC, Lough Hoe Bog SA, Lough Conn and Lough Cullin SPA, and Killala Bay/Moy Estuary SPA), SAC-101 (Lough Gill SAC, Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC and Cummeen Strand SPA), and SAC-142 (Keel Machair/Menaun Cliffs SAC and Croaghaun/ Slievemore SAC);
- Moderate adverse effects against biodiversity during operation because ther is the potential for habitat degradation and a reduction in flow and water availability for SAC-39 (Glenamoy Bog Complex SAC), SAC-44 (Bunduff Lough And Machair/Trawalua/ Mullaghmore SAC and Streedagh Point Dunes SAC), SAC-73 (River Moy SAC), SAC-108 (Lough Gill SAC), SAC-131 (Boleybrack Mountain SAC), SAC-138 (Unshin River SAC), and SAC-142 (Keel Machair/Menaun Cliffs SAC and Croaghaun/ Slievemore SAC). There is also the potential potential for the loss of QI habitats and spread of invasive species to both SACs for SAC-142.
- Moderate adverse effects during construction of option SA option 43 associated with the potential for impacts to the local landscape and visual amenity of the area when installing/upgrading new/existing assets;
- Major adverse effects during construction for SA option 43 against materials due to the option requiring approximately 55km of new pipeline;
- Major adverse effects associated with SA option 43 and the emission of greenhouse gases due to the energy requirements associated with the increase in abstraction and need to pump water through over 50km of pipeline;
- Moderate adverse effects to environmental climate change resilience with SA option 15 and options SAC-39, 44, 138 and 142 due to theTheir high abstraction rates; and
- Major adverse effects during operation for SA option 15, and options SAC-39 and 138 as a result of potential risks to groundwater quality from increased groundwater abstractions.

Cumulative effects assessment identified potential significant adverse effects in relation to carbon emissions, although the individual options are assessed as only neutral to moderate in relation to this SEA objective. This is because potential increases in carbon emissions contribute to national emissions. The average carbon intensity from the individual options provides an indicator for the new options in SA-C but does provide a complete picture as it does not fully take account of efficiencies from replacement of failing infrastructure, treatment technology or potential for mitigation, such as use of renewable energy sources in relation to the whole network. Insufficient information is available for the cumulative effects assessment to consider how total study area carbon emissions will change overall and per ML of water.

SEA mitigation identified to address the key adverse impacts identified above includes further hydrological or hydrogeological modelling (as appropriate) to further inform understanding of potential impacts on European and national designated sites identified as potentially affected by increased abstractions from existing surface and groundwater sources (see the NIS of the Framework Plan for further information).

Other mitigation identified includes development of construction environmental management plans, public consultation with local residents on disruption during construction and consideration of the waste hierarchy in design. Measures to address the cumulative impact for carbon emissions include sourcing the energy supply from renewable sources. All developments will aim to achieve as far as possible requirements for no net loss in biodiversity or enhancement, as set out in the Biodiversity Action Plan (Irish Water, 2021). There may be potential to also provide opportunities for carbon sequestration with biodiversity enhancement. In addition, there are opportunities to reduce water demand (which in turn would reduce energy and carbon) by raising awareness of water issues, promoting water efficient devices and through leakage reduction.

In general, these are standard mitigation measures with some specific measures and additional requirements for further assessment or monitoring (see the SEA Appendix and the NIS Appendix for AA and SEA standard mitigation measures respectively).

An overall summary assessment, including potential for cumulative and in-combination effects and other measures, identified to be progressed alongside the supply side options is provided in Table 7.1. Key mitigation and proposed monitoring measures are also shown.

Table 7.1 SEA Summary

SEA Objectives	SA Preferred Approach (PA) (SA Approach 5) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
SA Preferred Approach with interim measures as required and a programme of leakage reduction and water conservation measures, taking an adaptive approach to address uncertainty				
1. Protect public health and promote wellbeing	C Minor Adverse to Moderate Adverse O Neutral to Moderate Beneficial The PA is expected to improve overall drinking water quality reliability and sustainability through the decommissioning of failing WTPs and the replacement of abstractions vulnerable to drought conditions. The PA is expected to reduce risks to access of good quality water supply across different conditions and over the plan period.	Standard good construction practice and consultation Further assessment of risks to water quality and consideration of catchment management initiatives to improve water quality and reduce treatment cost. For example, working with landowners and managers on practices to reduce levels of sediment and pollution from entering water courses through run off.	• Level of service, and the frequency and duration of drought orders • Number of days/hours when water supply to people is disrupted due to drought, freeze-thaw or other service/infrastructure issues • Number of public rights of way closures/diversions and length of paths created compared to loss	• Duration of construction works, and number of complaints received regarding construction works • Duration of temporary closures of footpaths and other recreational assets • Number of days where recreational uses are impeded
2. Protect and enhance biodiversity and contribute to	C Minor Adverse to Moderate Adverse O Neutral to Moderate Adverse Impacts from construction works for pipelines and service reservoirs	Routing/siting to avoid impacts. Standard good construction practice and specific measures as identified in the NIS of the Framework Plan.	• Temporary and permanent habitats lost vs habitats created/enhanced	• Monitor construction activities to ensure compliance

