Winter 2023

Regional Water Resources Plan South East

Appendix **1** Study Area **K** Technical Report

Tionscadal Éireann Project Ireland 2040

Data disclaimer:

This document uses best available data at time of writing. Some sources may have been updated in the interim period. 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.

Baseline data included in the RWRP-SE 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 will be detailed in the relevant sections of the RWRP-SE. 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 – Study Area K

This is the Technical Report for Study Area K which applies the Options Assessment Methodology, as set out in the National Water Resources Plan - Framework Plan (NWRP-FP), the final version of which was reviewed by the authors of this Technical Report Prior to finalisation of this Technical Report. This document should be reviewed in conjunction with Framework Plan and the Regional Water Resources Plan – South East (RWRP-SE), which explain key concepts and terminology used throughout the report.

This Study Area includes 75 water resource zones (WRZs) of which 3 are in County Kilkenny, 6 are in County Limerick, 24 of which are in County Tipperary and 42 in County Waterford. This Technical Report includes:

- The summary of Identified Need in this Study Area including Quality, Quantity, Reliability and Sustainability;
- Options considered within the Study Area;
- The range of approaches to resolve Identified Need;
- Development of an Outline Preferred Approach for the Study Area; and
- The adaptability of our Preferred Approach.

The Preferred Approach for this Study Area feeds into the regional Preferred Approach detailed in the RWRP-SE.

1.1 Summary of Our Options Assessment Methodology

In Chapter 8 of the Framework Plan, we described the Option Assessment Methodology that will be used to develop a national programme of proposed solutions for all of our water supplies. The objective of these solutions is to resolve the needs identified through the Supply Demand Balance (SDB), Water Quality, Reliability and Sustainability assessments. These needs will be discussed in further detail in this report. In the RWRP-SE, we apply this methodology to the South East Region shown in Figure 1.1.

As outlined in Section 1.9.4 of the Framework Plan, the regional boundaries have been delineated for the purpose of delivering the National Water Resources Plan. As a National Plan, sources outside the delivery region may be considered to meet need within a particular region.

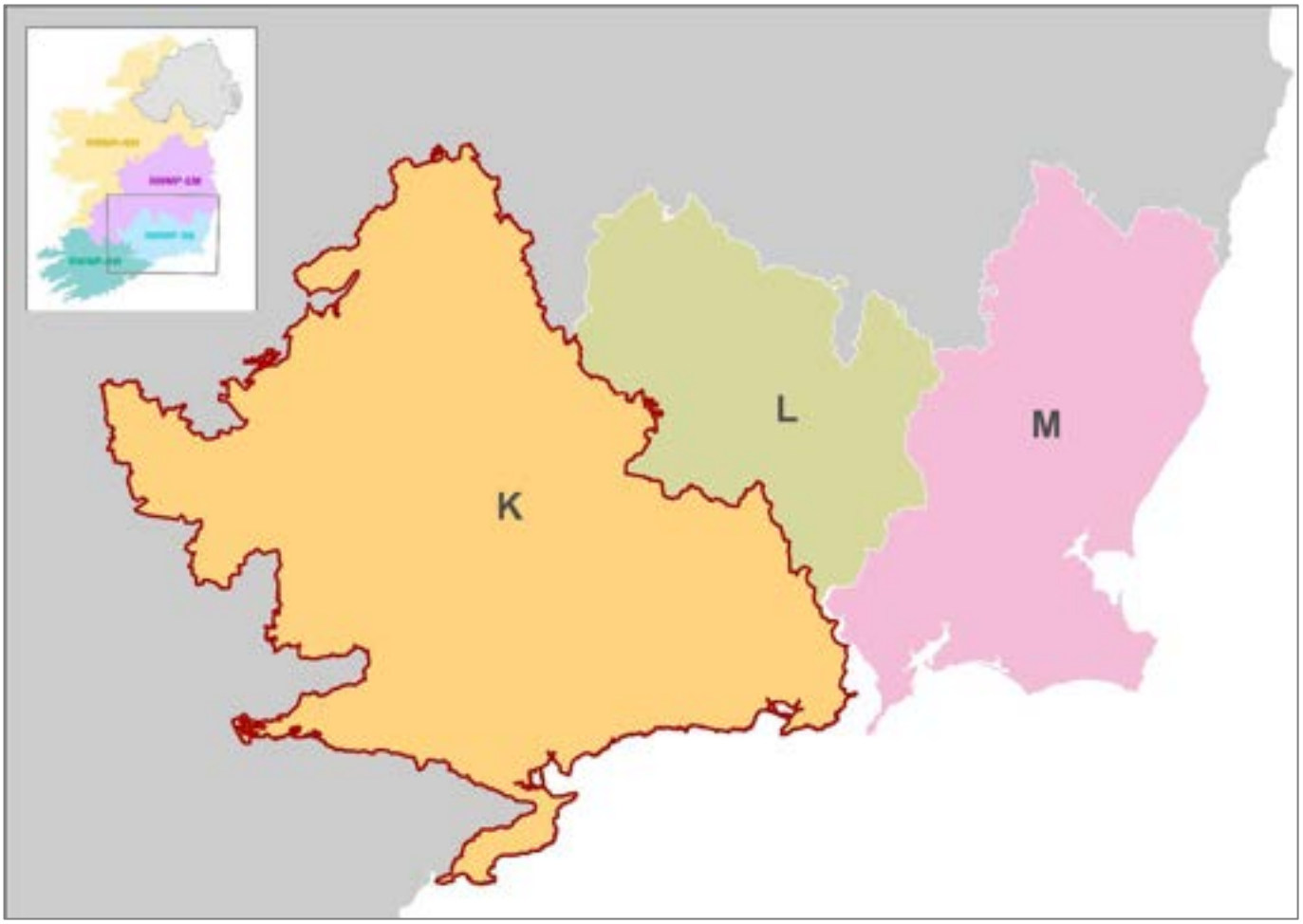

Figure 1.1 Overview of Study Areas within the South East Region.

This Technical Report is for Study Area K (SAK), which consists of 75 individual water resource zones (WRZs). Within this Study Area, the Preferred Approach has been developed following the process shown in Figure 1.2 and as outlined in Section 8.3 of the Framework Plan.

In this document, Option codes are labelled using the following naming convention: SAX-00X

- SAX refers to the Study Area within which the option is located.
- 00X refers to the individual option number.
- Any references to TG3 refers the South East Region (Regional Group 3).

It should be noted that assessments and preferred approaches and solutions at this stage are at a plan level. Environmental impacts and costing of projects are further reviewed at project level. No statutory consent or funding consent is conferred by inclusion in the national plan. Any projects that are progressed following this plan will require individual environmental assessments, including Environmental Impact Assessment and Appropriate Assessment (as required), in support of planning applications (where a project requires planning permission) or in support of licencing applications (for example, for new abstractions). Any such applications will also be subject to public consultation.

Figure 1.2 Option Assessment Methodology Process

1.2 Introduction to the Study Area

Study Area K consists of 75 WRZs supplying a population of approximately 214,979 people via approximately 3,891 kilometres of distribution network. The majority of the Study Area is split between County Tipperary and Waterford, with some schemes extending into County Kilkenny and Limerick. The city of Waterford is the largest demand centre in the region, with other notable towns including Clonmel, Tipperary, Tramore, Dungarvan and Thurles. The current sources of water supply for the region consist of 26 surface water abstractions and 84 groundwater abstraction sites. The Study Area's water treatment plants (WTPs) and their associated source type are summarised in Figure 1.3. and Table 1.1.

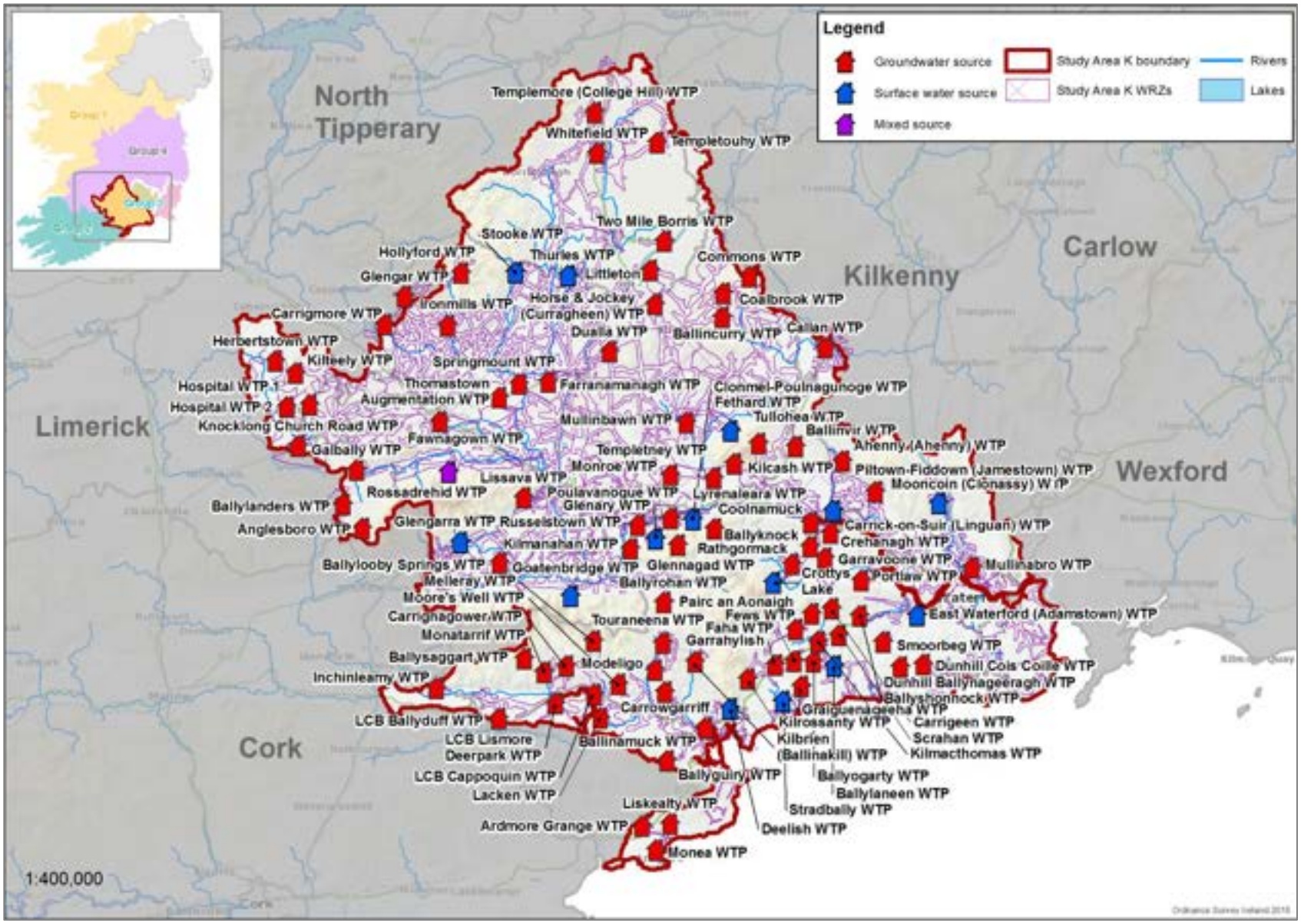

Figure 1.3 SAK Water Supply Study Area

Regarding surface water availability, most of SAK is within the large River Suir catchment, with small parts of the Study Area crossing into the coastal Colligan-Mahon catchment and the River Blackwater catchment. The River Suir is one the largest rivers in Ireland, with a total catchment area of 3,542 km^2, rising on the slopes of the Devil's Bit Mountain before draining large parts of County Tipperary as it flows south through wide karstified limestone plains. The Suir then turns sharply east to form the border with County Waterford, flowing through Clonmel before turning tidal at Carrick-on-Suir, joining the Nore and Barrow Rivers east of Waterford City, before finally entering the sea at Waterford Harbour. The River Suir is designated as the Lower River Suir Special Area of Conservation (SAC), and one of its tributaries, the Clodiagh River (Portlaw), is also designated for *Margaritifera* (Freshwater Pearl Mussel) SAC catchment.

Currently around 60% of the water supplies to SAK come from surface water sources, with most of these abstractions being from the River Suir system. The East Waterford WRZ, by far the largest WRZ in SAK, has 3 no. large surface water abstractions feeding the Adamstown WTP near Waterford City to deliver up to 58,000 m^3/day: 2 no. river sources, Clodiagh (Portlaw) and Mahon Rivers, and the Ballyshonnock Impounding Reservoir source. Other notable surface water sources in SAK include an abstraction from Clodiagh River (Tipperary), near the top of the Suir catchment, feeding Thurles WTP to supply up to 11,460 m^3/day Thurles / Borrisoleigh WRZ. Elsewhere in the Study Area, there are many abstractions from smaller upland river and stream sources. These include the Muskry and College Streams sources which are combined with groundwater to feed Rossadrehid WTP to supply up to 13,000 m^3/day to Galtee Regional WRZ. The Ahernes Glen and Glenbreda Streams feed Goatenbridge WTP to supply up to 11,336 m^3/day to Ardfinnan Regional WRZ. Whilst the Gurtnapisha, Walshbog and Cloran Streams are combined with an abstraction from the Anner River to feed Fethard WRZ to supply up to 6,500 m^3/day to Fethard & Mullenbawn Regional PWS WRZ.

Overall, 84 groundwater schemes are managed by Uisce Éireann in the region. The predominant aquifer type of the area is made up of poorly productive bedrock (60%), followed by karstic (28%) and productive fissured (12%). There are extensive swathes of regionally important karst aquifer present in the Suir catchment/south Tipperary, which could offer potential for groundwater development. Similar feasible, but challenging, prospects exist in Waterford with an extensive body of productive fissured bedrock (Rf) stretching from Wexford in the north east to Stradbally on the coast of Waterford.

Devonian Old Red Sandstone (ORS) consist mainly of coarse and fine sandstones, siltstones, shales, and conglomerates, and along with the Dinantian Lower Impure Limestones, make up the dominant bedrock geology in SAK. The limestones are often characterised by the occurrence of chert and shale bands and are generally less productive than the Pure Bedded Limestones. These sandstones are predominantly of a poorly productive bedrock flow regime and assumed to be generally devoid of intergranular permeability, with groundwater flow occurring predominantly through fractures and faults. Most groundwater flow occurs in the top 15-20 metres of the aquifer, with levels generally mirroring topography, although deeper flows along fault zones or connected fractures are encountered which can provide much higher yields. Significant flows can be found at springs issuing from bedding planes marking a change in lithology. However, since the yield often depends on the permeability developed in the uppermost few metres of broken and weathered rock, yields will often decrease markedly in dry spells as the water table falls, and these supplies may therefore be unreliable. Much of western and central Waterford, as well as parts of western Tipperary, is characterised by a larger proportion of ORS bedrock resulting in lower groundwater potential in these areas.

There are extensive swathes of regionally important karst aquifer in some areas, particularly in southern Tipperary. The distribution of permeability and yield is more homogenous where the development of karst has resulted in a more diffuse network of flow pathways. This provides a slightly more reliable flow regime than conduit dominated aquifers, however these karstic environments are still prone to pollution from point sources such as septic tanks, disposal sites and land spreading. A number of large abstractions take place from these pure bedded limestones, namely Mullenbawn spring (650 – 2,200 m^3/day) and

Monroe/Caherclough Borehole (c. 1,000 m^3/day) in South Tipperary. The regionally important aquifers are generally smaller in extent in this part of the country and are banded by locally important ORS.

An extensive body of productive fissured bedrock, made up primarily of volcanics, stretches along southern Waterford to Stradbally at the coast. The most productive yields are sourced from the well-developed fissures in the felsic Rhyolites and Andesites, which appear to decrease the further south west one moves from Gorey in Wexford. Lower permeabilities and yields can be more common here, with intrusive rocks forming a barrier to groundwater flow. The potential for productive wells becomes less frequent in Co. Waterford due to the greater proportion of intrusive rocks (dykes and sills). Although covering a less extensive area than the Ordovician Volcanics, the Devonian Kiltorcan Sandstones form a Regionally Important Fissured aquifer and can be found along the base of the Galtee Mountains, while also extending in a narrow band through Waterford, Tipperary to Kilkenny. This type of bedrock has shown to be able to provide good yields (c. 700 m^3/day at Cappoquin), where permeability depends on fractures and fissures. The cleaner sandstones are likely to have a denser network of fracturing and fracture permeability in the shalier sandstones.

Table 1.1Study Area K

Name	Total Population	214,979	Total Network Length (km)	3,891	Number of Water Resource Zones	75
Counties in Study Area	Kilkenny, Limerick, Tipperary, Waterford					
Principle Settlements	Clonmel, Dungarvan, Carrick-on-Suir, Cashel, Cahir, Dunmore East, Killenaule, Ardfinnan, Callan, Kilmacow, Fethard, Ballyclerahan, Hospital, Ballinroad, Holycross, Kilsheelan, Bansha, Ballynonty, Gortnahoo					
Number of Water Sources	110	Surface Water Sources	26		Groundwater Sources	84

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Ardmore Grange WTP	Groundwater	203	150	●	●	●	○
East Waterford (Adamstown)WTP	Ballyshonnock Impoundment, Mahon River, Clodagh River	64,243	58,000	●	○	○	●
Monatarrif WTP	Groundwater	13	120	●	●	○	○
Lacken WTP	Groundwater	69	36	●	◐	○	○
Pairc an Aonaigh WTP	Groundwater	61	20	●	●	○	○
LCB Lismore Deerpark WTP	Groundwater	1,687	864	●	●	○	○
Dunhill Ballynageeragh WTP	Groundwater	44	14	●	○	○	○
Melleray WTP	Groundwater	180	654	○	○	○	○
Moore's Well WTP	Groundwater	91	80	●	●	○	●

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Liskealty WTP	Groundwater	5	44	●	○	○	○
Glenagad WTP	Groundwater	57	40	●	○	○	○
Modeligo WTP	Groundwater	192	120	●	○	○	○
Lyrenaleara WTP	Groundwater	40	40	●	○	○	○
LCB Ballyduff WTP	Groundwater	447	136	○	●	○	○
Crehanagh WTP	Groundwater	17	10	●	●	○	○
Ballylaneen WTP	Ballylaneen	829	500	●	○	●	○
Kilbrien (Ballinakill) WTP	Groundwater	88	60	●	○	○	○
Touraneena WTP	Groundwater	349	140	●	●	○	○
Stradbally WTP	Stradbally	658	600	●	○	○	○
Smoorbeg WTP	Groundwater	65	20	●	●	○	●
Scrahan WTP	Groundwater	24	327	●	○	○	○
Russelstown WTP	Groundwater	28	45	●	○	○	○
Rathgormack WTP	Groundwater	502	222	○	○	○	○
Poulavanogue WTP	Groundwater	100	110	●	●	○	●

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Portlaw WTP	Groundwater	1,608	500	●	●	●	●
LCB Cappoquin WTP	Groundwater	1,452	687	○	●	○	○
Kilrossanty WTP	Groundwater	366	140	●	●	●	●
Kilmanahan WTP	Groundwater	39	55	TBC	○	○	○
Kilmacthomas WTP	Groundwater	295	160	●	●	○	○
Inchinleamy WTP	Groundwater	25	90	○	○	○	○
Graiguenageeha WTP	Groundwater	42	15	●	●	●	○
Garravoone WTP	Groundwater	37	90	●	○	○	○
Garrahylish WTP	Groundwater	3	6	●	○	○	○
Fews WTP	Groundwater	185	90	●	○	●	○
Faha WTP	Groundwater	66	50	●	●	○	●
Dunhill Cois Coille WTP	Groundwater	145	25	●	●	○	●
Ballinamuck WTP	Groundwater	12,034	9,500	●	○	○	○
Carrowgarriff WTP	Groundwater	45	218	●	○	○	○
Carrignagower WTP	Groundwater	37	40	●	●	○	○

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Carrigeen WTP	Groundwater	15	40	●	○	○	○
Ballyshonnock WTP	Groundwater	34	30	●	●	○	○
Ballysaggart WTP	Groundwater	71	469	●	○	○	○
Ballyogarty WTP	Groundwater	594	234	●	●	○	●
Ballyrohan WTP	Groundwater	652	250	●	●	○	○
Ballyknock WTP	Groundwater	11	4	●	●	○	●
Ballyguiry WTP	Groundwater	101	40	●	●	○	○
Deelish WTP	Deelish Reservoir	110	998	●	○	○	○
Monea WTP	Groundwater	426	770	●	○	●	○
Springmount WTP	Groundwater	4,538	2,000	○	●	○	○
Ballylooby Springs WTP	Groundwater	1,785	1,500	●	●	○	○
Lissava WTP	Groundwater	374	319	●	●	○	○
Glengar WTP	Groundwater	512	500	●	○	○	●
Templetney WTP	Groundwater	3,884	3,600	●	●	○	○
Monroe WTP	Groundwater	4,055	2,600	○	●	○	○

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Mullinbawn WTP	Groundwater	1,689	2,400			●	
Kilcash WTP	Groundwater	218	65	●	●		
Ironmills WTP	Groundwater	2,556	3,000	●	●		
Hollyford WTP	Groundwater	236	202	●	●		●
Fethard WTP	Gurtnapisha Stream, Walshbog Stream, Cloran Stream, Anner River	6,827	6,500				●
Glenary WTP	Glenary Abstraction 2	9,466	6,840	●	●		●
Rossadrehid WTP	Muskry Stream, College Stream, Groundwater	11,654	13,000		●	●	●
Farranamanagh WTP	Groundwater	11,654	1,400	TBC	●		
Thomastown Augmentation WTP	Groundwater	11,654	1,200	TBC	●		
Tullohea WTP	Groundwater	460	331	●			
Fawnagown WTP	Groundwater	4,860	2,500		●		
Stooke WTP	Multeen River Intake	5,122	4,090	●	●		●
Commons WTP	Groundwater	446	281	●	●	●	
Coalbrook WTP	Groundwater	1,305	1,200	●	●	●	●

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Ballincurry WTP	Groundwater	1,305	364	●	●	○	○
Clonmel- Poulavanogue WTP	2x Poulavanogue, Boola River	2,398	2,500	●	●	●	●
Carrick-on-Suir (Linguan) WTP	Linguan River	3,906	1,440	●	●	○	○
Coolnamuck WTP	Groundwater	2,056	480	●	●	○	●
Crottys Lake WTP	Crottys Lake	2,056	20	●	●	●	●
Glengarra WTP	Glengarra River	1,938	2,600	○	●	○	●
Ballinvir WTP	Groundwater	23	90	●	○	○	○
Goatenbridge WTP	Ahernes Glen Stream, Glenbreda Stream	11,336	7,400	●	●	○	●
Ahenny (Ahenny) WTP	Groundwater	69	144	○	○	○	○
Dualla WTP	Groundwater	561	396	●	○	○	○
Whitefield WTP	Groundwater	528	360	●	●	○	○
Two Mile Borris WTP	Groundwater	809	330	○	○	○	○
Littleton WTP	Groundwater	492	260	●	○	○	○
Templetuohy WTP	Groundwater	834	265	●	●	○	●
Thurles WTP	River Clodiagh	8,728	11,460	○	○	○	○

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Horse & Jockey (Curragheen) WTP	Groundwater	643	327	●	○	○	○
Templemore (College Hill) WTP	Groundwater	2,699	2,200	●	○	○	○
Carrigmore WTP	Groundwater	377	100	○	●	●	○
Hospital WTP 2	Groundwater	1,150	350	●	○	○	○
Hospital WTP 1	Groundwater		300	●	○	●	○
Knocklong WTP	Groundwater	1,137	430	●	○	●	●
Knocklong Church Road WTP	Groundwater		400	●	○	●	○
Kilteely WTP	Groundwater	484	280	●	●	○	○
Herbertstown WTP	Groundwater	687	300	●	○	●	○
Galbally WTP	Groundwater	368	200	●	●	○	○
Ballylanders WTP	Groundwater	559	250	●	●	○	○
Anglesboro WTP	Groundwater	24	50	○	○	○	○
Mullinabro WTP	Groundwater	6,521	15,000	●	○	○	○
Piltown-Fiddown (Jamestown) WTP	Groundwater	3,075	1,560	●	●	●	●

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Mooncoin (Clonassy) WTP	Clonassy/Pollanasa River, River Blackwater, Mullinavat	6,150	3,800	●	●	●	●
Callan WTP	Groundwater	2,725	1,080	●	●	●	●

Score	Uisce Éireann Asset Standard Assessment	Priority
●	Low Risk	Low Priority Asset
●	Medium Risk	Priority 2 Asset
●		
●	High Risk	Priority 1 Asset

2 Scoping the Study Area

2 Scoping the Study Area

In this chapter we summarise the current and future issues with water supplies in Study Area K, in terms of water quality, quantity, reliability and sustainability.

To identify the issues and corresponding need with the water supplies in this Study Area, and to inform the nature, scale and scope of the solutions that we need to consider to meet them, we have assessed:

- The **water quality** that we can supply;
- The **water quantity** that we can supply;
- The **reliability** of our existing supplies; and
- Additional information that impacts the long-term **sustainability** of our sources or infrastructure.

2.1 Water Quality

We assess the water quality investment needs of our water supplies by assessing the performance of our assets against the barriers set out in Chapter 5 of the Framework Plan. As set out in Chapter 5 of the Framework Plan, Uisce Éireann is developing scientifically robust datasets to assign risk. Uisce Éireann are utilising the well-established 'Failure Mode Effect Analysis' which provides a step-by-step approach for identifying all possible failure modes that can result in a hazardous event. Once identified, we assess risk against the existing controls (Barriers), which we have in place for source protection within our water treatment plants and networks. This Barrier Assessment process highlights where there is a deficit or potential for future deficit in these controls or treatment process elements.

The barriers are an internal gauge and the initial desktop assessments of barrier performance for SAK are summarised in Table 2.1.

