Summer 2023

Regional Water Resources Plan – North West

Strategic Environmental Assessment

Appendix H: Study Area B – 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.

Table of Contents

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 B 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 B within the North West Region for the options and approaches considered and as outlined in the Study Area B Technical Report (draft RWRP-NW Appendix 2). 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

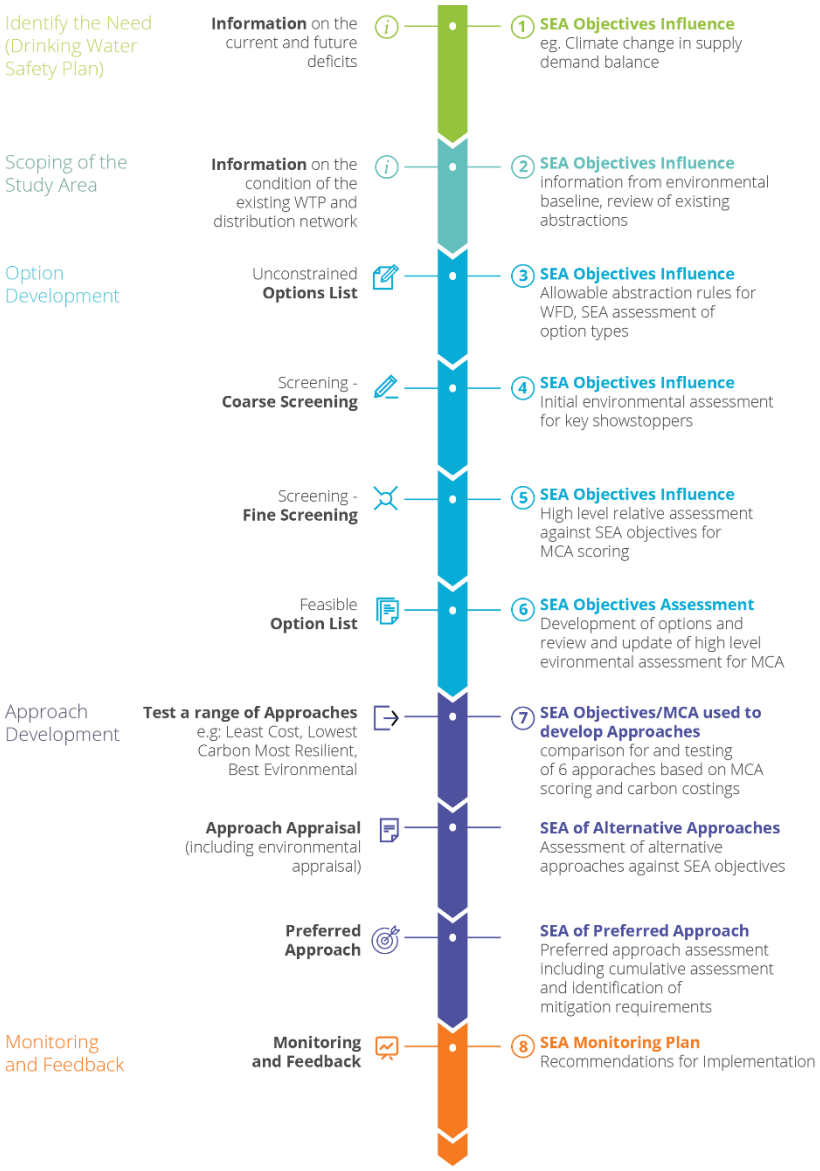

Figure 1.1 Option and Approach Development Process

the 5 year plan cycle and includes an annual review to identify actions required within the plan cycle.

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.

SEA Topic	SEA Objective
	Minimise impacts on other material assets and existing water abstractions.
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 SAB 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 SAB 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 SAB are provided in chapter 9 of this review.

1.6 Study Area B

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 SAB, the location of SAB in relation to the North West Region is shown in Figure 1.2.

Study Area B lies within the counties of Cavan, Monaghan, Leitrim, Longford, Donegal, and Sligo and its total area is approximately 2,790 km^2. There is one principal settlement (with a population of over 10,000) within SAB, namely Cavan (CSO, 2016a), as shown in Figure 1.3.

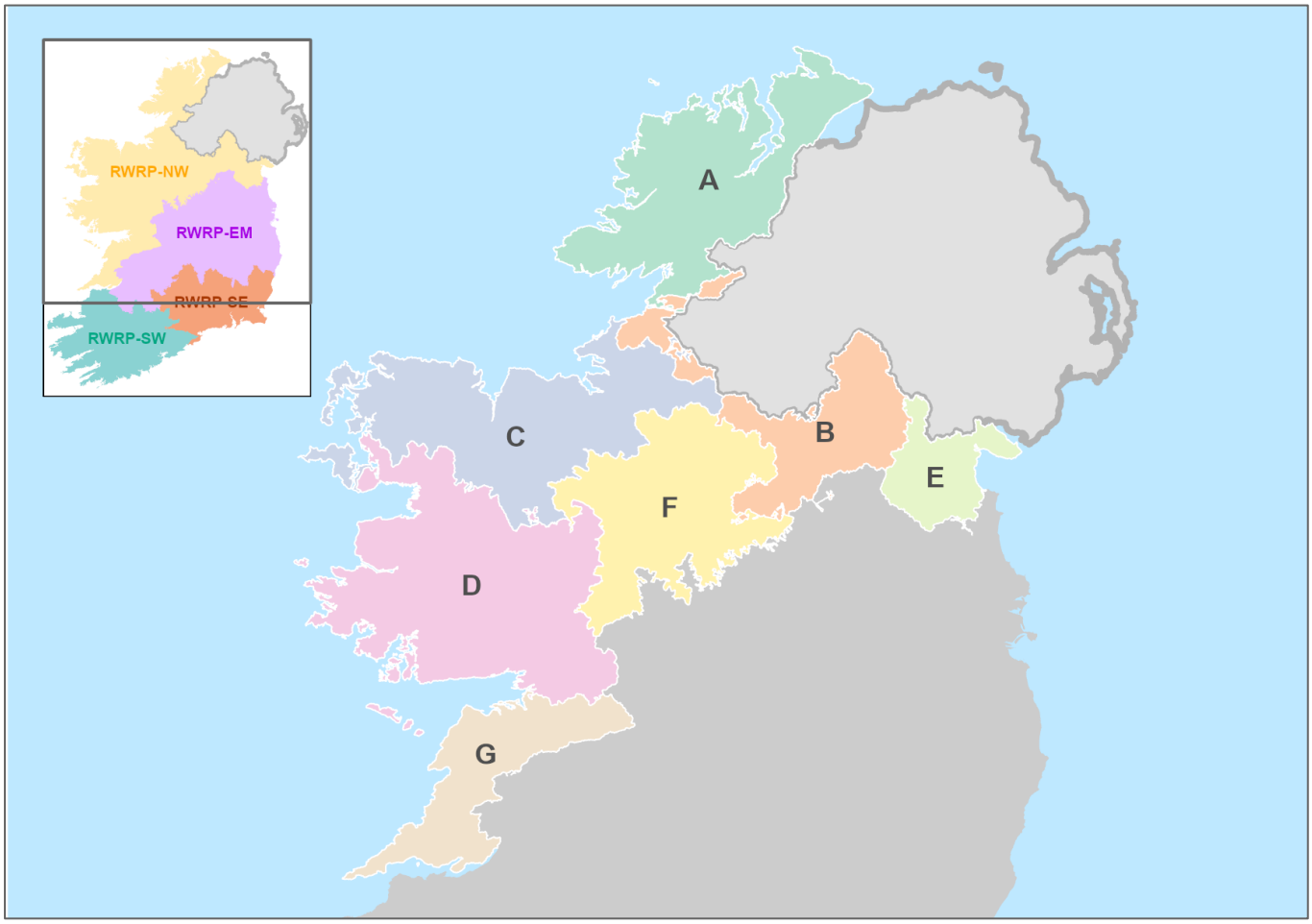

Figure 1.2 North West Region Study Areas

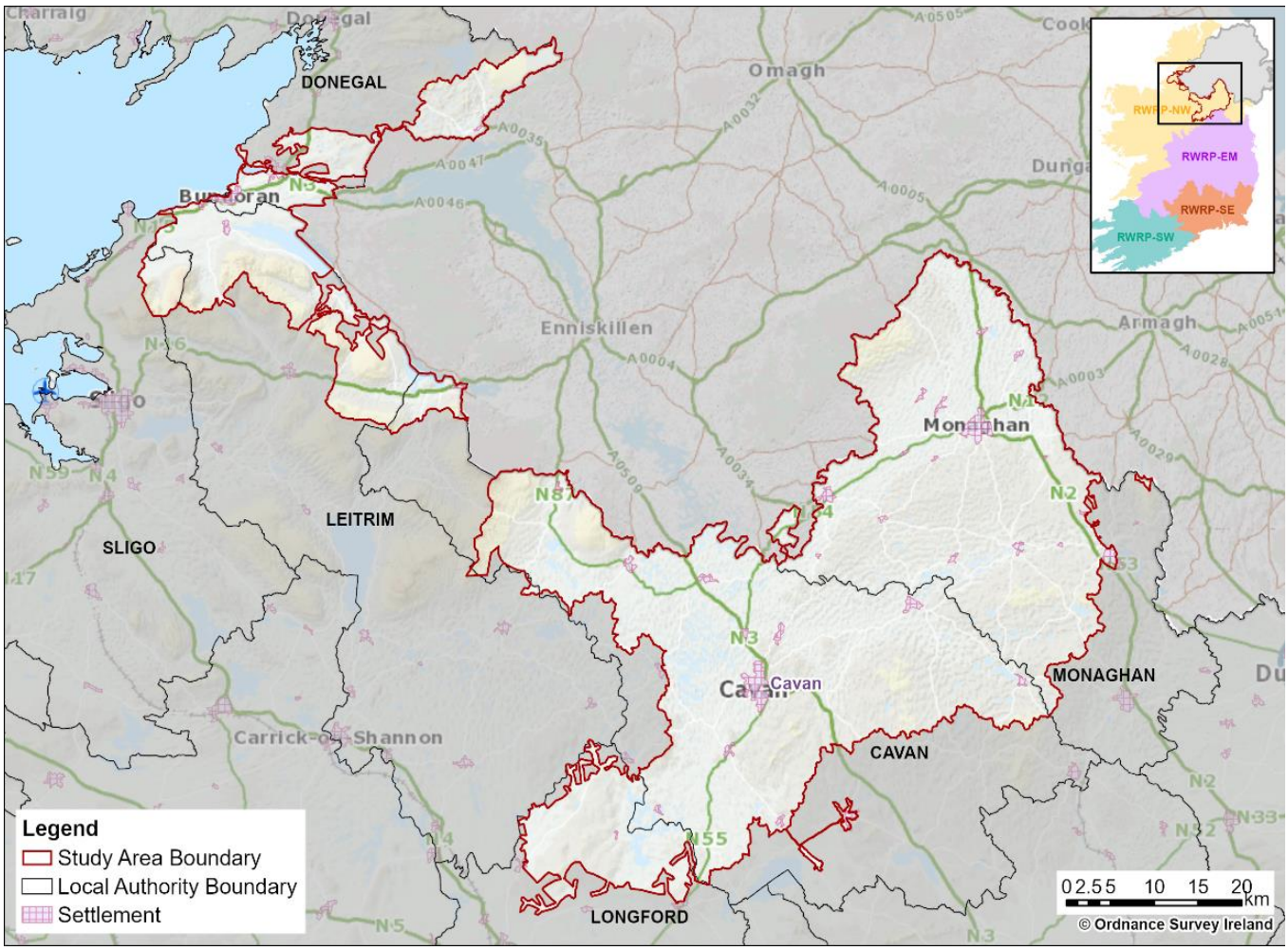

Figure 1.3 Study Area B

2

Study Area B Environmental Baseline Context

2 Study Area B Environmental Baseline Context

This chapter provides environmental baseline information for SAB 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 SAB

WRZ Reference Number and Name	Total Population Served (2019)*	% Population Change (2019-2044)*
2400SC0002 – Ballybay (Lough Egish)	10,744	15.3
0200SC0011 – Ballyconnell PWS	1,399	15.3
0200SC0008 – Ballyhaise PWS (GWS Import)	688	15.3
0200SC0012 – Ballyjamesduff RWSS	4,695	15.3
0200SC0013 – Bawnboy PWS	253	15.3
0200SC0016 – Belturbet PWS	1,962	15.3
0200SC0002 – Blacklion PWS (GWS Import)	187	15.3
0600SC0041 – Cashilard	375	15.3
0200SC0014 – Cavan RWSS	13,171	30.8
2400SC0003 – Clones	2,674	15.3
0200SC0017 – Cootehill PWS	2,190	15.3
2400SC0008 – Emyvale (GWS Import)	787	15.3
2400SC0005 – Glaslough (GWS Import)	323	15.3
2000SC0004 – Gowna	4,313	2.8
0200SC0004 – Gowna (GWS Import)	384	15.3
1700SC0004 – Kinlough Tullaghan	2,446	19.8
2400SC0011 – Monaghan	9,375	26.6
2400SC0004 - Newbliss	419	15.3
0600SC0011 – Pettigo Pub	318	15.3
0200SC0006 – Shercock PWS (GWS Import)	725	15.3
2400SC0010 – Smithboro	537	15.3
0200SC0019 – Swanlinvar PWS	307	15.3

*The estimated population has been based on the 2016 Census data. Uisce Éireann have projected the 2016 population forward to 2019 using the growth projections in the National Planning Framework, Regional Spatial and Economic Strategies, and Local Authority Planning sections

2.1.2 Economy and Employment

SAB had a below average household disposable income per person in 2019 (CSO, 2022), and an unemployment rate of 4% in the Border region, and 4% in the Midland 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 292 for the Midlands region (CSO, 2023b).

2.1.3 Tourism and Recreation

Tourism in SAB 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 Cavan has been described as "*the beautiful land of lakes*", emphasising the range of recreational activities and opportunities including, walking, fishing, golf, cycling, horse-riding, wellness, shopping, food and drink, and heritage as key assets for the area (This is Cavan, 2021).

Additionally, the study area is located within both Ireland's Ancient East and Ireland's Wild Atlantic Way. Ireland's Ancient East is part of a tourism development strategy that covers the South, East and part of the Midlands, and places emphasis on the importance of historic sites in the area (National Tourism Development Authority, 2016). Ireland's Wild Atlantic Way 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). There are no National Parks within SAB. 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 Midlands 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 Midlands 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
Midlands	Male: 80.0 Female: 83.2	47%	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 SAB.

Table 2.3 Areas Supplied by the WTPs in SAB

Water Treatment Plants	Water Resource Zone	Local Authority Supplied
Ballyconnell WTP (Cuillaghan)	0200SC0011 – Ballyconnell PWS	Cavan
Kilkitt WTP	2400SC0002 – Ballybay (Lough Egish)	Monaghan
Lismean WTP	0200SC0012 – Ballyjamesduff RWSS	Cavan
Bawnboy WTP	0200SC0013 – Bawnboy PWS	Cavan
Belturbet WTP	0200SC0016 – Belturbet PWS	Cavan
Cashilard WTP	0600SC0041 – Cashilard	Donegal
Knockataggart WTP	0200SC0014 – Cavan RWSS	Cavan
Carnroe WTP	2400SC0003 – Clones	Monaghan
Kilawaun WTP	0200SC0017 – Cootehill PWS	Cavan
Smear WTP	2000SC0004 – Gowna	Longford
Glenade WTP	1700SC0004 – Kinlough Tullaghan	Leitrim
Crosses WTP and Monaghan (Togan Lake) WTP	2400SC0011 – Monaghan	Monaghan
Newbliss WTP	2400SC0004 – Newbliss	Monaghan
Pettigo WTP	0600SC0011 – Pettigo Pub	Donegal
Smithboro WTP	2400SC0010 – Smithboro	Monaghan
Swanlinbar WTP	0200SC0019 – Swanlinbar PWS	Cavan

Currently for day-to-day operations, 8 out of 23 of the WRZs in the area have a current and projected future 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.

Poor water quality can be linked to risks to health. The Barrier Assessment identified 14 of the 17 WTPs within the study area as being at high risk of failing to achieve Uisce Éireann's conservative Barrier Assessment standards. Particularly in relation to bacteria and viruses (Barrier 1) and chlorine residuals in Uisce Éireann's networks (Barrier 2.1) (see Table 2.1 in the SAB 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 is one WRZ on the EPA Remedial Action List within SAB, namely Belturbet PWS. Uisce Éireann is currently progressing immediate corrective action in relation to a number of supplies within SAB in advance of the NWRP. Details of these are included in the SAB 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 SAB.

Table 2.4 provides a summary of the WFD catchments within SAB.