SEA Objectives	SA Preferred Approach (PA) (SA Approach 5) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
resilient ecosystems	on biodiversity. These can be minimised through careful routing and siting. Potential for construction and operational impacts on European and National designated sites.	Design to meet no net loss biodiversity or achieve enhancement, where possible, on or off site and in line with the Biodiversity Action Plan objectives. Further hydrological/hydrogeological assessments to determine impacts on designated sites. Operating rules to limit impacts on European and National sites.	• Site condition and population data for QI of European and National designated sites.	
3. To protect landscapes, townscapes and visual amenity	C Neutral to Moderate Adverse O Minor Adverse to Minor Beneficial Construction landscape impacts and long term impacts from above ground structures, such as new WTPs.	Routing and siting to reduce tree loss and appropriate location and design of above ground structures with landscape planting. Reinstatement of land use and vegetation.	• Total working area of pipelines non-designated landscapes • Land use/landscape features re-established for schemes over appropriate period – areas/km successfully restored to meet requirements	• Duration of construction works • Number of complaints received regarding visual impact of construction works
4. Protect and where appropriate enhance, built	C Neutral to Major Adverse O Neutral to Minor Adverse New resources required for construction works, including	Materials management to be integrated into design to optimise use of existing resources and	• Loss of greenfield land, including agricultural, forestry or other land uses	• Construction wastes sent to landfill

SEA Objectives	SA Preferred Approach (PA) (SA Approach 5) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
and natural assets and reduce waste	extensive lengths of pipeline, service reservoirs and new/upgraded WTPs. Ongoing maintenance requirements.	minimise waste from construction and operation.	• Disruptions to strategic infrastructure/services • Use of waste management plans • Volume of drinking water treatment residuals sent to landfill	
5. Reduce greenhouse gas emissions	C Neutral to Major Adverse O Neutral to Major Adverse Embodied and operational carbon contribute to national level carbon emission targets. Leakage and water efficiency can contribute to reducing carbon.	Design to minimise embodied carbon emissions and optimise operational efficiency. Seek renewable energy supply sources and optimise use of leakage and water efficiency measures to reduce carbon. Consider offsetting approaches with multiple benefits for water quality, carbon sequestration and linking with other objectives.	• Percentage of energy supply from renewable sources or reduced energy use • Carbon footprint (total tonnes) per year, predicted over plan period, lifetime of schemes and carbon intensity of water resource options (tonnes/Ml/d)	• Carbon footprint (total tonnes) during construction • Operational Carbon Intensity kgsCO_2equic/ML
6. Contribute to environmental climate	C Neutral to Moderate Adverse O Neutral to Moderate Adverse	Consider how operation can further reduce climate change pressure on at risk sources and associated designations,	• WFD waterbody status objectives at risk and designated site condition status	• None identified

SEA Objectives	SA Preferred Approach (PA) (SA Approach 5) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
	change resilience	Abstractions generally reduce environmental resilience but overall improved flexibility for operation using regional schemes has the potential to reduce pressure on at risk local resources SA option 15, SAC-39, 44, 138 and 142 require further assessment to understand their sustainability in the longer term.	particularly for SA option 15, SAC-39, 44, 138 and 142. Sustainability review of sources taking account of groundwater and surface water interconnections.	• Frequency of drought orders requiring change to normal abstractions/ compensation releases	
7.	Protect and improve surface water and groundwater status	C Neutral O Neutral to Major Adverse Generally, new/increased abstractions are limited to allowable limits and have a low risk of adverse effect on WFD waterbody status objectives.	Further investigation to consider effects on groundwater abstraction on the surface water environment.	• WFD waterbody status objectives at risk	• Pollution incidents during construction
8.	Avoid flood risk	C Neutral to Minor Adverse O Neutral Potential loss of flood plain increasing flood risk from construction and location of above	Siting and design of schemes to take account of flood risk and design for flood risk resilience.	• Number of options at risk of flooding at each AEP level	• Lost time to flooding • Lost time to power supply interruptions

SEA Objectives	SA Preferred Approach (PA) (SA Approach 5) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
	ground structures for SA option 43.			
9. Protect and where appropriate, enhance cultural heritage assets	C Neutral to Minor Adverse O Neutral Potential construction impacts on unknown archaeological interest. Impacts on known interests are expected to be avoided.	Standard good practice approaches to minimise potential impacts.	• Number of archaeological assets adversely affected by water resource options • Number of options that are rerouted to avoid cultural heritage impacts • Number of schemes including improvements to access recording of archaeological assets or communication/ interpretation of interest features	• Number of archaeological finds recorded during construction
10. Protect quality and function of soils	C Neutral to Minor Adverse O Neutral Potential for loss and damage to valuable soils during construction but impacts to geological assets are expected to be avoided.	Standard good practice to conserve and reinstate soils.	• Soil Management Plans implemented • Volume of contaminated land restored, or soils removed	• Total volume of soil removed or reused on site

8 Water Framework Directive Summary

8 Water Framework Directive Summary

Through the options identification and assessment process new options considered have been restricted to those expected to meet estimated sustainability requirements and all options have been assessed based on conservative allowable abstraction constraints. The options identified in SA-C are also expected to be sustainable, based on additional plan-level desk-based assessment, in terms of avoiding deterioration of WFD status or avoiding conflict with meeting WFD objectives.

All groundwater bodies used for the SA-C abstractions have good quantitative status (Irish Water, 2022). The risk of combined effects on groundwater body WFD objectives, or on existing abstractions, are considered low. However, impacts, including cumulative effects with non Uisce Éireann abstractions, will need to be considered in further detail as part of project level consenting to demonstrate both sustainability for any connected surface waterbodies and groundwater dependent habitats and protected areas.