Table 2.1 Quality: Barrier Scores

Quality: Barrier Scores				
Water Treatment Plants	**Barrier 1: Bacteria & Virus**	**Barrier 2.1: Maintain chlorine Residual in the Network**	**Barrier 3 Protozoa (Crypto) Asset Potential**	**Barrier 6b THM's Leading Indicator**
Ardmore Grange WTP	●	●	●	●
East Waterford (Adamstown)WTP	●	●	●	●
Monatarrif WTP	●	●	●	●
Lacken WTP	●	●	●	●
Pairc an Aonaigh WTP	●	●	●	●
LCB Lismore Deerpark WTP	●	●	●	●
Dunhill Ballynageeragh WTP	●	●	●	●

Quality: Barrier Scores				
Water Treatment Plants	**Barrier 1: Bacteria & Virus**	**Barrier 2.1: Maintain chlorine Residual in the Network**	**Barrier 3 Protozoa (Crypto) Asset Potential**	**Barrier 6b THM's Leading Indicator**
Melleray WTP				
Moore's Well WTP				
Liskealty WTP				TBC
Glennagad WTP				
Modeligo WTP				
Lyrenaleara WTP				
LCB Ballyduff WTP				
Crehanagh WTP				TBC
Ballylaneen WTP				
Kilbrien (Ballinakill) WTP				TBC
Touraneena WTP				
Stradbally WTP				
Smoorbeg WTP				
Scrahan WTP				
Russelstown WTP				
Rathgormack WTP				
Poulavanogue WTP				
Portlaw WTP				
LCB Cappoquin WTP				
Kilrossanty WTP				
Kilmanahan WTP	TBC			
Kilmacthomas WTP				

Quality: Barrier Scores				
Water Treatment Plants	**Barrier 1: Bacteria & Virus**	**Barrier 2.1: Maintain chlorine Residual in the Network**	**Barrier 3 Protozoa (Crypto) Asset Potential**	**Barrier 6b THM's Leading Indicator**
Inchinleamy WTP	●	○	○	TBC
Graiguenageeha WTP	●	●	○	TBC
Garravoone WTP	●	●	○	TBC
Garrahylish WTP	●	●	●	TBC
Fews WTP	●	○	●	TBC
Faha WTP	●	●	○	○
Dunhill Cois Coille WTP	●	●	○	○
Ballinamuck WTP	●	○	●	○
Carrowgarriff WTP	●	●	○	TBC
Carrignagower WTP	●	●	○	TBC
Carrigeen WTP	●	●	○	TBC
Ballyshonnock WTP	●	●	○	TBC
Ballysaggart WTP	●	○	○	TBC
Ballyogarty WTP	●	●	○	○
Ballyrohan WTP	●	○	○	○
Ballyknock WTP	●	●	○	○
Ballyguiry WTP	●	●	○	TBC
Deelish WTP	●	●	●	○
Monea WTP	●	○	●	○
Springmount WTP	●	○	●	○
Ballylooby Springs WTP	●	○	○	○
Lissava WTP	●	●	○	○

Quality: Barrier Scores				
Water Treatment Plants	**Barrier 1: Bacteria & Virus**	**Barrier 2.1: Maintain chlorine Residual in the Network**	**Barrier 3 Protozoa (Crypto) Asset Potential**	**Barrier 6b THM's Leading Indicator**
Glengar WTP	●	●	●	●
Templetney WTP	●	●	●	●
Monroe WTP	●	●	●	●
Mullinbawn WTP	●	●	●	●
Kilcash WTP	●	●	●	●
Ironmills WTP	●	●	●	●
Hollyford WTP	●	●	●	●
Fethard WTP	●	●	●	●
Glenary WTP	●	●	●	●
Rossadrehid WTP	●	●	●	●
Farranamanagh WTP	TBC	TBC	TBC	TBC
Thomastown Augmentation WTP	TBC	●	●	●
Tullohea WTP	●	●	●	●
Fawnagown WTP	TBC	●	●	●
Stooke WTP	●	●	●	●
Commons WTP	●	●	●	●
Coalbrook WTP	●	●	●	●
Ballincurry WTP	●	●	●	●
Clonmel- Poulavanouge WTP	●	●	●	●
Carrick-on-Suir (Linguan) WTP	●	●	●	●
Coolnamuck WTP	●	●	●	●
Crottys Lake WTP	●	●	●	●

Quality: Barrier Scores				
Water Treatment Plants	**Barrier 1: Bacteria & Virus**	**Barrier 2.1: Maintain chlorine Residual in the Network**	**Barrier 3 Protozoa (Crypto) Asset Potential**	**Barrier 6b THM's Leading Indicator**
Glengarra WTP	●	●	●	●
Ballinvir WTP	●	●	●	●
Goatenbridge WTP	●	●	●	●
Ahenny (Ahenny) WTP	●	●	●	●
Dualla WTP	●	●	●	●
Whitefield WTP	●	●	●	●
Two Mile Borris WTP	●	●	●	●
Littleton WTP	●	●	●	●
Templetuohy WTP	●	●	●	●
Thurles WTP	TBC	●	●	●
Horse & Jockey (Curragheen) WTP	●	●	●	●
Templemore (College Hill) WTP	●	●	●	●
Carrigmore WTP	●	●	●	●
Hospital WTP 2	●	●	●	●
Hospital WTP 1	●	●	●	●
Knocklong WTP	●	●	●	●
Knocklong Church Road WTP	●	●	●	●
Kilteely WTP	●	●	●	●
Herbertstown WTP	●	●	●	●
Galbally WTP	●	●	●	●
Ballylanders WTP	●	●	●	●
Anglesboro WTP	●	●	●	●

Quality: Barrier Scores				
Water Treatment Plants	**Barrier 1: Bacteria & Virus**	**Barrier 2.1: Maintain chlorine Residual in the Network**	**Barrier 3 Protozoa (Crypto) Asset Potential**	**Barrier 6b THM's Leading Indicator**
Mullinabro WTP	●	●	●	●
Piltown-Fiddown (Jamestown) WTP	●	●	●	●
Mooncoin (Clonassy) WTP	●	●	●	●
Callan WTP	●	●	●	●

Score	Uisce Éireann Asset Standard Assessment	Priority
●	Low Risk	Low Priority Asset
●	Medium Risk	Priority 2 Asset
●		
●	High Risk	Priority 1 Asset

The colour coding within the outline assessment indicates the severity of the potential barrier deficit, and the priority in terms of addressing the identified issues. However, it should be noted that the table is not an indicator of non-compliance with the European Union (Drinking Water) Regulations 2014 as amended (Drinking Water Regulations), but an assessment of the asset capability standard compared with the asset standard set out in Section 5.7 of the Framework Plan.

Based on the barrier assessment, 80 of the 99 Water Treatment Plants in the Study Area appear to have significant deficits, particularly in relation to secondary disinfection (Barrier 2.1). However, in some cases our desktop assessments can over-estimate risk, particularly when there is little available data on the catchment characteristics of our raw water sources. As our "Source to Tap" Drinking Water Safety Plan (DWSP) assessments are developed for each water supply, the barrier scores for all of our supplies will be updated and become more reliable.

It should be noted that the "quality need" identified through the Barrier Assessment is not an indicator of compliance with the Drinking Water Regulations. It is an assessment of the need to invest in areas of our asset base (human and structural) through resource planning, to ensure that we can address potential risks or emerging risks to our supplies.

At present, there are nine (9) WRZs within SAK on the Environmental Protection Agency (EPA) Remedial Action List (RAL), South Kilkenny, Glengar, Thurles, Clonmel Poulavanogue, Galtee Regional, Kilcash, Templemore / Templetuohy, Graiguenageeha and Dungarvan.

Uisce Éireann is currently progressing immediate corrective action in advance of the NWRP for a number of supplies within SAK. A national programme to improve disinfection standards (Barrier 1) at

water treatment facilities across Ireland was initiated by Uisce Éireann in 2016. Details of the 'in progress' projects to address critical water quality requirements are included in Table 2.2.

Table 2.2 Critical Water Quality Requirements SAK

Critical Water Quality Requirements	Progress
1. **Ring-Helvic Water Supply Scheme (Dungarvan):** This project extended the Dungarvan Water Supply to the Ring Helvick area and included the construction of two new reservoirs, pumping station and over 8 kilometres of new water mains. The project was needed to provide safe and secure drinking water for businesses and residents in the Ring Helvick area. Previously, the area was served by four separate water sources, which presented deficiencies in water availability and insufficient water treatment facilities, leading to a boil water notice for certain consumers and elevated levels of Trihalomethanes (THMs) for the Ring Supply. The scheme was removed from the EPA's Remedial Action List (RAL).	**Completed**
2. **Thurles Regional Water Supply Scheme:** The works have been completed to improve water supply in Thurles and the surrounding area. Drinking water to these areas were previously supplied by eight vulnerable water sources, with limitations on capacity. The completion of a new water treatment plant at Killeenyarda, Holycross has enabled the replacement of these sources and has also included the existing network and reservoir upgrades.	**Completed**
3. **Thurles RAL proposed action:** Process optimisation of Thurles WTP required to remove THM to remove site from RAL.	**In Progress**
4. **Hospital Water Treatment Plant Upgrades:** The works has been completed to upgrade works to the water treatment plant in Hospital, East County Limerick. The completion of these works has enabled the supply to be removed from the Environmental Protection Agency's Remedial Action List (RAL). Up until now, there was inadequate treatment to prevent cryptosporidium from entering the supply.	**Completed**
5. **Callan RAL proposed action:** Installation of UV disinfection completed, and site removed from RAL.	**Completed**
6. **Piltown-Fiddown RAL proposed action:** Develop new groundwater source and Installation of UV disinfection completed, and site removed from RAL.	**Completed**
7. **Burncourt Ballylooby:** Installation of UV disinfection completed, and site removed from RAL.	**Completed**
8. **Clonmel Poulavanogue RAL proposed action:** Investigating feasibility of expanding the well field at Monroe to allow rationalisation of Clonmel Poulavanogue water treatment plant.	**In Progress**
9. **Galtee Regional RAL proposed action:** Upgrade of the water treatment plant at Rossadrehid to provide resilient water treatment facilities and thus ensure a safe drinking water supply for the Galtee RWSS.	**In Progress**
10. **Dungarvan RAL proposed action:** Construction of new water treatment plant and provision of additional treated water storage to ensure safe and secure drinking water supply for Dungarvan town and environs.	**In Progress**

Critical Water Quality Requirements	Progress
11. Kereen RAL proposed action: Source abandoned and Kereen is connected to Cappoquin PWS. Site is removed from RAL.	**Completed**
12. Kilcash RAL proposed action: It is proposed to rationalise Kilcash to Templetney/Brackford Bridge WRZ.	**In Progress**
13.Templemore / Templetuohy RAL proposed action: Installation of UV disinfection required at Templetuohy WTP to remove site from RAL.	**In Progress**
14. South Kilkenny RAL proposed action: Installation of UV disinfection required at Mullinabro WTP to remove site from RAL.	**In Progress**
15. Glengar RAL proposed action: It is proposed to rationalise Glengar to Dundrum Regional WRZ.	**In Progress**
16. Graiguenageeha RAL proposed action: It is proposed to rationalise Graiguenageeha to Stradbally WRZ in 2024.	**In Progress**
17. Adamstown WTP Upgrades of Adamstown WTP are in progress to ensure safe and secure drinking water supply for the East Waterford Water Supply Scheme, which includes Waterford City.	**In Progress**
18. Goatenbridge WTP Upgrades of Goatenbridge WTP are in progress to ensure safe and secure drinking water supply for the Ardfinnan WSS.	**In Progress**
19. Site Assessment Groundwater Programme identified for the following Water Resource Zones: • East Waterford • Lismore / Cappoquin / Ballyduff (LCB) • Ballymacarbry • Portlaw • Callan • Tipperary Town • Galtee Regional • Templemore / Templetuohy • Coalbrook / Commons • Carrick-On-Suir	**Need Identified**
20. Reservoir Cleaning Programme: A major reservoir cleaning programme has been undertaken at 42 sites, which has reduced network water quality issues.	**Complete**
21. Disinfection Programme: In 2016, Uisce Éireann completed a nationwide review of all water treatment plants where disinfection upgrades were required, followed by a programme of works to deliver the required upgrades. To date, the disinfection programme has completed upgrade works at 39 of the 78 WRZs in SAK, based on assessed priority basis. Any requirements within the remaining 39 supplies will be identified via Drinking Water Safety Plans with solutions developed as part of the NWRP.	**Complete**

Critical Water Quality Requirements	Progress
• Anglesboro WTP • Ballylanders WTP • Carrigmore WTP • Herbertstown WTP • Hospital WTP 2 • Hospital WTP 1 • Callan WTP • Mooncoin (Clonassy) WTP • Mullinabro WTP • Ballyrohan WTP • Ballysaggart WTP • Deelish WTP • Ballinamuck WTP • Dunhill Ballynageeragh WTP • Dunhill Cois Coille WTP • East Waterford (Adamstown)WTP • Faha WTP • Fews WTP • Inchinleamy WTP • Garravoone WTP • Kilbrien (Ballinakill) WTP • Kilrossanty WTP • LCB Ballyduff WTP • LCB Cappoquin WTP • Melleray WTP • Modeligo WTP • Monea WTP • Rathgormack WTP • Touraneena WTP • Stradbally WTP • Horse & Jockey (Curragheen) WTP • Ahenny (Ahenny) WTP • Ballinvir WTP • Carrick-on-Suir (Linguan) WTP • Coalbrook WTP • Commons WTP • Rossadrehid WTP • Ironmills WTP • Monroe WTP • Mullinbawn WTP • Templetney WTP • Tullohea WTP • Crottys Lake WTP • Stooke WTP	

Critical Water Quality Requirements	Progress
• Springmount WTP • Ballylooby Springs WTP	

In summary, in relation to water quality Uisce Éireann will:

- Continually update Barrier Performance issues in the WRZ which have the potential to impact on drinking water quality in the region;
- Improve these assessments through the development of DWSPs for all of our supplies;
- Address the priority risks identified on the EPA Remedial Action List (noting that steps have already been taken, and are ongoing, to address these risks); and
- All residual need (grey dots) in relation to water quality will be brought through our options assessment process.

2.2 Water Quantity – Supply Demand Balance

Uisce Éireann assess the water quantity investment needs of our supplies by developing SDB calculations for each of our water supplies as summarised in Chapter 3, 4 and 6 of the Framework Plan. The calculations are used to assess the amount of water available in our supplies and compare that to the current and forecast demand for water in accordance with Figure 2.1.

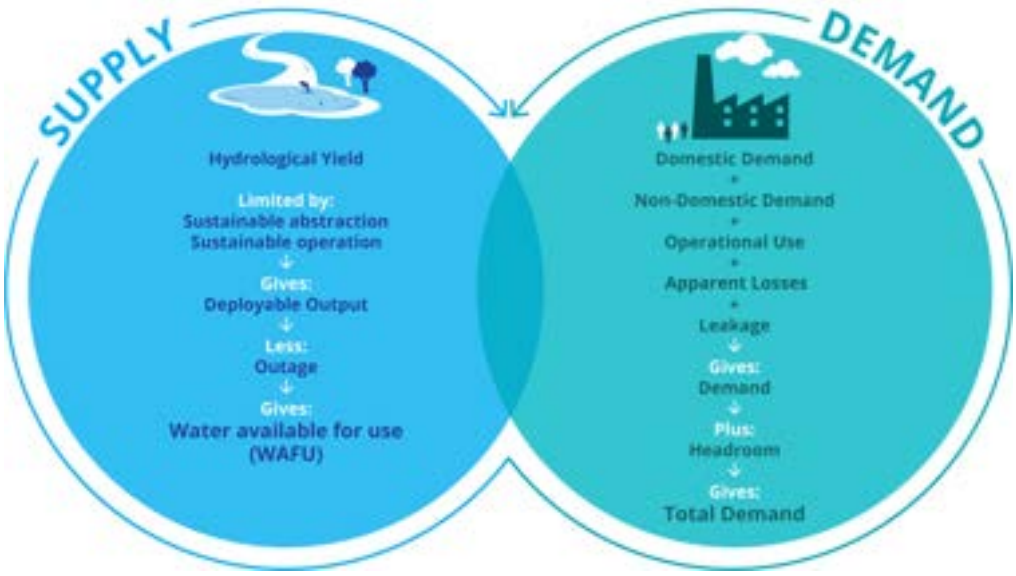

Figure 2.1 Supply Demand Balance

For each of the 75 WRZs in this Study Area, we assessed the baseline SDB and developed 25-year forecasts of supply and demand, in accordance with Figure 2.1.

The SDB assessments were carried out for each of the weather event planning scenarios (Normal Year Annual Average, Dry Year Annual Average, Dry Year Critical Period, Winter Critical Period) which described in Chapter 2 of the Framework Plan. The SDB deficits in SAK manifest in the following ways:

1. **Inappropriate standards and levels of risk for a strategic water supply**: As water supply is essential for public health, regulated water service providers must ensure appropriate standards of water supply which are able to endure drought conditions, peak events, and maintenance of our assets. This requires reserve capacity in our supplies. At present, not all supplies within this Study Area meet the required levels of reserve capacity. However, due to the lack of historical monitoring, particularly in relation to groundwater supplies, some of the deficits may be data driven.
2. **Day to day operations:** At present, in the dry year critical period 46 out of 75 of the WRZs in SAK have a current deficit and 48 out of 75 have a projected SDB deficit (based on a “do minimum” approach). However, under normal weather and demand conditions, this does not manifest as an interruption to supply for all WRZs. During recent dry periods, particularly the summer of 2018 and 2020 when water conservation orders were implemented, a number of the supplies in SAK were impacted.

A summary of the SDB deficit across all 75 WRZs is summarised in Table 2.3. The SDB for each WRZ is included in Appendix L of the Framework Plan.

The water resources zones are detailed in Appendix L of the Framework Plan - Supply Demand Balance Summaries.

Table 2.3 WRZ SDB Dry Year Critical Period Deficits – Based on plan level conservative estimates

Water Resource Zone Name	Water Resource Zone code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Kilmanahan	3100SC0129	39	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Carrignagower	3100SC0127	37	-17	-17	-18	-18	-18	-18
Monatarrif	3100SC0126	13	-22	-23	-23	-24	-24	-24
Portlaw	3100SC0124	1,608	-343	-358	-372	-384	-395	-405
Carrigeen	3100SC0123	15	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Lyrenaleara	3100SC0120	40	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Poulavanogue (Waterford)	3100SC0119	100	-65	-66	-67	-68	-68	-69
Russelstown	3100SC0118	28	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Kilbrien	3100SC0116	88	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ardmore Grange	3100SC0115	203	-107	-110	-112	-113	-115	-116
Liskealty	3100SC0114	5	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Lacken	3100SC0113	69	-4	-4	-5	-6	-6	-6
Modeligo	3100SC0112	192	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit

Water Resource Zone Name	Water Resource Zone code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Deelish/Ballinacourty/Kilnafrehan	3100SC0111	377	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Crehanagh	3100SC0110	17	-10	-10	-10	-10	-10	-10
Garravoone	3100SC0108	37	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ballyknock	3100SC0107	11	-11	-11	-11	-11	-11	-11
Kill/Ballylaneen	3100SC0102	1,107	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Scrahan	3100SC0101	24	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Kilmacthomas	3100SC0099	357	-65	-69	-72	-75	-78	-81
Ballyshunnock	3100SC0098	34	-15	-15	-15	-16	-16	-16
Ballyogarty	3100SC0097	594	-180	-189	-195	-201	-206	-211
Lismore / Cappoquin / Ballyduff (LCB)	3100SC0095	3,779	-951	-982	-1,007	-1,033	-1,058	-1,077
Graiguenageeha	3100SC0093	42	-9	-9	-9	-10	-10	-10
Dunhill Ballinageeragh	3100SC0092	44	-1	-2	-2	-2	-3	-3
Dunhill	3100SC0091	145	-11	-12	-13	-14	-15	-15
Rathgormack	3100SC0089	502	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit

Water Resource Zone Name	Water Resource Zone code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Glenagad	3100SC0087	57	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Stradbally	3100SC0083	658	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Moores Well	3100SC0081	91	-59	-62	-63	-64	-65	-66
Adramone / Kilrossanty	3100SC0079	366	-45	-49	-52	-55	-57	-60
Ballynoe / Melleray	3100SC0077	207	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ballymacarbry	3100SC0054	652	-46	-50	-54	-58	-62	-65
Inchinleamy	3100SC0053	25	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ballyguiry	3100SC0051	101	-34	-35	-35	-36	-36	-37
Fews	3100SC0045	185	-2	-4	-6	-7	-9	-10
Garrahylish	3100SC0044	3	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Faha	3100SC0042	66	-6	-7	-8	-9	-9	-10
Smoore	3100SC0035	65	-21	-21	-21	-21	-22	-22
East Waterford Water Supply Scheme	3100SC0033	64,243	-11,728	-14,466	-16,741	-18,010	-19,110	-19,990
Carrowgarriff	3100SC0030	45	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit

Water Resource Zone Name	Water Resource Zone code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Boolavoonteen / Kilcooney / Touraneena	3100SC0027	349	-54	-56	-58	-59	-61	-62
Ballysaggart	3100SC0024	71	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ardmore	3100SC0005	426	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Dungarvan	3100SC0001	13,159	-1,025	-1,353	-1,622	-1,742	-1,836	-1,911
Glengar	2900SC0069	512	-52	-60	-66	-70	-74	-77
Coalbrook / Commons	2900SC0067	1,751	-494	-536	-565	-582	-597	-609
Tipperary Town Supply	2900SC0049	4,860	-1,347	-1,181	-1,205	-1,237	-1,272	-1,299
Templemore / Templetuohy	2900SC0042	4,061	-307	-345	-377	-407	-438	-462
Templetney/Brackford Bridge PWS	2900SC0039	3,884	-1,062	-1,122	-1,155	-1,189	-1,222	-1,249
Kilcash	2900SC0036	218	-9	-10	-12	-13	-15	-16
Galtee Regional	2900SC0032	16,191	-6,825	-6,865	-7,053	-7,196	-7,335	-7,446
Tullohea	2900SC0031	460	-34	-39	-43	-46	-50	-53
Dundrum Regional	2900SC0029	7,914	-3,571	-3,765	-3,899	-3,980	-4,055	-4,116
Fethard & Mullenbawn Regional Public Water Supply	2900SC0026	9,077	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit

Water Resource Zone Name	Water Resource Zone code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Clonmel & Environs	2900SC0025	15,918	-5,499	-5,015	-4,607	-5,355	-6,396	-7,230
Carrick-On-Suir	2900SC0024	6,094	-1,240	-1,283	-1,330	-1,376	-1,421	-1,457
Burncourt Ballylooby	2900SC0023	4,096	-1,060	-1,144	-1,213	-1,257	-1,299	-1,333
Ballinvir	2900SC0022	23	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ardfinnan Regional	2900SC0021	11,336	-5,623	-5,760	-5,876	-6,012	-6,159	-6,276
Ahenny	2900SC0020	69	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Littleton PWS	2900SC0016	492	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Thurles / Borrisoleigh	2900SC0014	12,317	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Horse & Jockey PWS	2900SC0013	643	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Two Mile Borris	2900SC0009	809	-19	-24	-30	-35	-40	-44
Carrigmore	1900SC0038	377	-175	-178	-180	-182	-184	-186
Kilteely	1900SC0030	484	-99	-102	-105	-108	-111	-113
Anglesboro Water Supply	1900SC0026	24	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ballylanders Water Supply	1900SC0012	559	-190	-194	-197	-201	-204	-207

Water Resource Zone Name	Water Resource Zone code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Galbally Water Supply	1900SC0011	368	-87	-89	-92	-95	-97	-99
Knocklong/ Hospital	1900SC0010	2,287	-60	-72	-84	-97	-109	-119
Herbertstown	1900SC0008	687	-20	-23	-27	-31	-36	-39
Piltown-Fiddown	1500SC0019	3,075	-1,025	-1,077	-1,121	-1,148	-1,170	-1,188
Callan PWS	1500SC0005	2,725	-413	-435	-455	-475	-495	-511
South Kilkenny	1500SC0001	12,671	No Deficit	No Deficit	No Deficit	-143	-287	-403

As outlined in Chapter 4 of the Framework Plan, the estimated population currently living in each WRZ has been based on the 2016 Census data. Forecasts for future populations have been based on draft growth projections from the National Planning Framework (NPF), and updated information from the Regional Spatial and Economic Strategies (RSES) and Local Authority Planning sections (where available).

The target levels of service in the region were applied in each case, along with the corresponding requirements for reserves, indicating that our supplies are operating with a cumulative SDB deficit of approximately 44,022 m^3/day for the Study Area. As a result, while we can continue to supply water, the water supplies in this area may come under pressure, particularly in drought conditions. In addition, there may be ongoing reliability issues.

This situation will further deteriorate over time due to climate change driven reductions in water resources, together with increased demand due to population growth. If we do nothing, the SDB deficit is estimated to increase to approximately 58,817 m^3/day by 2044.

Our ongoing activities to improve the Supply Demand Balance in SAK are prioritised as:

- Ongoing leakage management including active leakage control, pressure management and find and fix activities to meet target levels of Leakage.
- Water Conservation measures, including information campaigns and initiatives, and Water Conservation Orders during drought periods.

2.3 Water Supply Reliability

The benefits of having sufficient water supplies in terms of quality and quantity are negated if we cannot distribute the water we produce effectively around our networks. We also need sufficient treated water storage to enable us to respond to planned or unplanned outages on our trunk main and distribution networks.

There are a number of problematic distribution and trunk mains throughout SAK. Uisce Éireann and the Local Authority Water Services sections will continue to monitor the performance of all water mains in the network to ensure that the most problematic mains are replaced as required.

During the drought in summer 2018, several raw water sources experienced issues; raw water levels dropped significantly at surface water abstraction at Ballylaneen WTP. Unplanned intermittent outages occurred at Fews WTP lasting for a few hours due to the source being unable to meet peak demand. Night-time restrictions were previously issued for Fews and Ballymacarbry Water Resource Zones. In these locations service interventions were required to ensure supply to customers could be maintained.

During our needs assessment for SAK, Uisce Éireann has identified several critical requirements for upgrades to the existing asset base, including storage and trunk main requirements. Progress to date on these projects is summarised in Table 2.4.

Table 2.4 SAK Critical Infrastructure Projects and Need Identification

Critical Requirement	Progress
1. **Tramore Water Network Improvement Project:** The works involve the construction of approximately 700m of new watermains. Works will take place on the Monvoy Road approximately 50m north of the Monvoy roundabout and continue the Ring Road to the Racecourse roundabout. This project will increase our capacity to	**Completed**

Critical Requirement	Progress
deliver reliable, sustainable high-quality water services and will improve the resilience of the water network in Tramore.	
2. Clonmel Regional Water Supply Scheme: The works has completed of the construction of a new reservoir and watermains, which will benefit the northern parts of Clonmel Town and surrounding areas. This project included the construction of a new reservoir and over 4 kilometres of new watermains. The project was needed to increase the security of the water supply for businesses and residents in North Clonmel. The water infrastructure had an insufficient level of storage capacity; however, this project has now increased storage capacity with construction of the new reservoir.	**Completed**
3. Distribution Network Repairs and Upgrades: Rolling programme of active leakage control, pressure management, find and fix and network upgrades	**In Progress**

In summary, there are some asset reliability issues across the distribution network within the Study Area. Some critical infrastructural projects, outlined in Table 2.4, to address these issues have been identified and are in progress. In addition to this, a continuous programme of repairs, upgrades and leakage reduction is being progressed as part of Uisce Éireann National Leakage Reduction Programme across all Study Areas.

2.4 Water Supply Sustainability

The water supplies within the region were developed over time to address the needs of the local populations and to support growth and development.