Table 2.4 Catchments within SAB (EPA, 2020)

WFD Catchments	Total Catchment Area (km^2)	Catchment Area within SAB (km^2)
Donegal Bay North	805	<1
Erne	3,441	2,302
Lough Neagh & Lower Bann	551	375
Newry, Fane, Glyde and Dee	1,675	34
Sligo Bay	1,606	1
Upper Shannon (26C)	1,500	68
Upper Shannon (26F)	1,229	6

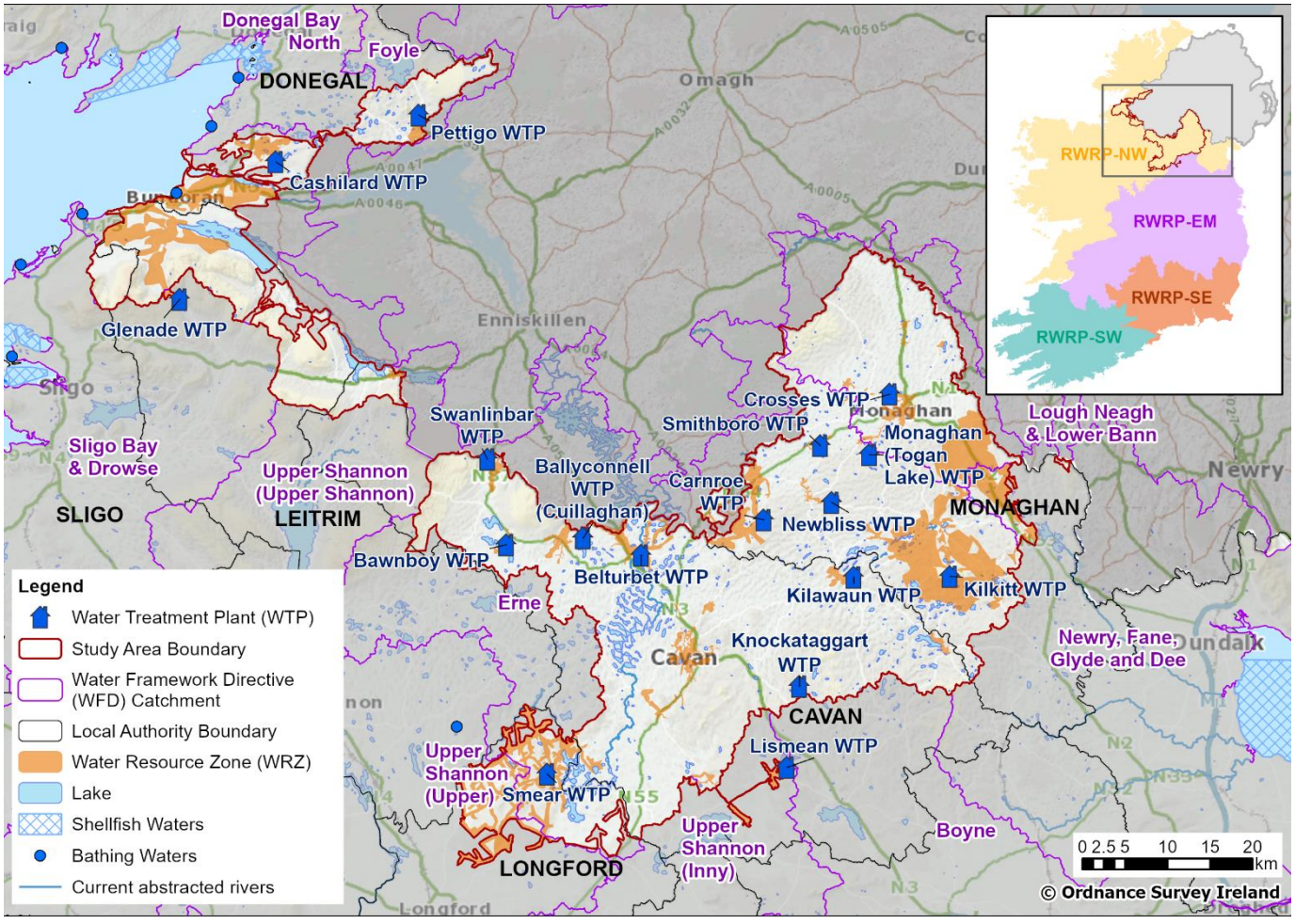

Figure 2.1 Water Environment of SAB

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 SAB 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 SAB supplies, Uisce Éireann have assessed the potential impacts of their twelve surface water abstractions: Aghalough (Pettigo Pub), Coragh Lough (Cootehill PWS), Corcaghan Lough (Monaghan), Corconnolly lake (Clones), Feagh Lough (Newbliss), Greagh Lough (Monaghan), Lough Acanon Dam (Cavan RWSS), Lough Bawn (Ballybay (Lough Egish)), Lough Gowna Intake (Gowna), Nadrageel Lough (Ballyjamesduff RWSS), River Erne (Belturbet PWS), and St. Columbkill Lake (Cashilard).

Based on this initial assessment, the volumes of water abstracted at Coragh Lough (Cootehill PWS), Corcaghan Lough (Monaghan), Corconnolly lake (Clones), Feagh Lough (Newbliss), Greagh Lough (Monaghan), Lough Acanon Dam (Cavan RWSS), Lough Bawn (Ballybay (Lough Egish)), Nadrageel Lough (Ballyjamesduff RWSS) and St. Columbkill Lake (Cashilard) may not meet sustainability guidelines during dry weather flows. However, under the proposed regulatory regime, sustainable abstraction quantities will be adjudicated by the EPA. Uisce Éireann have assumed, given the need to maintain supplies, that a transition to new abstraction quantities would likely take place in the medium term.

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 SAB and the total number of surface and groundwater waterbodies within SAB are provided in Table 2.5 below.

Table 2.5 WFD Waterbodies within SAB (EPA, 2023a)

Waterbody Type	Water Catchments	Number of Waterbodies	Number of Waterbodies Rated Below Moderate
Rivers	Donegal Bay North	0	0
	Erne	113	27
	Lough Neagh & Lower Bann	25	7
	Newry, Fane, Glyde and Dee	1	1
	Sligo Bay & Drowse	1	0
	Upper Shannon (26C and 26F)	14	2
Lakes	Donegal Bay North	0	0
	Erne	110	46
	Lough Neagh & Lower Bann	9	5
	Newry, Fane, Glyde and Dee	1	0
	Sligo Bay & Drowse	0	0
	Upper Shannon (26C and 26F)	0	0
Transitional and Coastal	N/A	3	0
Groundwater	N/A	58	4

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:

- Donegal Bay North: Agriculture (74%), Forestry (32%) and Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (32%);
- Erne: Agriculture (84%) and Other (abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species) (20%);
- Lough Neagh & Lower Bann: Agriculture (63%) and Hydromorphology (56%);
- Newry, Fane, Glyde and Dee: Agriculture (65%) and Hydromorphology (33%);
- 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 (26C): Agriculture (79%) and Hydromorphology (37%); and
- Upper Shannon (26F): Agriculture (81%) and Urban Wastewater (19%).

The Cullies_040 river, Erne_020 river, Corconnelly lake, Fane_040 river, Brackan lake, Stragar_010, Gill SO lake and Grange (Sligo)_010 waterbodies are at particular risk of abstraction in SAB. Table 2.6 includes a summary of the 'at risk' waterbodies within SAB.

Table 2.6 Summary of 'At Risk' Waterbodies in SAB (EPA, 2023b)

Waterbody Type	Water Catchments	Number of Waterbodies Identified as 'At Risk'	Surface Waterbodies Status 'At Risk' Due to Abstraction Pressure*
Rivers	Donegal Bay North	0	0
	Erne	55	
	Lough Neagh & Lower Bann	13	
	Newry, Fane, Glyde and Dee	1	
	Sligo Bay & Drowse	0	
	Upper Shannon (26C and 26F)	5	
Lakes	Donegal Bay North	0	9
	Erne	32	
	Lough Neagh & Lower Bann	1	
	Newry, Fane, Glyde and Dee	1	
	Sligo Bay & Drowse	0	
	Upper Shannon (26C and 26F)	0	
Transitional and Coastal	N/A	0	0
Groundwater	N/A	2	N/A
Total		**110**	**9**

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 SAB 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 SAB (catchments.ie, 2022)

Areas for Action	Key Reasons for Selection
Annalee	• The status of the overall Annalee River is currently at good status, however this lower waterbody within the area is currently not reaching this good status • A deterioration in the fish population has been observed
Avaghon	• Currently not meeting its good status objective due to a declining in water quality • Monaghan County Council have a good understanding of the Avaghon Area for Action and can help LAWPRO build on their existing work which they have carried out
Camlin	• Poor water quality observed in Camlin_070 waterbody potentially due to poor fish stocks

Areas for Action	Key Reasons for Selection
	• High levels of ammonia and nutrients observed in Calmin_010 and Calmin_060 waterbodies • Pollution pressures from numerous sources on the three waterbodies
Cullies	• Garty Lough is an important drinking water supply for the Erne Valley Group Water Scheme and protecting the inflowing streams and the lake is particularly important • Cullies_030 waterbody is currently at Poor Status with no known reason/cause • Pollution in waterbodies related to agriculture and failing septic tanks
Duff	• A recent deterioration in the water quality for the Duff River was noticed • The Duff River is a Blue Dot River meaning it requires special attention • Rivers are extremely sensitive to pollution
Glyde-Proules	• Five waterbodies in the Glyde-Proules PAA have recently reported a deterioration in water quality • One of the deteriorated waterbodies, the Glyde_050, is also not meeting its protective area objective • There is the potential to build on recent improvements which has been noted in two of the waterbodies. • The Area for Action spans across three counties which required a cross border partnership • Plans are already proposed to upgrade and carry out works at the Carrickmacross WWTP
Kilroosky Lough Cluster	• The Kilroosky Lough Cluster lakes are designated Special Areas of Conservation (SAC) and are protected for the important White Clawed Crayfish • Summerhill lake is currently at Moderate Status and so not achieving its objective • A potential source of pollution in the Kilroosky Lough Cluster is related to agriculture
Laghy Stream - Bridgetown	• The Bridgetown_010 waterbody is a Blue Dot Site meaning it requires extra protection
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.
Maghery	• The Maghery River rises within the Slieve Beagh Special Protection Area which is an important habitat for birds in particular the Hen Harrier. • It is an important drinking water supply for the Aughnashalvey Group Water Scheme.

Areas for Action	Key Reasons for Selection
	• The Maghery_010 is currently at poor status. The levels of nutrients in the river are too high and there is also indication of a toxic substance in one section of the river. Agriculture or industry may possibly be the source of these. • The Maghery_020 is also currently at poor status. The levels of nutrients are too high, there is also evidence of excessive sediment in the river.
Mountain (Water) and Emy Lake	• To build on improvements which have already been carried out in two of the waterbodies by Monaghan County Council • There is currently a trust in operation within the area • The Glaslough/Tyholland Group Water Scheme sources and supplies the local community • A community's project currently in progress which is looking at the hydromorphological issues, such as the weir in Emyvale
Nadreegeel	• Cavan County have already carried out extensive monitoring in the Nadreegeel catchment, which can be incorporated and built-on • The Nadreegeel Lough Stream_020 is in the headwaters to Nadreegeel Lakes, therefore any potential issues to water quality identified in the Nadreegeel River has the potential to help and improve water quality within the lakes themselves. • There is a group water schemes (GWS), the Billis and Lavey GWS, located within the area • Nadreegeel Lakes is also used for the public water supply, supplying the neighbouring town of Ballyjamesduff.
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
Sheelin (With Inny)	• A number of the waterbodies are protected for their habitat or species within them thus must achieve a Good quality status • A number of waterbodies are achieving Moderate or Poor status due to nutrient and physical changes • Lough Sheelin has improved to Good Status however the presence of the invasive Zebra Mussel threatens this
Templeport	• Build on recent action by Cavan County Council relating to a direct discharge to Templeport Lake Stream • Bunerky Lake included as it has similar pressures to the river water body • The two water bodies included in the recommended action area are the only water bodies that are less than 'Good' in this sub-catchment

Areas for Action	Key Reasons for Selection
	• Improvements in these water bodies may protect the current High status in the Blackwater (Newtowngore)_020 river water body
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.
Upper Erne	• Two deteriorated water bodies both of which have recently dropped in status to Poor in the 2013-2015 monitoring cycle • Work planned by Cavan County Council and potential to build on findings. • Starting in the headwaters thus multiple pressures which can be investigated at the same time • Two unassigned lake water bodies in the upper Erne system to be included to determine water quality.
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 SAB.

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 2021 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

Summary	
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 SAB

County	Key Risk Areas
Cavan (Cavan County Council, 2019)	• Increased storms and intensity of rainfall • Flooding • 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
Donegal (Donegal City Council, 2019)	• Extreme rainfall and storms • Flooding • Increasing temperatures • Changes to natural ecosystem • Ocean warming and acidification • Rising sea levels
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
Longford (Longford County Council, 2019)	• Increased summer temperatures • Reduction of frost days • Increased frequency and intensity of rainfall • Flooding • Increased storm intensity
Monaghan (Monaghan County Council, 2019)	• More intense storms and rainfall events • Increased river and coastal flooding • 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
Sligo (Sligo County 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

County	Key Risk Areas
	• Increase in duration of phenological cycle • Increased frequency and intensity of coastal inundation and erosion

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 SAB, 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 SAB 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

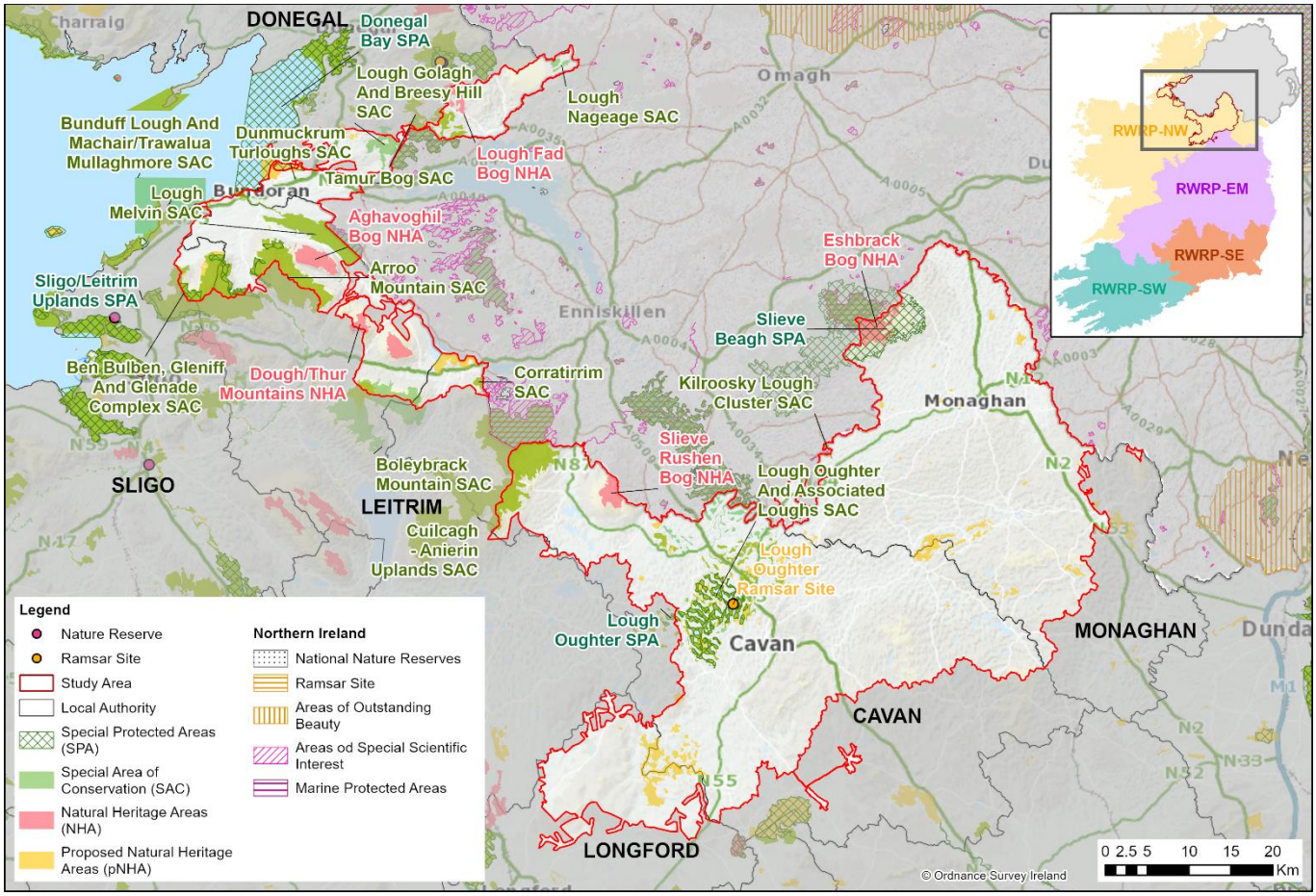

Figure 2.2 Designated Sites in SAB

proposed Natural Heritage Areas (see Table 2.10 and Figure 2.2). The European sites (SPAs and SACs), and the potential impacts on them, are discussed in more detail in the NIS.

Table 2.10 Designated Sites within SAB (NPWS, 2023)

Receptor	Name	Total Number
Special Protected Area (SPA)	Lough Oughter SPA	4
	Donegal Bay SPA	
	Slieve Beagh SPA	
	Sligo/Leitrim Uplands SPA	
Special Area of Conservation (SAC)	Lough Oughter And Associated Loughs SAC	13
	Lough Melvin SAC	
	Cuilcagh - Anierin Uplands SAC	
	Ben Bulben, Gleniff And Glenade Complex SAC	
	Bunduff Lough And Machair/Trawalua/Mullaghmore SAC	
	Corratirrim SAC	
	Arroo Mountain SAC	
	Boleybrack Mountain SAC	
	Lough Nageage SAC	
	Lough Golagh And Breesy Hill SAC	
	Dunmuckrum Turloughs SAC	
	Tamur Bog SAC	
	Kilroosky Lough Cluster SAC	
Ramsar Sites	Lough Oughter	1
Nature Reserves	N/A	0
National Parks	N/A	0
Natural Heritage Areas (NHAs)	Slieve Rushen Bog NHA	5
	Lough Fad Bog NHA	
	Eshbrack Bog NHA	
	Dough/Thur Mountains NHA	
	Aghavoghil Bog NHA	
Proposed Natural Heritage Areas (pNHAs)	See Figure 2.2	54

2.4.2 Habitats

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

Table 2.11 Habitat Areas for SAB (EPA, 2018)

Habitat	Ha	% of Study Area
Agricultural Land		
Pastures	183,760	65.94%
Land principally occupied by agriculture, with significant areas of natural vegetation	38,984	13.99%
Non-irrigated arable land	83	0.03%
Natural Habitats		
Peat bogs	18,558	6.66%
Water bodies	7,141	2.56%
Natural grasslands	2,697	0.97%
Moors and heathland	1,933	0.69%
Inland marshes	731	0.26%
Beaches, dunes, sands	261	0.09%
Intertidal flats	35	0.01%
Estuaries	35	0.01%
Salt marshes	26	0.01%
Forest		
Transitional woodland-shrub	8,682	3.12%
Coniferous forest	7,609	2.73%
Mixed forest	2,762	0.99%
Broad-leaved forest	1,672	0.60%

Particularly relevant habitats that depend on the water quality and/or quantity in SAB 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 eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation;

[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 RWRP-NW. 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

- Natural dystrophic lakes and ponds;
- Bog habitats – *Rhynchosporion* depressions, transition mires and quaking bog habitats;
- Bog woodland;
- Alkaline fens;
- Groundwater dependant terrestrial habitats, such as petrifying springs with tufa formation and blanket bogs;
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae;*
- 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 SAB include:

- Otter (*Lutra lutra*);
- Fish species - Atlantic Salmon (*Salmo salar*);
- White-clawed Crayfish (*Austropotamobius pallipes*);
- Marsh Fritillary (*Euphydryas aurinia*);
- Slender green feather-moss (*Hamatocaulis vernicosus*);
- Geyer's Whorl Snail (*Vertigo geyeri*);
- Petalwort (*Petalophyllum ralfsii*);
- 'Qualifying interest' bird species e.g. peregrine falcon (*Falco peregrinus*), chough (*Pyrrhocorax pyrrhocorax*) and hen harrier (*Circus cyaneus*); and
- Waterbirds of 'qualifying interest' e.g. Brent goose (*Branta bernicla*), whooper swan (*Cygnus cygnus*) and winter migratory waders.