9 Appropriate Assessment Summary

9 Appropriate Assessment Summary

The NIS of the Regional Plan's conclusions for SAC, regarding 'In-combination effects with other plans and projects' and 'In-combination effects between Preferred Options', as set out below, and are included in more detail in Appendix E of the NIS for the Regional Plan.

Potential in-combination effects with other projects and plans were identified for the preferred options on the River Moy SAC, Lough Conn and Lough Cullin SPA, Lough Gill SAC, Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, Cummeen Strand SPA, Unshin River SAC, Ballysadare Bay SPA, Lough Mask SPA, Lough Carra/Mask Complex SAC, Killala Bay/Moy Estuary SAC, and Killala Bay/Moy Estuary SPA. The potential effects include pollution, habitat loss, mortality, disturbance, habitat degradation, water table/availability and spread of invasive species impacts. The assessment concluded that with the mitigation identified there will be no adverse effects on the integrity of the European site in-combination with other plans or projects.

Potential in-combination effects between preferred options were identified for Lough Conn and Lough Cullin SPA, Lough Gill SAC and River Moy SAC. The potential impacts include habitat loss, pollution, mortality, disturbance and spread of invasive and non-native species impacts. With the implementation of mitigation as detailed in Appendix E of the NIS, there will be no adverse effects on the integrity of European sites.

10 Recommendations for Implementation

10 Recommendations for Implementation

Environmental actions for the implementation plan and the draft monitoring plan are identified in:

- SEA Environmental Report of the Framework Plan – this includes general proposals and standard mitigation requirements (also see SEA Environmental Report Appendix); and
- SEA Environmental Report of the Regional Plan - this includes specific mitigation and monitoring requirements for the North West Region options and cumulative effects.

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Appendix A Fine Screening Summaries

Key			
0 Neutral	-1 Minor adverse	-2 Moderate Adverse	-3 Major adverse
	1 Minor beneficial	2 Moderate Beneficial	3 Major Beneficial

Table A.1 Fine Screening Summary of Desalination Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-90	Desalination plant to supply the scheme with possibility to supply Mulranny as well.									3	0	-19

Table A.2 Fine Screening Summary of Groundwater Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-07	New GW bastraction in regionaly karstified aquifer in Tobercurry to partly supply deficit in Lough Talt WRZ.									0	0	-18
SAC-27	New GW abstraction in Lisglennon (quarry in the area) to supply deficit at Basllina WRZ, upgrade Lisglennon WTP									1	0	-17
SAC-34a	Increase GW abstraction to partly supply deficit at Charlestown WRZ, upgrade Charlestown WTP									1	0	-14
SAC-35a	Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP									1	0	-13

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-39	Increase GW abstraction (Belmullet GWB (poorly productive bedrock)) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP									2	0	-14
SAC-44	New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH									0	0	-18
SAC-48a	Increase GW abstraction (Glencar GWB (karstic))to supply deficit at Kinlough/Tullaghan, upgrade Glenade WTP									2	0	-14
SAC-57	Increase GW abstraction from Carrowcanada Spring to supply deficit at									0	0	-11

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	Swinford WRZ, wpgrade WTP											
SAC-135	No Deficit - Upgrade existing Riverstown WTP									1	0	-17
SAC-67	New GW abstraction to supply deficit at Foxford, upgrade WTP									0	0	-13
SAC-71	Increase GW abstraction to partly supply deficit at Charlestown WRZ, upgrade Charlestown WTP									1	0	-13
SAC-77	Increase GW abstraction to supply deficit at Kilkelly WRZ, upgrade Kilkelly WTP									1	0	-12
SAC-84	New GW abstraction at Erris, upgrade Erris WTP									1	0	-19

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC91	New GW abstraction to partly supply deficit at Achill Island, upgrade Achill WTP									2	0	-21
SAC132	New GW abstraction (Glenade Dowra GWB (productive fissured bedrock)) to supply Dowra WRZ.									0	0	-13
SAC138	Refurb existing spring and upgrade WTP for water quality improvements									1	0	-15

Table A.3 Fine Screening Summary of Groundwater and Interconnection Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-58b	New GW wellfield and supply deficit to Knock Airport WRZ (new regional WSS).									1	0	-15
SAC-58a	New GW wellfield and supply deficit to Charlestown WRZ (new regional WSS).									0	0	-13

Table A.4 Fine Screening Summary of Groundwater and Rationalisation Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-34	Rationalise Knock Airport to Charlestown WRZ.									1	0	-14
SAC-35	Rationalise Knock Airport to Kilkelly WRZ									1	0	-13
SAC-48	Rationalise North Sligo Regional Water Supply to Kinlough Tullaghan.									2	0	-14

Table A.5 Fine Screening Summary of Group Water Scheme Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-66	Interconnect Foxford with Callow GWS to supply deficit from GWS.									2	0	-20
SAC-131	Keep supplying Dowra WRZ from Doobally GWS.									0	0	-3

Table A.6 Fine Screening Summary of Group Water Scheme Interconnection Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-09a	Supply deficit from Culfadda GWS.									1	0	-15
SAC-09b	Interconnect Kilaturley GWS with Lough Talt and supply deficit from GWS.									1	0	-18
SAC-38	Interconnect Kilaturley GWS with Knock Airport and supply deficit from GWS.									1	0	-15
SAC-53	Interconnect Kilaturley GWS with Swinford and supply deficit from GWS.									1	0	-15
SAC-73	Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.									1	0	-15