As outlined at Section 3.7.2 of the Framework Plan, the Government is currently developing new legislation dealing with water abstractions. At the end of 2022, the government passed the Water Environment (Abstractions and Associated Impoundments) Act, 2022 which will ensure our national abstractions align with the requirements of the Water Framework Directive.The act has not yet commenced and its associated regulations and guidelines which will further detail the types of assessment and national methodology to be used are not yet in place. Whilst the regulations and guidelines for the new abstraction regime are being developed, Irish Water are assessing existing abstractions to identify surface water sites that may exceed future abstraction thresholds. We have taken a precautionary approach based on our 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 be determined by the EPA based on the project level information before them. Our assessment procedure is set out at Appendix C of the Framework Plan, and in line with a precautionary approach.

To understand the potential impact of the Abstraction Legislation on the SAK supplies, we have assessed the potential impacts on our 26 no. surface water abstractions at Ahernes Glen Abstraction (Ardfinnan Regional), Glenbreda Stream Abstraction (Ardfinnan Regional), Glengarra River (Burncourt Ballylooby), Crottys Lake (Carrick-On-Suir), Lingaun River (Carrick-On-Suir), Boola River Intake (Clonmel & Enviorns), Poulavanogue Abstraction 1 (Clonmel & Enviorns), Poulavanogue Abstraction 2 (Clonmel & Enviorns), Glenary Abstraction 2 (Clonmel & Enviorns), Deelish Reservoir (Deelish/Ballinacourty/Kilnafrehan), Multeen River Intake (Dundrum Regional), Clodagh River (East Waterford Water Supply Scheme),

Ballyshonock Impoundment (East Waterford Water Supply Scheme), Mahon River Intake (East Waterford Water Supply Scheme), Gurtnapisha (Fethard & Mullenbawn Regional Public Water Supply), Walshbog (Fethard & Mullenbawn Regional Public Water Supply), Cloran Stream (Fethard & Mullenbawn Regional Public Water Supply), Anner River (Fethard & Mullenbawn Regional Public Water Supply), College Stream Intake (Galtee Regional), Muskry Stream Intake (Galtee Regional), Ballylaneen (Kill/Ballylaneen), Portlaw Springs (Portlaw), Clonassy/Pollanasa River (South Kilkenny), River Blackwater, Mullinavat (South Kilkenny), Stradbally (Stradbally), and River Clodiagh (Thurles / Borrisoleigh).

Table 2.5 presents the findings of this assessment in order to indicate the potential reductions (based on a do-nothing approach) to abstractions that may be required at our existing surface water supplies and the potential changes to our SDB. The table presents our current abstraction levels[1], our source hydrological yield[2], the estimated sustainable abstraction[3] amount which the source may be limited to in the future.

Based on this initial assessment, the volumes of water abstracted from Ahernes Glen Abstraction (Ardfinnan Regional), Glenbreda Stream Abstraction (Ardfinnan Regional), Glengarra River (Burncourt Ballylooby), Boola River Intake (Clonmel & Environs), Poulavanogue Abstraction 1 (Clonmel & Environs), Poulavanogue Abstraction 2 (Clonmel & Environs), Glenary Abstraction 2 (Clonmel & Environs), Deelish Reservoir (Deelish/Ballinacourty/Kilnafrehan), Multeen River Intake (Dundrum Regional), Clodagh River (East Waterford Water Supply Scheme), Ballyshonnock Impoundment (East Waterford Water Supply Scheme), Mahon River Intake (East Waterford Water Supply Scheme), Gurtnapisha (Fethard & Mullenbawn Regional Public Water Supply), Walshbog (Fethard & Mullenbawn Regional Public Water Supply), Cloran Stream (Fethard & Mullenbawn Regional Public Water Supply), Anner River (Fethard & Mullenbawn Regional Public Water Supply), College Stream Intake (Galtee Regional), Muskry Stream Intake (Galtee Regional), Portlaw Springs (Portlaw), Clonassy/Pollanasa River (South Kilkenny), River Blackwater, Mullinavat (South Kilkenny), and River Clodiagh (Thurles / Borrisoleigh) may not meet sustainability guidelines. However, under the proposed regulatory regime, sustainable abstraction quantities will be adjudicated by the EPA. We have assumed, given the need to maintain supplies, that a transition to new abstraction quantities would likely take place in the medium term.

Table 2.5 Comparison of Current Abstraction, Hydrological Yield and Theoretical Future Abstraction

Source (WRZ)	Current abstraction (m^3/day)	Hydrological yield (m^3/day)	Theoretical future abstraction limit (m^3/day)
Ahernes Glen Abstraction (Ardfinnan Regional)	6,783	690	179
Glenbreda Stream Abstraction (Ardfinnan Regional)		706	182
Glengarra River (Burncourt Ballylooby)	2,383	1,055	502
Crottys Lake (Carrick-On-Suir)	18	526	128

[1] Based on WTP 22hr (DYCP) capacity
[2] Our hydrological yield estimate is the 'safe' yield calculated to be available during a 1 in 50 year drought event. We use this figure in the SDB calculations to determine whether a WRZ is projected to be in deficit or surplus
[3] Our sustainable or 'allowable' abstraction estimate is based on limiting abstraction to 5-15% of the Q95 low flow for river sources or 10% of Q50 inflow for lakes. This is based on our best understanding of how the EPA may enforce future abstraction licencing applying UKTAG guidance.

Source (WRZ)	Current abstraction (m^3/day)	Hydrological yield (m^3/day)	Theoretical future abstraction limit (m^3/day)
Linguan River (Carrick-On-Suir)	1,320	9,559	2,543
Boola River Intake (Clonmel & Environs)	2,292	396	63
Poulavanogue Abstraction 1 (Clonmel & Environs)		243	72
Poulavanogue Abstraction 2 (Clonmel & Environs)		459	138
Glenary Abstraction 2 (Clonmel & Environs)	6,270	1,144	248
Deelish Reservoir (Deelish/Ballinacourty/Kilnafrehan)	915	439	286
Multeen River Intake (Dundrum Regional)	3,749	2,284	516
Clodagh River (East Waterford Water Supply Scheme)	53,167	19,088	2,917
Ballyshonnock Impoundment (East Waterford Water Supply Scheme)		10,900	1,866
Mahon River Intake (East Waterford Water Supply Scheme)		14,491	4,560
Gurtnapisha (Fethard & Mullenbawn Regional Public Water Supply)	5,958	364	114
Walshbog (Fethard & Mullenbawn Regional Public Water Supply)		166	50
Cloran Stream (Fethard & Mullenbawn Regional Public Water Supply)		112	34
Anner River (Fethard & Mullenbawn Regional Public Water Supply)		14,927	3,344
College Stream Intake (Galtee Regional)	11,917	724	193
Muskry Stream Intake (Galtee Regional)		930	265
Ballylaneen (Kill/Ballylaneen)	458	14,142	4,485
Portlaw Springs (Portlaw)	458	154	32

Source (WRZ)	Current abstraction (m^3/day)	Hydrological yield (m^3/day)	Theoretical future abstraction limit (m^3/day)
Clonassy/Pollanasa River (South Kilkenny)	3,483	4,618	692
River Blackwater, Mullinavat (South Kilkenny)		5,519	820
Stradbally (Stradbally)	550	8,762	1,945
River Clodiagh (Thurles / Borrisoleigh)	10,505	15,904	4,920

The potential change to the SDB[4] for each WRZ, as a result of these potential reductions in abstraction during Dry Weather Flow are summarised in Table 2.6.

Table 2.6 Potential Change to SDB Based on Potential Abstraction Reductions

Source (WRZ)	Potential change in SDB (m^3/day)
Ahernes Glen Abstraction (Ardfinnan Regional)	-844
Glenbreda Stream Abstraction (Ardfinnan Regional)	
Glengarra River (Burncourt Ballylooby)	-588
Crottys Lake (Carrick-On-Suir)	None
Linguan River (Carrick-On-Suir)	
Boola River Intake (Clonmel & Environs)	-1,438
Poulavanogue Abstraction 1 (Clonmel & Environs)	
Poulavanogue Abstraction 2 (Clonmel & Environs)	
Glenary Abstraction 2 (Clonmel & Environs)	
Deelish Reservoir (Deelish/Ballinacourty/Kilnafrehan)	-3
Multeen River Intake (Dundrum Regional)	-1,443
Clodagh River (East Waterford Water Supply Scheme)	-27,843

[4] Based on the potential changes to the projected WRZ supply demand balance (SDB) figure for the dry year critical period (DYCP) 2044 future scenario.

Source (WRZ)	Potential change in SDB (m^3/day)
Ballyshonnock Impoundment (East Waterford Water Supply Scheme)	
Mahon River Intake (East Waterford Water Supply Scheme)	
Gurtnapisha (Fethard & Mullenbawn Regional Public Water Supply)	-2,849
Walshbog (Fethard & Mullenbawn Regional Public Water Supply)	
Cloran Stream (Fethard & Mullenbawn Regional Public Water Supply)	
Anner River (Fethard & Mullenbawn Regional Public Water Supply)	
College Stream Intake (Galtee Regional)	-928
Muskry Stream Intake (Galtee Regional)	
Ballylaneen (Kill/Ballylaneen)	None
Portlaw Springs (Portlaw)	-116
Clonassy/Pollanasa River (South Kilkenny)	-2,250
River Blackwater, Mullinavat (South Kilkenny)	
Stradbally (Stradbally)	None
River Clodiagh (Thurles / Borrisoleigh)	-1,077

The net impact of these potential minimum environmental flow requirements has been assessed using the outline assessment methodology described in Appendix C of the Framework Plan. Groundwater abstractions will need to conform to the proposed new abstraction licencing regime. These abstractions will be assessed in two ways:

- Impacts on the groundwater bodies from which they abstract; and
- Impact of the groundwater abstraction on the base flow in surface waterbodies.

As noted in Section 3.2.2 of the Framework Plan, producing robust desktop assessments of water availability from our existing groundwater abstractions is very difficult. Ideally, yield estimates would be based on a three-dimensional assessment of the geology within the vicinity of the supply, supplemented with long term records on pumping and drawdown of water levels over many years. Uisce Éireann does not have this type of information available for most of our groundwater supplies and while we will aim to complete site-specific studies of groundwater availability, this may take many years.

On an interim basis Uisce Éireann has developed an initial assessment for existing abstractions based on best available information. For more information, please see Appendix C Supply Assessment and Appendix G Regulatory and Licensing Constraints of the NWRP - Framework Plan. Over the coming years, Uisce Éireann will work with the environmental regulator EPA and the Geological Survey of Ireland, to develop desktop and site investigation systems to better understand the sustainability of our groundwater sources. We are not in a position to estimate changes to the groundwater availability until better data is available.

In summary, when considering the requirements of the Water Framework Directive (WFD), some of our schemes may be subject to reductions in abstraction, especially during drought periods. While we have developed a potential understanding of the impact of the legislation, we cannot reliably include an estimation of sustainable abstraction within the SDB calculations.

However, we do use our sustainable abstraction estimations to assess the sensitivity of the Preferred Approach as set out in Chapter 7 of this Technical Report. This assessment determines whether the Preferred Approach is adaptable to change across a range of potential future scenarios and verifies our ability to adapt and increases our resilience to future changes.

When the new Legislation on abstraction of water has been enacted and regulatory assessments completed if an abstraction is confirmed to be affecting a waterbody status the Supply Demand Balance will be updated as outlined in the monitoring and feedback section of the RWRP, Section 9.2.2. All future abstractions considered through the Framework Plan options assessment are validated for sustainability, including options to increase abstraction at existing sites.

2.5 Water Resource Zone Needs Summary

Study Area K has issues in relation to quality, quantity, reliability and sustainability which must be addressed as part of the Preferred Approach to future water resources planning, summarised in Table 2.7.

Table 2.7 Summary of Need Quality, Quantity, Reliability, Sustainability

Quality	Upgrades required to water treatment plants
Quantity	Net leakage reduction 347 m³/day in the region Additional Leakage Targets of 36,233 m³/day to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500 m³/day Interim additional supplies of 44,022 m³/day within 10 years Total of 58,817 m³/d additional supplies beyond the 10-year horizon
Reliability	Continued network upgrades and improvements in the bulk and distribution networks and storage
Sustainability	It is not envisaged that there are sustainability issues with the volumes abstracted at Crottys Lake (Carrick-On-Suir), Linguan River (Carrick-On-Suir), Ballylaneen (Kill/Ballylaneen), and Stradbally (Stradbally). Based on this initial assessment, the volumes of water abstracted at Ahernes Glen Abstraction (Ardfinnan Regional), Glenbreda Stream Abstraction (Ardfinnan Regional), Glengarra River (Burncourt Ballylooby), Boola River Intake (Clonmel & Environs), Poulavanogue Abstraction 1 (Clonmel & Environs), Poulavanogue

	Abstraction 2 (Clonmel & Environs), Glenary Abstraction 2 (Clonmel & Environs), Deelish Reservoir (Deelish/Ballinacourty/Kilnafrehan), Multeen River Intake (Dundrum Regional), Clodagh River (East Waterford Water Supply Scheme), Ballyshonnock Impoundment (East Waterford Water Supply Scheme), Mahon River Intake (East Waterford Water Supply Scheme), Gurtnapisha (Fethard & Mullenbawn Regional Public Water Supply), Walshbog (Fethard & Mullenbawn Regional Public Water Supply), Cloran Stream (Fethard & Mullenbawn Regional Public Water Supply), Anner River (Fethard & Mullenbawn Regional Public Water Supply), College Stream Intake (Galtee Regional), Muskry Stream Intake (Galtee Regional), Portlaw Springs (Portlaw), Clonassy/Pollanasa River (South Kilkenny), River Blackwater, Mullinavat (South Kilkenny), and River Clodiagh (Thurles / Borrisoleigh) may not meet sustainability guidelines during dry weather flows. However, under the proposed regulatory regime, this will be adjudicated by the EPA. Over the coming years, Uisce Éireann will work with the environmental regulator EPA and the Geological Survey of Ireland, to develop desktop and site investigation systems to better understand the sustainability of our groundwater sources.

All of these needs will be considered within our options assessment process and in the development of the Preferred Approach.

Further details of planned, live and recently completed projects are available on our website see: https://www.water.ie/projects-plans/our-projects/

3 Solution Types Considered in Study Area K

3 Solution Types Considered in Study Area K

In this chapter, we summarise the type of solutions we have considered to address identified need for treated drinking water supply in Study Area K.

As outlined in Chapter 7 of the Framework Plan, we consider measures across the following three pillars: **Lose Less**, **Use Less** and **Supply Smarter** in forming our list of unconstrained options, which are assessed for short, medium and long-term solutions. For SAK as part of our unconstrained options, the following options have been reviewed.

3.1 Leakage Reduction

The Leakage reduction measures across the public water supply considered for SAK are based on what we 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 (NRR); and
- Net leakage reductions targets listed in Table 3.1 have been applied to SDB deficit to move towards achieving the national Sustainable Economic Level of Leakage (SELL) target prioritised based on
    - Supply demand deficit;
    - Existing abstractions with sustainability issues; and
    - Drought impacts.
- Additional leakage targets to achieve SELL and reduce leakage levels to 21 % of demand in WRZs with demand in excess of 1,500 m^3/day, see Table 3.1.

Table 3.1 SELL Targets for WRZ in SAK

WRZ	Net Leakage Reduction applied to SDB (m^3)	Additional leakage Targets to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500 m^3/day (m^3/day)	Total Leakage Targets (m^3/day)
South Kilkenny		3,482	3,482
Knocklong/ Hospital		31	31
Galbally Water Supply		21	21
Ballylanders Water Supply		12	12
Anglesboro Water Supply		1	1

WRZ	Net Leakage Reduction applied to SDB (m^3)	Additional leakage Targets to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500 m^3/day (m^3/day)	Total Leakage Targets (m^3/day)
Kilteely		5	5
Thurles / Borrisoleigh		420	420
Ahenny		11	11
Ardfinnan Regional		2,160	2,160
Ballinvir		14	14
Burncourt Ballylooby		1,398	1,398
Carrick-On-Suir		261	261
Clonmel & Environs		3,291	3,291
Fethard & Mullenbawn Regional Public Water Supply	69	2,962	3,031
Dundrum Regional		3,762	3,762
Tullohea		29	29
Galtee Regional	139	3,633	3,772
Templetney/Brackford Bridge PWS		1,872	1,872
Templemore / Templetuohy		712	712
Tipperary Town Supply	139	946	1,085
Dungarvan		2,154	2,154
East Waterford Water Supply Scheme		8,118	8,118
Ballyguiry		7	7
Lismore / Cappoquin / Ballyduff (LCB)		795	795
Ballyogarty		25	25
Ballyshunnock		18	18
Ballyknock		6	6

WRZ	Net Leakage Reduction applied to SDB (m^3)	Additional leakage Targets to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500 m^3/day (m^3/day)	Total Leakage Targets (m^3/day)
Garravoone		13	13
Crehanagh		7	7
Liskealty		4	4
Ardmore Grange		63	63

3.2 Water Conservation

At present, Uisce Éireann is conducting pilot studies in relation to water conservation stewardship in businesses and is actively pursuing Conservation Education Awareness Campaigns and partnerships. During drought conditions in 2018 and 2020, a Water Conservation Order was implemented in order to protect our water supplies and reduce pressure on the natural environment during this period. We will continue to promote 'Water Conservation Activities', collecting and monitoring data over a number of years to assess the benefits. As part of the NWRP – Framework Plan, we have not applied reductions to the SDB deficit for unquantifiable water conservation gains, however as stipulated within the Consultation Report prepared in relation to the NWRP- Framework Plan, UÉ will progress pilot studies on water conservation measures. Based on the outcomes of these studies, we may include such factors in future iterations of our NWRP. However, we do assume that any gain will offset consumer usage growth factors.

3.3 Supply Smarter

The supply options considered as part of the options development are unconstrained by distance from SAK and include:

- Stand-alone groundwater options, across the region
- Stand-alone surface water options, across the region
- Transfers
- Rationalisations
- Advanced Leakage Reduction
- Desalination
- Water Treatment Plant Upgrades for water quality purposes

4 Option Development SAK

4 Option Development for Study Area K

This chapter describes how our options assessment methodology was applied to produce a Feasible

The purpose of our options assessment process, as outlined in Chapter 8 of the Framework Plan, is to consider the widest practicable range of solutions to resolve identified need within a given area. A suitable screening criterion is then applied to filter out any options that are not feasible, based on sustainability (environmental and social impacts), resilience or deliverability. As sustainability is at the heart of our plan, 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 even before screening begins to ensure the protection of the environment. For example, having regard to WFD objectives, Uisce Éireann does not allow for any inter-catchment raw water transfers due to the high risk of transferring invasive non-native species (INNS) between catchments and non-compliance with WFD objectives.

The options assessment screening process involves the following:

- Developing a long list of unconstrained options – the maximum possible list of unscreened options for water supply, not limited by cost or feasibility;
- Coarse Screening – We filter the unconstrained options using a coarse screening assessment where we remove any options that fail to meet desktop assessment criteria under: Resilience, Deliverability and Flexibility or Sustainability (Environmental and Social Impacts); and
- Fine Screening – We filter the remaining options from the coarse screening exercise through a fine screening assessment, which includes 33 detailed questions, related to environmental objectives identified for the SEA (including biodiversity, the water environment and requirements under climate change adaptation) as well as Resilience, Deliverability and Progressibility.

The coarse screening and fine screening questions, and the associated scoring criteria, are included in Chapter 3 and Appendix A of the Study Area Environmental Report.

4.1 Developing a List of Unconstrained Options

At the start of our screening process, we conduct a specialist desktop review of groundwater bodies and surface water catchments. This allows us to understand potential additional availability at existing water abstractions or to identify any potential new water sources within the Study Area; as summarised in Table 4.1.

Table 4.1 Desktop Assessments for Unconstrained Options

Existing and New Ground Water sources	A Hydrogeologist conducts a desktop groundwater availability assessment of all potential aquifers and aquitards within, and within a reasonable distance of, the study area.
Existing and New Surface Water sources and Conjunctive Use Options	A Hydrologist carries out a desktop surface water availability assessment of all potential catchments and waterbodies within, and within a reasonable distance of, the study area.
Water Treatment upgrades, Desalination, Rationalisation and Effluent Reuse Options	An Engineer reviews any potential increases in capacity at existing water treatment sites and any potential conjunctive use or effluent reuse options.

Based on these desktop assessments, Uisce Éireann developed an initial list of unconstrained options for new supplies and increases and upgrades to existing supplies and assets. An unconstrained options review workshop was then held with our Local Authority Partners to identify any additional unconstrained options that may be available based on local knowledge. A total list of unconstrained options was then compiled.

For SAK, 693 Unconstrained Options were identified to address need. These unconstrained options were not limited by cost, distance from the area or feasibility. These options are summarised in Table 4.2 and shown spatially in Figure 4.1.

Table 4.2 SAK Unconstrained Options

No. of Options	Option Type
214	Groundwater
124	Surface Water
64	Transfers
259	Rationalisation
1	Advanced Leakage Reduction
2	Desalination
29	Upgrade WTP (WQ only)

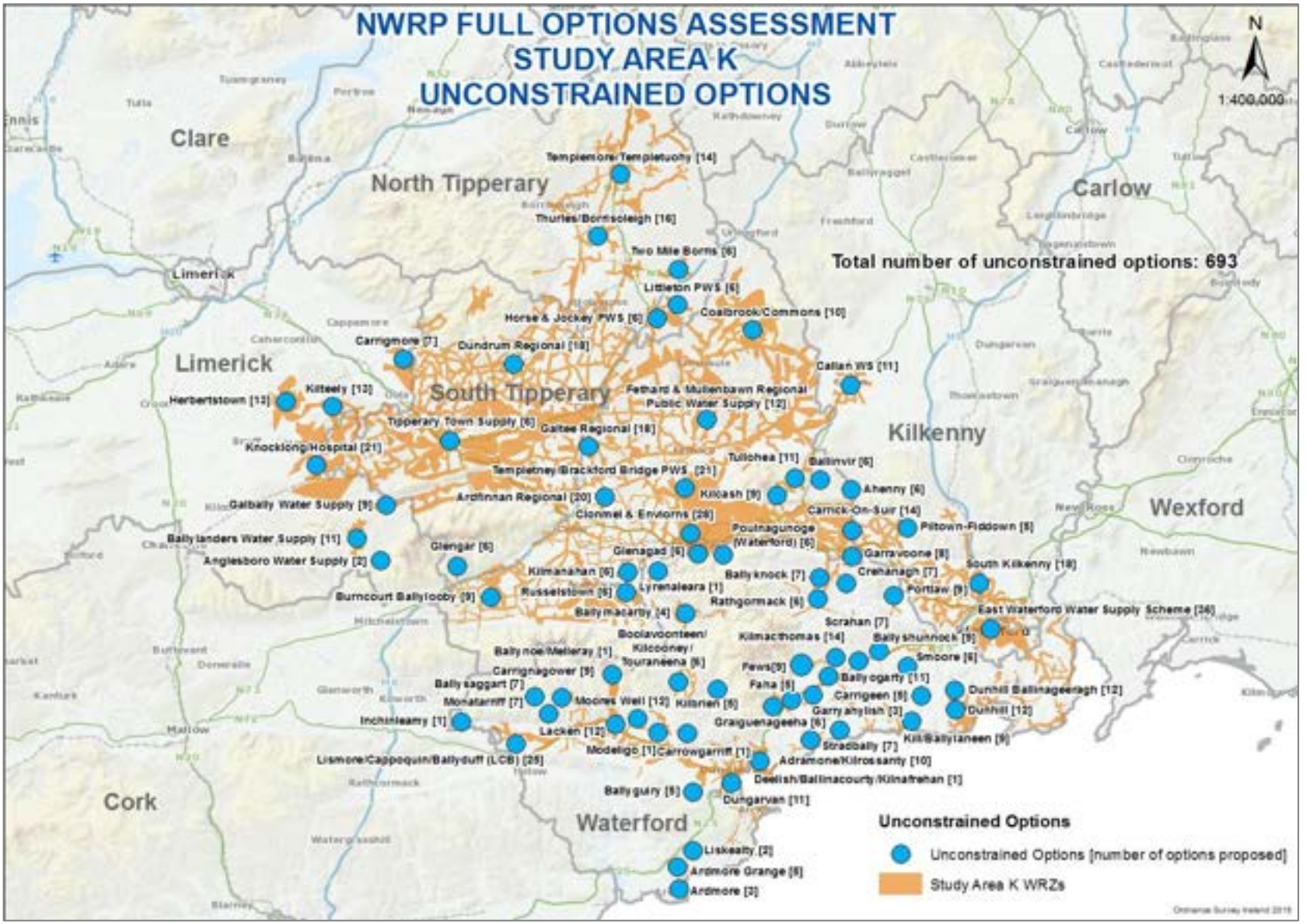

Figure 4.1 SAK Unconstrained Options

The 693 options were filtered through our screening process to eliminate those with potentially unviable environmental impacts or feasibility issues. This process is summarised below.

Example Rejected Option

Option SAK-215

Increase SW abstraction from Burncourt River and upgrade Glengarra WTP to supply deficit.

Rejection Reason

Burncourt River is the only source of supply for the Glengarra WTP. Glengarra WTP abstracts 2,383 m^3/day at 22hr/day capacity which is over its potential Allowable Abstraction limit. Therefore, no further abstraction is possible from Burncourt River.

4.2 Coarse Screening

The 693 identified Unconstrained Options were assessed through Coarse Screening against the criteria of:

- Resilience;
- Deliverability and Flexibility; and
- Sustainability (Environmental and Social Impacts).

The Coarse Screening process is summarised in Chapter 8 of the Framework Plan. The coarse screening assessments were conducted by a specialist team, including Engineers, Hydrologists and, Hydrogeologists, Ecologists, and Environmental Scientists.

160 Unconstrained Options were rejected at this stage as they were found to be unviable in relation to one or more assessment criteria. Details of these options and the justification for their rejection are outlined in the rejection summary, Annex B of this report. The rejection summary records the criteria against which the rejected options were assessed as having a 'red' score for the purposes of the coarse screening exercise (as explained in more detail in Chapter 8 of the framework plan), and accordingly were not brought forward at the coarse screening phase. The box below provides an example of a rejection justification for an option considered for a Burncourt Ballylooby WRZ in Study Area K.

The rejected options are summarised in Annex B of this technical report. Annex B records the criteria against which the rejected options were assessed as having a "red" score for the purposes of the coarse screening exercise (as explained in more detail in Chapter 8 of the Framework Plan), and accordingly were not brought forward at the coarse screening stage. The options remaining after Coarse Screening are summarised by type in Table 4.3.

The remaining 533 options were progressed to further assessment through the Fine Screening process.

Table 4.3 SAK Remaining Options after Course Screening

No. of Options	Option Type
164	Groundwater
78	Surface Water
50	Transfers
212	Rationalisation
2	Desalination
27	Upgrade WTP (WQ only)

4.3 Fine Screening

The 533 remaining options were subject to a more detailed multi-criteria assessment (MCA) at the Fine Screening Stage using desktop assessments of performance against 33 specified questions relating to Sustainability (Environmental and Social Impacts), Resilience, Deliverability and Progressibility. These questions are set out in Appendix N of the Framework Plan. The assessment for each option was based on an objective assessment with uniform scoring criteria, based on best publicly available datasets.