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

Animals:

- American mink (*Mustela/Neovison vison*);
- Brown rat (*Rattus norvegicus*);
- Canada goose (*Branta canadensis*);
- Common carp (*Cyprinus carpio*);
- Grey squirrel (*Sciurus carolinensis*);
- Greylag goose (*Anser anser*);
- Roach (*Rutilus rutilus*);
- Ruddy duck (*Oxyura jamaicensis*);
- Siberian chipmunk (*Tamias sibiricus*); and
- Zebra mussel (*Dreissena polymorpha*).

Plants:

- American skunk-cabbage (*Lysichiton americanus*);
- 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*);
- Rhododendron (*Rhododendron ponticum*);
- Salmonberry (*Rubus spectabilis*);
- Spanish bluebell (*Hyacinthoides hispanica*);
- Three-cornered leek (*Allium triquetrum*); and
- Waterweeds (*Elodea* spp.).

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 SAB are listed in Table 2.12, such as agricultural land.

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 17 WTPs in SAB, meeting the average demand of 20.2 Ml/d in 2019.

There are no canals or ports of national or regional significance in SAB. There are no airports of local significance. Other significant transport infrastructure includes the main road network (particularly the N2, N3, N15, N16, N54, N55, and N87).

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

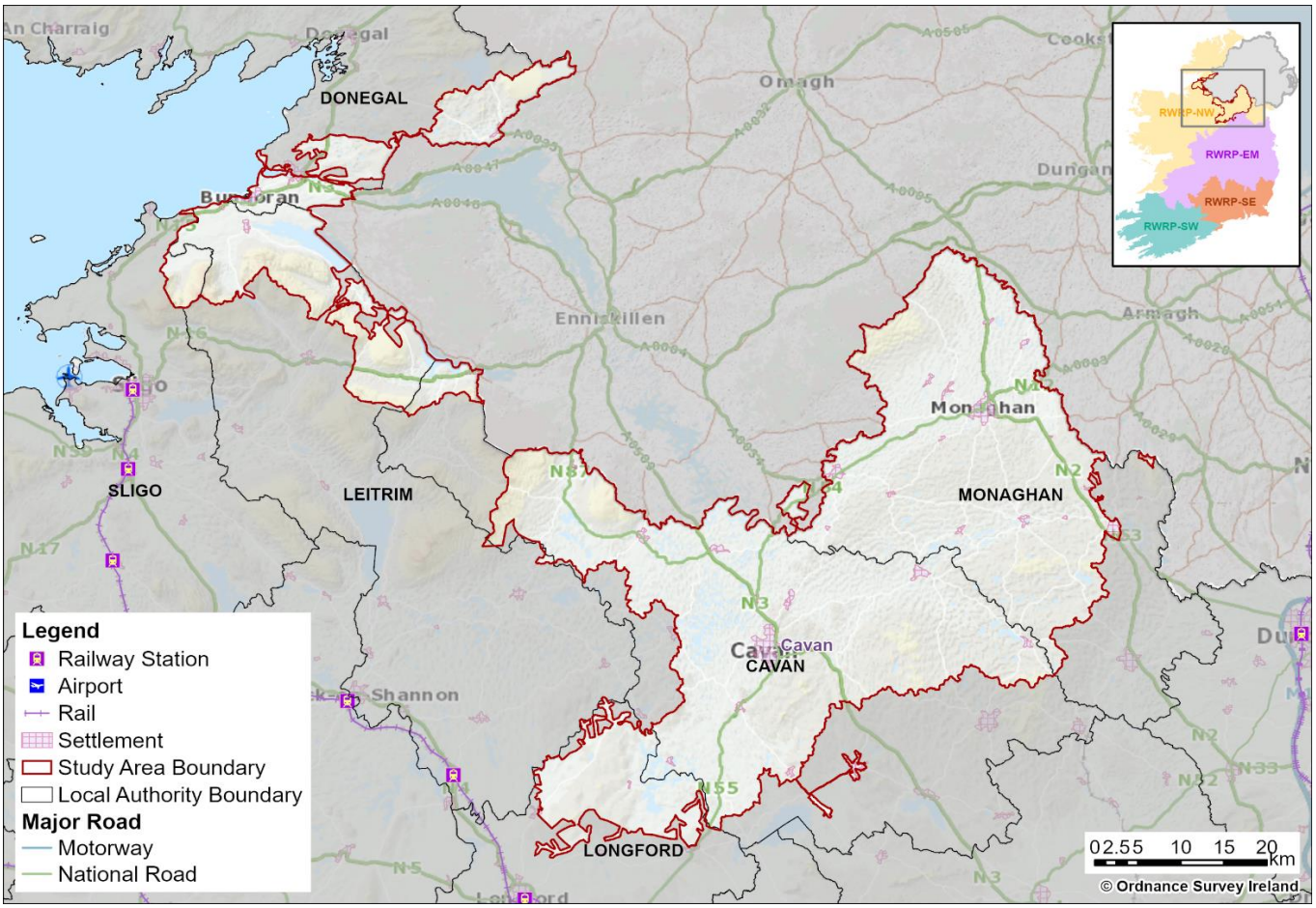

Figure 2.3 Transport Infrastructure in SAB

Table 2.12 Land Use within SAB (EPA, 2018)[2]

Land use	Ha	% of Study Area	Comparison to Overall North West Region %
Agriculture	222,827	79.96%	57.28%
Urban	3,251	1.17%	1.18%
Natural Habitats	31,417	11.27%	31.76%
Forest	20,725	7.44%	9.47%
Industry	374	0.13%	0.07%
Other	69	0.02%	0.24%

Proposals for other strategic developments within SAB are considered for the assessment. These are primarily identified from the National Planning Framework and from myProjectIreland, where any

[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 RWRP-NW. 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

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 SAB[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		
25 units, Drumalee Manor, Drumalee, County Cavan	Abbeylands Regeneration Project	Ballybay Regeneration
Ballyconnell Community Services	Ballyconnell Market House - Community, Remote Working and Tourism Hub	Ballyjamesduff Regeneration Strategy
Belturbet Town Regeneration Master Plan	Castleblayney Enterprise Centre	Castleblayney Market Square Regeneration and Castleblayney Market Square Regeneration Phase 2
Cavan General Hospital, Emergency Department and Ward Block	Cavan Town Centre	Cavan Railway - Cavan Town Ulster Canal Greenway - Leitrim Greenway at Belturbet
Clones Regeneration	Cootehill Technology Park	Dublin Street Regeneration and Dublin Street Regeneration Monaghan
Libraries Capital Programme - Monaghan Library	Lough Egish Food Park Expansion	Newbliss Enterprise and Digital Hub
The Clones Terminus	Ulster Canal Greenway - Smithboro - Clones	Ulster Canal Restoration, Phase 2
Ulster Canal Greenway- Smithborough to Monaghan		

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

[3] Note that the myProjectIreland dataset was taken at a fixed point in time to allow for assessment of cumulative effects. The date for SAB being the 14/04/22.

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 SAB 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 SAB (Ordnance Survey Ireland. n.d.)

Landscape Character Area	Sensitivity	Value
County: Cavan (Cavan County Council)		
No values or sensitivity information available		
County: Donegal (Donegal County Council)		
No values or sensitivity information available		
County: Leitrim (Leitrim County Council)		
No values or sensitivity information available		
County: Longford (Longford County Council, 2015)		
Northern Drumlin Lakeland	Low to Medium with some High areas	-
Northern Upland	Medium to High	-
Shannon Basin/Lough Ree	Medium to High	-
Central Corridor	Low with potential areas of Medium to High	-
Inny Basin	Low with potential areas of Medium to High	-
Peatlands	Low with the vicinity of the Royal Canal High	-
Open Agricultural	Low	-
County: Monaghan (Monaghan County Council, 2008)		
Slieve Beagh Uplands	High	-
Blackwater Valley & Drumlin Farmland	Medium	-
Smithborough Hills	Low	-
Clones River Valley & Farmed Uplands	Low	-

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

Landscape Character Area	Sensitivity	Value
Monaghan Drumlin Uplands	Low	-
Mullyash Uplands	Medium	-
Ballybay Castleblayney Lakelands	Medium	-
Drumlin and Upland Farmland of South Monaghan	Low	-
Carrickmacross Drumlin & Lowland Farmland	Low	-
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 one SCA in SAB; 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 SAB 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 N2, N3, N15, N16, N54, N55, and N87.

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 SAB, 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.

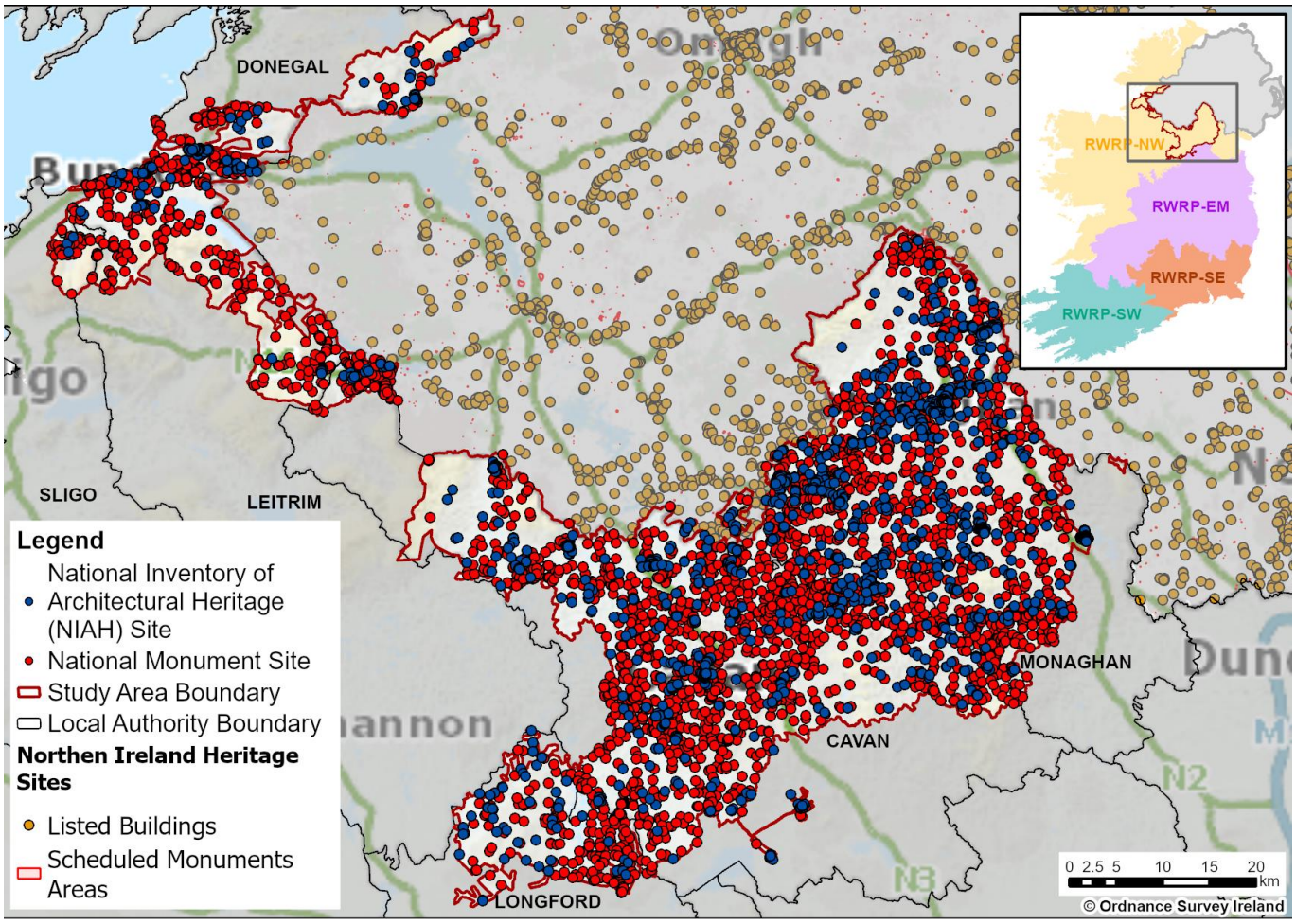

Figure 2.4 SAB Cultural Heritage Assets

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.

Table 2.15 Cultural Heritage Assets within SAB

Assets	Total Number
National Monuments Service Sites	3,245
National Inventory of Architectural Heritage Sites	1,945
Sites and Monuments Record Zones	2,483

2.9 Geology and Soils

Table 2.12 lists the land uses within SAB. SAB predominantly has a fine loamy soil type (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 SAB are shown in Figure 2.5.

Dinantian (early) Sandstones, Shales and Limestones Group comprises a mixture of siltstones, sandstones, mudstones, shales and limestones. Permeability is generally low but may be higher in the sandstone and limestone beds, and substantially higher in certain areas. Where extensive faulting occurs, such as at Clones, the aquifer permeability is likely to be increased. Additional fracturing may also be associated with the faulting. Where clean limestones are present, dissolution may occur along faults, fractures and bedding planes, widening them and enhancing the permeability.

The karst forms a key regionally important aquifer in some areas. The pure bedded limestones make up a relatively minor proportion of the bedrock here and are most prominent in northwest Cavan. Diffuse recharge occurs via rainfall percolating through permeable subsoil and rock outcrops. Despite the presence of peat and till, point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines.

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, 52 of which have the potential to constrain water resource options in SAB.

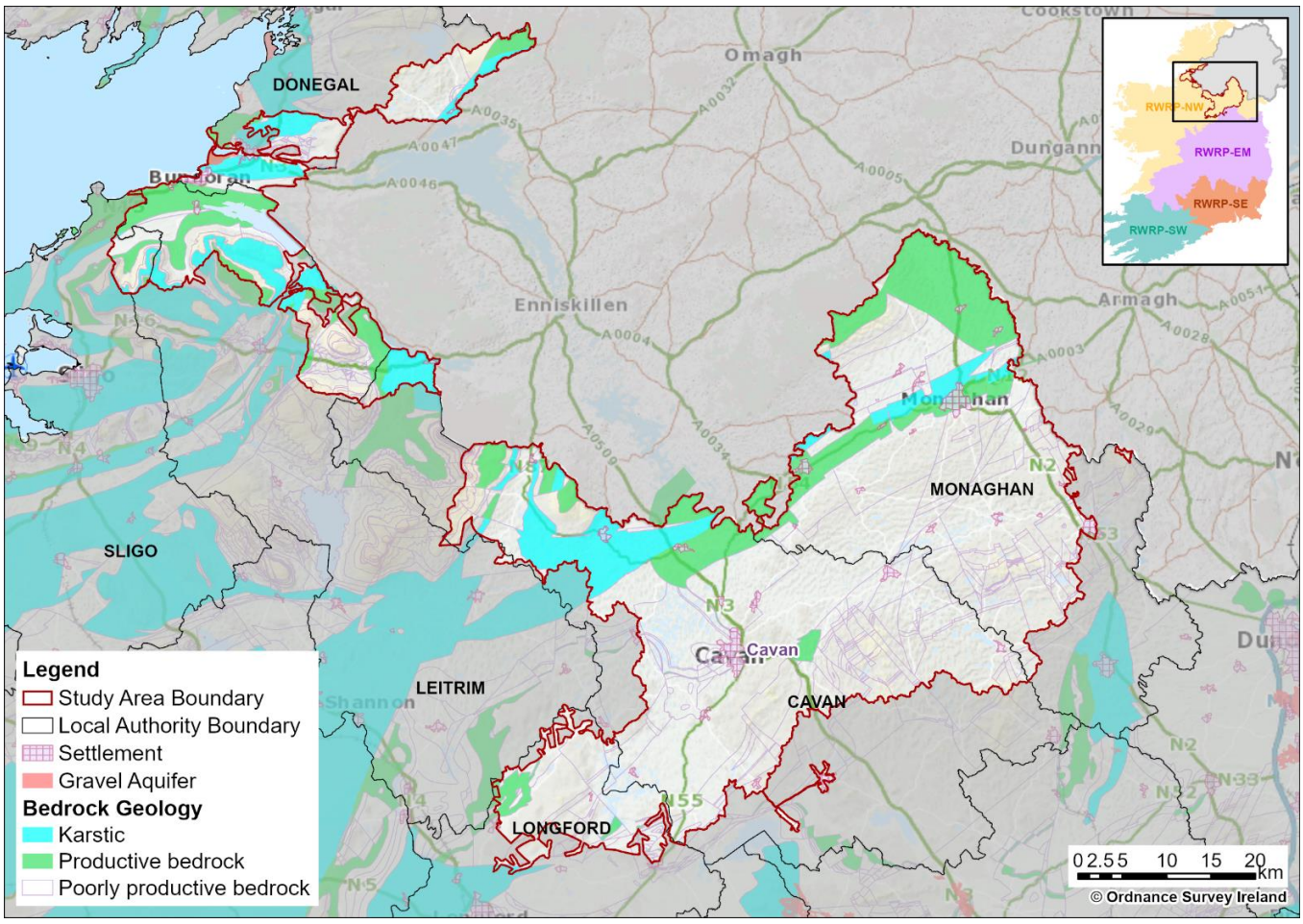

Figure 2.5 SAB Hydrogeology

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 SAB 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 SAB, 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 important part in water planning. Valuing access to environment for recreation.	Climate change, biodiversity, water environment, material assets and landscape and visual amenity
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 SAB, 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 SAB 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 SAB.	Biodiversity and climate change
Biodiversity, Flora and Fauna	**Issues:** There are several designated national and European sites within SAB. Notable areas include the Lough Oughter and Associated SAC, and the Cuilcagh - Anierin Uplands SAC. There are no waterbodies	Water resources, water quality and climate change

SEA Topic	Issues and Opportunities	Interrelated Topics
	designated for *Margaritifera* (Freshwater Pearl Mussel) but there are some sections of the Erne catchment 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	
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 SAB.	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 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.	Biodiversity and water environment
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 SAB 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 SAB 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 194 unconstrained options were identified for SAB 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 194 unconstrained options, 73 were rejected after being analysed against the coarse screening criteria of resilience, deliverability and environment.