Table A.7 Fine Screening Summary of Group Water Scheme Rationalisation Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-137	Rationalise Swinford to Kilaturley GWS									1	2	-14

Table A.8 Fine Screening Summary of Surface Water Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-06a	Increase SW abstraction at Lough Gill and upgrade of Foxes Den WTP.									0	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-10	Supply Lough Talt WRZ from Lough Gara and abandon Lough Talt source.									2	0	-23
SAC-11	Recommission Cairns Hill WTP and abandon Lough Talt source.									1	0	-18
SAC-14a	Increase SW abstraction from Lough Conn. Upgrade Wherrew WTP and abandon Lisglennon WTP									1	0	-19
SAC-113a	Increase SW abstraction from Lough Conn to supply deficit at Basllina WRZ, upgrade Lisglennon WTP									2	0	-17
SAC-15a	Increase SW abstraction from Lough Conn. Replace Lisglennon WTP									1	0	-19

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	and abandon Wherrew WTP											
SAC-26	New South Lough Conn WTP to provide additional yield for Ballina only.									1	0	-20
SAC-36a	Increase SW abstraction at Lough Mask and upgrade Tourmakeady WTP									1	0	-18
SAC-45	New SW abstraction from Glencar Lough to supply deficit at North Sligo, upgrade WTP									1	0	-20
SAC-47a	Increase SW abstraction from Lough Gill and expand Foxes Den WTP to supply deficit.									0	0	-16
SAC-50a	Supply Sligo Town from upgraded Foxes Den									0	0	-17

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	WTP and offset Kinsellagh for North Sligo RWSS.											
SAC-51a	Increase SW abstraction from Lough Gill and expand Foxes Den WTP to supply deficit.									0	0	-16
SAC-51b	Maintain existing abstraction at Kilsellagh impoundment.									0	0	-16
SAC-113b	Increase SW abstraction from Lough Conn. Upgrade Wherrew WTP to provide additional yield.									2	0	-17
SAC-68	New SW abstraction from the River Moy to supply deficit at Foxford, upgrade WTP									1	0	-19

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-81	Increase SW abstraction from River Glore. New WTP and new storage required.									0	0	-16
SAC-86	Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP									0	0	-9
SAC-87	Increase SW abstraction from Accorymore Lake. Requires 1m raise of the dam, increased abstraction and WTP upgrade.									5	0	-22
SAC-111	New SW abstraction from Lough Feeagh and new WTP to supply Achill Island. Abandon existing source.									2	0	-21

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-100	Increase SW abstraction from Lough Gill and expand Foxes Den WTP to supply deficit.									0	0	-16
SAC-101	"Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.									0	0	-16
SAC-102	New SW abstraction from Glencar Lough including new WTP to partly supply deficit.									2	0	-24
SAC-108	Upgrade Moneyduff WTP - no deficit									0	0	-13
SAC-112	Increase SW abstraction from Lough Mask and									0	0	-15

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	upgrade of Tourmakeady WTP.											
SAC-113	Interconnect Swinford WRZ with Lough Mask.									0	0	-15
SAC-114	Interconnect Charlestown WRZ with Lough Mask.									0	0	-15
SAC-115	Interconnect Knock Airport WRZ with Lough Mask.									0	0	-15
SAC-116	Interconnect Kilkelly WRZ with Lough Mask.									0	0	-15
SAC-117	Interconnect Kiltimagh WRZ with Lough Mask.									0	0	-15
SAC-118	Increase SW abstraction from Lough Conn and upgrade Wherrew WTP									0	0	-15
SAC-119	Rationalise Swinford WRZ with Lough Conn.									0	0	-15

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-120	Rationalise Charlestown WRZ with Lough Conn.									0	0	-15
SAC-121	RationaliseKnock Airport WRZ with Lough Conn.									0	0	-15
SAC-122	Rationalise Kilkelly WRZ with Lough Conn.									0	0	-15
SAC-123	Rationalise Kiltimagh WRZ with Lough Conn.									0	0	-15
SAC-124	New SW abstraction from Ballysadare River and new water treatment plant. Network requirements to distribution network.									3	0	-26
SAC-127	Increase SW abstraction from Lough Gill and expand Foxes Den WTP to supply deficit.									1	0	-17

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-134	Upgrade Moneyduff WTP and supply Dowra									0	0	-13
SAC-136	Upgrade Moneyduff WTP and supply Dowra									0	0	-13
SAC-139	Rationalise Kiltimagh to Lough Mask WRZ									0	0	-11
SAC-140	Increase SW abstraction at Lough Mask and upgrade Tourmakeady WTP									0	0	-11
SAC-142	New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.									1	0	-18
SAC-144	Increase SW abstraction from Lough Conn.									1	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	Upgrade Lisglennon WTP for increased capacity and and maintain Wherrew WTP at current capacity											
SAC-147	Increase SW abstraction from Lough Conn. Upgrade Lisglennon WTP for increased capacity and and maintain Wherrew WTP at current capacity									0	0	-18
SAC-149	Increase SW abstraction from Lough Gill and expand Foxes Den WTP to supply deficit.									0	0	-16

Table A.9 Fine Screening Summary of Surface Water and Interconnection Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-113a	Interconnect Swinford WRZ with Lough Conn.									0	0	-11
SAC-51	Supply deficit to North Sligo from Sligo Town (Killsellagh WTP)									0	0	-16
SAC-113c	Interconnect Knock Airport WRZ with Lough Conn.									2	0	-10
SAC-113d	Interconnect Kilkelly WRZ with Lough Conn.									2	0	-10
SAC-113e	Interconnect Kiltimagh WRZ with Lough Conn.									2	0	-10
SAC-113f	Interconnect Foxford WRZ with Lough Conn.									2	0	-17
SAC-107	Increase SW abstraction from Lough Gill. Interconnect North Leitrim RWSS and Sligo									0	0	-16