At Fine Screening stage, no further options were rejected, with the remaining 533 options considered to be feasible and brought forward to desktop outline design and costing. These are summarised in Table 4.4 and shown spatially in Figure 4.2.

Table 4.4 SAK Remaining Options after Fine Screening (Feasible Options)

No. of Options	Option Type
164	Groundwater
78	Surface Water
50	Transfers
212	Rationalisation
2	Desalination
27	Upgrade WTP (WQ only)

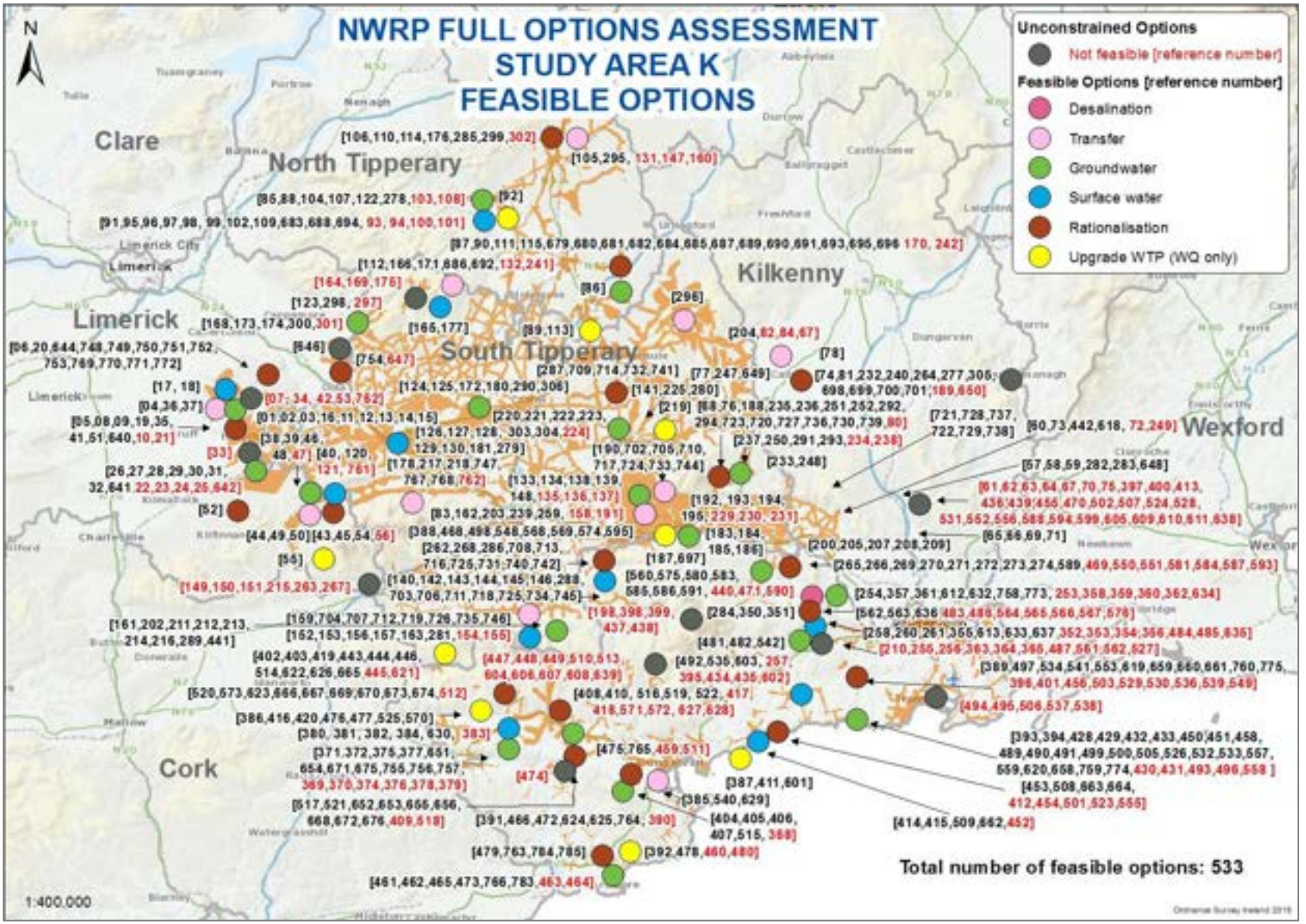

Figure 4.2 SAK Spatial Overview of the Feasible Options

4.4 Options Assessment Summary

The SDB deficit in the region ranges between 44,022 m^3/day in 2019 during normal conditions, to a maximum of 58,817 m^3/day in 2044 during dry conditions. During the options assessment stage, a total of 693 unconstrained options were assessed. Of these, 160 options were screened out for the reasons summarised in Table 4.5 and recorded in Annex B.

Table 4.5 Rejected Options Summary

No. of Options	Reason for Rejection
83	Resilience, Deliverability & Flexibility, Sustainability
47	Deliverability & Flexibility
1	Reliability & Sustainability
29	Other

The remaining 533 feasible options are categorised into options that resolve the need for one WRZ only "WRZ options" and options that resolved the need for more than one WRZ "Study Area options". Table 4.6 provides an overview of the number of WRZ options and Study Area options for the WRZs in Study Area K. From this table it can be noted that there are 154 WRZ Options and 379 options which can be merged to form 124 Study Area Options.

A summary of the number of options and whether they are WRZ, or SA options is contained in Table 4.6.

Table 4.6 SAK Feasible Options Summary

Water Resource Zone Name	Option Type	
	WRZ Option	SA Grouped Option
Adramone / Kilrossanty	3	3
Ahenny	1	5
Anglesboro Water Supply	1	0
Ardfinnan Regional	3	13
Ardmore	1	1
Ardmore Grange	2	2
Ballinvir	1	5
Ballyguiry	2	2
Ballyknock	2	4
Ballylanders Water Supply	3	6
Ballymacarbry	2	0
Ballynoe / Melleray	1	0
Ballyogarty	2	6

Water Resource Zone Name	Option Type	
	WRZ Option	SA Grouped Option
Ballysaggart	1	4
Ballyshunnock	2	6
Boolavoonteen / Kilcooney / Touraneena	2	0
Burncourt Ballylooby	4	4
Callan PWS	3	3
Carrick-On-Suir	2	7
Carrigeen	1	2
Carrigmore	2	3
Carrignagower	1	5
Carrowgarriff	1	0
Clonmel & Environs	6	15
Coalbrook / Commons	1	3
Crehanagh	2	5
Deelish/Ballinacourty/kilnafrehan	1	0
Dundrum Regional	7	5
Dungarvan	3	5
Dunhill	2	10
Dunhill Ballinageeragh	2	10
East Waterford Water Supply Scheme	5	19
Faha	2	2
Fethard & Mullenbawn Regional Public Water Supply	3	5
Fews	2	6
Galbally Water Supply	4	4
Galtee Regional	7	6
Garravoone	1	5
Garryahylish	1	1
Glenagad	1	4
Glengar	1	3
Graiguenageeha	1	4
Herbertstown	4	8
Horse & Jockey PWS	1	5
Inchinleamy	1	0
Kilbrien	1	0

Water Resource Zone Name	Option Type	
	WRZ Option	SA Grouped Option
Kilcash	1	7
Kill/Ballylaneen	1	5
Kilmacthomas	2	8
Kilmanahan	1	5
Kilteely	2	9
Knocklong/ Hospital	3	10
Lacken	3	8
Liskealty	1	1
Lismore / Cappoquin / Ballyduff (LCB)	2	13
Littleton PWS	1	5
Lyrenaleara	1	0
Modeligo	1	0
Monatarrif	1	4
Moores Well	3	8
Piltown-Fiddown	1	2
Portlaw	2	6
Poulnagunoge (Waterford)	1	4
Rathgormack	1	4
Russelstown	1	5
Scrahan	1	6
Smoore	1	4
South Kilkenny	4	8
Stradbally	1	5
Templemore / Templetuohy	5	7
Templetney/Brackford Bridge PWS	4	15
Thurles / Borrisoleigh	2	10
Tipperary Town Supply	2	2
Tullohea	1	8
Two Mile Borris	2	4

5 Approach Development

5 Approach Development

This chapter describes how we tested different combinations of the Feasible Options to develop a Preferred Approach to meet the needs we identified for the WRZ in Study Area K.

5.1 Approach Development

5.1.1 Introduction to Approach Development

The purpose of the NWRP is to examine all potential options that could be used to resolve issues within the water resource zone (unconstrained options) and then to eliminate those that are not feasible or that have identifiable environmental issues at a desktop level (options assessment screening). Of the remaining feasible options Uisce Éireann next step is to assess a number of approaches to resolve need across the Study Area. An approach is a way of configuring an option or options to meet the deficit focused on a particular outcome. For example, a "Least Carbon" approach would be the option or combination of options that would involve the least embodied and operational carbon load over the lifetime of the option. As part of the NWRP, Uisce Éireann considers six approaches, as summarised in Table 5.1.

These six approaches have been outlined at Section 8.3.7 of the Framework Plan and were consulted on as part of the SEA Scoping consultation conducted between 9th November 2017 and 22nd December 2017. These approaches have been specifically chosen to ensure that the NWRP aligns with all the relevant Government Policies outlined in Table 5.1.

Table 5.1 The Six Approaches

Approaches Tested	Description	Policy Driver
Least Cost	Lowest Net Present Value (NPV) cost in terms of Capital, Operational, Environmental and Social and Carbon Costs.	Public Spending Code
Best Appropriate Assessment (AA)	Lowest score against the European Sites (Biodiversity) sub-criteria question: Score = 0 equates to no likely significant effects (LSEs). If, in our opinion, these 0 scoring options meet the deficit/ plan objectives, they are automatically picked as the Preferred Approach. Score = -1 or -2 equates to LSEs that can be addressed with general/standard mitigation measures. Score = -3 equates to LSEs that may be harder to mitigate or require significant project level assessment.	Habitats Directive

Approaches Tested	Description	Policy Driver
Quickest Delivery	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.	Statutory Obligations under the Water Supply Act and Drinking Water Regulations
Best Environmental	This is the option or combination of options with the highest total score across the 19 No. SEA MCA sub-criteria questions	SEA Directive and Water Framework Directive
Most Resilient	This is the option or combination of options with the highest total score against the resilience criteria.	National Adaptation Framework and Climate Action Plan
Lowest Carbon	This is the option or combination of options with the lowest embodied and operational carbon cost.	Climate Action Plan

We then compare the options identified as the best performing within each of the six approach criteria (Least Cost, Best AA, Lowest Carbon etc.) against each other as outlined in Figure 5.1 to come up with a Preferred Approach that meets the objectives of the Framework Plan and aligns with all relevant Government Policy.

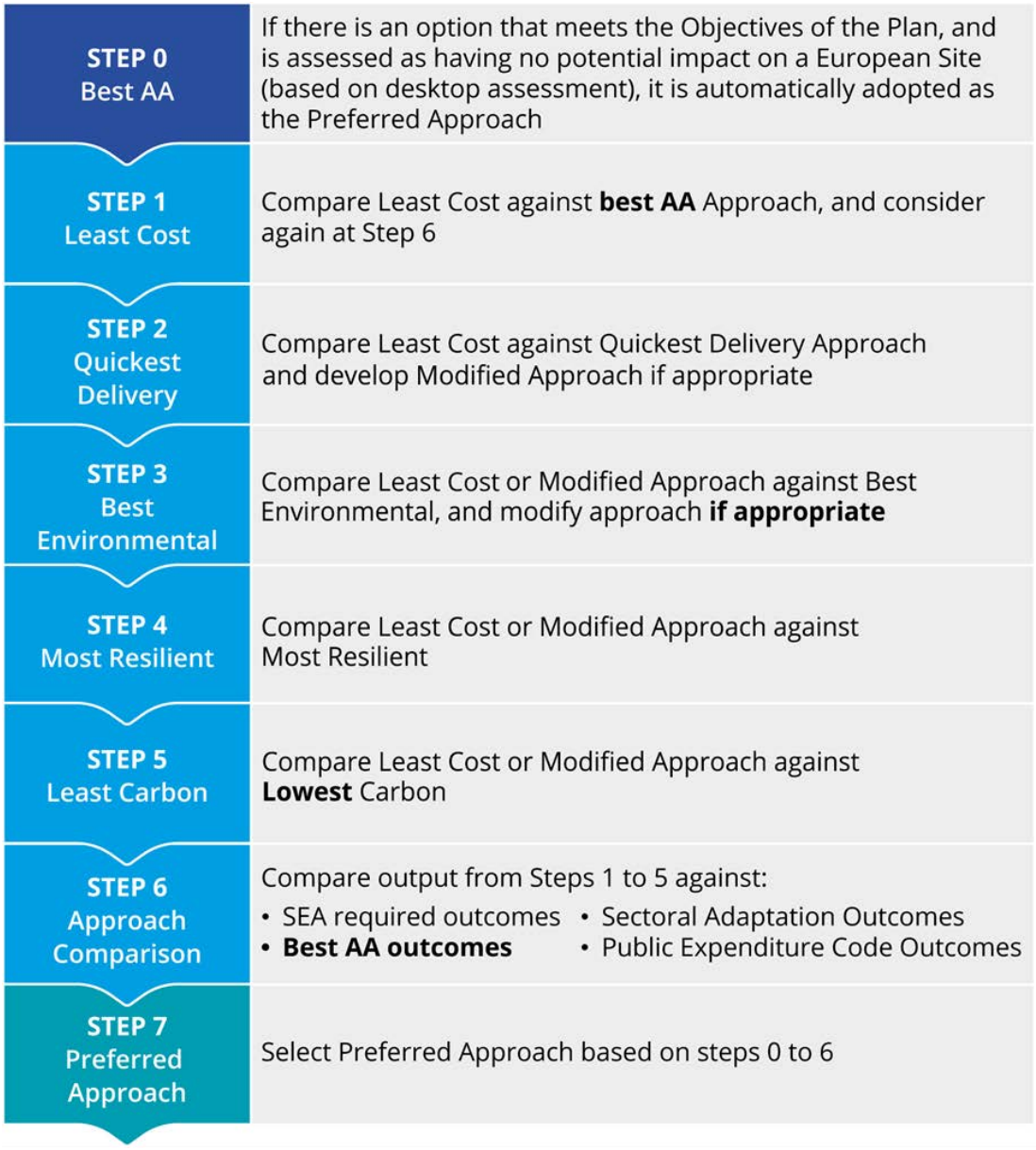

Figure 5.1 Figure of the 7-step assessment process

This methodology which is further detailed in Chapter 7 of the RWRP - SE follows a process to develop the Preferred Approach for a Study Area across three stages;

Stage 1 – We assess the water resource zones individually to develop an initial Preferred Approach, the **WRZ Preferred Approach** for all of the supplies in the Study Area

Stage 2 – We assess whether there are any larger options that might resolve deficits across multiple WRZs within a Study Area. We then develop combinations of these options (SA Combinations).

Stage 3 – We assess the SA Combinations and the WRZ Level approach in order to determine the best performing combination. This is known as the Preferred Approach at SA Level.

At each stage of assessment as detailed above, we carry out an assessment of the cumulative and in-combination effects of the Preferred Approach as detailed in the SEA Environmental Report for the RWRP-SE and the Environmental Review for this Study Area.

Within the Regional Plan, we will examine the Preferred Approach at a third spatial level for the entire South East Strategic Study Areas and will make any required changes in order to develop a Preferred Approach across the entire Region.

Further details on these three stages are provided in Chapter 7 of the RWRP-SE. Section 5.2 provides an overview of the application of this process to SAK.

5.2 Preferred Approach Development Process for Study Area K

5.2.1 Stage 1 – WRZ Level Approach

As outlined in Section 4.4 of this technical report there are 533 feasible options. 154 of these options are WRZ Options while 379 options are merged to form 124 Study Area Options. Table 5.2 outlines the 154 WRZ options for SAK, providing option reference numbers and detailing the WRZs to which they provide a solution to solve the deficit. These specific solutions are presented as “Options” for the purposes of this plan; however, will be subject to their own regulatory, timing and budgetary constraints.

Table 5.2 SAK Feasible Options

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Adramone / Kilrossanty	SAK-450	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit.
Adramone / Kilrossanty	SAK-451	New GW abstraction and new WTP to supply deficit.
Adramone / Kilrossanty	SAK-458	Recommission Knockeylan WTP [GW] and supply deficit.
Ahenny	SAK-233	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Land acquisition required due to lack of space at the WTP site.
Anglesboro Water Supply	SAK-055	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ardfinnan Regional	SAK-152	New SW abstraction from River Suir and new WTP to supply deficit.
Ardfinnan Regional	SAK-156	New SW abstraction from River Tar and upgrade Goatenbridge WTP to supply deficit.
Ardfinnan Regional	SAK-161	New GW abstraction and new WTP to supply deficit.
Ardmore	SAK-392	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ardmore Grange	SAK-624	New GW abstraction and new WTP to supply deficit.
Ardmore Grange	SAK-625	Increase GW abstraction and upgrade WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Ballinvir	SAK-248	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ballyguiry	SAK-472	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit.
Ballyguiry	SAK-473	New GW abstraction and new WTP to supply deficit.
Ballyknock	SAK-580	Increase GW abstraction from Ballyknock BH and upgrade Ballyknock WTP to supply deficit.
Ballyknock	SAK-583	New GW abstraction and upgrade Ballyknock WTP to supply deficit.
Ballylanders Water Supply	SAK-046	Increase GW abstraction at Ballylanders BH and upgrade Ballylanders Pump Station WTP to supply deficit.
Ballylanders Water Supply	SAK-049	Interconnect Ballylanders Ballyduff GWSs and supply deficit from GWS.
Ballylanders Water Supply	SAK-050	Interconnect Ballylanders and Griston GWS and supply deficit from GWS.
Ballymacarbry	SAK-441	New GW abstraction (karstic) and new WTP to supply deficit.
Ballymacarbry	SAK-442	New GW abstraction and new WTP to supply deficit.
Ballynoe / Melleray	SAK-386	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ballyogarty	SAK-393	Increase GW abstraction from existing BH and upgrade Ballyogarty WTP to supply deficit.
Ballyogarty	SAK-394	New GW abstraction and new WTP to supply deficit.
Ballysaggart	SAK-420	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ballyshunnock	SAK-481	Increase GW abstraction from BH and Ballyshunnock WTP to supply deficit.
Ballyshunnock	SAK-482	New GW abstraction and new WTP to supply deficit.
Boolavoonteen / Kilcooney / Touraneena	SAK-444	Increase GW abstraction from Touraneena BH and upgrade Touraneena WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Boolavoonteen / Kilcooney / Touraneena	SAK-446	New GW abstraction and new WTP to supply deficit.
Burncourt Ballylooby	SAK-211	Increase GW abstraction from no.2 BHs and upgrade Ballylooby Springs WTP to supply deficit.
Burncourt Ballylooby	SAK-212	Increase GW abstraction from Lissava BH and upgrade Lissava WTP to supply deficit.
Burncourt Ballylooby	SAK-214	New GW abstraction at Lissava and new WTP to supply deficit.
Burncourt Ballylooby	SAK-216	New GW abstraction and new WTP to supply deficit.
Callan WS 1001	SAK-077	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit.
Callan WS 1001	SAK-078	New SW abstraction from King's River and new WTP to supply deficit.
Callan WS 1001	SAK-649	New GW abstraction and new WTP
Carrick-On-Suir	SAK-202	New GW abstraction and new Linguan WTP to supply deficit.
Carrick-On-Suir	SAK-205	New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit.
Carrigeen	SAK-548	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Carrigmore	SAK-123	Increase GW abstraction at Carrigmore BH and upgrade Carrigmore BH to supply deficit.
Carrigmore	SAK-646	New GW abstraction and new WTP to supply deficit.
Carrignagower	SAK-622	New GW abstraction and new WTP to supply deficit.
Carrowgarriff	SAK-416	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Clonmel	SAK-133	Increase abstraction at Monroe BHs and upgrade Monroe WTP to partly supply deficit.
Clonmel	SAK-138	New GW abstraction at Monroe wellfield and upgrade Monroe WTP to partly supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Clonmel	SAK-139	New GW abstraction in vicinity of Clonmel and new WTP to partly supply deficit.
Clonmel	SAK-140	New abstraction from the River Suir and new WTP at Barnes (site identified)
Clonmel	SAK-142	New abstraction from the River Suir and upgrade Glenary WTP to supply deficit.
Clonmel	SAK-148	New GW abstraction at Showgrounds site in Clonmel town and new WTP to partly supply deficit.
Coalbrook / Commons	SAK-247	New GW abstraction and new WTP to supply deficit.
Crehanagh	SAK-585	Increase GW abstraction from Crehanagh BH and upgrade Crehanagh WTP to supply deficit.
Crehanagh	SAK-586	New GW abstraction and upgrade Crehanagh WTP to supply deficit.
Deelish/Ballinacourty	SAK-387	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Dundrum Regional	SAK-165	New SW abstraction from River Suir and new WTP to supply deficit.
Dundrum Regional	SAK-168	Increase GW abstraction at Ironmills BH and upgrade Ironmills WTP to partly address deficit.
Dundrum Regional	SAK-172	New GW abstraction to east of Dundrum WRZ and new WTP to partly supply deficit.
Dundrum Regional	SAK-173	New GW abstraction at Hollyford WSZ and new WTP to partly supply deficit.
Dundrum Regional	SAK-174	Increase GW abstraction at Hollyford spring and upgrade Hollyford WTP to partly supply deficit.
Dundrum Regional	SAK-176	Rationalise Hollyford to Ironmills WTP. Rationalisation within WRZ.
Dundrum Regional	SAK-177	New SW abstraction from River Multeen and new WTP to supply deficit at Hollyford WSZ.
Dungarvan	SAK-461	Increase GW abstraction from no. 6 BH and upgrade Ballinamuck WTP to supply deficit.
Dungarvan	SAK-466	New GW abstraction from Mapestown wellfield and new WTP and supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Dungarvan	SAK-467	New SW abstraction from Colligan River and new WTP to supply spare capacity to neighbouring WRZs.
Dunhill - Cois Coille	SAK-488	Increase GW abstraction from BH and upgrade Dunhill Cois Coille WTP to supply deficit.
Dunhill - Cois Coille	SAK-491	New GW abstraction and new WTP to supply deficit.
Dunhill Ballinageeragh	SAK-532	Increase GW abstraction from Dunhill BH and upgrade Dunhill Ballynageeragh WTP to supply deficit.
Dunhill Ballinageeragh	SAK-533	New GW abstraction and upgrade Dunhill Ballynageeragh WTP to supply deficit.
East Waterford Water Supply Scheme	SAK-260	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit.
East Waterford Water Supply Scheme	SAK-350	New desalination plant for East Waterford WRZ to supply full demand - Suir Estuary.
East Waterford Water Supply Scheme	SAK-351	New desalination plant for East Waterford WRZ to supply full demand - Tramore or Dunmore East.
East Waterford Water Supply Scheme	SAK-357	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply deficit.
East Waterford Water Supply Scheme	SAK-365	Reintroduce SW abstraction from Knockaderry Impoundment and upgrade Adamstown WTP (algae removal) to supply partial deficit.
Faha	SAK-499	Increase GW abstraction from Faha BH and upgrade Faha WTP to supply deficit.
Faha	SAK-500	New GW abstraction and upgrade Faha WTP to supply deficit.
Fethard & Mullenbawn Regional Public Water Supply	SAK-219	Upgrade existing Dualla WTP for water quality improvements. The WRZ is not in deficit.
Fethard & Mullenbawn Regional Public Water Supply	SAK-225	Upgrade Fethard WTP for water quality improvements. WRZ is not in deficit.
Fethard & Mullenbawn Regional Public Water Supply	SAK-303	Bring Mullinahone/Killaghy WTP into production and upgrade WTP. Supply spare capacity to neighbouring schemes in deficit.
Fews	SAK-557	Increase GW abstraction from Fews BH and upgrade Fews WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Fews	SAK-559	New GW abstraction and upgrade Fews WTP to supply deficit.
Galbally Water Supply	SAK-038	Increase GW abstraction at Galbally BH and upgrade Galbally WTP to supply deficit.
Galbally Water Supply	SAK-039	New GW abstraction and upgrade Galbally WTP/new WTP to supply deficit.
Galbally Water Supply	SAK-040	New SW abstraction from River Aherlow and new WTP to supply full deficit.
Galbally Water Supply	SAK-044	Interconnect Galbally and Ballinamona GWS and supply deficit from Ballinamona GWS.
Galtee Regional	SAK-120	New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit.
Galtee Regional	SAK-122	Increase abstraction at Springmount spring and upgrade Springmount WTP to partly supply deficit.
Galtee Regional	SAK-124	New GW abstraction in karstic region near Springmount and upgrade Springmount WTP to partly supply deficit.
Galtee Regional	SAK-125	New GW abstraction near Kilross and new WTP to partly supply deficit.
Galtee Regional	SAK-126	New SW abstraction from the River Suir and new WTP to supply deficit.
Galtee Regional	SAK-290	Bring Thomastown WTP into production and increase GW abstraction.
Galtee Regional	SAK-306	Increase existing GW abstraction and upgrade Farranamanagh WTP to partly supply deficit.
Garravoone	SAK-595	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Garryahylish	SAK-525	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Glenagad	SAK-568	Upgrade WTP for water quality improvements.
Glengar	SAK-298	New GW abstraction and new WTP to supply deficit.
Graiguenageeha	SAK-505	Increase GW abstraction from BH and upgrade Graiguenageeha WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Herbertstown	SAK-011	Increase GW abstraction at Herberstown Pump Station BH and upgrade Herbertstown WTP to supply deficit.
Herbertstown	SAK-015	New GW abstraction and new WTP to supply deficit.
Herbertstown	SAK-016	New GW abstraction (karstic) and new WTP to supply deficit.
Herbertstown	SAK-017	New SW abstraction from River Camoge and new WTP to for full demand and decommission existing WTPs.
Horse and Jockey	SAK-089	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Inchinleamy	SAK-476	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Kilbrien	SAK-509	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Kilcash	SAK-250	New GW abstraction in karstic region and new WTP to supply deficit.
Kill/Ballylaneen	SAK-601	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Kilmacthomas	SAK-428	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit.
Kilmacthomas	SAK-433	Increase GW abstraction from Parc an Aonaigh Kilmacthomas BH and upgrade Parc an Aonaigh Kilmacthomas WTP to supply deficit.
Kilmanahan	SAK-574	Upgrade WTP for water quality improvements.
Kilteely	SAK-001	Increase GW abstraction at Kilteely BH and upgrade existing Kilteely WTP to supply deficit.
Kilteely	SAK-003	New GW abstraction (karstic) and new WTP to supply deficit.
Knocklong/ Hospital	SAK-026	Increase GW abstraction at Knocklong Church Road and upgrade Knocklong Church Road WTP to supply deficit.
Knocklong/ Hospital	SAK-029	Increase GW abstraction at Knocklong BH and upgrade Knocklong BH WTP to supply deficit.
Knocklong/ Hospital	SAK-032	New GW abstraction (karstic) and new WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Lacken	SAK-514	Increase GW abstraction from BH and upgrade Lacken WTP to supply deficit.
Lacken	SAK-515	New GW abstraction and new WTP to supply deficit.
Lacken	SAK-516	New GW abstraction (karstic) and new WTP to supply deficit.
Liskealty	SAK-478	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Lismore / Cappoquin / Ballyduff (LCB)	SAK-380	New SW abstraction from Blackwater River and new WTP to supply deficit.
Lismore / Cappoquin / Ballyduff (LCB)	SAK-987	Increase GW abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to partly supply deficit. New GW (commission 2018 TW) abstraction and upgrade Lismore Deerpark WTP to partly supply deficit.
Littleton	SAK-113	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Lyreanearla	SAK-569	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Modeligo	SAK-477	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Monatarrif	SAK-570	Increase existing GW abstraction and upgrade Monatarrif WTP to supply deficit.
Moores Well	SAK-402	Increase GW abstraction from existing BH and upgrade Moore's Well WTP to supply deficit.
Moores Well	SAK-404	New GW abstraction (karstic) and new WTP to supply deficit.
Moores Well	SAK-406	New GW abstraction (productive fissured bedrock) and new WTP to supply deficit.
Piltown-Fiddown	SAK-073	New GW and upgrade Jamestown WTP to supply deficit (progressing as project to address RAL).
Portlaw	SAK-560	Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit.
Portlaw	SAK-618	New GW abstraction and new WTP to partly supply deficit.
Poulavanogue (Waterford)	SAK-575	Increase GW abstraction from Poulavanogue BH and upgrade Poulavanogue WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Rathgormack	SAK-468	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Russelstown	SAK-498	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Scrahan	SAK-388	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Smoore	SAK-526	Increase GW abstraction from Smoor Beg BH and upgrade Smoorbeg WTP to supply deficit.
South Kilkenny Environs	SAK-057	Increase GW abstraction from existing BHs and upgrade Mullinabro WTP to supply deficit.
South Kilkenny Environs	SAK-060	New GW abstraction (productive fissured bedrock) and new WTP to supply deficit.
South Kilkenny Environs	SAK-282	New wellfield and new WTP supply deficit.
South Kilkenny Environs	SAK-648	Bring back Silverspring WTP to production and supply deficit.
Stradbally	SAK-411	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Templemore/Templetuohy	SAK-104	New GW abstraction and new WTP to supply deficit.
Templemore/Templetuohy	SAK-105	Interconnect Templemore/Templetuohy and Moyne GWS and supply deficit from GWS.
Templemore/Templetuohy	SAK-106	Rationalise Templetuohy to Templemore [rationalise to College Hill WTP]. Rationalisation within WRZ.
Templemore/Templetuohy	SAK-107	Increase GW abstraction at College Hill BH and upgrade Templemore College Hill WTP to supply deficit.
Templemore/Templetuohy	SAK-109	New SW abstraction from River Suir and new WTP to supply deficit.
Templetney/Brackford Bridge PWS	SAK-183	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit.
Templetney/Brackford Bridge PWS	SAK-187	New GW abstraction and new WTP to supply deficit.
Templetney/Brackford Bridge PWS	SAK-192	New SW abstraction from Anner River and new WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAK	
	Option Code	Option Description
Templetney/Brackford Bridge PWS	SAK-195	New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit.
Thurles	SAK-091	New SW abstraction from River Suir. Treat at new Thurles WTP.
Thurles	SAK-092	Upgrade existing WTPs for water quality improvements. The WRZ is not in deficit.
Tipperary Town Supply	SAK-180	New GW abstraction and new WTP to supply deficit.
Tipperary Town Supply	SAK-181	New SW abstraction from the River Ara new WTP to supply deficit.
Tullohea	SAK-237	New GW abstraction at Ninemilehouse and new WTP to supply deficit.
Two Mile Borris	SAK-085	Increase GW abstraction from Two Mile Borris BH and upgrade Two Mile Borris WTP to supply deficit.
Two Mile Borris	SAK-086	New GW abstraction and upgrade existing Two Mile Borris WTP to supply deficit.