Sustainability reasons for rejecting options were identified for 22 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 SAB. 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 SAB Technical Report.

Table 3.2 Coarse Screening Rejection Register

Option Reference	Option Description	Rejection Reasoning
SAB-009	Interconnect Cavan WRZ and Annagh GWS and supply deficit from GWS, upgrade Knockataggart WTP	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving

Option Reference	Option Description	Rejection Reasoning
SAB-033	Interconnect Ballyconnell WRZ and Kildallan GWS and supply deficit from GWS.	WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAB-058	Increase existing SW abstraction from Lough Coragh and upgrade Kilawaun WTP to supply deficit at Cootehill PWS WRZ	
SAB-064	Interconnect Cootehill WRZ and Drumgole GWS and supply deficit from GWS.	
SAB-065	Interconnect Cootehill WRZ and Barraghy GWS and supply deficit from GWS.	
SAB-066	Interconnect Cootehill WRZ and Kill GWS and supply deficit from GWS.	
SAB-116	Interconnect Emyvale WRZ and Truagh GWS and supply deficit from GWS.	
SAB-117	Interconnect Emyvale WRZ and Tydavnet GWS and supply deficit from GWS.	
SAB-139	Interconnect Gowna WRZ and Garty Lough GWS and supply deficit from GWS.	
SAB-148	Increase existing SW abstraction from Lough Unshin (Ballyshannon (Parkhill) WTP).	
SAB-149	Increase existing SW abstraction from Lough Unshin (Ballyshannon (Parkhill) WTP).	
SAB-150	Increase existing SW abstraction from Lough Unshin (Ballyshannon (Parkhill) WTP).	
SAB-151	Increase existing SW abstraction from Lough Unshin (Ballyshannon (Parkhill) WTP).	
SAB-168	Rationalise Cashilard to Ballyshannon WSZ.	
SAB-171	Split Cashilard and rationalise part to Ballyshannon supply and part to Ballymagroarty WRZs.	
SAB-181	Rastionalise Pettigo Pub to Ballyshannon WRZ (Lough Unshin source).	

Option Reference	Option Description	Rejection Reasoning
SAB-184	Rationalise Derrykillew to Ballyshannon WRZ (Lough Unshin source).	
SAB-003	Increase existing SW abstraction from Lough Acanon Dam. Raise the dam and supply deficit to Cavan. Interconnect with Belturbit.	Proposed abstraction is above allowable abstraction estimate, based on inflows. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAB-002	Increase existing SW abstraction from Lough Acanon Dam. Raise the dam and supply deficit to Cavan, upgrade Knockataggart WTP	SAB-001, to increase abstraction is a better option. The reservoir has suitable yield, therefore there is no need to raise dam to increase storage/ yield available. Proposed abstraction is above allowable abstraction estimate, based on inflows. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAB-087	Increase existing SW abstraction from Corconnelly lake, upgrade Carnroe WTP and supply deficit at Clones WRZ	The desktop assessment undertaken indicates that there is no scope to increase the abstraction from the small lake source to meet demand. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.
SAB-088	Recommission Carnroe Lake (manmade reservoir at the WTP) Skerrick Lake abstractions.	
SAB-103	Interconnect Smithboro WRZ and Aughnashalvey GWS and supply deficit from GWS.	

3.4 Stage 5: Fine Screening

A total of 121 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 SAB.

3.5 Stage 6: Feasible Options List

A total of 121 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 SAB 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

[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).

Integrity (AESI) identified at the project stage would be implemented. Scores of -1 to -3 equates to LSEs 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.

STEP 0 Best AA	If there is an option that meets the Objectives of the Plan, and is assessed as having no potential impact on a European Site (based on desktop assessment), it is automatically adopted as the Preferred Approach
STEP 1 Least Cost	Compare Least Cost against **best AA** Approach, and consider again at Step 6
STEP 2 Quickest Delivery	Compare Least Cost against Quickest Delivery Approach and develop Modified Approach if appropriate
STEP 3 Best Environmental	Compare Least Cost or Modified Approach against Best Environmental, and modify approach **if appropriate**
STEP 4 Most Resilient	Compare Least Cost or Modified Approach against Most Resilient
STEP 5 Least Carbon	Compare Least Cost or Modified Approach against **Lowest** Carbon
STEP 6 Approach Comparison	Compare output from Steps 1 to 5 against: • SEA required outcomes • Sectoral Adaptation Outcomes • **Best AA outcomes** • Public Expenditure Code Outcomes
STEP 7 Preferred Approach	Select Preferred Approach based on steps 0 to 6

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.

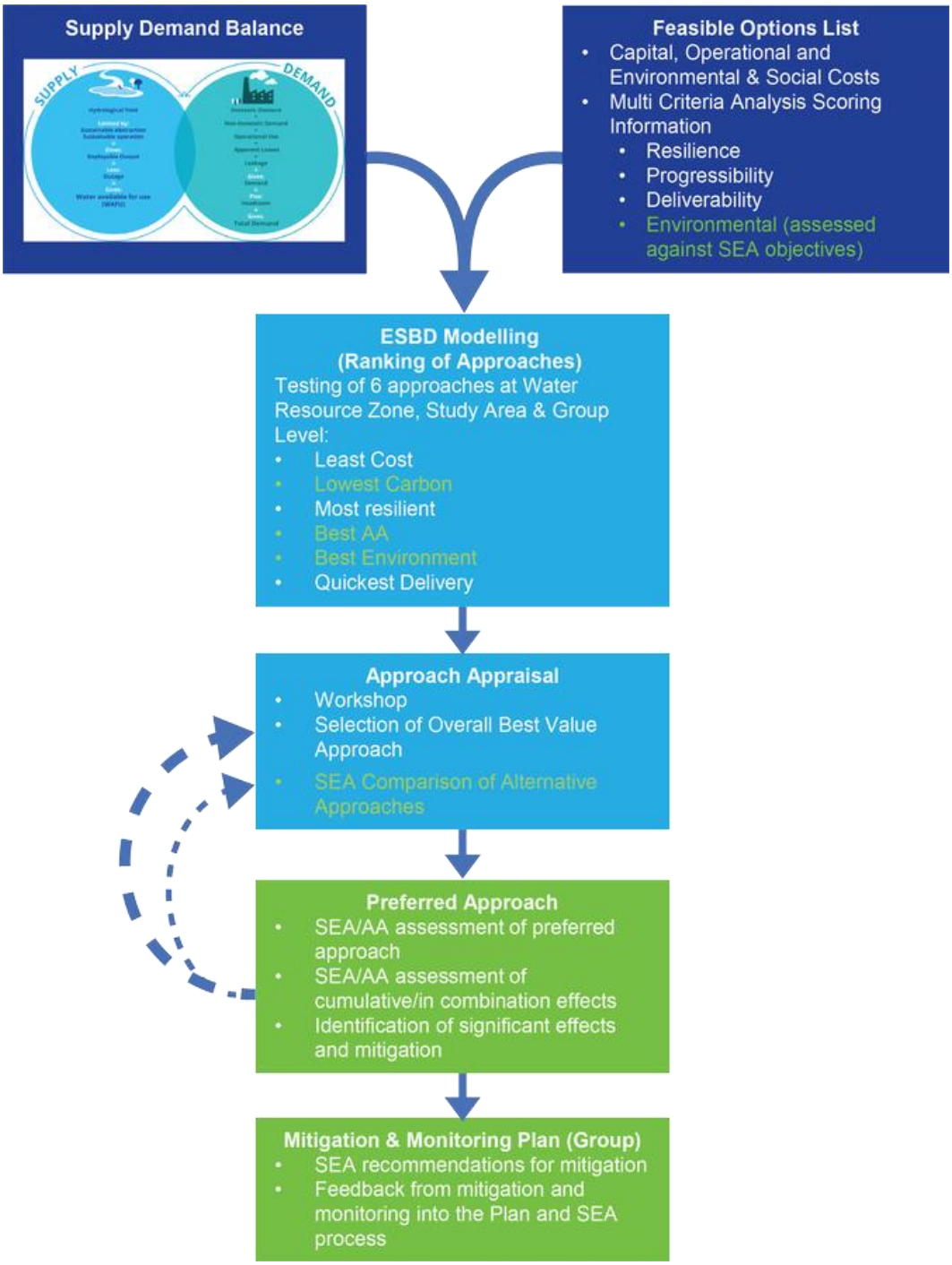

Figure 4.2 Approach Development Process

4.3 SAB 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 SAB there are 45 WRZ options and these are listed in Table 5.2 in the SAB 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 SAB, a total of 6 combinations were compared, including the WRZ Level Approach; these are presented in Table 4.2. Note that the Preferred Approach selected at the end of the process has been outlined in red throughout this section.

Table 4.2 SAB Summary of SA Combination of Performance against Approach Category

Category	WRZ Level Approach	SA Combination 1 (SA Option 1, 22, 24, 35, 38 and 49)	SA Combination 2 (SA Option 1, 24, 35, 38 and 49)	SA Combination 3 (SA Option 24, 35, 38 and 49)	SA Combination 4 (SA Option 24, 35, 38, 49, 53 and 55)	SA Combination 5 (SA Option 1, 35, 38, and 49)
Least Cost				Worst		Best
Quickest Delivery	Best	Worst	Worst		Worst	
Number of -3 Biodiversity Scores	No -3 Scores	No -3 Scores	No -3 Scores	No -3 Scores	No -3 Scores	No -3 Scores
Lowest Carbon	Worst					Best
Most Resilient	Worst					Best**
Best Environmental	Worst					Best**

Key														
Ranked order (best to worst)	Best													Worst

*SA options are also known as SA grouped options

Key
**Combination 5 and combination 2 have the same AA, resilience and environmental score. However, combination 5 scores better against the least cost, quickest delivery and lowest carbon criteria, therefore, combination 5 was selected as the best AA, most resilient and best environmental 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 two approaches (see Table 4.3).

Table 4.3 Study Area Approach Categories

Category	SA Approach 1 (WRZ Approach)	SA Approach 2 (SA Combination 5) (SA Option 1, 35, 38, and 49)
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 Appendix A and a full list of options for each approach is given in Appendix B 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 (SA Approach 2) (SA combination 5)	Quickest Delivery (SA Approach 1) (WRZ Approach)	Best Environmental (SA Approach 2) (SA Combination 5)	Most Resilient (SA Approach 2) (SA Combination 5)	Lowest Carbon (SA Approach 2) (SA Combination 5)
SA options (Group options)	No options	**SA option 1:** 011, 053 **SA option 35:** 157, 185 **SA option 38:**	**SA option 1:** 011, 053 **SA option 35:** 157, 185 **SA option 38:**	N/A	**SA option 1:** 011, 053 **SA option 35:** 157, 185 **SA option 38:**	**SA option 1:** 011, 053 **SA option 35:** 157, 185 **SA option 38:**	**SA option 1:** 011, 053 **SA option 35:** 157, 185 **SA option 38:**

Options included	Do Minimum	Least Cost Approach (SA Approach 2) (SA Combination 5)	Best Appropriate Assessment (SA Approach 2) (SA combination 5)	Quickest Delivery (SA Approach 1) (WRZ Approach)	Best Environmental (SA Approach 2) (SA Combination 5)	Most Resilient (SA Approach 2) (SA Combination 5)	Lowest Carbon (SA Approach 2) (SA Combination 5)
		024, 029, 041, 048 **SA option 49:** 170	024, 029, 041, 048 **SA option 49:** 170		024, 029, 041, 048 **SA option 49:** 170	024, 029, 041, 048 **SA option 49:** 170	024, 029, 041, 048 **SA option 49:** 170
WRZ options	No options	060 067 072 077 078 084 086 104 115 123 127 133 173 189 190 191 192 202	060 067 072 077 078 084 086 104 115 123 127 133 173 189 190 191 192 202	001 027 036 051 060 067 072 077 078 084 086 104 115 123 127 133 173 187 188 189 190 191 192 202 186	060 067 072 077 078 084 086 104 115 123 127 133 173 189 190 191 192 202	060 067 072 077 078 084 086 104 115 123 127 133 173 189 190 191 192 202	060 067 072 077 078 084 086 104 115 123 127 133 173 189 190 191 192 202

* For the option references - all options are part of SAB e.g. SAB-060 is shown as 060 above

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 SAB Technical Report.

Within SAB, this resulted in two approaches being selected from the six 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 two 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 in Table 4.2 may be different. This 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 suggests that SA approach 1, and SA approach 2 are both the best AA because they have the same number of -3 biodiversity scores (i.e. none of these approaches had -3 scores). However, SA approach 2 was selected as the best AA approach in Table 4.3 after comparing the number of -2 and -1 biodiversity scores.

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

Category Criteria	SA Approach 1 (WRZ Approach) (QD)	SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)
Least Cost Score	Worst	Best
Quickest Delivery Score	Best	Worst
Best AA Score	No -3 Scores	No -3 Scores
Lowest Carbon Score	Worst	Best
Most Resilient Score	Worst	Best
Best Environmental Score	Worst	Best

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

4.4 Comparison of SAB Approaches

An overall summary of the infrastructure components and abstractions for each of the SA approaches identified for SAB 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 (WRZ Approach) (QD)	SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)
New pipeline network (km)	0	31	47
New WTPs	0	3	0
Upgrade WTPs	0	16	13
New/upgraded abstractions	0	10	6
WTPs decommissioned	0	1	4
Abstractions abandoned	0	1	4
Raw Water Storage	0	0	1
Treated Water Storage	0	3	1

A comparative assessment of the two 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 (WRZ Approach) (QD)	SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)	Range (Difference between Lowest and Highest Score)
Population, health, economy and recreation	-3 scores	No Difference		0
	MCA score	Best	Worst	1
Water Environment:	-3 scores	Worst	Best	3

Topic	Total No. of	SA Approach 1 (WRZ Approach) (QD)	SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)	Range (Difference between Lowest and Highest Score)
quality and resources	MCA score	Worst	Best	7
Biodiversity, Flora and Fauna	-3 scores	No Difference		0
	MCA score	Worst	Best	15
Material Assets	-3 scores	No Difference		0
	MCA score	Worst	Best	1
Landscape and Visual	-3 scores	No Difference		0
	MCA score	Worst	Best	5
Climate Change	-3 scores	No Difference		0
	MCA Score	Best	Worst	1
Culture, Heritage and Archaeology	-3 scores	No Difference		0
	MCA Score	Best	Worst	4
Geology and Soils	-3 scores	No Difference		0
	MCA Score	Worst	Best	2

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.

Key
** 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 (WRZ Approach) (QD)

SA approach 1, key comparison points:

- Identified as the best in the Quickest Delivery category;
- Option types included:
    - WRZ options: 4 groundwater abstraction options, 7 group water scheme options, 1 group water scheme and interconnection option, 4 surface water abstraction options, and 9 WTP upgrade options;
- No -3 biodiversity scores (no higher risk options that could impact on European sites); and
- The key differences in infrastructure for SA Approach 1 include:
    - The lowest length of pipeline;
    - Three new WTPs;
    - Three more WTP upgrades;
    - Four more new/upgraded abstractions;
    - The lowest number of WTPs decommissioned and abstractions abandoned;
    - No new raw water storage facilities; and
    - Two more new treated water storage facilities.

4.4.2 SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)

SA approach 2, key comparison points:

- Identified as the best in the following categories: Least Cost, Best AA, Lowest Cost, Most Resilient and Best Environmental;
- Option types included:
    - SA option (group option): 1 surface water abstraction and interconnection option; 2 surface water abstraction and rationalisation options, and 1 groundwater and rationalisation option;
    - WRZ options: 2 groundwater abstraction options, 7 group water scheme options, 1 group water scheme and interconnection option, 3 surface water abstraction options, and 4 WTP upgrade options;
- No -3 biodiversity scores (no higher risk options that could impact on European sites); and
- The key differences in infrastructure for SA Approach 2 include:
    - The longest length of pipeline;
    - No new WTPS;
    - The lowest number of WTP upgrades;
    - The lowest number of new/upgraded abstractions;
    - Three more WTPs decommissioned, and abstractions abandoned;
    - One new raw water storage facility; and
    - The lowest number of new treated water storage facilities.

4.5 SAB 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 -2,724 m^3/d in 2019, to a projected maximum of -3,840 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 SAB.