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	Environs for increased resilience.											
SAC-107a	Interconnect North Leitrim RWSS and Sligo Environs for increased resilience.									0	0	-16

Table A.10 Fine Screening Summary of Surface Water and Rationalisation Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-01	Rationalise Lough Talt to Lough Conn. Upgrade of									1	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	Wherrew WTP to provide additional output and new watermains through Ballina and Bonniconlon to Lough Talt required.											
SAC-02	Rationalise Lough Talt to Lough Conn. Upgrade of existing Wherrew WTP to provide additional output and new watermains through Ballina and Bonniconlon to Lough Talt required.									0	0	-17
SAC-03	Upgrade existing Wherrew WTP and rationalise Lough Talt									1	0	-18
SAC-04	New South Lough Conn WTP - abstraction point at the southern end of									4	0	-24

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	Lough Conn to serve the Lough Talt catchment. New mains through Foxford and Aclare to Lough Talt required.											
SAC-05	Rationalise Lough Talt to Lough Conn. Upgrade of existing Lisglennon WTP to provide additional output and new watermains through Ballina and Bonniconlon to Lough Talt required.									1	0	-18
SAC-06	Rationalise Lough Talt to Foxes Den WTP. New watermains to Castleoye SR required.									0	0	-18
SAC-14	Rationalise Lough Talt to Wherrew WTP									1	0	-19

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-15	Rationalise Lough Talt to Lisglennon WTP									1	0	-19
SAC-29	Rationalise Riverstown to Foxes Den WTP for long term OPEX savings and improved resilience.									0	0	-18
SAC-33	Rationalise Knock Airport to South Lough Conn WTP.									4	0	-24
SAC-36	Rationalise Knock airport to Lough Mask WRZ									1	0	-18
SAC-40	Rationalise Ceide Fields WRZ to Lisglennon WTP.									1	0	-18
SAC-42	Rationalise North Sligo to Ballyshannon WRZ (Lough Melvin).									0	0	-14
SAC-46	Rationalise North Sligo Regional Water Supply WRZ to Foxes Den WTP.									0	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-47	Rationalise North Sligo Regional Water Supply to Kinsellagh WTP. Supply Sligo Town from upgraded Foxes Den WTP and offset Kinsellagh for North Sligo RWSS.									0	0	-16
SAC-50	Supply North Sligo from Kinsellagh. New trunk main from Kinsellagh WTP to Rosses Point required.									0	0	-17
SAC-55	Rationalise Swinford WRZ to upgraded Wherrew WTP.									1	0	-18
SAC-56	Rationalise Swinford to South Lough Conn WTP.									4	0	-24
SAC-59	Rationalise Swinford WRZ to Lisglennon WTP.									1	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-60	Rationalise Swinford to Lough Mask WRZ									1	0	-18
SAC-61	Rationalise Foxford WRZ to upgraded Wherrew WTP.									1	0	-18
SAC-62	Rationalise Foxford to South Lough Conn WTP.									4	0	-24
SAC-65	Rationalise Foxford to Lough Mask WRZ									1	0	-18
SAC-69	Rationalise Foxford WRZ to Lisglennon WTP.									1	0	-18
SAC-135	Rationalise Dowra to North Leitrim via Ballinagleragh GWS.									2	0	-17
SAC-74	Rationalise Charlestown WRZ to upgraded Wherrew WTP.									1	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-75	Rationalise Charlestown to South Lough Conn WTP.									4	0	-24
SAC-76	Rationalise Charlestown WRZ to Lisgennnon WTP.									1	0	-18
SAC-78	Rationalase Kilkelly to Lough Mask WRZ.									1	0	-18
SAC-82	Rationalise Kiltimagh to Lough Mask WRZ									1	0	-18
SAC-92	Rationalise Achill Island WRZ to Lough Mask WRZ									1	0	-18
SAC-95	Rationalise Lough Easkey to Lough Conn									0	0	-17
SAC-97	Rationalise Lough Easky to Lough Conn.									1	0	-18

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-97b	Rationalise Lough Easkey WRZ to upgraded Wherrew WTP.									1	0	-18
SAC-97c	Rationalise Lough Easky to Lisglennon WTP									1	0	-18
SAC-97d	Rationalise Lough Easky to Wherrew WTP									1	0	-19
SAC-97a	Rationalise Lough Easkey WRZ to Lisgennnon WTP.									1	0	-18
SAC-99	Rationaliase Lough Easkey to Foxes Den WRZ.									0	0	-18
SAC-125	Transfer of part of Lough Easkey from Ballina RWSS and other part from Foxes Den PWS									1	0	-17
SAC-126	Transfer of part of Lough Easkey from Ballina									1	0	-17

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	RWSS and other part from Foxes Den PWS											
SAC-130	Rationalise Foxford WRZ with Lough Conn.									0	0	-15
SAC-133	Rationalise Dowra to North Leitrim RWSS.									0	0	-13
SAC-143	Rationalise Lough Talt to Lisglennon WTP									1	0	-18
SAC-145	Rationalise Lough Easky to Lisglennon WTP									1	0	-18
SAC-146	Rationalise Lough Talt to Lisglennon WTP									0	0	-18
SAC-148	Rationalise Lough Talt to Foxes Den WTP									0	0	-16