The WRZ options are then assessed against the six approach types, outlined in Table 5.1 and the result of this process is provided in Table 5.3.

Table 5.3 SAK Alignment of WRZ Options with Approach Categories

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Adramone / Kilrossanty	3	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-
		Recommission Knockeylan WTP [GW] and supply deficit.	-	-	✓	-	-	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Ahenny	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Land acquisition required due to lack of space at the WTP site.	✓	✓	✓	✓	✓	✓
Anglesboro Water Supply	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Ardfinnan Regional	3	New SW abstraction from River Suir and new WTP to supply deficit.	-	-	-	-	-	✓
		New SW abstraction from River Tar and upgrade Goatenbridge WTP to supply deficit.	-	✓	-	-	✓	-
		New GW abstraction and new WTP to supply deficit.	✓	-	✓	✓	-	-
Ardmore	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Ardmore Grange	2	New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-
		Increase GW abstraction and upgrade WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Ballinvir	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Ballyguiry	2	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit.	✓	✓	✓	✓	✓	-
		New GW abstraction and new WTP to supply deficit.	-	-	-	-	-	✓
Ballyknock	2	Increase GW abstraction from Ballyknock BH and upgrade Ballyknock WTP to supply deficit.	✓	✓	✓	-	✓	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
		New GW abstraction and upgrade Ballyknock WTP to supply deficit.	-	-	✓	✓	-	-
Ballylanders Water Supply	3	Increase GW abstraction at Ballylanders BH and upgrade Ballylanders Pump Station WTP to supply deficit.	✓	✓	-	-	-	✓
		Interconnect Ballylanders Ballyduff GWSs and supply deficit from GWS.	-	✓	✓	✓	-	✓
		Interconnect Ballylanders and Griston GWS and supply deficit from GWS.	-	-	✓	-	✓	✓
Ballymacarbry	2	New GW abstraction (karstic) and new WTP to supply deficit.	✓	-	✓	✓	-	-
		New GW abstraction and new WTP to supply deficit.	-	✓	-	-	✓	✓
Ballynoe / Melleray	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Ballyogarty	2	Increase GW abstraction from existing BH and upgrade Ballyogarty WTP to supply deficit.	✓	✓	✓	-	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	✓	-	-
Ballysaggart	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Ballyshunnock	2	Increase GW abstraction from BH and Ballyshunnock WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Boolavoonteen / Kilcooney / Touraneena	2	Increase GW abstraction from Touraneena BH and upgrade Touraneena WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-
Burncourt Ballylooby	4	Increase GW abstraction from no.2 BHs and upgrade Ballylooby Springs WTP to supply deficit.	✓	-	-	✓	✓	✓
		Increase GW abstraction from Lissava BH and upgrade Lissava WTP to supply deficit.	-	✓	✓	✓	-	-
		New GW abstraction at Lissava and new WTP to supply deficit.	-	-	✓	-	-	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-
Callan PWS	3	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit.	✓	-	-	-	-	-
		New SW abstraction from King's River and new WTP to supply deficit.	-	-	-	-	✓	✓
		New GW abstraction and new WTP	-	✓	✓	✓	-	-
Carrick-On-Suir	2	New GW abstraction and new Linguan WTP to supply deficit.	✓	✓	-	✓	✓	-
		New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit.	-	✓	✓	-	-	✓
Carrigeen	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Carrigmore	2	Increase GW abstraction at Carrigmore BH and upgrade Carrigmore BH to supply deficit.	✓	✓	✓	✓	✓	-
		New GW abstraction and new WTP to supply deficit.	-	-	-	-	-	✓
Carrignagower	1	New GW abstraction and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Carrowgarriff	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Clonmel & Environs	6	Increase abstraction at Monroe BHs and upgrade Monroe WTP to partly supply deficit.	-	-	-	-	-	-
		New GW abstraction at Monroe wellfield and upgrade Monroe WTP to partly supply deficit.	-	-	-	-	-	-
		New GW abstraction in vicinity of Clonmel and new WTP to partly supply deficit.	-	-	-	-	-	-
		New abstraction from the River Suir and new WTP at Barnes (site identified).	✓	✓	✓	-	-	✓
		New abstraction from the River Suir and upgrade Glenary WTP to supply deficit.	-	-	✓	✓	✓	✓
		New GW abstraction at Showgrounds site in Clonmel town and new WTP to partly supply deficit.	-	-	-	-	-	-
Coalbrook / Commons	1	New GW abstraction and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Crehanagh	2	Increase GW abstraction from Crehanagh BH and upgrade Crehanagh WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and upgrade Crehanagh WTP to supply deficit.	-	-	✓	-	-	-
Deelish/Ballinacourty/ Kilnafrehan	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Dundrum Regional	7	New SW abstraction from River Suir and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		Increase GW abstraction at Ironmills BH and upgrade Ironmills WTP to partly address deficit.	-	-	-	-	-	-
		New GW abstraction to east of Dundrum WRZ and new WTP to partly supply deficit.	-	-	-	-	-	-
		New GW abstraction at Hollyford WSZ and new WTP to partly supply deficit.	-	-	-	-	-	-
		Increase GW abstraction at Hollyford spring and upgrade Hollyford WTP to partly supply deficit.	-	-	-	-	-	-
		Rationalise Hollyford to Ironmills WTP. Rationalisation within WRZ.	-	-	-	-	-	-
		New SW abstraction from River Multeen and new WTP to supply deficit at Hollyford WSZ.	-	-	-	-	-	-
Dungarvan	3	Increase GW abstraction from no. 6 BH and upgrade Ballinamuck WTP to supply deficit.	✓	✓	✓	✓	-	✓
		New GW abstraction from Mapestown wellfield and new WTP and supply deficit.	-	-	✓	-	✓	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
		New SW abstraction from Colligan River and new WTP to supply spare capacity to neighbouring WRZs.	-	-	-	-	-	-
Dunhill	2	Increase GW abstraction from BH and upgrade Dunhill Cois Coille WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	✓	-	-
Dunhill Ballinageeragh	2	Increase GW abstraction from Dunhill BH and upgrade Dunhill Ballynageeragh WTP to supply deficit.	✓	✓	✓	-	✓	✓
		New GW abstraction and upgrade Dunhill Ballynageeragh WTP to supply deficit.	-	-	✓	✓	-	-
East Waterford Water Supply Scheme	5	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit.	✓	-	-	-	-	-
		New desalination plant for East Waterford WRZ to supply full demand - Suir Estuary.	-	-	-	-	-	✓
		New desalination plant for East Waterford WRZ to supply full demand - Tramore or Dunmore East.	-	-	-	-	-	✓
		New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit.	-	-	-	✓	-	-
		Reintroduce SW abstraction from Knockaderry Impoundment and upgrade Adamstown WTP (algae removal) to supply partial deficit.	-	✓	✓	-	✓	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Faha	2	Increase GW abstraction from Faha BH and upgrade Faha WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and upgrade Faha WTP to supply deficit.	-	-	✓	✓	-	✓
Fethard & Mullenbawn Regional Public Water Supply	3	Upgrade existing Dualla WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	-	-	-
		Upgrade Fethard WTP for water quality improvements. WRZ is not in deficit.	✓	✓	-	✓	✓	-
		Bring Mullinahone/Killaghy WTP into production and upgrade WTP. Supply spare capacity to neighbouring schemes in deficit.	-	✓	-	-	-	✓
Fews	2	Increase GW abstraction from Fews BH and upgrade Fews WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and upgrade Fews WTP to supply deficit.	-	-	✓	-	-	-
Galbally Water Supply	4	Increase GW abstraction at Galbally BH and upgrade Galbally WTP to supply deficit.	✓	✓	✓	-	✓	-
		New GW abstraction and upgrade Galbally WTP/new WTP to supply deficit.	-	-	✓	-	-	-
		New SW abstraction from River Aherlow and new WTP to supply full deficit.	-	-	-	-	-	✓
		Interconnect Galbally and Ballinamona GWS and supply deficit from Ballinamona GWS.	-	✓	✓	✓	-	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Galtee Regional	7	New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit.	✓	✓	-	-	-	-
		Increase abstraction at Springmount spring and upgrade Springmount WTP to partly supply deficit.	-	-	-	-	-	-
		New GW abstraction in karstic region near Springmount and upgrade Springmount WTP to partly supply deficit.	-	-	-	-	-	-
		New GW abstraction near Kilross and new WTP to partly supply deficit.	-	-	-	-	-	-
		New SW abstraction from the River Suir and new WTP to supply deficit.	-	-	✓	✓	✓	✓
		Bring Thomastown WTP into production and increase GW abstraction.	-	-	-	-	-	-
		Increase existing GW abstraction and upgrade Farranamanagh WTP to partly supply deficit.	-	-	-	-	-	-
Garravoone	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Garryahylish	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Glenagad	1	Upgrade WTP for water quality improvements.	✓	✓	✓	✓	✓	✓
Glengar	1	New GW abstraction and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Graiguenageeha	1	Increase GW abstraction from BH and upgrade Graiguenageeha WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Herbertstown	4	Increase GW abstraction at Herbertstown Pump Station BH and upgrade Herbertstown WTP to supply deficit.	✓	✓	✓	✓	✓	-
		New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-
		New GW abstraction (karstic) and new WTP to supply deficit.	-	-	✓	-	-	-
		New SW abstraction from River Camoge and new WTP to for full demand and decommission existing WTPs.	-	-	-	-	-	✓
Horse & Jockey PWS	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Inchinleamy	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Kilbrien	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Kilcash	1	New GW abstraction in karstic region and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Kill/Ballylaneen	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Kilmacthomas	2	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit.	✓	✓	✓	✓	-	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
		Increase GW abstraction from Parc an Aonaigh Kilmacthomas BH and upgrade Parc an Aonaigh Kilmacthomas WTP to supply deficit.	-	✓	✓	-	✓	✓
Kilmanahan	1	Upgrade WTP for water quality improvements.	✓	✓	✓	✓	✓	✓
Kilteely	2	Increase GW abstraction at Kilteely BH and upgrade existing Kilteely WTP to supply deficit.	✓	✓	✓	✓	✓	-
		New GW abstraction (karstic) and new WTP to supply deficit.	-	-	✓	-	-	✓
Knocklong/ Hospital	3	Increase GW abstraction at Knocklong Church Road and upgrade Knocklong Church Road WTP to supply deficit.	-	-	✓	✓	✓	-
		Increase GW abstraction at Knocklong BH and upgrade Knocklong BH WTP to supply deficit.	✓	✓	✓	-	-	✓
		New GW abstraction (karstic) and new WTP to supply deficit.	-	-	✓	-	-	-
Lacken	3	Increase GW abstraction from BH and upgrade Lacken WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	-	-	-	✓
		New GW abstraction (karstic) and new WTP to supply deficit.	-	-	-	-	-	-
Liskealty	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Lismore / Cappoquin / Ballyduff (LCB)	2	New SW abstraction from Blackwater River and new WTP to supply deficit.	-	-	-	-	-	✓

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
		Increase GW abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to partly supply deficit. New GW (commission 2018 TW) abstraction and upgrade Lismore Deerpark WTP to partly supply deficit.	✓	✓	✓	✓	✓	-
Littleton PWS	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Lyreanearla	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Modeligo	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Monatarrif	1	Increase existing GW abstraction and upgrade Monatarrif WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Moores Well	3	Increase GW abstraction from existing BH and upgrade Moore's Well WTP to supply deficit.	✓	✓	-	✓	✓	-
		New GW abstraction (karstic) and new WTP to supply deficit.	-	-	✓	-	-	✓
		New GW abstraction (productive fissured bedrock) and new WTP to supply deficit.	-	-	-	-	-	-
Piltown-Fiddown	1	New GW and upgrade Jamestown WTP to supply deficit (progressing as project to address RAL).	✓	✓	✓	✓	✓	✓
Portlaw	2	Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit.	-	✓	✓	✓	✓	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
		New GW abstraction and new WTP to partly supply deficit.	✓	-	✓	-	-	✓
Poulavanogue (Waterford)	1	Increase GW abstraction from Poulavanogue BH and upgrade Poulavanogue WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Rathgormack	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Russelstown	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Scrahan	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Smoore	1	Increase GW abstraction from Smoor Beg BH and upgrade Smoorbeg WTP to supply deficit.	✓	✓	✓	✓	✓	✓
South Kilkenny Environs	4	Increase GW abstraction from existing BHs and upgrade Mullinabro WTP to supply deficit.	-	-	-	-	-	✓
		New GW abstraction (productive fissured bedrock) and new WTP to supply deficit.	-	-	-	-	-	-
		New wellfield and new WTP supply deficit.	-	-	-	✓	-	-
		Bring back Silverspring WTP to production and supply deficit.	✓	✓	✓	-	✓	✓
Stradbally	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Templemore/Templetuohy	5	New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
		Interconnect Templemore/Templetuohy and Moyne GWS and supply deficit from GWS.	-	✓	-	-	✓	-
		Rationalise Templetuohy to Templemore [rationalise to College Hill WTP]. Rationalisation within WRZ.	✓	-	-	✓	-	-
		Increase GW abstraction at College Hill BH and upgrade Templemore College Hill WTP to supply deficit.	-	✓	-	-	-	-
		New SW abstraction from River Suir and new WTP to supply deficit.	-	-	-	-	-	✓
Templetney/Brackford Bridge PWS	4	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit.	-	✓	✓	✓	✓	-
		New GW abstraction and new WTP to supply deficit.	✓	-	✓	-	-	-
		New SW abstraction from Anner River and new WTP to supply deficit.	-	-	✓	-	-	-
		New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit.	-	-	✓	-	-	✓
Thurles / Borrisoleigh	2	New SW abstraction from River Suir. Treat at new Thurles WTP.	-	-	-	-	-	-
		Upgrade existing WTPs for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Tipperary Town Supply	2	New GW abstraction and new WTP to supply deficit.	✓	✓	✓	✓	-	✓
		New SW abstraction from the River Ara new WTP to supply deficit.	-	-	✓	-	✓	-

Water Resource Zone Name	Feasible Options SAK		Approach					
	No. of WRZ Options	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Tullohea	1	New GW abstraction at Ninemilehouse and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Two Mile Borris	2	Increase GW abstraction from Two Mile Borris BH and upgrade Two Mile Borris WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and upgrade existing Two Mile Borris WTP to supply deficit.	-	-	✓	-	-	-

The 7-Step Process outlined in Figure 5.1 was then applied to each WRZ in SAK, in order to develop a WRZ level approach. A summary of the outcome of this assessment at WRZ level (i.e. WRZ options only) is shown in Table 5.4.

The findings of the Preferred Approach Development for SAK at WRZ level, include the following:

- In terms of Best AA, 12 WRZ options score a 0 in relation to potential impact on a designated European Site;
- In 58 of the 75 Water Resource Zones, the Preferred Approach consists of the same Plan Level options as the Best AA and Best Environmental Approaches.
- 4 WRZ options have a -3 AA score against the European Site (Biodiversity) question. A -3 Score against biodiversity indicates a potential high risk (without mitigation measures) under the biodiversity criterion for a European Site

Preferred Approaches at WRZ level are outlined in Table 5.4.

Table 5.4 SAK WRZ Approach Options

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Adramone / Kilrossanty	SAK-450	Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ahenny	SAK-233	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit. Land acquisition required due to lack of space at the WTP site.	-	✓	✓	✓	✓	✓	✓	✓
Anglesboro Water Supply	SAK-055	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Ardfinnan Regional	SAK-156	New SW abstraction from River Tar and upgrade Goatenbridge WTP to supply deficit.	-	-	✓	-	-	✓	-	✓
Ardmore	SAK-392	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Ardmore Grange	SAK-625	Increase GW abstraction and upgrade WTP to supply deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Ballinvir	SAK-248	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ballyguiry	SAK-472	Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit.	-	✓	✓	✓	✓	✓	-	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Ballyknock	SAK-580	Increase GW abstraction from Ballyknock BH and upgrade Ballyknock WTP to supply deficit.	-	✓	✓	✓	-	✓	✓	✓
Ballylanders Water Supply	SAK-046	Increase GW abstraction at Ballylanders BH and upgrade Ballylanders Pump Station WTP to supply deficit.	-	✓	✓	-	-	-	✓	✓
Ballymacarbry	SAK-441	New GW abstraction (karstic) and new WTP to supply deficit.	-	✓	-	✓	✓	-	-	✓
Ballynoe / Melleray	SAK-386	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ballyogarty	SAK-393	Increase GW abstraction from existing BH and upgrade Ballyogarty WTP to supply deficit.	-	✓	✓	✓	-	✓	✓	✓
Ballysaggart	SAK-420	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ballyshunnock	SAK-481	Increase GW abstraction from BH and Ballyshunnock WTP to supply deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Boolavoonteen / Kilcooney / Touraneena	SAK-444	Increase GW abstraction from Touraneena BH and upgrade Touraneena WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Burncourt Ballylooby	SAK-211	Increase GW abstraction from no.2 BHs and upgrade Ballylooby Springs WTP to supply deficit.	-	✓	-	-	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Callan PWS	SAK-077	Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit.		✓	-	-	-	✓	-	✓
Carrick-On-Suir	SAK-202	New GW abstraction and new Linguan WTP to supply deficit.	-	✓	✓	-	✓	✓	-	✓
Carrigeen	SAK-548	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Carrigmore	SAK-123	Increase GW abstraction at Carrigmore BH and upgrade Carrigmore BH to supply deficit.	✓	✓	✓	✓	✓	✓	-	✓
Carrignagower	SAK-622	New GW abstraction and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Carrowgarriff	SAK-416	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Clonmel & Environs	SAK-140	New abstraction from the River Suir and new WTP at Barnes (site identified)	-	✓	✓	✓	-	-	✓	✓
Coalbrook / Commons	SAK-247	New GW abstraction and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Crehanagh	SAK-585	Increase GW abstraction from Crehanagh BH and upgrade Crehanagh WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Deelish/Ballinacourty/Kilnafrehan	SAK-387	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Dundrum Regional	SAK-165	New SW abstraction from River Suir and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Dungarvan	SAK-461	Increase GW abstraction from no. 6 BH and upgrade Ballinamuck WTP to supply deficit.	-	✓	✓	✓	✓	-	✓	✓
Dunhill - Cois Coille	SAK-488	Increase GW abstraction from BH and upgrade Dunhill Cois Coille WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Dunhill Ballinageeragh	SAK-532	Increase GW abstraction from Dunhill BH and upgrade Dunhill Ballynageeragh WTP to supply deficit.	-	✓	✓	✓	-	✓	✓	✓
East Waterford Water Supply Scheme	SAK-260	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit.	-	✓	-	-	-	-	-	✓
Faha	SAK-499	Increase GW abstraction from Faha BH and upgrade Faha WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Fethard & Mullenbawn Regional Public Water Supply	SAK-225	Upgrade Fethard WTP for water quality improvements. WRZ is not in deficit.	-	✓	✓	-	✓	✓	-	✓
Fethard & Mullenbawn Regional Public Water Supply	SAK-219	Upgrade existing Dualla WTP for water quality improvements. The WRZ is not in deficit.	✓	-	✓	✓	-	-	-	✓
Fews	SAK-557	Increase GW abstraction from Fews BH and upgrade Fews WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Galbally Water Supply	SAK-038	Increase GW abstraction at Galbally BH and upgrade Galbally WTP to supply deficit.	-	✓	✓	✓	-	✓	-	✓
Galtee Regional	SAK-120	New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit.	-	✓	✓	-	-	-	-	✓
Garravoone	SAK-595	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Garryahylish	SAK-525	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Glenagad	SAK-568	Upgrade WTP for water quality improvements.	-	✓	✓	✓	✓	✓	✓	✓
Glengar	SAK-298	New GW abstraction and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Graiguenageeha	SAK-505	Increase GW abstraction from BH and upgrade Graiguenageeha WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Herbertstown	SAK-011	Increase GW abstraction at Herbertstown Pump Station BH and upgrade Herbertstown WTP to supply deficit.	✓	✓	✓	✓	✓	✓	-	✓
Horse & Jockey PWS	SAK-089	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Inchinleamy	SAK-476	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Kilbrien	SAK-509	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Kilcash	SAK-250	New GW abstraction in karstic region and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Kill/Ballylaneen	SAK-601	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Kilmacthomas	SAK-428	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit.	-	✓	✓	✓	✓	-	✓	✓
Kilmanahan	SAK-574	Upgrade WTP for water quality improvements.	-	✓	✓	✓	✓	✓	✓	✓
Kilteely	SAK-001	Increase GW abstraction at Kilteely BH and upgrade existing Kilteely WTP to supply deficit.	✓	✓	✓	✓	✓	✓	-	✓
Knocklong/ Hospital	SAK-029	Increase GW abstraction at Knocklong BH and upgrade Knocklong BH WTP to supply deficit.	✓	✓	✓	✓	-	-	✓	✓
Lacken	SAK-514	Increase GW abstraction from BH and upgrade Lacken WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Liskealty	SAK-478	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Lismore / Cappoquin / Ballyduff (LCB)	SAK-987	Increase GW abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to partly supply deficit. New GW (commission 2018 TW) abstraction and upgrade Lismore Deerpark WTP to partly supply deficit.	-	✓	✓	✓	✓	✓	-	✓
Littleton PWS	SAK-113	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Lyrenaleara	SAK-569	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Modeligo	SAK-477	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Monatarrif	SAK-570	Increase existing GW abstraction and upgrade Monatarrif WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Moores Well	SAK-402	Increase GW abstraction from existing BH and upgrade Moore's Well WTP to supply deficit.	-	✓	✓	-	✓	✓	-	✓
Piltown-Fiddown	SAK-073	New GW and upgrade Jamestown WTP to supply deficit (progressing as project to address RAL).	-	✓	✓	✓	✓	✓	✓	✓
Portlaw	SAK-560	Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit.	-	-	✓	✓	✓	✓	-	✓
Portlaw	SAK-618	New GW abstraction and new WTP to partly supply deficit.	-	✓	-	✓	-	-	✓	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Poulavanogue (Waterford)	SAK-575	Increase GW abstraction from Poulavanogue BH and upgrade Poulavanogue WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Rathgormack	SAK-468	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Russelstown	SAK-498	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Scrahan	SAK-388	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Smoore	SAK-526	Increase GW abstraction from Smoor Beg BH and upgrade Smoorbeg WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
South Kilkenny	SAK-648	Bring back Silverspring WTP to production and supply deficit.	-	✓	✓	✓	-	✓	✓	✓
Stradbally	SAK-411	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Templemore/Templetuohy	SAK-106	Rationalise Templetuohy to Templemore [rationalise to College Hill WTP]. Rationalisation within WRZ.	-	✓	-	-	✓	-	-	✓
Templetney/Brackford Bridge PWS	SAK-183	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit.	-	-	✓	✓	✓	✓	-	✓

Water Resource Zone Name	Feasible Options SAK		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Thurles / Borrisoleigh	SAK-092	Upgrade existing WTPs for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Tipperary Town Supply	SAK-180	New GW abstraction and new WTP to supply deficit.	-	✓	✓	✓	✓	-	✓	✓
Tullohea	SAK-237	New GW abstraction at Ninemilehouse and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Two Mile Borris	SAK-085	Increase GW abstraction from Two Mile Borris BH and upgrade Two Mile Borris WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓

5.2.2 Stage 2 - Preferred Approach Development at the Study Area Level

The Second Stage of our Approach Development Process involves identifying the Study Area options that can address Need in more than one WRZ within the Study Area, and then develop various combinations which contain elements of the different options. These are called SA Combinations. SA Combinations will consist of a number of different individual projects or options; however, the benefit of looking at them in the round at a plan level is to consider the wider, more holistic, spatial scale benefits the plan level assessment has in considering what options might work across multiple WRZ's.