Table 4.8 Supply Demand Balance for SAB

WRZ Name	WRZ Code	Population	Maximum Deficit m^3/day*	
			2019	2044
Monaghan	2400SC0011	9,375	No Deficit	No Deficit
Smithboro	2400SC0010	537	-35	-53
Emyvale (GWS Import)	2400SC0008	787	N/A***	N/A***
Glaslough (GWS Import)	2400SC0005	323	N/A***	N/A***
Newbliss	2400SC0004	419	No Deficit	No Deficit
Clones	2400SC0003	2,674	-301	-420
Ballybay (Lough Egish)	2400SC0002	10,744	No Deficit	No Deficit
Gowna	2000SC0004	4,313	-735	-769
Kinlough Tullaghan	1700SC0004	2,446	-861	-1,001
Cashilard	0600SC0041	375	No Deficit	No Deficit
Pettigo Pub	0600SC0011	318	-65	-75
Swanlinbar PWS	0200SC0019	307	No Deficit	No Deficit
Cootehill PWS	0200SC0017	2,190	-155	-241
Belturbet PWS	0200SC0016	1,962	No Deficit	No Deficit
Cavan RWSS	0200SC0014	13,171	-307	-930
Bawnboy PWS	0200SC0013	253	No Deficit	No Deficit
Ballyjamesduff RWSS	0200SC0012	4,695	No Deficit	No Deficit
Ballyconnell PWS	0200SC0011	1,399	-264	-351
Ballyhaise PWS (GWS Import)	0200SC0008	688	N/A***	N/A***

WRZ Name	WRZ Code	Population	Maximum Deficit m^3/day*	
			2019	2044
Shercock PWS (GWS Import)	0200SC0006	725	N/A***	N/A***
Gowna (GWS Import)	0200SC0004	384	N/A***	N/A***
Blacklion PWS (GWS Import)	0200SC0002	187	N/A***	N/A***
Derrykillew	No Data**	No Data**	No Data**	No Data**

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

** Note that this WRZ receives supply from Northern Ireland, therefore, Uisce Éireann do not have access to this data

***Note that 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 (WRZ Approach) (QD)	SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)
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	-	+
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	--	-
	O	--	--	-

SEA Objectives	Phase (Construction (C) / Operation (O))	Do Minimum	SA Approach 1 (WRZ Approach) (QD)	SA Approach 2 (SA Combination 5) (LCo, BA, LC, MR, BE)
7. Protect and improve surface water and groundwater status	C	0	0	0
	O	--	--	--
8. Avoid flood risk	C	0	-	-
	O	0	0	0
9. Protect and where appropriate, enhance cultural heritage assets	C	0	-	--
	O	0	0	0
10. Protect quality and function of soils	C	0	-	-
	O	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 1 is likely to have a have a moderate adverse impact against biodiversity during construction as it requires more new WTP infrastructure with

the potential to impact European designated sites. SA approach 1 also has the potential for more adverse impacts against landscape during construction and operation as the approach involves three new WTPs and only one decommission compared with SA approach 2 which has no new WTPs and four decommissions. SA approach 2 is likely to have less adverse impacts for resilience as it uses more resilient sources and a higher number of rationalisation options which has the potential to result in reduced pressure on the sources required. SA approach 2 is likely to have a more adverse impact for cultural heritage during construction due to a greater number of new above ground assets being located in proximity to NIAH/SMR sites.

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 2 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

SAB Preferred Approach: Strategic Environmental Assessment

5 SAB Preferred Approach Strategic Environmental Assessment

5.1 SAB 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 fifteen of the WRZs in the study area. The other WRZs are covered by four SA options, namely:

- SA option 1 proposes to interconnect the Cavan and Ballyjamesduff WRZs and upgrade the Lismean WTP;
- SA option 35 proposes a new surface water abstraction, new WTP, and to rationalise the Derrykillew WRZ to the Ballyshannon WRZ;
- SA option 38 proposes to increase the groundwater abstraction and to rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ; and
- SA option 49 proposes to rationalise Cashilard to Ballymagoarty (part of Ballyshannon/ Bundoran WRZ).

The SA Preferred Approach for the remaining WRZ options involves new and increased groundwater abstractions, new surface water abstractions, group water scheme interconnection and supply, retention of current group water scheme supplies, and WTP upgrades.

Table 5.1 gives a breakdown of the options in SAB and the associated abstractions.

Table 5.1 Preferred Approach Breakdown

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
SAB-011 (SA Option 1) 0200SC0014 Cavan RWSS	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade WTP for water quality improvements. • SA option 1: Ballyjamesduff RWSS is not in deficit, supply spare capacity to Cavan RWSS. • Existing source (Lough Nadrageel lake waterbody (LWB)) WFD status 2016-2021 – Moderate	5,804 m^3/d
SAB-053 (SA Option 1) 0200SC0012 Ballyjamesduff RWSS		3,425 m^3/d
SAB-024 (SA Option 38) 0200SC0016 Belturbet PWS	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme • SA option 38: Belturbet PWS in deficit so rationalise to Ballyconnell • Existing source (Newtown-Ballyconnell waterbody (WB)) WFD status 2016-2021 – Good	815 m^3/d

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
SAB-029 (SA Option 38) 0200SC0011 Ballyconnell PWS	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme • SA option 38: Ballyconnell PWS not in deficit • Existing source (Newtown-Ballyconnell WB) WFD status 2016-2021 – Good	908 m^3/d
SAB-041 (SA Option 38) 0200SC0013 Bawnboy PWS	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme • SA option 38: Bawnboy PWS in deficit so rationalise to Ballyconnell • Existing source (Newtown-Ballyconnell WB) WFD status 2016-2021 – Good	174 m^3/d
SAB-048 (SA Option 38) 0200SC0019 Swanlinbar PWS	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme • SA option 38: Swanlinbar PWS in deficit so rationalise to Ballyconnell • Existing source (Newtown-Ballyconnell WB) WFD status 2016-2021 – Good	147 m^3/d
SAB-060 0200SC0017 Cootehill PWS	New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP • Cootehill PWS in deficit so new surface water abstraction • New source (Dromore river waterbody (RWB)) WFD status 2016-2021 – Poor	888 m^3/d
SAB-067 0200SC0008 Ballyhaise PWS (GWS Import)	Keep supplying Ballyhaise WRZ from Annagh GWS • Existing source (Lough Nadreegeal LWB) WFD status 2016-2021 – Moderate	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
SAB-072 0200SC0006 Shercock PWS (GWS Import)	Keep supplying Shercock WRZ from Dhuish GWS • Existing source (Sillan LWB) WFD status 2016-2021 – Poor	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
SAB-077 & SAB-078 0200SC0002	Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough)	WRZ is supplied by a private Group Water Supply, therefore, the water available for use

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
Blacklion PWS (GWS Import)	• Existing sources: (Marble Arch GWB) WFD status 2016-2021 – Good, (Garvagh LWB) WFD status 2016-2021 – Unassigned	(WAFU) has not been verified for use in the SDB
SAB-084 0200SC0004 Gowna (GWS Import)	Keep supplying Gowna WRZ from Erne Valley GWS. • Existing source (Lough Garty LWB) WFD status 2016-2021 – Poor	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
SAB-133 2000SC0004 Gowna	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit • Increase SW abstraction to supply deficit. • Existing source (Gowna North LWB) WFD status 2016-2021 – 'Poor'	2,603 m^3/d
SAB-086 2400SC0003 Clones	Increase GW abstraction from existing boreholes to supply deficit and upgrade existing WTP • Clones WRZ in deficit so increase GW abstraction. • Existing source (Clones GWB) WFD status 2016-2021 – Good	888 m^3/d
SAB-189 2400SC0004 Newbliss	Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit. • Upgrade works at existing WTP adjacent to Lough Feagh. • Existing source (Feagh LWB) WFD status 2016-2021 – Unassigned	N/A
SAB-104 2400SC0010 Smithboro	Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS • Smithboro in deficit so interconnect with Stranoodan GWS • Existing source (White Rockcorry LWB) WFD status 2016-2021 – Poor	176 m^3/d
SAB-190 & SAB-191 2400SC0011 Monaghan	Upgrade Togan (Lake) WTP for water quality improvements Upgrade Crosses WTP for water quality improvements. • Monaghan WRZ is not in deficit	N/A

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
	• Existing sources: (Monaghan Town GWB) WFD status 2016-2021 – Good, (Greagh LWB) WFD status 2016-2021 – Poor, (Corcaghan LWB) WFD status 2016-2021 – Poor	
SAB-115 2400SC0008 Emyvale (GWS Import)	Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS • Existing source (Emy LWB) WFD status 2016-2021 – Poor	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
SAB-123 2400SC0005 Glaslough (GWS Import)	Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS. • Existing source (Emy LWB) WFD status 2016-2021 – Poor	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
SAB-127 2400SC0002 Ballybay (Lough Egish)	Upgrade Kilkitt WTP for water quality improvements • Upgrade works at existing WTP • Existing source (Bawn LWB) WFD status 2016-2021 – Poor	N/A
SAB-202 1700SC0004 Kinlough Tullaghan	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP • Kinlough/Tullaghan WRZ in deficit so new abstraction from Glenade Lake and upgrade WTP • New source (Glenade LWB) WFD status 2016-2021 – Good	1,547 m^3/d
SAB-170 (SA Option 49) 0600SC0041 Cashilard	Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ • SA option 49: New Assaroe SW abstraction to supply deficit • New source (Assaroe Highly Modified Waterbody (HMWB)) WFD status 2016-2021 – Good	252 m^3/d
SAB-173 0600SC0011 Pettigo Pub	Increase GW abstraction • Pettigo Pub WRZ in deficit so increase GW abstraction • Existing source (Ballyshannon East GWB) WFD status 2016-2021 – Good	222 m^3/d
SAB-535 (SA option 35)	New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-	WRZ receives small supply from Northern Ireland

WRZ Name and Option Reference*	Option Description	Abstraction / Demand
Derrykillew (no WRZ code available)	ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source). • Dependent on preferred approach for Ballyshannon/Bundoran WRZ (Study Area A) • Derrykillew does not have a WRZ code as it is a small supply sourced from Northern Ireland • New Assaroe SW abstraction to supply deficit. • New source (Assaroe HMWB) WFD status 2016-2021 – Good	

*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 1, 35, 38 and 49 are labelled as SAB-501, 535, 538 and 549 respectively.

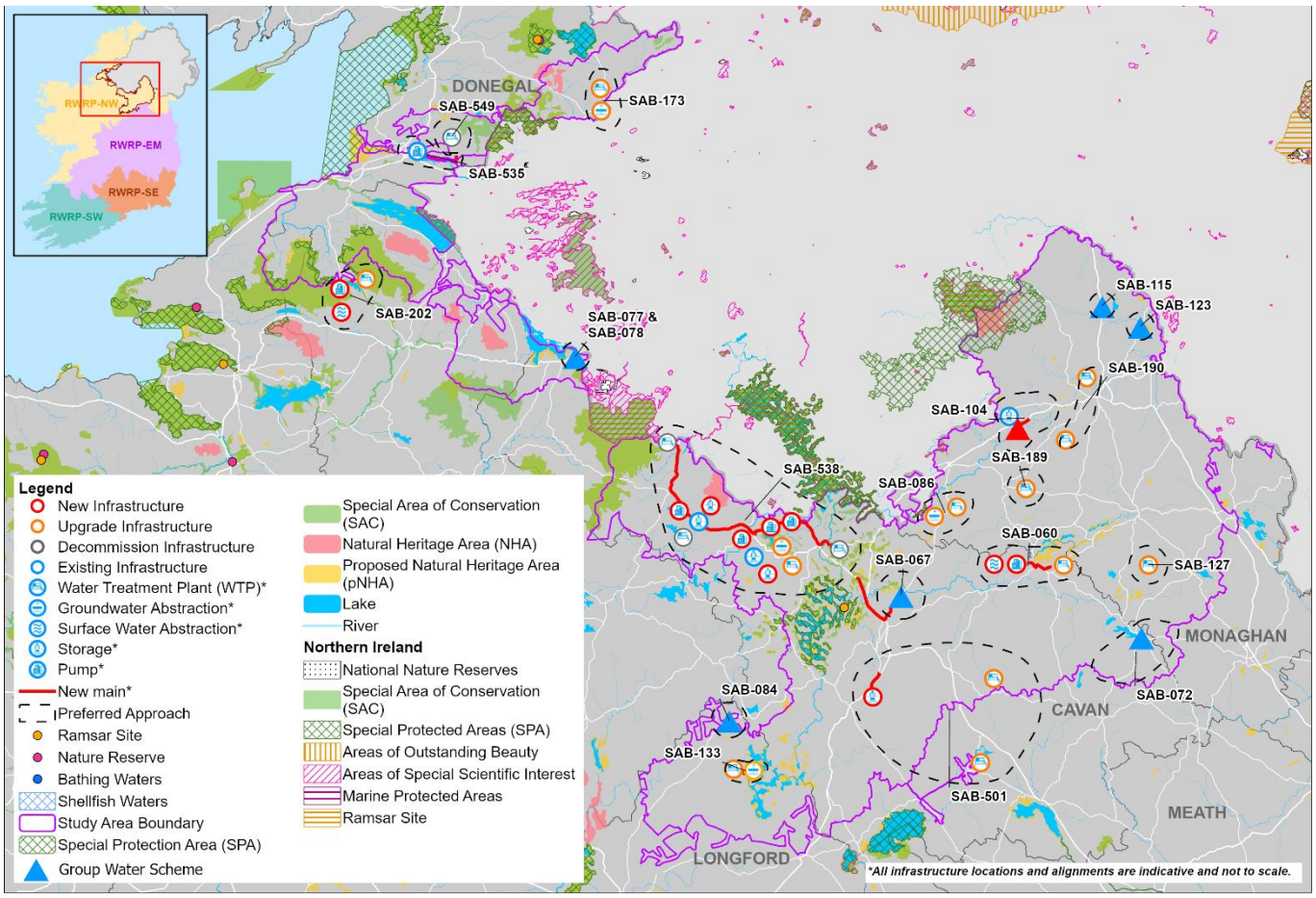

Figure 5.1 SA Preferred Approach and Key Environmental Designations

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
SAB-060	✓	-	✓	✓	-	-	-	-
SAB-067	-	-	-	-	-	-	-	-
SAB-072	✓	-	-	-	-	-	-	-
SAB-077	-	-	-	-	-	-	-	-
SAB-078	-	-	-	-	-	-	-	-
SAB-084	-	-	-	-	-	-	-	-
SAB-086	-	-	✓	✓	-	-	-	-
SAB-104	✓	-	✓	-	-	-	-	-
SAB-115	-	-	-	-	-	-	-	-
SAB-123	-	-	-	-	-	-	-	-
SAB-127	-	-	✓	-	-	-	-	-
SAB-133	✓	-	✓	✓	-	-	-	-
SAB-173	-	-	✓	✓	-	-	-	-
SAB-189	-	-	✓	-	-	-	-	-
SAB-190								
SAB-202	✓	-	✓	✓	-	-	-	-
SA option 1 (SAB-011 and 053)	✓	-	✓	-	-	-	✓	
SA option 35 (SAB-157 and 185)	✓	-	-	-	-	-	-	-
SA option 38 (SAB-024, 029, 041 and 048)	✓	-	✓	✓	✓	✓	-	✓
SA option 49 (SAB-170)	-	-	-	-	✓	✓	-	-

*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 1 (SAB-011 and 053)	Interconnect Cavan and Ballyhaise to Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. Upgrade Lismean WTP for water quality improvements.	Construction	-	-	-	-	-	0	0	0	-	-
		Operation	++	0	0	0	-	++	0	0	0	0
SAB-060	New SW abstraction from River Drumore to	Construction	--	-	-	-	-	-	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)
	supply deficit. Treat at the existing Kilawaun WTP.	Operation	0	0	0	0	-	-	-	0	0	0
SA option 38 (SAB-024, 029, 041 and 048)	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme. Increase GW abstraction from existing boreholes to supply deficit.	Construction	-	--	-	--	-	--	0	0	--	-
		Operation	+	--	+	0	-	--	---	0	0	0
SAB-072		Construction	-	-	-	-	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)
	Keep supplying Shercock WRZ from Dhuish GWS	Operation	0	0	0	0	0	0	0	0	0	0
SAB-077	Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	Construction	0	0	0	0	0	0	0	0	0	0
		Operation	0	0	0	0	0	0	0	0	0	0
SAB-078	Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	Construction	0	0	0	0	0	0	0	0	0	0
		Operation	0	0	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)
SAB-086	Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	Construction	-	-	0	0	0	--	0	0	0	0
		Operation	+	0	0	0	0	--	---	0	0	0
SAB-189	Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	Construction	-	0	0	0	0	0	0	0	0	0
		Operation	+	0	0	0	0	0	0	0	0	0
SAB-104	Interconnect Smithboro WRZ and Stranoodan	Construction	-	-	-	-	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)
	GWS and supply deficit from GWS	Operation	0	0	0	0	0	0	0	0	0	0
SAB-127	Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	Construction	-	-	0	0	0	0	0	0	0	0
		Operation	+	0	0	0	0	0	0	0	0	0
SAB-133	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely	Construction	-	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)
	flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	Operation	0	0	0	0	0	-	0	0	0	0
SAB-202	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	Construction	-	--	-	-	-	-	0	0	-	-
		Operation	0	-	0	0	-	-	-	0	0	0
		Construction	-	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 49 (SAB-170)	Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	Operation	+	0	+	0	0	0	0	0	0	0
SAB-173	Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ	Construction	-	0	0	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 35 (SAB-157 and 185)	New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source.	Construction	-	-	-	-	0	0	0	0	--	-
		Operation	0	0	0	0	0	0	0	0	0	0
SAB-084	Keep supplying Gowna WRZ from Erne Valley GWS	Construction	0	0	0	0	0	0	0	0	0	0
		Operation	0	0	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)
SAB-067	Keep supplying Ballyhaise WRZ from Annagh GWS	Construction	0	0	0	0	0	0	0	0	0	0
		Operation	0	0	0	0	0	0	0	0	0	0
SAB-123	Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS	Construction	0	0	0	0	0	0	0	0	0	0
		Operation	0	0	0	0	0	0	0	0	0	0
SAB-115	Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS	Construction	0	0	0	0	0	0	0	0	0	0
		Operation	0	0	0	0	0	0	0	0	0	0
SAB-190	Upgrade Togan (Lake) WTP for water quality	Construction	-	0	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)
	improvements. Monaghan WRZ is not in deficit	Operation	+	0	0	0	0	0	0	0	0	0
SAB-191	Upgrade Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit	Construction	-	0	0	0	0	0	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 SAB 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: Cavan RWSS, Kinlough Tullaghan, Gowna and Monaghan.

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 SAB 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 SAB Preferred Approach is provided in the SAB Technical Report. A high-level assessment of what this could mean for the SEA is shown in Table 5.4.