Table A.11 Fine Screening Summary of WTP Upgrade Options in SA-C

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
SAC-01a	Upgrade of Wherrew WTP to provide additional yield.									1	0	-18
SAC-02a	Upgrade Wherrew WTP to provide additional yield.									0	0	-17
SAC-02b	Upgrade Wherrew WTP to provide additional yield.									1	0	-18
SAC-23	Upgrade of Lisglennon WTP to provide additional yield.									1	0	-18
SAC-24	Upgrade of Wherrew WTP to provide additional yield for Ballina only.									0	0	-12
SAC-25	Upgrade of Lisglennon WTP to provide									0	0	-12

Option Reference	Name	Environmental								Total - 3 Scores	Environmental Scoring	
		Population, Health, Economy and Recreation	Water Environment: Quality and Resources	Biodiversity, Flora and Fauna	Material Assets	Landscape and Visual	Climate Change	Culture, Heritage and Archaeology	Geology and Soils		Positive Score - Potential Beneficial Effects	Negative Scores - Potential Adverse Effects
	additional yield for Ballina only.											
SAC-128	Upgrade of Lisglennon WTP to provide additional yield.									1	0	-17

Appendix B SA Approaches for SA-C

Note: SA Options are also referred to as Group Options

WRZ	Preferred Approach - SA Approach 4		Least Cost - SA Approach 4		Best Environmental - SA Approach 5	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2700SC0001: Lough Talt	SAC-143 Rationalise Lough Talt to Lisglennon WTP	43	SAC-143 Rationalise Lough Talt to Lisglennon WTP	43	SAC-05 Rationalise Lough Talt to Lough Conn. Upgrade of existing Lisglennon WTP to provide additional output and new watermains through Ballina and Bonniconlon to Lough Talt required.	4
2200SC0004: Ballina	SAC-144 Increase SW abstraction from Lough Conn. Upgrade Lisglennon WTP for increased capacity and and maintain Wherrew WTP at current capacity	43	SAC-144 Increase SW abstraction from Lough Conn. Upgrade Lisglennon WTP for increased capacity and and maintain Wherrew WTP at current capacity	43	SAC-23 Upgrade of Lisglennon WTP to provide additional yield.	4
2200SC0019: Knock Airport	SAC-35 Rationalise Knock Airport to Kilkelly WRZ	15	SAC-35 Rationalise Knock Airport to Kilkelly WRZ	15	SAC-58b New GW wellfield and supply deficit to Knock Airport WRZ (new regional WSS).	-
2200SC0006: Ceide Fields	SAC-39 Increase GW abstraction (Belmullet GWB (poorly productive bedrock)) to	-	SAC-39 Increase GW abstraction (Belmullet GWB (poorly productive	-	SAC-40 Rationalise Ceide Fields WRZ to Lisglennon WTP.	4

WRZ	Preferred Approach - SA Approach 4		Least Cost - SA Approach 4		Best Environmental - SA Approach 5	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
	supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP		bedrock)) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP			
2700SC0003: North Sligo Regional Water Supply	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH	-	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH	-	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH	-
2200SC0018: Swinford	SAC-137 Rationalise Swinford to Kilaturley GWS	-	SAC-137 Rationalise Swinford to Kilaturley GWS	-	SAC-59 Rationalise Swinford WRZ to Lisglennon WTP.	4
2200SC0011: Foxford	SAC-67 New GW abstraction to supply deficit at Foxford, upgrade WTP	-	SAC-67 New GW abstraction to supply deficit at Foxford, upgrade WTP	-	SAC-69 Rationalise Foxford WRZ to Lisglennon WTP.	4
2200SC0008: Charlestown	SAC-73 Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.	-	SAC-73 Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.	-	SAC-76 Rationalise Charlestown WRZ to Lisgennnon WTP.	4
2200SC0012: Kilkelly	SAC-35a Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP	15	SAC-35a Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP	15	SAC-77 Increase GW abstraction to supply deficit at Kilkelly WRZ, upgrade Kilkelly WTP	-

WRZ	Preferred Approach - SA Approach 4		Least Cost - SA Approach 4		Best Environmental - SA Approach 5	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2200SC0014: Kiltimagh PWS	SAC-139 Rationalise Kiltimagh to Lough Mask WRZ	42	SAC-139 Rationalise Kiltimagh to Lough Mask WRZ	42	SAC-81 Increase SW abstraction from River Glore. New WTP and new storage required.	-
2200SC0007: Erris RWSS	SAC-86 Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP	-	SAC-86 Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP	-	SAC-86 Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP	-
2200SC0005: Achill	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-
2700SC0002: Lough Easkey RWSS	SAC-145 Rationalise Lough Easky to Lisglennon WTP	43	SAC-145 Rationalise Lough Easky to Lisglennon WTP	43	SAC-97a Rationalise Lough Easkey WRZ to Lisgennnon WTP.	4
2700SC0004: Sligo Town & Environs	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand	-	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction	-	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase	-