For each Study Area, one of the SA Combinations will always be the WRZ Level Approach. The WRZ Level Approach is the combination of all of the individual the Preferred Approach at WRZ level for the entire Study Area. Table 5.5 below provides a summary of the 124 Study Area options.

Table 5.5 SAK Grouped Options

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Kilteely Herbertstown	SAK-801	Increase GW abstraction at Herbertstown Pump Station BH and upgrade Herbertstown WTP to supply deficit. Interconnect Kilteely and Herbertstown WRZs for increased resilience and supply deficit from Herbertstown WRZ.	Group 1
Kilteely Herbertstown	SAK-802	Rationalise Kilteely and Herbertstown to Limerick City WRZ.	Group 2
Kilteely Herbertstown	SAK-803	Increase GW abstraction at Kilteely BH and upgrade existing Kilteely WTP to supply deficit. Rationalise Herbertstown to Kilteely WRZ.	Group 3
Kilteely Herbertstown	SAK-805	Increase GW abstraction at Herbertstown Pump Station BH and upgrade Herbertstown WTP to supply deficit. Rationalise Kilteely to Herbertstown WRZ.	Group 5
Kilteely Oola / Pallasgreen	SAK-806	Rationalise Kilteely to Oola / Pallasgreen WRZ (Oola WTP).	Group 6
Herbertstown Knocklong/ Hospital	SAK-807	Increase GW abstraction at Herbertstown Pump Station BH and upgrade Herbertstown WTP to supply deficit. Interconnect Knocklong/Hospital and Herbertstown WRZ and supply deficit from Herbertstown WRZ.	Group 7
Herbertstown Knocklong/ Hospital	SAK-808	New SW abstraction from River Camoge and new WTP to for full demand and decommission existing WTPs. Interconnect Knocklong/Hospital and Herbertstown WRZ and supply deficit from Herbertstown WRZ.	Group 8
Knocklong/ Hospital Galbally Water Supply	SAK-809	Increase GW abstraction at Knocklong Church Road and upgrade Knocklong Church Road WTP to supply deficit. Increase GW abstraction at Knocklong BH and upgrade Knocklong BH WTP to supply deficit. Rationalise Galbally to Knocklong/Hospital WRZ.	Group 9

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Ballylanders Water Supply Martinstown Water Supply	SAK-810	Rationalise Ballylanders to Martinstown WRZ.	Group 10
Galbally Water Supply Ballylanders Water Supply	SAK-812	Increase GW abstraction at Ballylanders BH and upgrade Ballylanders Pump Station WTP to supply deficit. Rationalise Galbally to Ballylanders WRZ.	Group 12
Knocklong/ Hospital Ballylanders Water Supply	SAK-813	Increase GW abstraction at Knocklong Church Road and upgrade Knocklong Church Road WTP to supply deficit. Increase GW abstraction at Knocklong BH and upgrade Knocklong BH WTP to supply deficit. Rationalise Ballylanders to Knocklong/Hospital WRZ.	Group 13
Kilteely Knocklong/ Hospital Galbally Water Supply Ballylanders Water Supply Galtee Regional	SAK-815	New SW abstraction from the River Suir and new WTP to supply deficit in Galtee Regional WRZ. Rationalise Ballylanders, Kilteely, Knocklong/ Hospital and Galbally WRZs to Galtee Regional WRZ.	Group 15
Galtee Regional Clonmel Ardfinnan Regional	SAK-816	New abstraction from Suir and new WTP [Barnes site] for Galtee RWSS, Clonmel and Ardfinnan RWSS to address combined deficit. New abstraction is located at Clonmel.	Group 16
South Kilkenny Carrick-On-Suir	SAK-818	Increase SW abstraction from Lingaun River and upgrade Linguan WTP to partly supply deficit. Interconnect South Kilkenny and Carrick-on-Suir WRZs for improved resilience and supply deficit from Linguan WTP.	Group 18
South Kilkenny Carrick-On-Suir	SAK-819	New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit. Interconnect South Kilkenny and Carrick-on-Suir WRZs for improved resilience and supply deficit.	Group 19
Piltown-Fiddown Carrick-On-Suir	SAK-820	New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit. Rationalise Piltown-Fiddown to Carrick-on-Suir.	Group 20
South Kilkenny Piltown-Fiddown	SAK-821	Increase GW abstraction from existing BHs and upgrade Mullinabro WTP to supply deficit. Rationalise Piltown-Fiddown to South Kilkenny WRZ.	Group 21
South Kilkenny East Waterford Water Supply Scheme	SAK-823	Increase GW abstraction from existing BHs and upgrade Mullinabro WTP to supply deficit. Interconnect East Waterford and South Kilkenny WRZs and supply deficit from Mullinabro WTP.	Group 23

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
South Kilkenny East Waterford Water Supply Scheme	SAK-825	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Interconnect South Kilkenny and East Waterford WRZs for improved resilience and supply deficit.	Group 25
South Kilkenny East Waterford Water Supply Scheme	SAK-827	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise South Kilkenny to East Waterford WRZ.	Group 27
South Kilkenny East Waterford Water Supply Scheme	SAK-828	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Interconnect South Kilkenny and East Waterford WRZ for improved resilience and supply deficit.	Group 28
Callan PWS Fethard & Mullenbawn Regional Public Water Supply	SAK-832	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighbouring WRZ in deficit. Rationalise Callan to Fethard WRZ.	Group 32
Callan PWS Fethard & Mullenbawn Regional Public Water Supply	SAK-833	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighbouring WRZ in deficit. Interconnect Callan and Fethard WRZs for improved resilience and supply deficit from Mullinbawn WTP.	Group 33
Clonmel Glenagad Poulavanogue (Waterford)	SAK-834	Increase abstraction at Monroe BHs and upgrade Monroe WTP to partly supply deficit. Rationalise Poulavanogue (Waterford) and Glenagad to Clonmel WRZ.	Group 34
Clonmel Glenagad Poulavanogue (Waterford)	SAK-836	New abstraction from the River Suir and new WTP [Barnes site] to supply deficit. Rationalise Poulavanogue (Waterford) and Glenagad to Clonmel WRZ.	Group 36
Rathgormack Ballyknock Crehanagh Garravoone Carrick-On-Suir	SAK-837	New GW abstraction and new Linguan WTP to supply deficit in Clonmel. Rationalise Rathgormack, Ballyknock, Crehanagh and Garravoone to Carrick on Suir WRZ.	Group 37
Rathgormack Ballyknock Crehanagh Garravoone Carrick-On-Suir	SAK-838	New SW abstraction from River Suir upstream of Carrick-on-Suir and new WTP to supply deficit. Rationalise Rathgormack, Ballyknock, Crehanagh and Garravoone to Carrick on Suir WRZ.	Group 38

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Horse & Jockey PWS Littleton PWS	SAK-839	Increase GW abstraction at Curraheen BH and upgrade Curragheen WTP to supply spare capacity to neighbouring scheme. Rationalise Littleton to Horse and Jockey WRZ.	Group 39
Templetney/Brackford Bridge PWS Ahenny	SAK-840	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit. Rationalise Ahenny to Templetney/Brackford Bridge WRZ.	Group 40
Clonmel Templetney/Brackford Bridge PWS	SAK-841	New abstraction from the River Suir and new WTP at Barnes site to supply deficit. Rationalise Templetney/Brackford Bridge to Clonmel.	Group 41
Clonmel Templetney/Brackford Bridge PWS	SAK-842	New abstraction from the River Suir and new WTP at Barnes site to supply deficit. Interconnect Templetney/Brackford Bridge and Clonmel WRZs and supply deficit from Clonmel.	Group 42
Clonmel Ardfinnan Regional	SAK-846	New abstraction from the River Suir and new WTP at Barnes site to supply deficit in Clonmel WRZ. Interconnect Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel.	Group 46
Ardfinnan Regional Burncourt Ballylooby	SAK-847	New GW abstraction and upgrade Lissava WTP to supply deficit in Burncourt Ballylooby WRZ. Interconnect Ardfinnan Regional and Burncourt/Ballylooby WRZs and partly supply deficit from Burncourt/Ballylooby.	Group 47
Ardfinnan Regional Burncourt Ballylooby	SAK-848	New SW abstraction from River Suir and new WTP to supply deficit in Ardfinnan Regional WRZ. Interconnect Burncourt Ballylooby Ardfinnan Regional WRZs and supply deficit from Ardfinnan Regional.	Group 48
Ardfinnan Regional Burncourt Ballylooby	SAK-850	New SW abstraction from River Tar and upgrade Goatenbridge WTP to supply deficit in Ardfinnan Regional WRZ. Interconnect Burncourt Ballylooby Ardfinnan Regional WRZs and supply deficit from Ardfinnan Regional.	Group 50
Templetney/Brackford Bridge PWS Carrick-On-Suir	SAK-851	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit. Interconnect Carrick-On-Suir and Templetney/Brackford Bridge WRZs and supply deficit from Templetney/Brackford Bridge.	Group 51
Templetney/Brackford Bridge PWS Carrick-On-Suir	SAK-852	New SW abstraction from Anner River and new WTP to supply deficit. Interconnect Carrick-On-Suir and Templetney/Brackford Bridge WRZs and supply deficit from Templetney/Brackford Bridge.	Group 52

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Fethard & Mullenbawn Regional Public Water Supply Coalbrook / Commons	SAK-853	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighbouring WRZ in deficit. Interconnect Coalbrook / Commons and Fethard & Mullenbawn and supply deficit from Fethard & Mullenbawn.	Group 53
Fethard & Mullenbawn Regional Public Water Supply Coalbrook / Commons	SAK-854	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighbouring WRZ in deficit. Rationalise Coalbrook/Commons to Fethard & Mullenbawn WRZ.	Group 54
Horse & Jockey PWS Thurles / Borrisoleigh	SAK-857	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey to Thurles WRZ.	Group 57
Templetney/Brackford Bridge PWS Tullohea Kilcash	SAK-858	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit. Rationalise Tullohea and Kilcash WRZs to Templetney/Brackford Bridge WRZ.	Group 58
Templetney/Brackford Bridge PWS Tullohea Kilcash	SAK-859	New SW abstraction from Anner River and new WTP to supply deficit. Rationalise Tullohea and Kilcash WRZs to Templetney/Brackford Bridge WRZ.	Group 59
Thurles / Borrisoleigh Littleton PWS	SAK-860	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Littleton to Thurles WRZ.	Group 60
Thurles / Borrisoleigh Templemore/Templetuohy	SAK-861	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Templemore/Templetuohy to Thurles WRZ.	Group 61
Thurles / Borrisoleigh Templemore/Templetuohy	SAK-862	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Interconnect Templemore/Templetuohy and Thurles WRZs and supply deficit from Thurles.	Group 62
Templemore/Templetuohy Roscrea	SAK-863	Rationalise Templemore/Templetuohy to Roscrea WRZ [Glenbehagh WTP].	Group 63
Two Mile Borris Thurles / Borrisoleigh	SAK-864	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Two Mile Borris to Thurles WRZ.	Group 64
Galtee Regional Tipperary Town Supply	SAK-866	New SW abstraction from the River Suir and new WTP to supply deficit in Galtee Regional WRZ. Interconnect Tipperary Town and & Galtee Regional and supply deficit from Galtee Regional.	Group 66

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Thurles / Borrisoleigh Dundrum Regional	SAK-868	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles.	Group 68
Galtee Regional Dundrum Regional	SAK-869	New SW abstraction from the River Suir and new WTP to supply deficit in Galtee Regional WRZ. Interconnect Dundrum Regional with Galtee Regional WRZ and supply deficit from Galtee Regional.	Group 69
Galtee Regional Clonmel & Environs Ardfinnan Regional	SAK-871	New abstraction from Suir and new WTP for Galtee RWSS, Clonmel and Ardfinnan RWSS to address combined deficit. New abstraction is located at Caher.	Group 71
South Kilkenny East Waterford Water Supply Scheme	SAK-872	New wellfield and new WTP in South Kilkenny WRZ supply deficit. Interconnect East Waterford and South Kilkenny WRZs and supply deficit from South Kilkenny.	Group 72
Thurles / Borrisoleigh Templemore/Templetuohy	SAK-873	Bring Borrisoleigh WTP into production and upgrade WTP. Interconnect with Templemore/Templetuohy WRZ.	Group 73
Russelstown Kilmanahan Clonmel & Environs	SAK-874	New abstraction from the River Suir and upgrade Glenary WTP to supply deficit. Rationalise Kilmanahan and Russelstown to Clonmel WRZ.	Group 74
Tullohea Kilcash	SAK-875	New GW abstraction at Ninemilehouse and new WTP to supply deficit. Rationalise Kilcash to Tullohea WRZ.	Group 75
Tullohea Ballinvir	SAK-876	New GW abstraction at Ninemilehouse and new WTP to supply deficit. Rationalise Ballinvir to Tullohea WRZ.	Group 76
Coalbrook / Commons Urlingford-Johnstown PWS	SAK-877	Interconnect Coalbrook / Commons to Urlingford-Johnstown PWS WRZ (SA 6) [new GW abstraction] to supply partial deficit.	Group 77
Glengar Dundrum Regional	SAK-878	Increase GW abstraction at Ironmills BH and upgrade Ironmills WTP to partly address deficit. Rationalise Glengar to Dundrum Regional WRZ.	Group 78
Templemore/Templetuohy New Shannon Source	SAK-880	Connect Templemore/Templetuohy to WSP.	Group 80
Fethard & Mullenbawn Regional Public Water	SAK-881	Bring Mullinahone/Killaghy WTP into production and upgrade WTP. Supply spare capacity to neighbouring schemes in deficit.	Group 81

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Supply Callan PWS		Interconnect Callan with Fethard & Mullenbawn Regional WTZ [Kilaghy WTP] and supply deficit.	
Lismore / Cappoquin / Ballyduff (LCB) Dungarvan	SAK-902	New GW abstraction from Mapestown wellfield and new WTP and supply deficit. Interconnect Lismore / Cappoquin / Ballyduff (LCB) and Dungarvan WRZs and supply deficit from Dungarvan.	Group 102
Scrahan Kilmacthomas	SAK-903	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit. Rationalise Scrahan to Kilmacthomas to address water quality issues.	Group 103
Lismore / Cappoquin / Ballyduff (LCB) Moores Well	SAK-907	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. Rationalise Moores Well to Lismore/ Cappoquin/ Ballyduff (LCB) WRZ.	Group 107
Lismore / Cappoquin / Ballyduff (LCB) Moores Well	SAK-909	New SW abstraction from Blackwater River and new WTP to supply deficit. Rationalise Moores Well to Lismore/ Cappoquin/ Ballyduff (LCB) WRZ.	Group 109
Stradbally Adramone / Kilrossanty	SAK-916	Supply spare capacity to Adramone/Kilrossanty WRZ and upgrade Stradbally WTP. Rationalise Adramone / Kilrossanty to Stradbally WRZ.	Group 116
Dungarvan Ballyguiry	SAK-919	New GW abstraction from Mapestown wellfield and new WTP and supply deficit. Rationalise Ballyguiry to Dungarvan WRZ.	Group 119
Stradbally Graiguenageeha	SAK-921	Supply spare capacity to Graiguenageeha WRZ and upgrade Stradbally WTP.	Group 121
Lismore / Cappoquin / Ballyduff (LCB) Lacken	SAK-922	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. Rationalise Lacken to Lismore / Cappoquin / Ballyduff (LCB) WRZ.	Group 122
Lismore / Cappoquin / Ballyduff (LCB) Lacken	SAK-924	New SW abstraction from Blackwater River and new WTP to supply deficit. Rationalise Lacken to Lismore / Cappoquin / Ballyduff (LCB) WRZ.	Group 124
Moores Well Lacken	SAK-925	Increase GW abstraction from existing BH and upgrade Moore's Well WTP to supply deficit. Rationalise Lacken to Moore's Well WRZ.	Group 125

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Moores Well Lacken	SAK-926	New GW abstraction (karstic) and new WTP to supply deficit in Moores Well WRZ. Rationalise Lacken to Moore's Well WRZ.	Group 126
Moores Well Lacken	SAK-927	New GW abstraction (productive fissured bedrock) and new WTP to supply deficit in Moore's Well WRZ. Rationalise Lacken to Moore's Well WRZ.	Group 127
Dunhill Dunhill Ballinageeragh	SAK-928	Increase GW abstraction from BH and upgrade Dunhill Cois Coille WTP to supply deficit. Rationalise Dunhill Ballinageeragh to Dunhill WRZ.	Group 128
Dunhill Dunhill Ballinageeragh	SAK-929	New SW abstraction from Dunhill River and new WTP [full deficit] to supply Dunhill and Dunhill Ballinageeragh WRZs. Decommission existing WTPs.	Group 129
Dunhill Dunhill Ballinageeragh	SAK-930	Increase GW abstraction from BH and upgrade Dunhill Cois Coille WTP to supply deficit. Interconnect Dunhill Ballinageeragh and Dunhill and supply deficit from Dunhill WRZ.	Group 130
Kilmacthomas Fews	SAK-933	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit. Rationalise Fews to Kilmacthomas WRZ.	Group 133
Crehanagh Garravoone	SAK-935	Increase existing GW abstraction from Garravoone BH and upgrade Garravoone WTP to supply spare capacity to neighbouring WRZ in deficit. Rationalise Crehanagh to Garravoone WRZ.	Group 135
Dunhill Dunhill Ballinageeragh Kill/Ballylaneen	SAK-937	Supply spare capacity from Kill/Ballylaneen to Dunhill and Dunhill Ballinageeragh WRZs and upgrade Ballylaneen WTP. Rationalise Dunhill and Dunhill Ballinageeragh to Kill/Ballylaneen WRZ.	Group 137
East Waterford Water Supply Scheme Portlaw	SAK-938	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Portlaw to East Waterford WRZ to address water quality issues.	Group 138
Ardmore Ardmore Grange	SAK-940	Increase GW abstraction at Ardmore and supply spare capacity to neighbouring schemes in deficit. Rationalise Ardmore Grange to Ardmore WRZ.	Group 140
Carrignagower Monatarrif	SAK-941	New GW abstraction at Carrignagower and new WTP to supply deficit. Rationalise Monatarrif to Carrignagower WRZ.	Group 141

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
East Waterford Water Supply Scheme Portlaw	SAK-942	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Portlaw to East Waterford WRZ to address water quality issues.	Group 142
East Waterford Water Supply Scheme Ballyogarty Kilmacthomas Dunhill - Cois Coille Smoore Dunhill Ballinageeragh Fews Kill/Ballylaneen Scrahan	SAK-943	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Dunhill - Cois Coille, Smoore, Dunhill Ballinageeragh, Fews, Kill/Ballylaneen, and Scrahan to East Waterford WRZ.	Group 143
East Waterford Water Supply Scheme Rathgormack Ballyshunnock Carrigeen Portlaw Ballyknock Crehanagh Garravoone	SAK-944	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Rathgormack, Ballyshunnock, Carrigeen, Portlaw, Ballyknock, Crehanagh and Garravoone to East Waterford WRZ.	Group 144
East Waterford Water Supply Scheme Rathgormack Ballyshunnock Carrigeen Portlaw Ballyknock Crehanagh Garravoone	SAK-945	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Rathgormack, Ballyshunnock, Carrigeen, Portlaw, Ballyknock, Crehanagh and Garravoone to East Waterford WRZ.	Group 145
East Waterford Water Supply Scheme Portlaw	SAK-946	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Portlaw to East Waterford WRZ to address water quality issues.	Group 146
East Waterford Water Supply Scheme Ballyshunnock Portlaw	SAK-947	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Ballyshunnock and Portlaw to East Waterford WRZ.	Group 147
East Waterford Water Supply Scheme Ballyogarty Stradbally Kilmacthomas Dunhill - Cois Coille Smoore Dunhill Ballinageeragh Fews Kill/Ballylaneen Scrahan	SAK-948	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Ballyogarty, Kilmacthomas, Dunhill - Cois Coille, Smoore, Dunhill Ballinageeragh, Kill/Ballylaneen, Scrahan and Fews to Adamstown WTP.	Group 148

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
East Waterford Water Supply Scheme Ballyogarty Kilmacthomas Faha Smoore Fews Kill/Ballylaneen Scrahan Dunhill - Cois Coille Dunhill Ballinageeragh	SAK-949	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ.	Group 149
East Waterford Water Supply Scheme Ballyogarty Stradbally Kilmacthomas Adramone / Kilrossanty Dunhill - Cois Coille Faha Graiguenageeha Garrahylish Smoore Dunhill Ballinageeragh Fews Kill/Ballylaneen Scrahan	SAK-950	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Ballyogarty, Stradbally, Kilmacthomas, Adramone / Kilrossanty, Dunhill - Cois Coille, Faha, Graiguenageeha, Garrahylish, Smoore, Dunhill Ballinageeragh, Fews, Kill/Ballylaneen, and Scrahan to Adamstown WTP.	Group 150
Ballyogarty Kilmacthomas	SAK-953	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit. Rationalise Ballyogarty to Kilmacthomas WRZ.	Group 153
Carrignagower Ballysaggart	SAK-954	Rationalise Carrignagower to Ballysaggart [spare capacity].	Group 154
Dungarvan Lismore / Cappoquin / Ballyduff (LCB)	SAK-955	New SW abstraction from Blackwater River and new WTP to supply deficit in Lismore/ Cappoquin/ Ballyduff. Interconnect Dungarvan and Lismore/ Cappoquin/ Ballyduff and supply deficit from Lismore/ Cappoquin/ Ballyduff WRZ.	Group 155
East Waterford Water Supply Scheme Ballyshunnock	SAK-957	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Ballyshunnock to East Waterford WRZ.	Group 157
East Waterford Water Supply Scheme Ballyshunnock	SAK-958	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyshunnock to East Waterford WRZ.	Group 158
Kilteely Knocklong/ Hospital	SAK-961	Increase GW abstraction at Knocklong Church Road and upgrade Knocklong Church Road WTP to supply deficit. Interconnect Kilteely and Knocklong Hospital WRZs for increased resilience and supply deficit from Knocklong Hospital WRZ.	Group 161

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Ballylanders Water Supply Limerick City	SAK-964	Rationalise Ballylanders to Limerick City (Clareville WTP).	Group 164
Lismore / Cappoquin / Ballyduff (LCB) Lacken Moores Well	SAK-967	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. Rationalise Lacken and Morees Well to Lismore / Cappoquin / Ballyduff (LCB) WRZ.	Group 167
Lismore / Cappoquin / Ballyduff (LCB) Lacken Moores Well	SAK-968	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Lacken and Morees Well to Lismore / Cappoquin / Ballyduff (LCB) WRZ.	Group 168
Kilmacthomas Fews Scrahan Ballyogarty	SAK-969	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit. Rationalise Fews, Scrahan and Ballyogarty to Kilmacthomas WRZ.	Group 169
Stradbally Graiguenageeha Adramone / Kilrossanty	SAK-970	Supply spare capacity to Adramone/Kilrossanty and Graiguenageeha WRZs and upgrade Stradbally WTP. Rationalise Graiguenageeha and Adramone/Kilrossanty to Stradbally WRZ.	Group 170
Ballysaggart Monatarrif Carrignagower	SAK-971	Rationalise Carrignagower and Monatarrif to Ballysaggart [spare capacity].	Group 171
Ballysaggart Monatarrif Carrignagower Lismore / Cappoquin / Ballyduff (LCB)	SAK-972	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Ballysaggart, Monatarrif and Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ.	Group 172
Ballysaggart Monatarrif Carrignagower Lismore / Cappoquin / Ballyduff (LCB) Lacken Moores Well	SAK-973	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Ballysaggart, Monatarrif, Lacken, Moore's Well,	Group 173

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
		and Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ.	
Horse & Jockey PWS Littleton PWS Templemore/Templetuohy Two Mile Borris Thurles / Borrisoleigh	SAK-974	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, Templemore/Templetuohy and Two Mile Borris to Thurles WRZ.	Group 174
Horse & Jockey PWS Littleton PWS Dundrum Regional Two Mile Borris Thurles / Borrisoleigh Glengar	SAK-975	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ.	Group 175
Horse & Jockey PWS Littleton PWS Dundrum Regional Two Mile Borris Thurles / Borrisoleigh Glengar Templemore/Templetuohy	SAK-976	Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, Templemore/Templetuohy and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ.	Group 176
Templetney/Brackford Bridge PWS Tullohea Kilcash Ahenny Ballinvir	SAK-977	Increase GW abstraction from existing no.3 BHs and upgrade Templetney WTP to supply deficit. Rationalise Tullohea, Kilcash, Ahenny and Ballinvir to Templetney/Brackford Bridge WRZ.	Group 177
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional	SAK-978	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel.	Group 178
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Russelstown Kilmanahan	SAK-979	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel. Rationalise Russelstown and Kilmanahan to Clonmel WRZ.	Group 179

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Russelstown Kilmanahan Glenagad Poulavanogue (Waterford)	SAK-980	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel. Rationalise Russelstown, Glenagad, Poulavanogue (Waterford) and Kilmanahan to Clonmel WRZ.	Group 180
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Tullohea Kilcash Ahenny Ballinvir	SAK-981	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel. Rationalise Tullohea, Kilcash, Ahenny and Ballinvir to Templetney/Brackford Bridge WRZ.	Group 181
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Tullohea Kilcash Ahenny Ballinvir Russelstown Kilmanahan	SAK-982	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel. Rationalise Tullohea, Kilcash, Ahenny and Ballinvir to Templetney/Brackford Bridge WRZ. Rationalise Russelstown and Kilmanahan to Clonmel WRZ.	Group 182
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Tullohea Kilcash Ahenny Ballinvir Russelstown Kilmanahan Glenagad Poulavanogue (Waterford)	SAK-983	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel. Rationalise Tullohea, Kilcash, Ahenny and Ballinvir to Templetney/Brackford Bridge WRZ. Rationalise Russelstown, Glenagad, Poulavanogue (Waterford) and Kilmanahan to Clonmel WRZ.	Group 183
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Burncourt Ballylooby	SAK-984	New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge, Burncourt Ballylooby and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel.	Group 184

Feasible Options SAK			
Water Resource Zone Name	**Option code**	**Option Description**	**SA Grouped Option**
Carrigmore Kilteely Herbertstown Knocklong/ Hospital Ballylanders Water Supply Galbally Water Supply Limerick City	SAK-985c	Rationalise Carrigmore, Herbertstown, Knocklong/ Hospital, Ballylanders Water Supply, Kilteely and Galbally Water Supply to Limerick City WRZ.	Group 185c
Carrigmore Murroe / Cappamore /Foileen	SAK-986	Rationalise Carrigmore to Murroe / Cappamore Foileen WRZ (SA 8).	Group 186
East Waterford Water Supply Scheme Dunhill Dunhill Ballinageeragh	SAK-988	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Dunhill and Dunhill Ballinageeragh WRZs to East Waterford WRZ.	Group 188
Liskealty Ardmore Grange	SAK-990	Increase GW abstraction and upgrade WTP to supply deficit. Rationalise Liskealty to Ardmore Grange WRZ.	Group 190
Ballyguiry Dungarvan	SAK-991	Increase GW abstraction from no. 4 BH and upgrade Ballinamuck WTP to supply deficit. Rationalise Ballyguiry to Dungarvan WRZ.	Group 191
Galtee Regional Tipperary Town Supply	SAK-992	New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit. Interconnect with Tipperary Town for increased resilience. New GW abstraction and new WTP to supply deficit in Tipperary Town WRZ and interconnect with Galtee Regional for increased resilience.	Group 192
Carrigmore Kilteely Herbertstown Knocklong/ Hospital Limerick City	SAK-993	Rationalise Carrigmore, Kilteely, Herbertstown and Knocklong/Hospital to Limerick City WRZ.	Group 193
East Waterford Water Supply Scheme Dunhill Dunhill Ballinageeragh	SAK-994	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit. Rationalise Dunhill and Dunhill Ballinageeragh to East Waterford WRZ.	Group 194
Dungarvan Stradbally Graiguenageeha	SAK-995	Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Stradbally and Graiguenageeha to Dungarvan WRZ.	Group 195

The 124 Study Area options result in 12 SA Combinations including the WRZ level Approach. The 12 SA Combinations in terms of the types of options within each combination are summarised in Table 5.6 below.