Table 5.4 SAB 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	+8,000 m^3/d	The impact of sustainability reductions would reduce the volumes that can be abstracted from Uisce Éireann's

Uncertainty	Likelihood	Increase (+)/ Decrease (-) in Deficit	Environmental Impacts Relative to Assessment of Preferred Approach Key: Green - Positive Amber - Negative
	current abstractions are large compared to the waterbodies from which they abstract)		existing sources, therefore, increasing the SDB deficit. There are some surface water sources in SAB that would be impacted by sustainability reductions. However, the Preferred Approach is designed to relieve pressure on these by supplementing supply from more resilient sources. For example, the St. Columbkill Lake abstraction that is potentially unsustainable is to be decommissioned as part of the Preferred Approach. Groundwater sustainability is more difficult to assess at desktop level, however, as the abstractions in SAB are small in scale any impacts are likely to be minimal.
			The SA Preferred Approach addresses reductions and decommissions an abstraction that has 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)	+200 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. Within SAB, several of the supplies from smaller lake sources that are more vulnerable to climate change impacts are to be interconnected to larger, more resilient surface water or groundwater sources. 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)	-2,274 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 eight of the twenty-three 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 reduce expected abstraction requirements
Leakage Targets	Low (Uisce Éireann is focused on sustainability and aggressive leakage reduction)	+96 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)	-1,142 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 SAB 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 SAB Preferred Approach

6 SEA Cumulative Effects for SAB Preferred Approach

Secondary, cumulative and the synergistic nature of the effects of the SAB 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 SAB

The potential 'within plan' cumulative effects for SAB 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 SAB

Preferred Approach Option Reference	SAB-060	SAB-072	SAB-077	SAB-078	SAB-086	SAB-189	SAB-104	SAB-127	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1	SAB-084	SAB-067	SAB-123	SAB-115	SAB-190
SAB-191																				
SAB-190																				
SAB-115																				
SAB-123																				
SAB-067																				
SAB-084																				
SA option 1	LOAL LOC				LOAL ULE						LOC		LOAL LOC ULE N3							
SA option 49																				
SA option 38	LOAL LOC				LOAL ULE ULE2						LOC									
SA option 35																				
SAB-133	LOC																			

Preferred Approach Option Reference	SAB-060	SAB-072	SAB-077	SAB-078	SAB-086	SAB-189	SAB-104	SAB-127	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1	SAB-084	SAB-067	SAB-123	SAB-115	SAB-190
SAB-173																				
SAB-202																				
SAB-127																				
SAB-104																				
SAB-189																				
SAB-086	LOAL																			
SAB-078																				
SAB-077																				
SAB-072																				

Key	
Construction Phase	
Operation Phase	
Construction and Operation	
Lough Oughter and Associated Loughs SAC	LOAL
Lough Oughter Complex SPA	LOC
Upper Lough Erne SPA	ULE
Upper Lough Erne SAC	ULE2
N3 Road	N3

There could be cumulative effects associated with construction in terms of traffic, noise and dust for the options (SA options 38 and 1) located along the N3 road (indicated by 'N3' 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. Potential for cumulative effects also includes:

- Cumulative effects from disturbance (SAB-086, SA option 38 and SA option 1) and pollution (SAB-060, SAB-086, SA option 38 and SA option 1) impacts on Lough Oughter and Associated Loughs SAC if construction of options are concurrent (shown as 'LOAL'' in Table 6.1);
- Cumulative effects from disturbance (SAB-086, SA option 1 and SA option 38) and pollution (SAB-086 and SA option 38) impacts on Upper Lough Erne SPA if construction of options are concurrent (shown as 'ULE' in Table 6.1);
- cumulative effects from disturbance and pollution impacts on Upper Lough Erne SAC if construction of options SAB-086 and SA option 38 are concurrent (shown as 'ULE2' in Table 6.1); and
- Cumulative effects from disturbance impacts on Lough Oughter Complex SPA if construction of options SAB-060, SAB-133, SA option 1 and SA option 38 are concurrent (shown as 'LOC' in Table 6.1).

Effects can be managed by standard good practice mitigation, such as having buffers along the edge of the waterbodies 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. 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 all of the WFD groundwater bodies (Ballyshannon East, Clones, Marble Arch, Monaghan Town and Newtown-Ballyconnerll) 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.

The potential for cumulative effects on European designated sites has been considered in the NIS. The NIS concluded that there will be no operational cumulative effects to the sites.

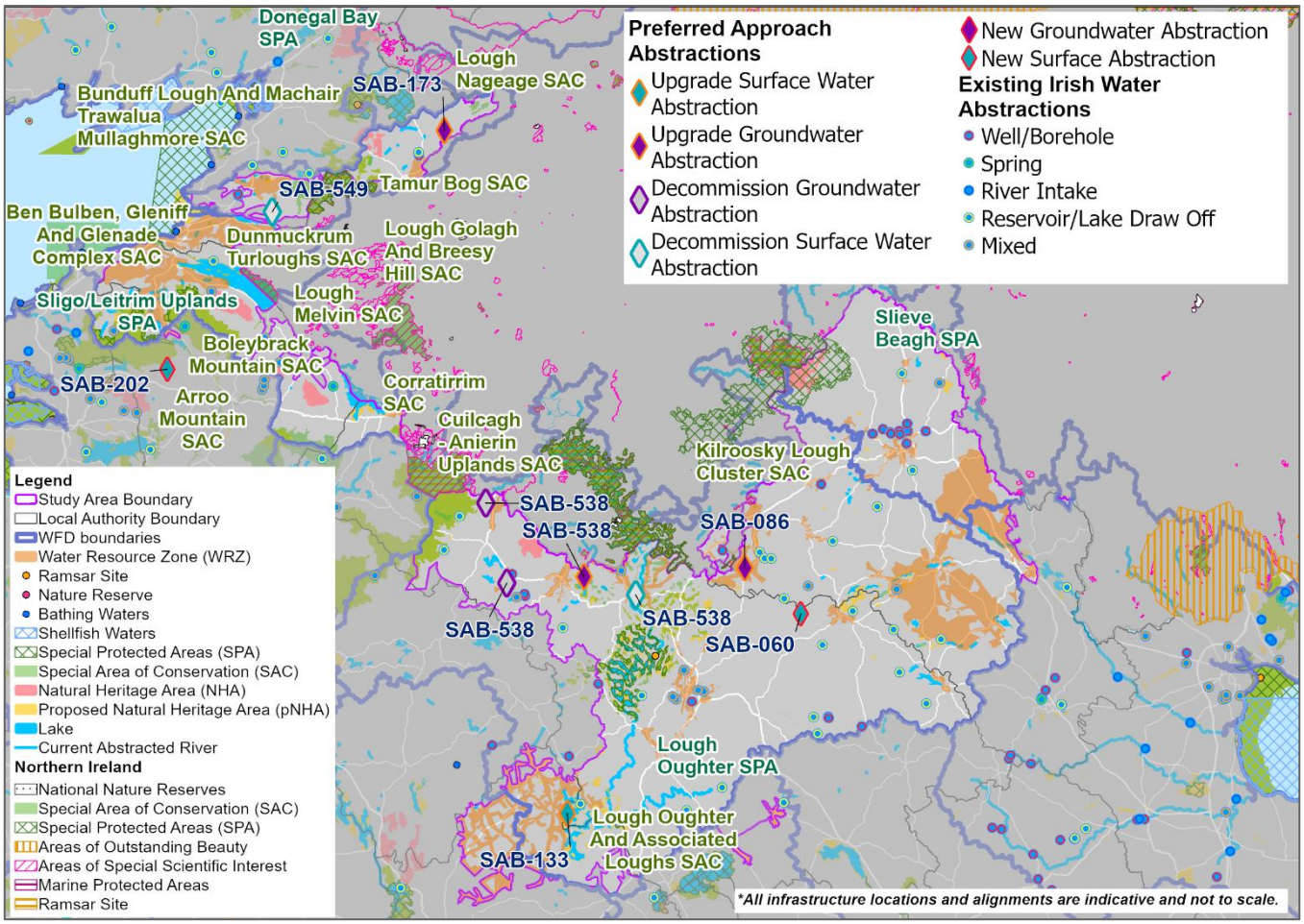

Figure 6.1 SA Preferred Approach Abstractions in SAB

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 SAB this averages as 0.28 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 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.

6.2 Cumulative Effects with Other Developments

The SAB 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 SAB there are a number of projects in Ballyconnell, Cavan and Monaghan. Abbeylands Regeneration Project is part of the Cavan Town Centre development and is therefore not considered separately within this cumulative assessment.

6.2.1 Cumulative Effects during Construction

The projects in Ballyconnell, Cavan and Monaghan could result in cumulative effects with the SAB Preferred Approach if they were to be constructed at the same time. This is identified in Table 6.2 as 'B', 'C' and 'M' respectively. Projects in Ballyconnell, Cavan and Monaghan include: Ballyconnell Community Services and Ballyconnell Market House; Cavan General Hospital, Drumalee Manor, Cavan Town Centre and Cavan Railway; and Dublin Street Regeneration and Dublin Street Regeneration Monaghan, Libraries Capital Programme - Monaghan Library and Ulster Canal Greenway- Smithborough to Monaghan, respectively. Potential effects could include increased traffic and noise to the residential and commercial properties in Ballyconnell, Cavan and Monaghan. 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.

In the event construction of the SAB Preferred Approach (SAB-060, SAB-133 and SA options 1 and 38) is concurrent with Cavan General Hospital, Cavan Town Centre and Drumalee Manor, there is potential for disturbance (all options) and pollution (only for SA option 1) impacts on Lough Oughter Complex SPA. This is represented in Table 6.2 as 'LOC'.

In the event construction of the SAB Preferred Approach (SAB-060, SAB-086 and SA options 1 and 38) is concurrent with Ballyconnell Community Services, Ballyconnell Market House, Cavan General Hospital, Cavan Town Centre, Drumalee Manor, Clones regeneration, The Clones Terminus and Ulster Canal Restoration works, there is potential for pollution (all options) and disturbance (SAB-086, SA option 1 and 38) impacts on Lough Oughter and Associated Loughs SAC. This is represented in Table 6.2 as 'LOAL'.

There is potential for cumulative effects on the Upper Lough Erne SPA, represented in Table 6.2 as 'ULE', if construction of the SAB Preferred Approach (SAB-086 and SA option 1 and 38) is concurrent with Ballyconnell Community Services, Ballyconnell Market House, Cavan General Hospital, Cavan Town Centre, Drumalee Manor, Clones regeneration, The Clones Terminus and Ulster Canal Restoration works. Potential impacts include pollution (SAB-086 and SA option 38) and disturbance impacts (all options).

There is also potential for cumulative effects from pollution and disturbance impacts on the Upper Lough Erne SAC if construction of the SAB Preferred Approach (SAB-086 and SA option 38) is concurrent with Ballyconnell Community Services, Ballyconnell Market House, Cavan General Hospital, Cavan Town Centre, Drumalee Manor, Clones regeneration, The Clones Terminus and Ulster Canal Restoration works. This is represented in Table 6.2 as 'ULE2'.

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 SAB

Project Developments	SAB-060	SAB-067	SAB-072	SAB-077	SAB-078	SAB-084	SAB-086	SAB-189	SAB-104	SAB-123	SAB-127	SAB-190	SAB-191	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1
25 units, Drumalee Manor, Drumalee, County Cavan	LOAL						LOAL									LOC		LOAL		LOAL
							ULE											ULE		ULE
	LOC						ULE2											ULE2		LOC
																		LOC		C
Abbeylands Regeneration Project																				
Ballybay Regeneration																				
Ballyconnell Community Services	LOAL						LOAL											LOAL		LOAL
							ULE											ULE		
							ULE2											ULE2		ULE
																		B		
	LOAL						LOAL											LOAL		LOAL
							ULE											ULE		
							ULE2											ULE2		ULE

Project Developments	SAB-060	SAB-067	SAB-072	SAB-077	SAB-078	SAB-084	SAB-086	SAB-189	SAB-104	SAB-123	SAB-127	SAB-190	SAB-191	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1
Ballyconnell Market House - Community, Remote Working and Tourism Hub																		B		
Ballyjamesduff Regeneration Strategy																				
Belturbet Town Regeneration Master Plan																				
Castleblayney Enterprise Centre																				
Castleblayney Market Square Regeneration and Castleblayney Market Square Regeneration Phase 2																				

Project Developments	SAB-060	SAB-067	SAB-072	SAB-077	SAB-078	SAB-084	SAB-086	SAB-189	SAB-104	SAB-123	SAB-127	SAB-190	SAB-191	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1
Cavan General Hospital, Emergency Department and Ward Block	LOAL						LOAL									LOC		LOAL		LOAL
							ULE											ULE		ULE
	LOC						ULE2											ULE2		LOC
																		LOC		C
Cavan Town Centre	LOAL						LOAL									LOC		LOAL		LOAL
							ULE											ULE		ULE
	LOC						ULE2											ULE2		LOC
																		LOC		C
Cavan Railway - Cavan Town Ulster Canal Greenway - Leitrim Greenway at Belturbet																				
Clones Regeneration	LOAL						LOAL											LOAL		LOAL
							ULE													
							ULE2											ULE		ULE

Project Developments	SAB-060	SAB-067	SAB-072	SAB-077	SAB-078	SAB-084	SAB-086	SAB-189	SAB-104	SAB-123	SAB-127	SAB-190	SAB-191	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1
																		ULE2		
Cootehill Technology Park																				
Dublin Street Regeneration and Dublin Street Regeneration Monaghan																				
Libraries Capital Programme - Monaghan Library																				
Lough Egish Food Park Expansion																				
Lough Egish Food Park Expansion																				
Newbliss Enterprise and Digital Hub																				

Project Developments	SAB-060	SAB-067	SAB-072	SAB-077	SAB-078	SAB-084	SAB-086	SAB-189	SAB-104	SAB-123	SAB-127	SAB-190	SAB-191	SAB-202	SAB-173	SAB-133	SA option 35	SA option 38	SA option 49	SA option 1
The Clones Terminus	LOAL						LOAL ULE ULE2											LOAL ULE ULE2		
Ulster Canal Greenway - Smithboro - Clones																				
Ulster Canal Restoration, Phase 2	LOAL						LOAL ULE ULE2											LOAL ULE ULE2		LOAL ULE
Ulster Canal Greenway- Smithborough to Monaghan																				

Key	
Construction Phase	
Operation Phase	
Construction and Operation	
Ballyconnell	B
Cavan	C
Lough Oughter and Associated Loughs SAC	LOAL
Lough Oughter Complex SPA	LOC
Upper Lough Erne SPA	ULE
Upper Lough Erne SAC	ULE2

6.2.2 Cumulative Effects during Operation

There could be cumulative effects from habitat degradation and a reduction in flow and water availability on Lough Oughter and Associated Loughs SAC with operation of Ballyconnell Community Services, Ballyconnell Market House, Cavan General Hospital, Cavan Town Centre, Drumalee Manor, Clones regeneration, The Clones Terminus and Ulster Canal Restoration works and the SAB Preferred Approach (SA option 38). This is represented in Table 6.2 as 'LOAL'. With implementation of standard good practice measures there would be no adverse effects on the integrity of either of these European sites.

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 emissions for carbon. The same mitigation measures suggested for the SAB 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 SAB 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 impacts for SA option 1, associated with increasing resilience and the quality of water supply for local communities; and the subsequent benefits of this for public health. There are minor beneficial impacts for options SAB-086, 189, 191, 190 and 127, and SA option 49 associated with the quality of water supply for local communities. There are also minor beneficial impacts for SA option 38 associated with the decommissioning of WTPs reducing visual, noise and traffic disruption in the localised rural area.

Key potential adverse impacts identified at plan level include:

- Moderate adverse effects during construction for SAB-060 regarding public health and/or quality of life from dust, noise and/traffic in urban and rural areas;
- Moderate adverse effects during operation of SA option 38 associated with potential impacts on European designated sites. The option is within the Lough Oughter and Associated Loughs SAC and there is the potential for habitat degradation and a reduction in flow and water availability;
- Moderate adverse effects during construction for SAB-202 associated with potential impacts to European and nationally designated sites. The option is within the Glenade Lough SAC (also a pNHA), hydrologically linked to Lough Gill SAC and approximately 1km from Sligo/Leitrim Uplands SPA. During construction there is the potential for the loss (only Glenade Lough) and pollution of QI habitats and supporting habitats to the SACs. There is also the potential for disturbance to QI species to the SACs and SPA;
- Moderate adverse effects to environmental climate change resilience with options SA option 38, and options SAB-086 and 173 due to the level of increase required for the existing groundwater abstractions;
- Potential for major adverse effects during operation for SA option 38 and options SAB-086 and 173 due to the level of abstraction required from their associated groundwater abstraction sources. Although all of the WFD groundwater bodies affected by abstractions have a good quantitative status, further studies are required to understand the impacts and develop mitigation;
- Moderate adverse impacts for SA options 35 and 38, and SAB-060 during construction associated with cultural heritage. These options are located at known archaeological sites. Further cultural heritage and archaeological assessment will be required to aid option alignment; and
- Moderate adverse impacts for SAB-060 and 081 during construction associated with geology and soils. This option is located at a known geological heritage site.