WRZ	Preferred Approach - SA Approach 4		Least Cost - SA Approach 4		Best Environmental - SA Approach 5	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
Foxes Den Public Water Supply	of Foxes Den WTP to cover Kilsellagh supply and supply deficit.		from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.		abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.	
1700SC0003: North Leitrim RWSS	SAC-108 Upgrade Moneyduff WTP - no deficit	-	SAC-108 Upgrade Moneyduff WTP - no deficit	-	SAC-108 Upgrade Moneyduff WTP - no deficit	-
2700SC0005: Riverstown	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-
0200SC0003: Dowra	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 3		Lowest Carbon - SA Approach 4	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2700SC0001: Lough Talt	SAC-01 Rationalise Lough Talt to Lough Conn. Upgrade of Wherrew WTP to provide	1	SAC-15 Rationalise Lough Talt to Lisglennon WTP	11	SAC-143 Rationalise Lough Talt to Lisglennon WTP	43

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 3		Lowest Carbon - SA Approach 4	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
	additional output and new watermains through Ballina and Bonniconlon to Lough Talt required.					
2200SC0004: Ballina	SAC-01a Upgrade of Wherrew WTP to provide additional yield.	1	SAC-15a Increase SW abstraction from Lough Conn. Replace Lisglennon WTP and abandon Wherrew WTP	11	SAC-144 Increase SW abstraction from Lough Conn. Upgrade Lisglennon WTP for increased capacity and and maintain Wherrew WTP at current capacity	43
2200SC0019: Knock Airport	SAC-58b New GW wellfield and supply deficit to Knock Airport WRZ (new regional WSS).	-	SAC-35 Rationalise Knock Airport to Kilkelly WRZ	15	SAC-35 Rationalise Knock Airport to Kilkelly WRZ	15
2200SC0006: Ceide Fields	SAC-39 Increase GW abstraction (Belmullet GWB (poorly productive bedrock)) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP	-	SAC-39 Increase GW abstraction (Belmullet GWB (poorly productive bedrock)) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP	-	SAC-39 Increase GW abstraction (Belmullet GWB (poorly productive bedrock)) to supply deficit at Ceide Fields WRZ, upgrade Ceide Fields WTP	-
2700SC0003: North Sligo Regional Water Supply	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used	-	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade	-	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 3		Lowest Carbon - SA Approach 4	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
	in conjunction with current Ardnaglass BH		WTP. To be used in conjunction with current Ardnaglass BH		WTP. To be used in conjunction with current Ardnaglass BH	
2200SC0018: Swinford	SAC-137 Rationalise Swinford to Kilaturley GWS	-	SAC137 Rationalise Swinford to Kilaturley GWS	-	SAC-137 Rationalise Swinford to Kilaturley GWS	-
2200SC0011: Foxford	SAC-67 New GW abstraction to supply deficit at Foxford, upgrade WTP	-	SAC-67 New GW abstraction to supply deficit at Foxford, upgrade WTP	-	SAC-67 New GW abstraction to supply deficit at Foxford, upgrade WTP	-
2200SC0008: Charlestown	SAC-73 Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.	-	SAC-73 Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.	-	SAC-73 Interconnect Kilaturley GWS with Charlestown and supply deficit from GWS.	-
2200SC0012: Kilkelly	SAC-35a Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP	15	SAC-35a Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP	15	SAC-35a Increase GW abstraction at Kilkelly WRZ, upgrade Kilkelly WTP	15
2200SC0014: Kiltimagh PWS	SAC-81 Increase SW abstraction from River Glore. New WTP and new storage required.	-	SAC-81 Increase SW abstraction from River Glore. New WTP and new storage required.	-	SAC-139 Rationalise Kiltimagh to Lough Mask WRZ	42
2200SC0007: Erris RWSS	SAC-86	-	SAC-86	-	SAC-86	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 3		Lowest Carbon - SA Approach 4	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
	Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP		Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP		Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP	
2200SC0005: Achill	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-
2700SC0002: Lough Easkey RWSS	SAC-97 Rationalise Lough Easky to Lough Conn.	1	SAC-97c Rationalise Lough Easky to Lisglennon WTP	11	SAC-145 Rationalise Lough Easky to Lisglennon WTP	43
2700SC0004: Sligo Town & Environs Foxes Den Public Water Supply	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.	-	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.	-	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 3		Lowest Carbon - SA Approach 4	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
1700SC0003: North Leitrim RWSS	SAC-108 Upgrade Moneyduff WTP - no deficit	-	SAC-108 Upgrade Moneyduff WTP - no deficit	-	SAC-108 Upgrade Moneyduff WTP - no deficit	-
2700SC0005: Riverstown	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-
0200SC0003: Dowra	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-

WRZ	Best Appropriate Assessment - SA Approach 5	
	Option Description	SA Option
2700SC0001: Lough Talt	SAC-05 Rationalise Lough Talt to Lough Conn. Upgrade of existing Lisglennon WTP to provide additional output and new watermains through Ballina and Bonniconlon to Lough Talt required.	4
2200SC0004: Ballina	SAC-23 Upgrade of Lisglennon WTP to provide additional yield.	4

WRZ	Best Appropriate Assessment - SA Approach 5	
	Option Description	SA Option
2200SC0019: Knock Airport	SAC-58b New GW wellfield and supply deficit to Knock Airport WRZ (new regional WSS).	-
2200SC0006: Ceide Fields	SAC-40 Rationalise Ceide Fields WRZ to Lisglennon WTP.	4
2700SC0003: North Sligo Regional Water Supply	SAC-44 New GW abstraction to supply deficit at North Sligo, upgrade WTP. To be used in conjunction with current Ardnaglass BH	-
2200SC0018: Swinford	SAC-59 Rationalise Swinford WRZ to Lisglennon WTP.	4
2200SC0011: Foxford	SAC-69 Rationalise Foxford WRZ to Lisglennon WTP.	4
2200SC0008: Charlestown	SAC-76 Rationalise Charlestown WRZ to Lisgennnon WTP.	4
2200SC0012: Kilkelly	SAC-77 Increase GW abstraction to supply deficit at Kilkelly WRZ, upgrade Kilkelly WTP	-
2200SC0014: Kiltimagh PWS	SAC-81 Increase SW abstraction from River Glore. New WTP and new storage required.	-
2200SC0007: Erris RWSS	SAC-86	-