Table 5.6 SAK Combinations

Key	WRZ Approach Option	○	SA Grouped Option	□

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192,193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Adramone / Kilrossanty	○	○	○	○	○	○	□	○	○	□	○	○
Ahenny	○	○	□	□	○	○	○	○	□	○	□	○
Anglesboro Water Supply	○	○	○	○	○	○	○	○	○	○	○	○
Ardfinnan Regional	○	□	□	□	○	○	□	□	□	○	□	○
Ardmore	○	○	○	○	○	□	○	○	○	○	○	○
Ardmore Grange	○	○	□	○	○	□	□	○	○	○	○	○
Ballinvir	○	○	○	□	○	○	○	○	○	○	□	○
Ballyguiry	○	□	□	○	□	□	□	○	○	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192, 193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Ballyknock	○	○	○	□	○	○	○	□	□	○	○	○
Ballylanders Water Supply	○	□	○	□	□	□	○	□	□	○	○	○
Ballymacarbry	○	○	○	○	○	○	○	○	○	○	○	○
Ballynoe / Melleray	○	○	○	○	○	○	○	○	○	○	○	○
Ballyogarty	○	○	□	□	○	○	□	□	□	□	○	○
Ballysaggart	○	□	○	□	○	□	○	□	□	○	○	○
Ballyshunnock	○	○	○	○	○	○	○	○	□	○	○	○
Boolavoonteen / Kilcooney / Touraneena	○	○	○	○	○	○	○	○	○	○	○	○
Burncourt Ballylooby	○	□	○	○	○	○	□	○	□	○	○	○
Callan WS 1001	○	○	○	○	○	□	○	○	○	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192, 193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Carrick-On-Suir	○	□	□	□	□	□	○	□	□	○	○	○
Carrigeen	○	○	○	○	○	○	○	○	○	○	○	○
Carrigmore	○	○	○	□	□	□	□	□	○	○	○	○
Carrignagower	○	○	○	□	○	○	○	□	□	○	○	○
Carrowgarriff	○	○	○	○	○	○	○	○	○	○	○	○
Clonmel	○	□	□	□	□	□	□	□	□	○	□	○
Coalbrook / Commons	○	□	○	□	○	□	○	○	○	○	○	○
Crehanagh	○	○	○	□	○	□	□	□	□	○	○	○
Deelish /Ballinacourty	○	○	○	○	○	○	○	○	○	○	○	○
Dundrum Regional	○	□	○	□	□	□	□	□	□	○	○	□
Dungarvan	○	□	□	○	□	□	□	○	○	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192,193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Dunhill - Cois Coille	○	○	○	□	○	□	○	□	□	□	○	○
Dunhill Ballinageeragh	○	○	○	□	○	□	○	□	□	□	○	○
East Waterford Water Supply Scheme	○	○	○	□	□	□	○	□	□	□	○	○
Faha	○	○	○	□	○	○	○	□	○	□	○	○
Fethard & Mullenbawn Regional Public Water Supply	○	○	○	□	○	□	○	○	○	○	○	○
Fews	○	○	○	□	○	□	□	□	○	□	○	○
Galbally Water Supply	○	○	□	□	□	□	○	□	□	○	○	○
Galtee Regional	○	□	□	○	□	□	□	□	□	○	○	○
Garravoone	○	○	○	□	○	□	□	□	□	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192, 193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Garryahylish	○	○	○	○	○	○	○	○	○	○	○	○
Glenagad	○	□	□	□	□	○	○	□	□	○	□	○
Glengar	○	□	○	□	□	○	□	○	□	○	○	□
Graiguenageeha	○	○	○	□	○	○	□	○	○	○	○	○
Herbertstown	○	□	□	□	□	□	□	□	□	○	○	○
Horse and Jockey	○	○	○	□	○	□	□	○	○	○	○	□
Inchinleamy	○	○	○	○	○	○	○	○	○	○	○	○
Kilbrien	○	○	○	○	○	○	○	○	○	○	○	○
Kilcash	○	□	○	□	○	□	○	○	□	○	□	○
Kill/Ballylaneen	○	○	○	□	○	○	○	□	○	□	○	○
Kilmacthomas	○	○	□	□	○	□	□	□	□	□	○	○
Kilmanahan	○	○	□	□	○	□	○	□	○	○	□	○
Kilteely	○	□	□	□	□	□	□	□	□	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192, 193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Knocklong/ Hospital	○	□	□	□	□	□	□	□	○	○	○	○
Lacken	○	□	○	□	○	□	○	□	○	○	○	○
Liskealty	○	○	□	○	○	○	□	○	○	○	○	○
Lismore / Cappoquin / Ballyduff (LCB)	○	○	○	□	○	○	○	□	○	○	○	○
Littleton	○	○	○	□	○	○	□	○	○	○	○	□
Lyreanearla	○	○	○	○	○	○	○	○	○	○	○	○
Modeligo	○	○	○	○	○	○	○	○	○	○	○	○
Monatarriff	○	□	○	□	○	□	○	□	□	○	○	○
Moores Well	○	□	○	□	○	□	○	□	○	○	○	○
Piltown-Fiddown	○	□	○	○	○	□	○	○	○	○	○	○
Portlaw	○	○	○	○	○	○	○	○	□	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192, 193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Poulavanogue (Waterford)	○	□	□	□	□	○	○	□	□	○	□	○
Rathgormack	○	○	○	□	○	○	○	□	□	○	○	○
Russelstown	○	○	□	□	○	□	○	□	○	○	□	○
Scrahan	○	○	○	□	○	○	□	□	○	□	○	○
Smoore	○	○	○	□	○	○	○	□	○	○	○	○
South Kilkenny Environs	○	○	□	○	□	□	○	○	○	○	○	○
Stradbally	○	○	○	□	○	○	□	○	○	○	○	○
Templemore/ Templetuohy	○	□	○	○	○	□	□	○	□	○	○	○
Templetney/ Brackford Bridge PWS	○	□	□	□	□	□	□	□	□	○	□	○
Thurles	○	□	○	□	○	□	□	○	□	○	○	□

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119, 125, 141)	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185b)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127, 129,133,135,140,141,187,193)	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192, 193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75,78,129,142,153,171,187,192)	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Tipperary Town Supply	○	□	□	○	□	○	□	○	□	○	○	○
Tullohea	○	□	○	□	○	□	○	○	□	○	□	○
Two Mile Borris	○	○	○	□	○	○	□	○	○	○	○	□

5.2.3 Stage 3 – Preferred Approach at Study Area Level

As part of stage three, we compare the WRZ Level Approach and the SA Combinations to determine the Preferred Approach that provides the best outcome for the Study Area.

We use the EBSD tool to rank the combinations against the assessment criteria and we then compare the best performing SA Combinations under each of the six approach types, using the 7-step process set out in Fig 5.1, to establish the Preferred Approach at Study Area level. The results of this process are provided in Table 5.7.

Table 5.7 SAK Summary of SA Combination of Performance against Approach Type

Ranked order (best to worst)	Best													Worst

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 6, 7, 10, 20, 34, 47, 58, 66, 73, 77, 78, 119	SA Combination 2 (SA Grouped Option 1, 9, 18, 40, 46, 153, 183, 190, 191 and 192)	SA Combination 3 (SA Grouped Option 37, 53, 149, 173, 175, 183, 185,195)	SA Combination 4 (SA Grouped Option 23,34,51,66,78,119,185h)	SA Combination 5 (SA Grouped Option 12,20,28,33,57,59,63,69,74,77,119,127,129,1	SA Combination 6 (SA Grouped Option 135,169,170,176,184,187,190,191,192,193)	SA Combination 7 (SA Grouped Option 38,69,149,173,180,185)	SA Combination 8 (SA Grouped Option 3,12,34,37,40,50,61,75 78,129,142,153,171,1	SA Combination 9 (SA Grouped Option 149)	SA Combination 10 (SA Grouped Option 183)	SA Combination 11 (SA Grouped Option 175)
Least Cost				Best		Worst						
Quickest Delivery		Best		Worst								
Best AA biodiversity	9 -3 AA impacts	7 -3 AA impacts	9 -3 AA impacts	9 -3 AA impacts	7 -3 AA impacts	11 -3 AA impacts	7 -3 AA impacts	9 -3 AA impacts	7 -3 AA impacts	9 -3 AA impacts	8 -3 AA impacts	8 -3 AA impacts
Lowest Carbon					Best					Worst		
Most Resilient								Best				Worst
Best Environmental	Worst			Best								

The SA Combinations in Table 5.6 are assessed to determine the approach categories as summarised in Table 5.8. SA Combination 3 was identified as the Least Cost and Best Environmental Approach. SA Combination 1 was identified as the Quickest Delivery Approach. SA Combination 7 was identified as the Most Resilient Approach. SA Combination 4 was identified as the Lowest Carbon Approach. SA Combination 8 was identified as the Best AA Approach.

Table 5.8 Best Combinations

Approach Categories	Best Performing Combination
Least Cost (LCo)	SA Combination 3
Best Environmental (BE)	SA Combination 3
Quickest Delivery (QD)	SA Combination 1
Most Resilient (MR)	SA Combination 7
Lowest Carbon (LC)	SA Combination 4
Best AA (BA)	SA Combination 8*

*Note: SA Combination 8 was identified as the Best AA because it has the least -2 and -1 impacts compared to other combinations with the same number of -3 impacts.

The MCA assessment included the following assessment criteria:

- Resilience;
- Deliverability and Flexibility;
- Progressibility; and
- Sustainability (Environmental and Social Impacts).

The NPV Costs are based on four criteria:

- Capital Costs – the cost to construct the option, including all overheads, consent and land acquisition costs;
- Operational Costs – the whole life cost to operate the option, including operators, chemical requirements and energy requirements including pumping;
- Carbon Costs – the whole life embodied and operational Carbon costs of the option; and
- Environmental and Social – the whole life Environmental and Social cost of the option covering climate regulation, traffic disruption and food production (carbon emissions are covered separately in the bullet point above).

The wider range of costs used in the estimation of the NPV aligns our Plan with any future Project Level Cost Benefit Analysis, in accordance with the Public Spending Code.

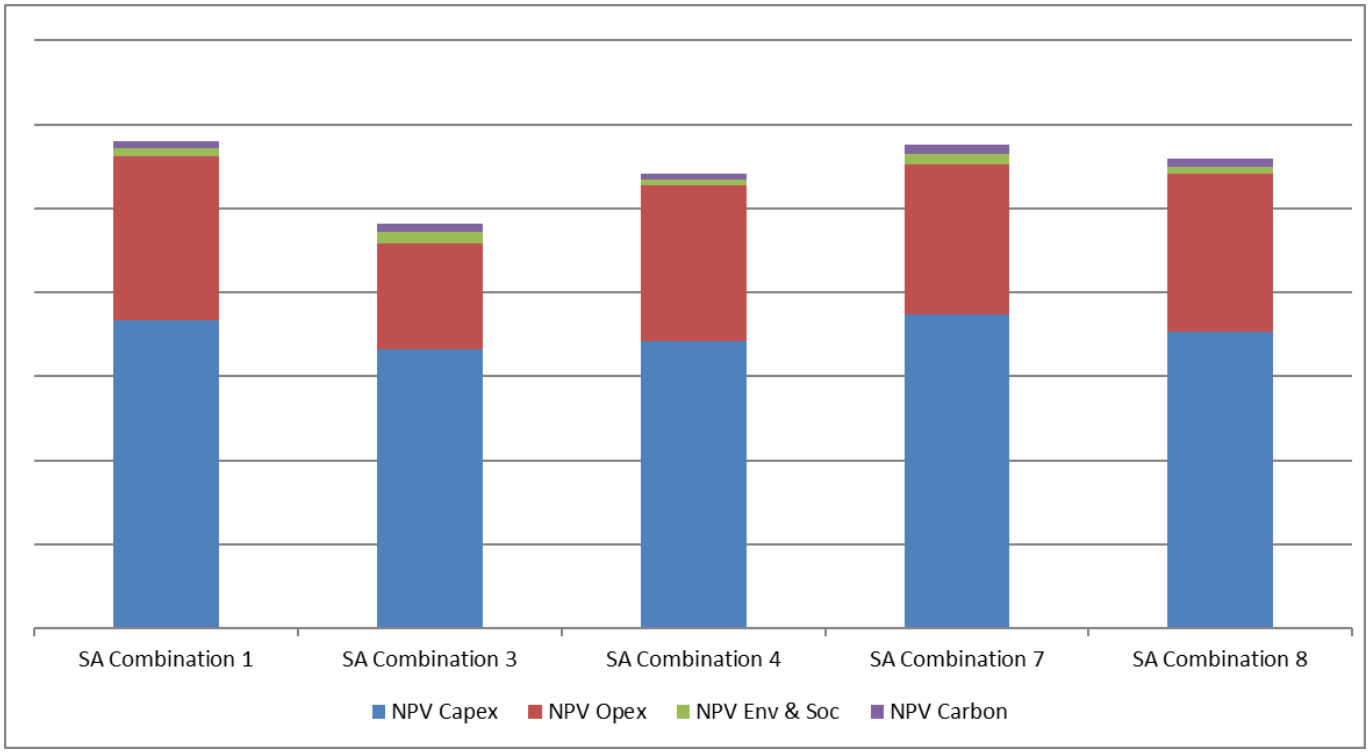

Figure 5.2 NPV Costs for SA Combinations

In accordance with the Options Methodology, these approaches are then compared against each other using the 7-Step process in Figure 5.1 to generate the best value combination of options at the Study Area level. The best value combination of options at the Study Area level results in the SA Preferred Approach. The outputs from the assessment were as follows:

- Step 1 – We compared the Least Cost Approach (SA Combination 3) against the Best AA Approach (SA Combination 8). The Best AA Approach (SA Combination 8) has two (2) fewer -3 AA impacts and also performs better against the criteria of Quickest Delivery as it consists of fewer and smaller scale rationalisations which can progress simultaneously and independently of each other. However, as this combination consists of smaller scale and fewer rationalisations there would be less interconnectivity. As site-based assessments may be able to reduce the number of -3 AA impacts (due to the completion of detailed yield assessments) it is considered to be more appropriate to take forward the Least Cost Approach as the first case scenario. If through site-based assessments the number of -3 AA impacts cannot be reduced (via abstractions within the safe yield) then the Preferred Approach could be reconsidered through the NWRP feedback and monitoring loop.
- Step 2 – We compared the Quickest Delivery Approach (SA Combination 1) against the Least Cost Approach (SA Combination 3). SA Combination 1 is the Quickest Delivery Approach because it consists of smaller scale rationalisations which can progress simultaneously and independently of each other. Whilst the Quickest Delivery Approach (SA Combination 1) has two (2) fewer -3 AA impacts than the Least Cost Approach (Combination 3) (as is the case for SA Combination 8) the combination consists of smaller scale and fewer rationalisations which would result in less interconnectivity. As site-based assessments may be able to reduce the number of -3 AA impacts it is considered more appropriate to take forward the Least Cost Approach as the first scenario. If through site-based assessments the number of -3 AA impacts cannot be reduced (via site mitigations) then the Preferred Approach could be reconsidered through the NWRP feedback and monitoring loop.

- Step 3 - We compared the Least Cost Approach (SA Combination 3) against the Best Environmental Approach (SA Combination 3). The Best Environmental Approach is the same as the Least Cost Approach. The Least Cost Approach was therefore retained at this stage.
- Step 4 – We compared the Least Cost Approach (SA Combination 3) against the Most Resilient Approach (SA Combination 7). The Most Resilient Approach (SA Combination 7) scores poorly against cost, quickest delivery and carbon criteria without offering a significant improvement in resilience and therefore Least Cost Approach was retained at this stage.
- Step 5 - We compared the Least Cost Approach (SA Combination 3) against the Lowest Carbon Approach (SA Combination 4). The Lowest Carbon Approach (SA Combination 4) consists of smaller scale and fewer rationalisations which would result in less interconnectivity. It also scores lower with respect to the Best Environmental Criteria. As site-based assessments may be able to reduce the number of -3 AA impacts it is considered more appropriate to take forward the Least Cost Approach as the first scenario. If through site-based assessments the number of -3 AA impacts cannot be reduced (via site mitigations) then the Preferred Approach could be reconsidered through the NWRP feedback and monitoring loop.
- Step 6 – A final assessment of the Least Cost Approach was completed against the Least Carbon, Best AA, Best Environmental, Quickest Delivery and Most Resilient Approaches. The Least Cost Approach (SA Combination 3) scores poorly in relation to the Quickest Delivery Approach and has two (2) additional -3 AA impacts associated with it than the Best AA Combination. Despite this, SA Combination 3 offers increased interconnectivity due to encompassing a higher number of rationalisations. Site-based assessments may be able to reduce the number of -3 AA impacts and it is considered more appropriate to take forward the Least Cost Approach as the first scenario. If through site-based assessments the number of -3 AA impacts cannot be reduced (via site mitigations) then the Preferred Approach could be reconsidered through the NWRP feedback and monitoring loop.
- Step 7 – The Least Cost Approach (SA Combination 3) was therefore selected as the Preferred Approach.

5.3 Study Area Preferred Approach Summary

On the basis of this initial assessment at Plan level, SA Combination 3 represents the Preferred Approach for Study Area K, which consists of the options listed in Table 5.9.

Table 5.9 Preferred Approach for SAK

WRZ Name	Preferred Approach Option Description SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185c)
Adramone / Kilrossanty	SAK-450 Increase GW abstraction from Kilrossanty BH and upgrade Kilrossanty WTP to supply deficit.

WRZ Name	Preferred Approach Option Description SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185c)
Templetney/Brackford Bridge PWS Clonmel & Environs Ardfinnan Regional Tullohea Kilcash Ahenny Ballinvir Russelstown Kilmanahan Glenagad Poulavanogue (Waterford)	Group 183 New abstraction from the River Suir and new WTP at Barnes (site identified). Interconnect Templetney/Brackford Bridge and Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel. Rationalise Tullohea, Kilcash, Ahenny and Ballinvir to Templetney/Brackford Bridge WRZ. Rationalise Russelstown, Glenagad, Poulavanogue (Waterford) and Kilmanahan to Clonmel WRZ.
Anglesboro Water Supply	SAK-055 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ardmore	SAK-392 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ardmore Grange	SAK-625 Increase GW abstraction and upgrade WTP to supply deficit.
East Waterford Water Supply Scheme Dunhill Dunhill Ballinageeragh Ballyogarty Kilmacthomas Faha Smoore Fews Kill/Ballylaneen Scrahan	Group 149 New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ.
Ballyguiry	SAK-472 Increase GW abstraction from Ballyguiry BH and upgrade Ballyguiry WTP to supply deficit.
Rathgormack Ballyknock Crehanagh Garravoone Carrick-On-Suir	Group 37 New GW abstraction and new Linguan WTP to supply deficit in Carrick-on-Suir. Rationalise Rathgormack, Ballyknock, Crehanagh and Garravoone to Carrick-on-Suir WRZ.

WRZ Name	Preferred Approach Option Description SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185c)
Carrigmore Kilteely Herbertstown Knocklong/ Hospital Ballylanders Water Supply Galbally Water Supply Limerick City	Group 185c Rationalise Carrigmore, Herbertstown, Knocklong/ Hospital, Ballylanders Water Supply, Kilteely and Galbally Water Supply to Limerick City WRZ.
Ballymacarbry	SAK-441 New GW abstraction (karstic) and new WTP to supply deficit.
Ballynoe / Melleray	SAK-386 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ballysaggart Monatarrif Carrignagower Lismore / Cappoquin / Ballyduff (LCB) Lacken Moores Well	Group 173 Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit. New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit. Rationalise Ballysaggart, Monatarrif, Lacken, Moore's Well, and Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ.
Ballyshunnock	SAK-481 Increase GW abstraction from BH and Ballyshunnock WTP to supply deficit.
Boolavoonteen / Kilcooney / Touraneena	SAK-444 Increase GW abstraction from Touraneena BH and upgrade Touraneena WTP to supply deficit.
Burncourt Ballylooby	SAK-211 Increase GW abstraction from no.2 BHs and upgrade Ballylooby Springs WTP to supply deficit.
Callan PWS	SAK-077 Increase GW abstraction from existing spring and BH and upgrade Callan WTP to supply deficit.
Carrigeen	SAK-548 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Carrowgarriff	SAK-416 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Fethard & Mullenbawn Regional Public Water Supply Coalbrook / Commons	Group 53 Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighbouring WRZ in deficit. Interconnect Coalbrook / Commons and Fethard & Mullenbawn and supply deficit from Fethard & Mullenbawn.

WRZ Name	Preferred Approach Option Description SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185c)
Deelish/Ballinacourty	SAK-387 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Horse & Jockey PWS Littleton PWS Dundrum Regional Two Mile Borris Thurles / Borrisoleigh Glengar	Group 175 Supply spare capacity from Thurles to neighbouring WRZs in deficit. Rationalise Horse and Jockey, Littleton, and Two Mile Borris to Thurles WRZ. Interconnect Dundrum Regional and Thurles and supply deficit from Thurles. Rationalise Glengar to Dundrum regional WRZ.
Dungarvan Graiguenageeha Stradbally	Group 195 Increase GW abstraction and upgrade Ballinamuck WTP to supply deficit. Rationalise Graiguenageeha and Stradbally to Dungarvan WRZ.
Galtee Regional	SAK-120 New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit.
Garrahylish	SAK-525 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Inchinleamy	SAK-476 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Kilbrien	SAK-509 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Liskealty	SAK-478 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Lyreanearla	SAK-569 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Modeligo	SAK-477 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Piltown-Fiddown	SAK-073 New GW and upgrade Jamestown WTP to supply deficit (progressing as project to address RAL).

WRZ Name	Preferred Approach Option Description SA Combination 3 (SA Grouped Option 37, 53, 121, 149, 173, 175, 183, 185c)
Portlaw	SAK-560 & SAK-618 Increase GW abstraction from Portlaw BH and Portlaw spring and upgrade Portlaw WTP to partly supply deficit. New GW abstraction and new WTP to partly supply deficit.
South Kilkenny	SAK-648 Bring back Silverspring WTP to production and supply deficit.
Templemore/Templetuohy	SAK-106 Rationalise Templetuohy to Templemore [rationalise to College Hill WTP]. Rationalisation within WRZ.
Tipperary Town Supply	SAK-180 New GW abstraction and new WTP to supply deficit.

The Preferred Approach (SA Combination 3) is shown schematically in Figure 5.3.1 and Figure 5.3.2.