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 SAB 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 2) 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 Neutral 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 Neutral to Moderate Adverse O Neutral to Moderate Adverse Impacts from construction works for pipelines and service reservoirs on biodiversity. These can be	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 2) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
resilient ecosystems	minimised through careful routing and siting. Potential for construction and operational impacts on European and National designated sites, most notably the Lough Oughter and Associated Loughs SAC.	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 Minor Adverse O Neutral 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 Moderate Adverse O Neutral	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 2) 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	New resources required for construction works, including 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 Minor Adverse O Neutral to Minor 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_2equiv/ML
6. Contribute to environmental climate	C Neutral to Moderate Adverse O Moderate Adverse to Moderate Beneficial	Consider how operation can further reduce climate change pressure on at risk sources and	• WFD waterbody status objectives at risk and	• None identified

SEA Objectives	SA Preferred Approach (PA) (SA Approach 2) 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 38, SAB-086 and SAB-173 require further assessment to understand their sustainability in the longer term.	associated designations, particularly for SA option 38, SAB-086 and SAB-173. Sustainability review of sources taking account of groundwater and surface water interconnections.	designated site condition status • 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. *GW abstractions assessments were based on preliminary and precautionary assumptions – further consideration in section 8 identified that there were unlikely to result in significant effects on WFD status or objectives but would need further investigation.	• WFD waterbody status objectives at risk	• Pollution incidents during construction

SEA Objectives	SA Preferred Approach (PA) (SA Approach 2) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
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 ground structures for SAB-060 and SAB-133. Also, flood risk impacts on operations with effect on meeting supply.	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
9. Protect and where appropriate, enhance cultural heritage assets	C Neutral to Moderate 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

SEA Objectives	SA Preferred Approach (PA) (SA Approach 2) Residual Effects Including Mitigation C – Construction (Short Term) O – Operational (Long Term)	Mitigation	Monitoring	
			Study Area Level	Scheme Level
10. Protect quality and function of soils	C Neutral to Moderate 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 SAB 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 SAB abstractions have good quantitative status and the majority are 'Not At Risk' of failing their WFD objectives (Irish Water, 2022). The abstractions are not located in close proximity to any existing source protection areas and the risk of combined effects to groundwater body WFD objectives, or on existing abstractions, is 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 SAB, 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 Lough Gill SAC, Donegal Bay SPA, Lough Oughter and Associated Loughs SAC, Lough Oughter Complex SPA, Upper Lough Erne SAC, and Upper Lough Erne SPA. The potential effects include pollution, habitat degradation, impacts on water table/availability, and disturbance. 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 the Lough Oughter and Associated Loughs SAC, Upper Lough Erne SAC, Upper Lough Erne SPA, and Lough Oughter Complex SPA. The potential impacts include pollution and disturbance. 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.

References

Catchments.ie. 2021a. *3rd Cycle Draft Erne Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/36%20Erne%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2021b. *3rd Cycle Draft Lough Neagh-Lower Bann Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/03%20Lough%20Neagh%20&%20Lower%20Bann%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2021c. *3rd Cycle Draft Newry, Fane, Glyde and Dee Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/06%20Newry,%20Fane,%20Glyde%20and%20Dee%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2021d. *3rd Cycle Draft Upper Shannon (26C) Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/26C%20Upper%20Shannon%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2021e. *3rd Cycle Draft Upper Shannon (26F) Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/26F%20Upper%20Shannon%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2021f. *3rd Cycle Draft Donegal Bay North Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/37%20Donegal%20Bay%20North%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2021g. *3rd Cycle Draft Sligo Bay & Drowes Catchment Repor*t. [Online]. [Accessed: 23/05/2022]. Available from: https://catchments.ie/wp-content/files/catchmentassessments/35%20Sligo%20Bay%20&%20Drowse%20Catchment%20Summary%20WFD%20Cycle%203.pdf

Catchments.ie. 2022. Areas for Action (2022-2027) DRAFT. [Online]. [Accessed: 26/05/2022]. Available from: https://www.catchments.ie/data/#/areaforaction?_k=taa8b6

Cavan County Council, 2019. *Climate Change Adaptation Strategy*. [Online]. [Accessed: 17/05/22]. Available from: https://www.cavancoco.ie/output/file-library/environment/climate-change/climate-change-adaptation-strategy-pdf.pdf

Central Statistics Office (CSO). 2016a. *E2014: Population Density and Area Size 2016 by Towns by Size, Census Year and Statistic.* [Online]. [Accessed: 06/01/20]. Available from: https://www.cso.ie/en/releasesandpublications/ep/p-cp2tc/cp2pdm/pd/

Central Statistics Office (CSO). 2020a. *Period Life Expectancy*. [Online]. [Accessed: 21/04/22]. Available from: https://data.cso.ie/table/VSA31

Central Statistics Office (CSO). 2020b. *Physical activity of persons aged 15 years and over*. [Online]. [Accessed: 21/12/20]. Available from: https://data.cso.ie/table/IH292

Central Statistics Office (CSO). 2022. *County Incomes and Regional GDP 2019*. [Online]. [Accessed: 06/05/22]. Available from: https://www.cso.ie/en/releasesandpublications/er/cirgdp/countyincomesandregionalgdp2019/

Central Statistics Office (CSO). 2023a. Labour Force Survey Quarter 1 2023. [Online]. [Accessed: 01/07/23]. Available from: https://www.cso.ie/en/releasesandpublications/ep/p-lfs/labourforcesurveyquarter12023/labourforce/

Central Statistics Office (CSO). 2023b. *New Dwelling Completions: Quarter 1 2023*. [Online]. [Accessed: 01/07/23]. Available from: https://www.cso.ie/en/releasesandpublications/ep/p-ndc/newdwellingcompletionsq12023/

Council Directive 2000/60/EC of 23rd October 2000 on the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. [Online]. [Accessed: 21/12/20]. Available from: https://ec.europa.eu/environment/water/water-framework/index_en.html

Department of Culture, Heritage and the Gaeltacht. 2020. *Historic Environment Viewer.* [Online]. [Accessed: 06/01/20]. Available from: http://webgis.archaeology.ie/historicenvironment/

Department of Environment, Community and Local Government, GSI and EPA.1999. *Groundwater Protection Schemes.* [Online]. [Accessed: 05/11/21]. Available from: https://www.gsi.ie/en-ie/publications/Pages/Groundwater-Protection-Schemes.aspx

Department of Housing, Planning and Local Government. 2019a. *Public Consultation on the Significant Water Management Issues for the third cycle River Basin Management Plan for Ireland 2022-2027*. [Online]. [Accessed: 06/01/20]. Available from: https://www.housing.gov.ie/water/water-quality/water-framework-directive/public-consultation-significant-water-management

Department of Housing, Planning and Local Government. 2019b. *Water Quality and Water Services Infrastructure: Climate Change Sectoral Adaptation Plan*. [Online]. [Accessed: 06/01/20]. Available from: https://www.dccae.gov.ie/documents/Water_Quality_and_Water_Services_Infrastructure_Climate_Adaptation_Plan.pdf

Department of the Environment, Climate and Communications. 2018. *Local Authority Adaptation Strategy Development Guidelines*. [Online]. [Accessed: 06/01/20]. Available from: https://www.dccae.gov.ie/documents/LA%20Adaptation%20Guidelines.pdf

Department of the Environment, Climate and Communications. 2023. *Climate Action Plan*. [Online]. [Accessed: 26/01/23]. Available from: https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023

Department of Transport, Tourism and Sport. 2019. *People, Place and Policy - Growing Tourism to 2025.* [Online]. [Accessed: 06/01/20]. Available from: https://assets.gov.ie/15792/8b462712683748e7bcec6c7d5c7ecd2a.pdf

Donegal City Council, 2019. *Climate Adaptation Strategy*. [Online]. [Accessed: 16/05/22]. Available from: https://www.donegalcoco.ie/media/donegalcountyc/environment/FINAL_Climate%20Change%20Adaptation%20Strategy%202019%20-2024.pdf

Environmental Protection Agency (EPA). 2018. *Corine Landcover - EPA Geoportal.* [Online]. [Accessed: 06/01/20]. Available from: http://gis.epa.ie/GetData/Download

Environmental Protection Agency (EPA). 2019. *Teagasc Soils Map*. [Online]. [Accessed: 06/01/20]. Available from: http://gis.teagasc.ie/soils/map.php

Environmental Protection Agency (EPA). 2020. *Water Framework Directive Water Catchments*. [Online]. [Accessed: 29/01/21]. Available from: https://gis.epa.ie/geonetwork/srv/eng/catalog.search#/metadata/78b8def6-16fd-4934-bc2a-1d52380a2b34

Environmental Protection Agency (EPA). 2021. *Air Quality in Ireland Report 2021*. [Online]. [Accessed: 31/10/22]. Available from: https://indd.adobe.com/view/67188a5f-37ff-44bd-b335-5d168fdcf113

Environmental Protection Agency (EPA). 2023a. *WFD Status Tables (excel) (All Waterbodies) 2016-2021*. [Online]. [Accessed: 31/05/23]. Available at: https://gis.epa.ie/GetData/Download

Environmental Protection Agency (EPA). 2023b. *WFD Risk Data Excel (Online)*. [Online]. [Accessed: 31/05/23]. Available at: https://gis.epa.ie/GetData/Download

European Communities (Birds and Natural Habitats) Regulations 2011 (SI. 477)

Government of Ireland. 2022. *Project Ireland 2040: National Planning Framework*. [Online]. [Accessed: 15/04/22]. Available from: http://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf

Government of Ireland. 2021. *myProjectIreland: Project Ireland 2040*. [Online]. [Accessed: 15/04/22]. Available from: https://geohive.maps.arcgis.com/apps/MapSeries/index.html?appid=f05a07c5a0324b1a887cd9d5d7103e22

Irish Water. 2021. *Irish Water's Biodiversity Action Plan: Embedding Biodiversity into Water Services*. [Online]. [Accessed: 25/06/21]. Available from: https://www.water.ie/docs/21668_Ervia_IrishWaterBiodiversityActionPlan_v7.pdf

Irish Water. 2022. Technical Note: Groundwater Summary Report – Potential impacts on GW Bodies due to Irish Water Groundwater Abstraction Scheme. July 2022.

Leitrim County Council. 2022. *Climate Change Adaptation Strategy*. [Online]. [Accessed: 17/05/22]. Available from: https://leitrimcoco.ie/eng/Services_A-Z/Environment/Climate-Change-Adaptation-Strategy/Leitrim-CCAS-2019-2024-.pdf

Longford County Council. 2019. *Climate Change Adaptation Strategy*. [Online]. [Accessed: 17/05/22]. Available from: https://www.longfordcoco.ie/services/environment/climate-action/climate-change-adaptation-strategy.pdf

Met Éireann. 2019. *Climate of Ireland*. [Online]. [Accessed: 06/01/20]. Available from: https://www.met.ie/climate/climate-of-ireland

Monaghan County Council. 2019. *Climate Change Adaptation Strategy*. [Online]. [Accessed: 17/05/22]. Available from: https://monaghan.ie/environment/wp-content/uploads/sites/11/2019/11/Monaghan-County-Council-Climate-Change-Adaptation-Strategy-2019-2024-PDF.pdf

National Biodiversity Data Centre. 2021. National Invasive Species Database. [Online]. [Accessed 13/12/21]. Available from: https://maps.biodiversityireland.ie/Dataset/66

National Parks and Wildlife Service (NPWS). 2011. *Red Lists*. [Online]. [Accessed: 06/01/20]. Available from: https://www.npws.ie/research-projects/animal-species/invertebrates/red-lists

National Parks and Wildlife Service (NPWS). 2023. *Protected Sites in Ireland*. [Online]. [Accessed: 16/05/23]. Available from: https://www.npws.ie/protected-sites

National Parks and Wildlife Service (NPWS). 2019. *Article 17 Reports 2019*. [Online]. [Accessed: 06/01/20]. Available from: https://www.npws.ie/publications/article-17-reports/article-17-reports-2019

National Tourism Development Authority. 2016. *Tourism Development & Innovation: A strategy for investment 2016-2022*. [Online]. [Accessed: 06/01/20]. Available from: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Irelands%20Ancient%20East/FI-Tourism-Investment-Strategy-Final-07-06-16.pdf

Nelson, B., Cummins, S., Fay, L., Jeffrey, R., Kelly, S., Kingston, N., Lockhart, N., Marnell, F., Tierney, D. and Wyse Jackson, M. 2019. *Checklists of protected and threatened species in Ireland*. Irish Wildlife Manuals, No. 116. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland. [Online]. [Accessed: 06/12/21]. Available from: https://www.npws.ie/sites/default/files/publications/pdf/IWM%20116%20Checklists%20Protected%20and%20Threatened%20Species%202019.pdf

Office of Public Works. 2009. *The Planning System and Flood Risk Management Guidelines for Planning Authorities*. [Online]. [Accessed: 06/01/20]. Available from: https://www.opr.ie/wp-content/uploads/2019/08/2009-Planning-System-Flood-Risk-Mgmt-1.pdf

Office of Public Works. 2018. C*atchment Flood Risk Assessment and Management Programme*. [Online]. [Accessed: 06/01/20]. Available from: https://www.floodinfo.ie/map/floodplans/

Ordnance Survey Ireland. n.d. *GeoHive Environmental Sensitivity Mapping.* [Online]. [Accessed: 03/08/21]. Available from: https://airomaps.geohive.ie/ESM/

Sligo County Council, 2019. *Climate Adaptation Strategy*. [Online]. [Accessed: 17/05/22]. Available from: https://www.sligococo.ie/corporateplan/ClimateAdaptationStrategy.pdf

This is Cavan. 2021. *This is Cavan*. [Online]. [Accessed: 10/05/22]. Available from: https://thisiscavan.ie/

UKTAG. 2013. *UK Technical Advisory Group on the Water Framework Directive Final recommendations on new and updated biological standards.* [Online]. [Accessed: 06/01/20]. Available from: http://www.wfduk.org/sites/default/files/Media/UKTAG%20Final%20recommendations%20on%20biological%20stds_20131030.PDF

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 Groundwater SAB

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
SAB-025	Interconnect Belturbet WRZ and Ballyconnell WRZ.									1	0	-14
SAB-027	Increase GW abstraction (Newtown-Ballyconnell GWB (karstic)) from existing boreholes to supply deficit at Ballyconnell PWS									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
SAB-029	Increase GW asbtraction (Newtown-Ballyconnell GWB (karstic)) from existing boreholes to supply deficit at Ballyconnell PWS									1	1	-19
SAB-030	Increase GW asbtraction from existing boreholes to supply deficit at Ballyconnell PWS									1	1	-18
SAB-038	Increase GW abstraction and supply spare capacity to neighbouring schemes.									1	0	-9
SAB-039	Increase GW abstraction and supply spare capacity to neighbouring schemes.									1	1	-9

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
SAB-042	Increase GW abstraction and supply spare capacity to neighbouring schemes.									1	0	-9
SAB-081	New GW abstraction (karstic) to supply Blacklion WRZ.									0	0	-15
SAB-086	Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ									1	0	-7
SAB-095	Rationalise Newbliss WRZ to Smithboro WRZ.									1	1	-8
SAB-099	Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Smithboro WRZ									1	0	-4

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
SAB-121	New GW abstraction (Aughnacloy GWB (productive fissured berock)) to supply Emyvale WRZ and new WTP.									0	0	-18
SAB-124	New GW abstraction (Aughnacloy GWB (productive fissured berock)) to supply Glaslough WRZ and new WTP.									0	0	-14
SAB-130	Increase existing GW abstraction from spring and supply deficit at Kinlough Tullaghan WRZ, upgrade Glenade WTP									2	0	-19
SAB-136	New GW abstraction (Aughnacloy GWB									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
	(productive fissured berock)) to supply deficit at Gowna WRZ.											
SAB-173	Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.									1	0	-7
SAB-186	New GW abstraction (Ballyshannon East GWB (poorly productive bedrock)) to supply Derrykillew WRZ.									0	0	-15
SAE-056	Increase existing GW abstraction to supply deficit at Kingscourt PWS WRZ,and upgradeLisanisky WTP									1	1	-12
SAE-057	Increase existing GW abstraction to supply									1	1	-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
	deficit at Kingscourt PWS WRZ,and upgradeLisanisky WTP											

Table A.2 Fine Screening Summary of Groundwater and Interconnection Options SAB

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
SAB-028	Increase GW asbtraction (Newtown-Ballyconnell GWB (karstic)) from Ballyconnell existing									1	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
	boreholes to supply deficit.											
SAB-035	Interconnect Ballyconnell WRZ and Bawnboy WRZ and supply deficit from Bawnboy.									1	0	-9
SAB-050	Interconnect Swanlinbar WRZ and Bawnboy WRZ and supply deficit from Bawnboy.									1	0	-9
SAB-073	Interconnect Shercock and Kingscourt WRZs and supply deficit from Kingscourt.									1	1	-12
SAB-102	Interconnect Smithboro and Monaghan for increased resilience and supply deficit from Monaghan WRZ									1	1	-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
	(increase GW abstraction) via Three Mile House connection.											