WRZ	Best Appropriate Assessment - SA Approach 5	
	Option Description	SA Option
	Increase SW abstraction from Carrowmore Lake to supply deficit at Erris WRZ, upgrade Erris WTP	
2200SC0005: Achill	SAC-142 New SW abstraction from Keel Lough and new raw water transfer to existing WTP. Includes WTP upgrade. New source to supplement Accorymore Lake during dry periods only.	-
2700SC0002: Lough Easkey RWSS	SAC-97a Rationalise Lough Easkey WRZ to Lisgennnon WTP.	4
2700SC0004: Sligo Town & Environs Foxes Den Public Water Supply	SAC-101 Rationalise Kilsellagh impoundment if deemed unreliable source and increase abstraction from Lough Gill and expand of Foxes Den WTP to cover Kilsellagh supply and supply deficit.	-
1700SC0003: North Leitrim RWSS	SAC-108 Upgrade Moneyduff WTP - no deficit	-
2700SC0005: Riverstown	SAC-138 Refurb existing spring and upgrade WTP for water quality improvements	-
0200SC0003: Dowra	SAC-131 Keep supplying Dowra WRZ from Doobally GWS.	-

Appendix C Figure Index Tables

Designated Site	Label	Designated Site	Label	Designated Site	Label
SACs (Figure 2.2)					
Bunduff Lough And Machair/Trawalua/Mullaghmore SAC	C201	Killala Bay/Moy Estuary SAC	C216	Lough Arrow SAC	C231
Lough Melvin SAC	C202	Knockalongy and Knockachree Cliffs SAC	C217	Bricklieve Mountains and Keishcorran SAC	C232
Streedagh Point Dunes SAC	C203	Union Wood SC	C218	Doogort Machair/Lough Doo SAC	C233
Arroo Mountain SAC	C204	Carrowmore Lake Complex SAC	C219	Doocastle Turlough SAC	C234
Glenade Lough SAC	C205	Cuilcagh - Anierin Uplands SAC	C220	Owenduff/Nephin Complex SAC	C235
Ben Bulben, Gleniff And Glenade Complex SAC	C206	Bellacorick Iron Flush SAC	C221	Croaghaun/Slievemore SAC	C236
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC	C207	Mullet/Blacksod Bay Complex SAC	C222	Flughany Bog SAC	C237
Broadhaven Bay SAC	C208	Unshin River SAC	C223	Cloonakillina Lough SAC	C238
Erris Head SAC	C209	Ox Mountains Bogs SAC	C224	Achill Head SAC	C239
Glenamoy Bog Complex SAC	C210	Bellacorick Bog Complex SAC	C225	Keel Machair/Menaun Cliffs SAC	C240
Lackan Saltmarsh and Kilcummin Head SAC	C211	Lough Dahybaun SAC	C226	River Moy SAC	C241
Lough Gill SAC	C212	Templehouse And Cloonacleigha Loughs SAC	C227	Lough Gall Bog SAC	C242
Boleybrack Mountain SAC	C213	Lough Nabrickkeagh Bog SAC	C228	Corraun Plateau SAC	C243
Ballysadare Bay SAC	C214	Lough Hoe Bog SAC	C229	West Connacht Coast SAC	C244

Designated Site	Label	Designated Site	Label	Designated Site	Label
Slieve Fyagh Bog SAC	C215	Turloughmore (Sligo) SAC	C230		
SPAs (Figure 2.2)					
Sligo/Leitrim Uplands SPA	C101	Termoncarragh Lake and Annagh Machair SPA	C107	Lough Arrow SPA	C113
Ballintemple and Ballygilgan SPA	C102	Ballysadare Bay SPA	C108	Doogort Machair SPA	C114
Illanmaster SPA	C103	Killala Bay/Moy Estuary SPA	C109	Lough Conn and Lough Cullin SPA	C115
Drumcliff Bay SPA	C104	Mullet Peninsula SPA	C110	Owenduff/Nephin Complex SPA	C116
Cummeen Strand SPA	C105	Carrowmore Lake SPA	C111		
Aughris Head SPA	C106	Blacksod Bay/Broad Haven SPA	C112		
NHAs (Figure 2.2)					
Dough/Thur Mountains NHA	C301	Ederglen Bog NHA	C307	Bangor Erris Bog NHA	C313
Crockauns/Keelogyboy Bogs NHA	C302	Slieveward Bog NHA	C308	Tullaghan Bay And Bog NHA	C314
Inagh Bog NHA	C303	Tristia Bog NHA	C309	Doogort East Bog NHA	C315
Pollatomish Bog NHA	C304	Forrew Bog NHA	C310	Cunnagher More Bog NHA	C316
Ummerantarry Bog NHA	C305	Corry Mountain Bog NHA	C311	Sraheens Bog NHA	C317
Glenturk More Bog NHA	C306	Carrane Hill Bog NHA	C312	Croaghmoyle Mountain NHA	C318