Table A.3 Fine Screening Summary of Groundwater and Rationalisation Options SAB

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
SAB-024	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.									1	1	-19
SAB-040	Rationalise Killeshandra WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.									1	1	-18
SAB-041	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.									1	1	-19
SAB-047	Rationalise Swanlinbar WRZ to Bawnboy WRZ.									1	1	-9

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
SAB-048	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.									1	1	-19
SAB-049	Rationalise Killeshandra WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.									1	1	-18
SAB-074	Rationalise Shercock to Kingscourt WRZ.									1	1	-12
SAB-083	Rationalise Killeshandra WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.									1	1	-18
SAB-100	Increase GW abstraction (productive fissured									1	1	-8

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
	bedrock) from existing boreholes to supply deficit at Smithboro WRZ											
SAB-101	Rationalise Smithboro to Monaghan WRZ (increase GW abstraction) via Three Mile House connection.									1	1	-10
SAB-122	Rationalise Emyvale to Monaghan WRZ.									1	1	-12
SAB-126	Rationalise Glaslough to Monaghan WRZ.									1	1	-12
SAB-209	Rationalise Emyvale to Monaghan WRZ.									1	0	-12
SAB-210	Rationalise Glaslough to Monaghan WRZ.									1	0	-12

Table A.4 Fine Screening Summary of Group Water Scheme Options SAB

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
SAB-067	Keep supplying Ballyhaise WRZ from Annagh GWS									0	0	0
SAB-072	Keep supplying Shercock WRZ from Dhuish GWS.									1	0	-8
SAB-077	Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring).									0	0	0
SAB-078	Keep supplying Blacklion WRZ from Gowlan GWS (Garvagh Lough).									0	0	0
SAB-084	Keep supplying Gowna WRZ from Erne Valley GWS.									0	0	0

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
SAB-115	Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.									0	0	0
SAB-123	Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.									0	0	0

Table A.5 Fine Screening Summary of Group Water Scheme and Interconnection Options SAB

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
SAB-104	Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.									0	0	-4
SAB-207	Rationalise Smithboro WRZ to Stranoodan GWS and supply deficit from GWS. Increase in WTP capacity required									0	1	-8
SAB-208	Rationalise Newbliss WRZ to Stranoodan GWS and supply deficit from GWS. Increase in WTP capacity required									0	1	-8

Table A.6 Fine Screening Summary of Surface Water Options SAB

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
SAB-001	Increase existing SW abstraction from Lough Acanon Dam and supply deficit to Cavan, upgrade Knockataggart WTP									1	0	-11
SAB-004	Increase existing SW abstraction from Lough Acanon Dam. Raise the									2	0	-22

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
	dam and supply deficit to Cavan											
SAB-005	Increase existing SW abstraction from Lough Acanon Dam. Raise the dam and supply deficit to Cavan									2	1	-23
SAB-006	Increase existing SW abstraction from Lough Acanon Dam. Raise the dam and supply deficit to Cavan									2	0	-20
SAB-007	Increase existing SW abstraction from Lough Acanon Dam. Raise the dam and supply deficit to Cavan									2	0	-22
SAB-008	New SW abstraction from Lough Oughter to supply									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
	deficit Cavan RWSS, upgrade Knockataggart WTP											
SAB-017	Increase existing SW abstraction from River Erne and upgrade Belturbet WTP to supply deficit									0	1	-12
SAB-031	New SW abstraction from Lough Cullinaghan to supply deficit. New WTP.									0	0	-14
SAB-044	New SW abstraction from River Swanlinbar. New WTP and abandon existing spring source.									0	0	-15
SAB-053	Upgrade Lismean WTP for water quality improvements. Ballyjamesduff RWSS is									1	0	-10

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
	not in deficit and supply spare capacity to Cavan RWSS.											
SAB-057	New SW abstraction from Lough Sheelin. Abandon existing Lough Nadreegeel source.									0	0	-19
SAB-059	New SW abstraction from Lough Drumore to supply deficit. Treat at the existing Kilawaun WTP.									0	0	-20
SAB-060	New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.									1	0	-25
SAB-063	New SW abstraction from Annalee River.									0	0	-19
SAB-068	New SW abstraction from Annalee River.									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
SAB-076	New SW abstraction from Lough Sillan and new WTP									0	0	-12
SAB-091	New SW abstraction from River Finn, upgrade Carnroe WTP and supply deficit at Clones WRZ									0	0	-16
SAB-092	New SW abstraction from River Finn to supply deficit at Clones WRZ									0	0	-15
SAB-120	New SW abstraction from Mountain River.									1	0	-18
SAB-125	New SW abstraction from Glaslough lake									1	0	-20
SAB-133	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump									0	0	-9

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
	Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.											
SAB-134	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.									0	1	-9

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
SAB-135	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.									0	1	-10
SAB-157	New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River									0	1	-9

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
	Erne/Kathleen Falls-ESB Dam).											
SAB-163	Increase existing SW abstraction from Lough Melvin (existing abstraction limitations) (Bundoran (Lough Melvin) WTP).									0	1	-15
SAB-174	New SW abstraction from Sessiaghkeelta River to supply deficit. Treat at existing WTP (upgrade).									0	0	-14
SAB-202	New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP									0	0	-15
SAB-204	Upgrade Lismean WTP for water quality improvements.									1	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
	Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.											

Table A.7 Fine Screening Summary of Surface Water and Interconnection Options SAB

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
SAB-011	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS.									1	0	-10
SAB-012	New regional scheme including Cavan RWSS, Ballyjamesduff and Bailieboro WRZ (Lough Ramor source).									0	0	-17
SAB-054	New regional scheme including Cavan RWSS, Ballyjamesduff and Bailieboro WRZ (Lough Ramor source). Interconnect between Ballyjamesduff, Cavan and Bailieboro.									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
SAB-137	Interconnect Gowna WRZ and Longford Central WRZs and supply deficit from Longford Central.									0	0	-7
SAB-141	Interconnect Gowna with South Leitrim WRZs and supply deficit from South Leitrim WRZ.									0	0	-7
SAB-203	Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS.									1	0	-12
SAB-205	Interconnect Ballyhaise and Ballyjamesduff WRZs. Supply spare capacity									1	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
	from Ballyjamesduff RWSS to Cavan RWSS.											

Table A.8 Fine Screening Summary of Surface Water and Rationalisation Options SAB

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
SAB-013	New regional scheme including Cavan RWSS, Ballyjamesduff and Bailieboro WRZ (Lough Ramor source).									1	0	-20

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
SAB-015	Rationalise Cavan to Ballyjamesduff WRZ (new SW abstraction from Lough Sheelin).									0	0	-19
SAB-021	Rationalise Belturbet to Cavan WRZ for increased resilience.									2	0	-22
SAB-055	New regional scheme including Cavan RWSS, Ballyjamesduff and Bailieboro WRZ (Lough Ramor source).									1	0	-20
SAB-061	Rationalise Cootehill to Cavan Regional WRZ.									2	1	-23
SAB-062	Rationalise Cootehill to Lough Egish WRZ.									0	0	-13
SAB-070	Rationalise Ballyhaise to Cavan regional WRZ.									0	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
	Interconnect Cavan and Ballyjamesduff WRZs and supply deficit from Ballyjamesduff (new SW abstraction from Lough Sheelin).											
SAB-071	Rationalise Ballyhaise to Cavan WRZ.									2	0	-20
SAB-075	Rationalise Shercock to Lough Egish WRZ.									0	1	-10
SAB-082	Rationalise Arvagh to Gowna WRZ.									0	1	-9
SAB-085	Rationalise Gowna (GWS Import) to Gowna WRZ.									0	1	-10
SAB-089	Rationalise Clones to Belturbet WRZ.									0	1	-12
SAB-090	Rationalise Clones to Cavan WRZ.									2	0	-22

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
SAB-096	Rationalise Newbliss WRZ to Clones WRZ for increased resilience (River Finn source).									0	0	-16
SAB-132	Rationalise Kinlough Tullaghan to Ballyshannon/Bundoran WRZ (Bundoran Urban WSZ - Lough Melvin source).									0	1	-15
SAB-142	Rationalise Gowna to Granard WRZ.									0	1	-11
SAB-170	Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)									0	2	-4
SAB-180	Rationalise Pettigo Pub to Donegal Eske WRZ.									0	1	-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
SAB-185	Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).									0	1	-9
SAB-212	Rationalise Pettigo Pub to Ballyshannon WRZ (River Erne) via Cashilard									0	0	-13

Table A.9 Fine Screening Summary of WTP Upgrade Options SAB

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
SAB-036	Upgrade Bawnboy WTP for water quality improvements. Bawnboy WRZ is not in deficit.									1	0	-5
SAB-051	Upgrade Lismean WTP for water quality improvements. Ballyjamesduff WRZ is not in deficit.									1	0	-6
SAB-106	Upgrade existing WTP for water quality improvements. Monaghan WRZ is not in deficit and supply spare capacity to Smithboro WRZ.									1	0	-10
SAB-107	Upgrade WTP existing for water quality									1	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
	improvements. Monaghan WRZ is not in deficit and supply spare capacity to Smithboro WRZ.											
SAB-108	Upgrade existing WTP for water quality improvements. Monaghan WRZ is not in deficit and supply spare capacity to Enyvale WRZ.									1	1	-14
SAB-109	Upgrade existing WTP for water quality improvements. Monaghan WRZ is not in deficit and supply spare capacity to Glaslough WRZ.									1	1	-14

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
SAB-127	Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.									0	0	-5
SAB-128	Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit and supply spare capacity to Cootehill PWS.									0	0	-13
SAB-129	Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit and supply spare capacity to Shercock PWS.									0	1	-10

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
SAB-187	Upgrade Belturbet WTP for water quality improvements. Belturbet PWS WRZ is not in deficit.									0	0	-4
SAB-188	Upgrade Swanlinbar WTP for water quality improvements. Swanlinbar PWS WRZ is not in deficit.									0	0	-2
SAB-189	Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.									1	0	-5
SAB-190	Upgrade Togan (Lake) WTP for water quality improvements.									0	0	-2

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
	Monaghan WRZ is not in deficit.											
SAB-191	Upgrade Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.									1	0	-7
SAB-192	Upgrade Cashilard WTP for water quality improvements. Cashilard WRZ is not in deficit.									1	0	-6
SAB-211	Upgrade existing WTPs for water quality improvements. Monaghan WRZ is not in deficit.									1	0	-13

Table A.10 Fine Screening Summary of Northern Ireland Imports SAB

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
SAB-079	Import water from Norther Ireland (NI) Water.									0	0	-8
SAB-179	Continue to import water from NI Water.									0	0	-7

Appendix B SA Approaches for SAB

Note: SA Options are also referred to as Group Options

WRZ	Preferred Approach - SA Approach 2		Least Cost - SA Approach 2		Best Environmental - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
0200SC0014: Cavan RWSS	SAB-011 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1	SAB-011 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1	SAB-011 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1
0200SC0016: Belturbet PWS	SAB-024 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	SAB-024 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	SAB-024 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0011: Ballyconnell PWS	SAB-029 Increase GW asbtraction from existing boreholes to supply deficit.	38	SAB-029 Increase GW asbtraction from existing boreholes to supply deficit.	38	SAB-029 Increase GW asbtraction from existing boreholes to supply deficit.	38

WRZ	Preferred Approach - SA Approach 2		Least Cost - SA Approach 2		Best Environmental - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
	Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.		Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.		Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	
0200SC0013: Bawnboy PWS	Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0019: Swanlinbar PWS	SAB-048 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	SAB-048 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	SAB-048 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0012: Ballyjamesduff RWSS	SAB-053 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS.	1	SAB-053 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS.	1	SAB-053 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS.	1

WRZ	Preferred Approach - SA Approach 2		Least Cost - SA Approach 2		Best Environmental - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
	0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.		0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.		0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	
0200SC0017: Cootehill PWS	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-
0200SC0008: Ballyhaise PWS (GWS Import)	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-
0200SC0006: Shercock PWS (GWS Import)	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-
0200SC0002: Blacklion PWS (GWS Import)	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-
0200SC0004: Gowna (GWS Import)	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-

WRZ	Preferred Approach - SA Approach 2		Least Cost - SA Approach 2		Best Environmental - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2400SC0003: Clones	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-
2400SC0004: Newbliss	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-
2400SC0010: Smithboro	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-
2400SC0011: Monaghan	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-
2400SC0008: Emyvale (GWS Import)	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-

WRZ	Preferred Approach - SA Approach 2		Least Cost - SA Approach 2		Best Environmental - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2400SC0005: Glaslough (GWS Import)	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-
2400SC0002: Lough Egish	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-
1700SC0004: Kinlough Tullaghan	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-
2000SC0004: Gowna	SAB-133 Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	-	SAB-133 Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	-	SAB-133 Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	-

WRZ	Preferred Approach - SA Approach 2		Least Cost - SA Approach 2		Best Environmental - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
0600SC0041: Cashilard	SAB-170 Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	49	SAB-170 Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	49	SAB-170 Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	49
0600SC0011: Pettigo Pub	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-
N/A: Derrykillew	SAB-185 and SAB-157 New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).	35	SAB-185 and SAB-157 New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).	35	SAB-185 and SAB-157 New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).	35

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 2		Lowest Carbon - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
0200SC0014: Cavan RWSS	SAB-001 Increase existing SW abstraction from Lough Acanon Dam and supply deficit to Cavan, upgrade Knockataggart WTP.	-	SAB-011 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1	SAB-011 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1
0200SC0016: Belturbet PWS	SAB-187 Upgrade Belturbet WTP for water quality improvements. Belturbet PWS WRZ is not in deficit.	-	SAB-024 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	SAB-024 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0011: Ballyconnell PWS	SAB-027 Increase GW abstraction (Newtown-Ballyconnell GWB (karstic)) from existing boreholes to supply deficit at Ballyconnell PWS	-	SAB-029 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to	38	SAB-029 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to	38

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 2		Lowest Carbon - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
			Ballyconnell WRZ and create a new regional scheme.		Ballyconnell WRZ and create a new regional scheme.	
0200SC0013: Bawnboy PWS	SAB-036 Upgrade Bawnboy WTP for water quality improvements. Bawnboy WRZ is not in deficit.	-	Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0019: Swanlinbar PWS	SAB-188 Upgrade Swanlinbar WTP for water quality improvements. Swanlinbar PWS WRZ is not in deficit.	-	SAB-048 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38	SAB-048 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0012: Ballyjamesduff RWSS	SAB-051 Upgrade Lismean WTP for water quality improvements. Ballyjamesduff WRZ is not in deficit.	-	SAB-053 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in	1	SAB-053 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in	1

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 2		Lowest Carbon - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
			deficit and supply spare capacity to Cavan RWSS.		deficit and supply spare capacity to Cavan RWSS.	
0200SC0017: Cootehill PWS	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-
0200SC0008: Ballyhaise PWS (GWS Import)	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-
0200SC0006: Shercock PWS (GWS Import)	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-
0200SC0002: Blacklion PWS (GWS Import)	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-
0200SC0004: Gowna (GWS Import)	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 2		Lowest Carbon - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2400SC0003: Clones	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-
2400SC0004: Newbliss	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-
2400SC0010: Smithboro	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-
2400SC0011: Monaghan	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-
2400SC0008: Emyvale (GWS Import)	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 2		Lowest Carbon - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
2400SC0005: Glaslough (GWS Import)	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-
2400SC0002: Lough Egish	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-
1700SC0004: Kinlough Tullaghan	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-
2000SC0004: Gowna	SAB-133 Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	-	SAB-133 Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	-	SAB-133 Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	-

WRZ	Quickest Delivery - SA Approach 1		Most Resilient - SA Approach 2		Lowest Carbon - SA Approach 2	
	Option Description	SA Option	Option Description	SA Option	Option Description	SA Option
0600SC0041: Cashilard	SAB-192 Upgrade Cashilard WTP for water quality improvements. Cashilard WRZ is not in deficit.	-	SAB-170 Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	49	SAB-170 Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	49
0600SC0011: Pettigo Pub	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-
N/A: Derrykillew	SAB-186 New GW abstraction (Ballyshannon East GWB (poorly productive bedrock)) to supply Derrykillew WRZ.	-	SAB-185 and SAB-157 New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).	35	SAB-185 and SAB-157 New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).	35

WRZ	Best Appropriate Assessment - SA Approach 3	
	Option Description	SA Option
0200SC0014: Cavan RWSS	SAB-011 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1
0200SC0016: Belturbet PWS	SAB-024 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0011: Ballyconnell PWS	SAB-029 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0013: Bawnboy PWS	Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38
0200SC0019: Swanlinbar PWS	SAB-048 Increase GW asbtraction from existing boreholes to supply deficit. Rationalise Belturbet WRZ, Swanlinbar and Bawnboy to Ballyconnell WRZ and create a new regional scheme.	38

WRZ	Best Appropriate Assessment - SA Approach 3	
	Option Description	SA Option
0200SC0012: Ballyjamesduff RWSS	SAB-053 Interconnect Cavan and Ballyjamesduff WRZs. Supply spare capacity from Ballyjamesduff RWSS to Cavan RWSS. 0200SC0012 - Upgrade WTP for water quality improvements. Ballyjamesduff RWSS is not in deficit and supply spare capacity to Cavan RWSS.	1
0200SC0017: Cootehill PWS	SAB-060 New SW abstraction from River Drumore to supply deficit. Treat at the existing Kilawaun WTP.	-
0200SC0008: Ballyhaise PWS (GWS Import)	SAB-067 Keep supplying Ballyhaise WRZfrom Annagh GWS.	-
0200SC0006: Shercock PWS (GWS Import)	SAB-072 Keep supplying Shercock WRZ from Dhuish GWS.	-
0200SC0002: Blacklion PWS (GWS Import)	SAB-077 and SAB-078 Keep supplying Blacklion WRZ from Gowlan GWS (Cuilcagh Mountain Spring and Garvagh Lough).	-
0200SC0004: Gowna (GWS Import)	SAB-084 Keep supplying Gowna WRZ from Erne Valley GWS.	-
2400SC0003: Clones	SAB-086 Increase GW abstraction (productive fissured bedrock) from existing boreholes to supply deficit at Clones WRZ	-

WRZ	Best Appropriate Assessment - SA Approach 3	
	Option Description	SA Option
2400SC0004: Newbliss	SAB-189 Upgrade Newbliss WTP for water quality improvements. Newbliss WRZ is not in deficit.	-
2400SC0010: Smithboro	SAB-104 Interconnect Smithboro WRZ and Stranoodan GWS and supply deficit from GWS.	-
2400SC0011: Monaghan	SAB-190 and SAB-191 Upgrade Togan (Lake) WTP and Crosses WTP for water quality improvements. Monaghan WRZ is not in deficit.	-
2400SC0008: Emyvale (GWS Import)	SAB-115 Keep supplying Emyvale WRZ from Glaslough and Tyholland GWS.	-
2400SC0005: Glaslough (GWS Import)	SAB-123 Keep supplying Glaslough WRZ from Glaslough and Tyholland GWS.	-
2400SC0002: Lough Egish	SAB-127 Upgrade Kilkitt WTP for water quality improvements. Lough Egish WRZ is not in deficit.	-
1700SC0004: Kinlough Tullaghan	SAB-202 New SW abstraction from Glenade Lough and upgrade of existing Glenade WTP	-
2000SC0004: Gowna	SAB-133	-

WRZ	Best Appropriate Assessment - SA Approach 3	
	Option Description	SA Option
	Replace rising main connecting raw water pump station and WTP at Lough Gowna (Cornadrung Pump Station), namely flooding of pump station, lack of control (raw water pumps control flow through plant) and increase SW abstraction to supply deficit.	
0600SC0041: Cashilard	SAB-170 Rationalise Cashilard to Ballymagoarty (part of Ballyshannon/Bundoran WRZ)	49
0600SC0011: Pettigo Pub	SAB-173 Increase GW abstraction from existing BHs to supply deficit at Pettigo Pub WRZ.	-
N/A: Derrykillew	SAB-185 and SAB-157 New SW abstraction from Assaroe Lake and new WTP (Planning Permission granted for new abstraction and WTP at Knaddar, Ballyshannon on River Erne/Kathleen Falls-ESB Dam). Rationalise Derrykillew to Ballyshannon WRZ (Assaroe lake source).	35