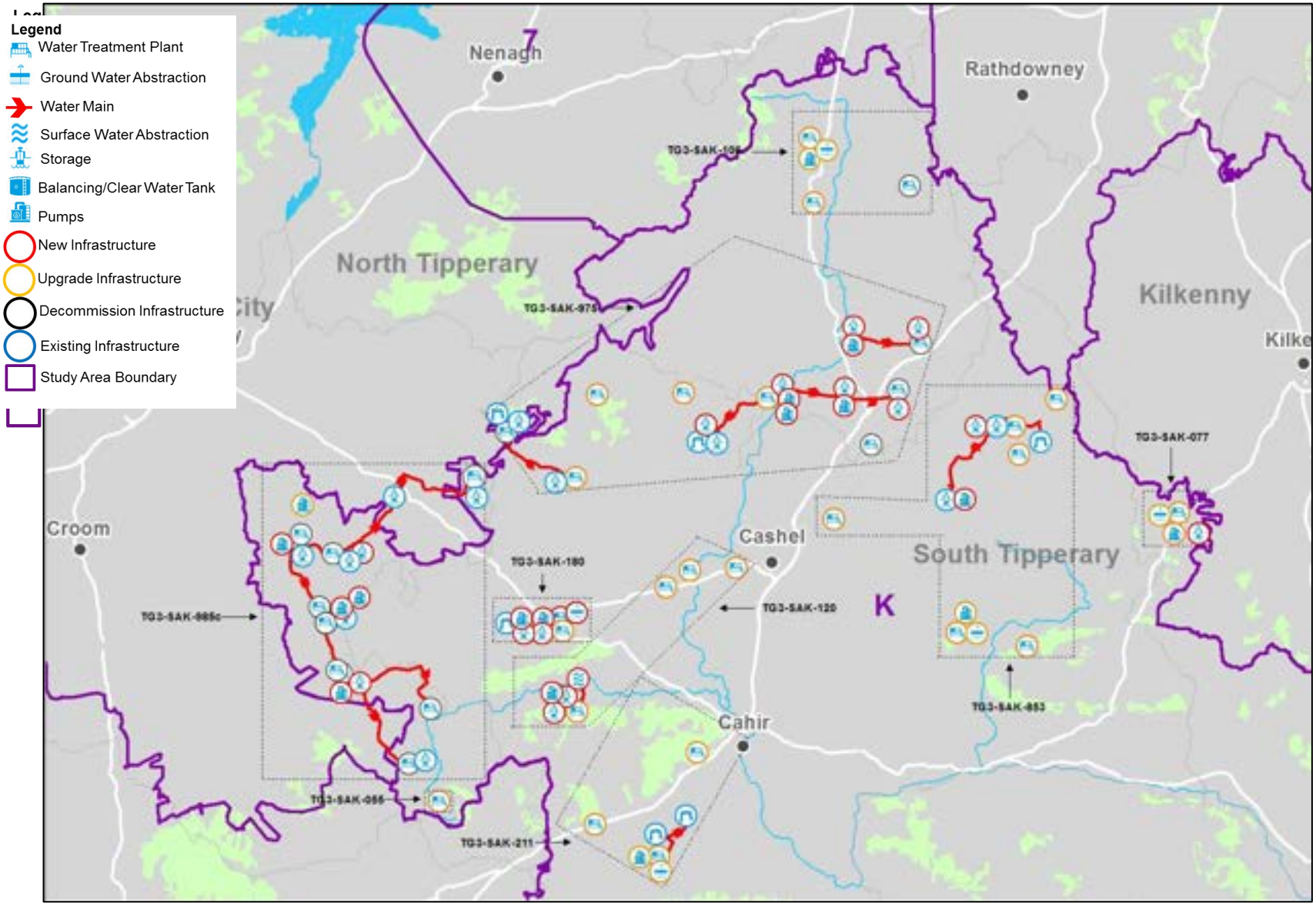

Figure 5.3.1 SAK Preferred Approach

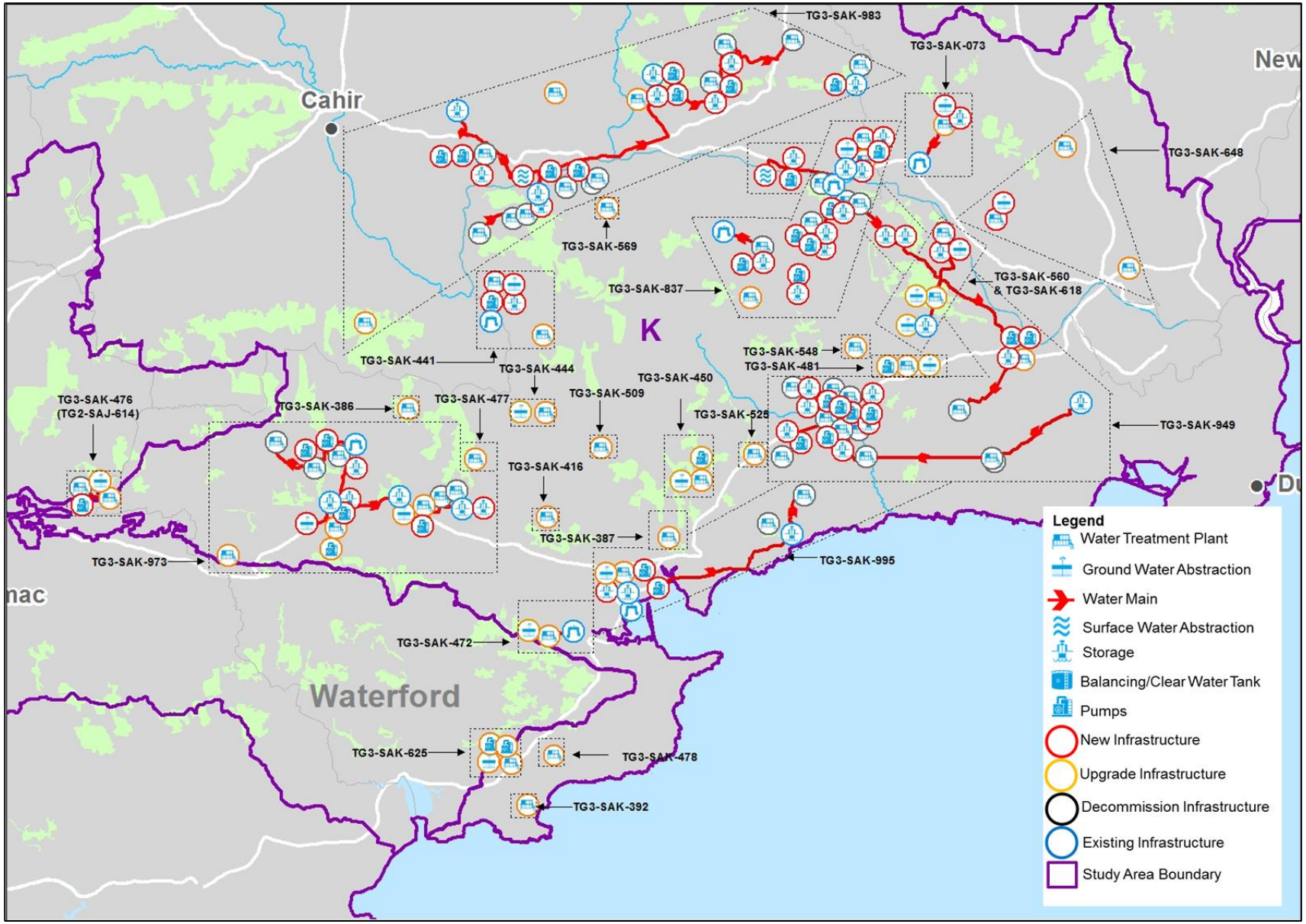

Figure 5.3.2 SAK Preferred Approach

The Preferred Approach for SAK also includes for demand side (**Lose Less** and **Use Less**) measures, including:

- Ongoing leakage management including active leakage control, pressure management and find and fix activities to offset Natural Rate of Leakage Rise (NRR).
- Continuation of UÉ household and business water conservation campaigns, initiatives and education programmes.
- The option to implement legally enforceable Water Conservation Orders in drought periods in order to protect the environment and our public water supplies.

Before we adopt this approach at Plan level for SAK, we must give consideration to the following:

- **Interim Solutions**: Based on the scale of need identified across all 539 WRZs, it is likely that it may take 5-10 investment cycles before we address all issues with the existing water supplies. Therefore, small localised options may be required on an interim basis to secure priority need in existing supplies until the SA Preferred Approach can be delivered;
- **Sensitivity Analysis**: When planning for water supplies over a medium to long term horizon, we must give consideration to adaptability of our plan to change across a range of future scenarios (for example, what if changes to technology allow us to reduce leakage beyond SELL, even in small WRZs or what if we are unable to secure a licence in the medium term to abstract the quantity water currently allowed for at a given location).

6 Preferred Plan Constraints – Interim Solutions

6 Preferred Plan Constraints – Interim Solutions

As outlined in more detail in Section 8.3.7.6 of the Framework Plan, the NWRP provides for an “interim solution” approach, which allows shorter term interventions to be identified and prioritised, when needed. The Preferred Approach for each WRZ, Study Area and Region will be delivered on a phased basis subject to budget and regulatory constraints. It will take many investment cycles to deliver the Preferred Approach across all WRZs, therefore, Uisce Éireann must have a means to continue delivering safe, secure and reliable water supplies (on a short to medium term basis) while we deliver our Preferred Approach.

On this basis, interim, short term capital maintenance solutions have been identified for all WTPs and will be utilised when needed. These solutions will allow UÉ time to deliver the Preferred Approach, while at the same time, maintaining a sustainable water supply. These interim solutions are generally smaller in scale and rely on making best use of already existing infrastructure.

Examples of general interim measures for different water sources include the following:

- For groundwater sites, where the Preferred Approach requires that the existing WTP is to be maintained, the interim solution would typically provide for refurbishment of the existing or development of new boreholes and borehole pumps, and an upgrade of the treatment process in line with proposed growth predictions. This may require a staged upgrade of the WTP. For example, the interim solution would typically include an upgrade of the WTP to provide supply to existing customers with consideration given to a further required expansion of the WTP at a later date.
- For surface water sites, where the Preferred Approach requires that the existing WTP is to be maintained, the interim option would typically involve the upgrade of the existing WTP in line with proposed growth predictions. As for groundwater sites this may require a staged upgrade of the WTP where the interim solution would typically include an upgrade of the WTP to provide supply to existing customers with consideration given to a further required expansion of the WTP at a later date.
- For groundwater and surface water sites where the Preferred Approach involves the decommissioning of the WTP by providing supply to the customers from another WTP within the WRZ or from another WRZ/Study Area/Region, the interim solution would involve the advancement of the rationalisation of the WTP, by provision of part supply or full supply if possible. If rationalisation is not feasible at that point in time due to dependencies on Study Area or Regional options, containerised WTP upgrade solutions would be considered for the WTP. This involves the provision of a package WTP within a containerised unit. These package plants can be modified for use on other sites in the future therefore are considered “no regrets” infrastructure investment.

A decision to progress any interim solution will be based on urgent or priority need to address water quality risk or supply reliability e.g., RAL or drought issues or critical need for example. The Regional Plan does not confer funding availability for any project and any interim measures will be subject to budget availability, relevant environmental assessment and other required consents in the normal way.

These solutions, in most cases, will only be used to allow time to deliver the longer-term solution. The interim solutions are determined in line with the Preferred Approach and as such, they are considered “no regrets” infrastructure investment.

Table 6.1 SAK Interim Options

WTP Name	Interim Option
Callan WTP	Refurb existing Spring and Borehole, and upgrade WTP to UÉ Standards
Mooncoin (Clonassy) WTP	Upgrade WTP to UÉ Standards
Piltown-Fiddown (Jamestown) WTP	Refurb existing Springs and Borehole, and upgrade WTP to UÉ Standards
Mullinabro WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Anglesboro WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballylanders WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Galbally WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Herbertstown WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Kilteely WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Knocklong Church Road WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Knocklong WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Hospital WTP 1	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Hospital WTP 2	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Carrigmore WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Templemore (College Hill) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Horse & Jockey (Curragheen) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Thurles WTP	Upgrade WTP to UÉ Standards
Templetuohy WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution

WTP Name	Interim Option
Littleton WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Two Mile Borris WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Whitefield WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Dualla WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ahenny (Ahenny) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Goatenbridge WTP	Upgrade WTP to UÉ Standards
Ballinvir WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Glengarra WTP	Upgrade WTP to UÉ Standards
Crottys Lake WTP	Upgrade WTP to UÉ Standards
Coolnamuck WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards.
Carrick-on-Suir (Linguan) WTP	Upgrade WTP to UÉ Standards
Clonmel- Poulavanogue WTP	Upgrade WTP to UÉ Standards – Potential site for a containerised solution
Ballincurry WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Coalbrook WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Commons WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Stooke WTP	Upgrade WTP to UÉ Standards
Fawnagown WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Tullohea WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Thomastown Augmentation WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards

WTP Name	Interim Option
Farranamanagh WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Rossadrehid WTP	Upgrade WTP to UÉ Standards
Glenary WTP	Upgrade WTP to UÉ Standards – Potential site for a containerised solution
Fethard WTP	Upgrade WTP to UÉ Standards
Hollyford WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards
Ironmills WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Kilcash WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Mullinbawn WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards.
Monroe WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Templetney WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Glengar WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Lissava WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballylooby Springs WTP	Refurb existing Springs, and upgrade WTP to UÉ Standards
Springmount WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards
Monea WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Deelish WTP	Upgrade WTP to UÉ Standards
Ballyguiry WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballyknock WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Ballyrohan WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards

WTP Name	Interim Option
Ballyogarty WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Ballysaggart WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Ballyshonnock WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Carrigeen WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Carrignagower WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Carrowgarriff WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballinamuck WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Dunhill Cois Coille WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Faha WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Fews WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Garrahylish WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards
Garravoone WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Graiguenageeha WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Inchinleamy WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Kilmacthomas WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Kilmanahan WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Kilrossanty WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
LCB Cappoquin WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards

WTP Name	Interim Option
Portlaw WTP	Refurb existing Borehole and Spring, and upgrade WTP to UÉ Standards
Poulavanogue WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Rathgormack WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Russelstown WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Scrahan WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Smoorbeg WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Stradbally WTP	Upgrade WTP to UÉ Standards – Potential site for a containerised solution
Touraneena WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Kilbrien (Ballinakill) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballylaneen WTP	Upgrade WTP to UÉ Standards – Potential site for a containerised solution
Crehanagh WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
LCB Ballyduff WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Lyrenaleara WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Modeligo WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Glenagad WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Liskealty WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards
Moore's Well WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Melleray WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards

WTP Name	Interim Option
Dunhill Ballynageeragh WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
LCB Lismore Deerpark WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Pairc an Aonaigh WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards.
Lacken WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Monatarrif WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
East Waterford (Adamstown)WTP	Upgrade WTP to UÉ Standards
Ardmore Grange WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards

Small Towns and Villages Growth Programme Uisce Éireann Investment Plan 2020-2024 includes a number of programmes and projects targeted at providing for growth. One such programme is the Small Towns and Villages Growth Programme (STVGP) which will provide funding for Water and Wastewater Treatment Plant growth capacity in smaller settlements which are not otherwise provided for in the Capital Investment Plan 2020 to 2024. The STVGP is focused on supporting growth in areas already served by UÉ infrastructure but where current or future capacity deficits have been identified.

Uisce Éireann have engaged with Local Authorities across the country to ensure that the investment is made appropriately in accordance with the relevant county development plan. Under this programme interim options works will be considered in Galtee Regional and Adramone / Kilrossanty WRZ.

7

Preferred Approach – Sensitivity Analysis

7 Preferred Approach – Sensitivity Analysis

Our supply demand forecast, and water quality barrier deficit assessments have been developed using the application of best practice methods within the data available. We have identified areas where we will focus improvements in data to improve the certainty of our forecasts. However, all long-term forecasts are subject to uncertainty. We have explored the sensitivity of our supply and demand forecasts to some of the key factors which influence them through a range of scenarios. This enables us to test the sensitivity of the Preferred Approach to changes in need, in order to ensure that our decision making is robust and that the approach is adaptable. We describe the factors which have been considered in Chapter 8 of the Framework Plan. In summary we test our Preferred Approach against the following questions:

1) What if the deployable output across our supplies is reduced based on sustainability limits within the new legislation on abstraction resulting in a larger supply demand balance deficit?
2) What if climate change impacts on our existing supplies are greater than anticipated?
3) What if our forecasts are too great and expected demand growth does not materialise resulting in a smaller supply demand balance deficit?
4) What if we are able to reduce leakage below SELL within the timeframe of the plan resulting in lower Needs?

A summary of the adaptability criteria and analysis we have undertaken for SAK is shown in Table 7.1.

Table 7.1 Sensitivity Analysis for SAK

Uncertainty	Likelihood	Increase / Decrease in Deficit	Impact on Preferred Approach
Sustainability	Moderate/High (as our current abstractions are large compared to the water bodies from which they abstract)	+39,400 m^3/day	**The impact of sustainability reductions would reduce the volumes that can be abstracted from our existing sources therefore increasing the supply demand balance deficit**. There are some surface water sources in SAK that would be impacted from sustainability reductions. However, our preferred approach is designed to relieve pressure on these sources by supplementing from more resilient sources. Groundwater sustainability is more difficult to assess at desktop level, however, as the abstractions in SAK are small in scale they do not appear to be problematic.
			Based on this scenario, the Preferred Approach remains the optimal solution.
Climate Change	High (international climate change targets have not been met)	+7,600 m3/day	**Higher climate change scenarios would impact our 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 optimizing our operations on a more environmentally

Uncertainty	Likelihood	Increase / Decrease in Deficit	Impact on Preferred Approach
			sustainable basis across the range of supplies.
			Based on this scenario, the Preferred Approach remains the optimal solution.
Demand Growth	Low/Moderate (growth has been based on policy)	-5,946 m^3/day	**The impact of lower-than-expected growth would reduce the supply demand balance deficit and the overall need requirement.** The supply demand balance deficit is spread across 75 individual water resource zones and is driven by quality as well as quantity issues. In this rural area, growth is relatively low.
			Based on this scenario, the Preferred Approach remains the optimal solution.
Leakage Targets	Low (Uisce Éireann is focused on sustainability and aggressive leakage reduction)	347 m^3/day	**The impact of lower-than-expected leakage savings would increase the supply demand balance deficit and the overall need requirement.** 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.
			Based on this scenario, the Preferred Approach remains the optimal solution.
	Moderate/High (Uisce Éireann is focused on sustainability and aggressive leakage reduction)	36,233 m^3/day	**Increased leakage savings beyond SELL would reduce the supply demand balance deficit and the overall need requirement.** The need drivers in SAK are across all 75 water resource zones and are driven by quality as well as availability issues. Therefore, the Preferred Approach is required, even accounting for increased leakage savings.
			Based on this scenario, the Preferred Approach remains as the optimal solution.

In reality, a combination of these scenarios may occur together. For example, growth in demand might be lower if we achieve greater leakage reductions. However, if this coincided with a reduction in permitted abstraction volume under the abstraction licensing regime, the reduction in demand may offset some or all of the loss in supply availability due to abstraction sustainability reductions.

Based on the adaptability assessment, the Interim and Preferred Approaches perform as follows:

- Interim Approach – As the purpose of the Interim Approach is to allow for emergency works for priority Quality and Quantity issues, the solutions will have a limited design life (usually less than 10 years). They allow time to assess the Preferred Approach and improve adaptability within our Plan.
- Preferred Approach – As the Supplies in SAK are relatively small, and as conservative limits have been applied to the supply availability assessments, the Preferred Approach is adaptable to a range of future outlooks in relation to sustainability and climate change. The demand growth in the area is small, and the Supply Demand Deficits are primarily driven by reliability. As Water Treatment Plants are modular, capacity will be delivered on a phased basis, allowing for adaptation across a range of futures. Our Preferred Approach is therefore Adaptable.

In summary, our sensitivity assessment of the Interim and Preferred Approaches demonstrates that they are both highly adaptable to a broad range of futures, and therefore represent ‘no regrets’ infrastructure.

8

Summary of Study Area K

8 Summary of Study Area K

Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience

The Preferred Approach for SAK (summarised in Table 5.8 and Figure 5.3) consists of local WRZs solutions for Anglesboro Water Supply, South Kilkenny, Piltown-Fiddown, Callan PWS, Templemore / Templetuohy, Galtee Regional, Tipperary Town Supply, Burncourt Ballylooby, Ballynoe / Melleray, Deelish/Ballinacourty/Kilnafrehan, Ardmore, Carrowgarriff, Ballymacarbry, Boolavoonteen / Kilcooney / Touraneena, Adramone/Kilrossanty, Ballyguiry, Inchinleamy, Modeligo, Liskealty, Ballyshunnock, Kilbrien, Garrahylish, Smoore, Carrigeen, Portlaw, Lyrenaleara, and Ardmore Grange, WRZs in the Study Area, primarily driven by the small scale of the supplies and difficulties in transporting small volumes of water over long distances.

Proposed solution for Carrick-On-Suir is new groundwater abstraction and rationalisation of Rathgormack, Ballyknock, Crehanagh and Garravoone WRZs. It is proposed to interconnect Coalbrook / Commons and Fethard & Mullenbawn WRZs. Rationalise Graiguenageeha to Stradbally WRZ. Rationalise Lacken, and Moores Well, Monatarrif, Carrignagower and Ballysaggart to Lismore / Cappoquin / Ballyduff (LCB) WRZ. Rationalise Horse & Jockey, Littleton, Glengar and Two Mile Borris to Thurles and interconnect with Dundrum Regional. The preferred approach for Clonmel involves new abstraction from River Suir and new WTP, interconnection with Templetney/Brackford Bridge and Ardfinnan Regional and rationalisation of Russelstown, Kilmanahan, Tullohea, Kilcash, Ahenny and Ballinvir, Glenagad and Poulavanogue WRZs. The preferred approach for Carrigmore, Kilteely, Herbertstown, Knocklong/Hospital, Ballylanders and Galbally is rationalisation to Limerick City WRZ. The preferred approach for Graiguenageeha and Stradbally is rationalisation to Dungarvan WRZ. Finally, the preferred approach for East Waterford Water Supply Scheme involves new surface water abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit. Rationalise Ballyogarty, Kilmacthomas, Faha, Smoore, Fews, Kill/Ballylaneen, Scrahan, Dunhill - Cois Coille and Dunhill Ballinageeragh to East Waterford WRZ.

Delivery of the Preferred Approach will secure all of the supplies in the area in terms of Quality, Quantity, Sustainability and Resilience.The Preferred Approach for SAK also includes for demand side (**Lose Less** and **Use Less**) measures, including:

- Ongoing leakage management including active leakage control, pressure management and find and fix activities to offset Natural Rate of Leakage Rise (NRR).
- Net leakage reduction in Fethard & Mullenbawn Regional Public Water Supply, Galtee Regional and Tipperary Town Supply Water Resource Zones, amounting to 347 m^3 per day (applied to SDB Deficit) to move towards achieving the National SELL Target by 2034.
- Continuation of UÉ household and business water conservation campaigns, initiatives and education programmes.
- The option to implement legally enforceable Water Conservation Orders in drought periods in order to protect the environment and our public water supplies.

As part of our Preferred Approach, we have also identified a range of interim solutions for SAK, as summarised in Table 6.1. The measures will only be progressed in the event of critical need to allow time for delivery of the required Preferred Approach solutions in the Study Area.

Annex A Study Area K Water Treatment Plants

WTP Asset Name	Local Plant Names
Ardmore Grange WTP	Ardmore Grange WTP
East Waterford (Adamstown)WTP	East Waterford (Adamstown)WTP
Monatarrif WTP	Monatarrif WTP
Lacken WTP	Lacken WTP
Pairc an Aonaigh WTP	Pairc an Aonaigh WTP
LCB Lismore Deerpark WTP	LCB Lismore Deerpark WTP
Dunhill Ballynageeragh WTP	Dunhill Ballynageeragh WTP
Melleray WTP	Melleray WTP
Moore's Well WTP	Moore's Well WTP
Liskealty WTP	Liskealty WTP
Glennagad WTP	Glennagad WTP
Modeligo WTP	Modeligo WTP
Lyrenaleara WTP	Lyrenaleara WTP
LCB Ballyduff WTP	LCB Ballyduff WTP
Crehanagh WTP	Crehanagh WTP
Ballylaneen WTP	Ballylaneen WTP
Kilbrien (Ballinakill) WTP	Kilbrien (Ballinakill) WTP
Touraneena WTP	Touraneena WTP
Stradbally WTP	Stradbally WTP
Smoorbeg WTP	Smoorbeg WTP
Scrahan WTP	Scrahan WTP
Russelstown WTP	Russelstown WTP
Rathgormack WTP	Rathgormack WTP
Poulavanogue WTP	Poulavanogue WTP
Portlaw WTP	Portlaw WTP
LCB Cappoquin WTP	LCB Cappoquin WTP
Kilrossanty WTP	Kilrossanty WTP
Kilmanahan WTP	Kilmanahan WTP
Kilmacthomas WTP	Kilmacthomas WTP
Inchinleamy WTP	Inchinleamy WTP
Graiguenageeha WTP	Graiguenageeha WTP
Garravoone WTP	Garravoone WTP
Garrahylish WTP	Garrahylish WTP
Fews WTP	Fews WTP
Faha WTP	Faha WTP

WTP Asset Name	Local Plant Names
Dunhill Cois Coille WTP	Dunhill Cois Coille WTP
Ballinamuck WTP	Ballinamuck WTP
Carrowgarriff WTP	Carrowgarriff WTP
Carrignagower WTP	Carrignagower WTP
Carrigeen WTP	Carrigeen WTP
Ballyshonnock WTP	Ballyshonnock WTP
Ballysaggart WTP	Ballysaggart WTP
Ballyogarty WTP	Ballyogarty WTP
Ballyrohan WTP	Ballyrohan WTP
Ballyknock WTP	Ballyknock WTP
Ballyguiry WTP	Ballyguiry WTP
Deelish WTP	Deelish WTP
Monea WTP	Monea WTP
Springmount WTP	Springmount WTP
Ballylooby Springs WTP	Ballylooby Springs WTP
Lissava WTP	Lissava WTP
Glengar WTP	Glengar WTP
Templetney WTP	Templetney WTP
Monroe WTP	Monroe WTP
Mullinbawn WTP	Mullinbawn WTP
Kilcash WTP	Kilcash WTP
Ironmills WTP	Ironmills WTP
Hollyford WTP	Hollyford WTP
Fethard WTP	Fethard WTP
Glenary WTP	Glenary WTP
Rossadrehid WTP	Rossadrehid WTP
Farranamanagh WTP	Farranamanagh WTP
Thomastown Augmentation WTP	Thomastown Augmentation WTP
Tullohea WTP	Tullohea WTP
Fawnagown WTP	Fawnagown WTP
Stooke WTP	Stooke WTP
Commons WTP	Commons WTP
Coalbrook WTP	Coalbrook WTP
Ballincurry WTP	Ballincurry WTP
Clonmel-Poulavanouge WTP	Clonmel- Poulavanouge WTP
Carrick-on-Suir (Linguan) WTP	Carrick-on-Suir (Linguan) WTP
Coolnamuck WTP	Coolnamuck WTP

WTP Asset Name	Local Plant Names
Crottys Lake WTP	Crottys Lake WTP
Glengarra WTP	Glengarra WTP
Ballinvir WTP	Ballinvir WTP
Goatenbridge WTP	Goatenbridge WTP
Ahenny (Ahenny) WTP	Ahenny (Ahenny) WTP
Dualla WTP	Dualla WTP
Whitefield WTP	Whitefield WTP
Two Mile Borris WTP	Two Mile Borris WTP
Littleton WTP	Littleton WTP
Templetuohy WTP	Templetuohy WTP
Thurles WTP	Thurles WTP
Horse & Jockey (Curragheen) WTP	Horse & Jockey (Curragheen) WTP
Templemore (College Hill) WTP	Templemore (College Hill) WTP
Carrigmore WTP	Carrigmore WTP
Hospital WTP 2	Hospital WTP 2
Hospital WTP 1	Hospital WTP 1
Knocklong WTP	Knocklong WTP
Knocklong Church Road WTP	Knocklong Church Road WTP
Kilteely WTP	Kilteely WTP
Herbertstown WTP	Herbertstown WTP
Galbally WTP	Galbally WTP
Ballylanders WTP	Ballylanders WTP
Anglesboro WTP	Anglesboro WTP
Mullinabro WTP	Mullinabro WTP
Piltown-Fiddown (Jamestown) WTP	Piltown-Fiddown (Jamestown) WTP
Mooncoin (Clonassy) WTP	Mooncoin (Clonassy) WTP
Callan WTP	Callan WTP

Annex B Study Area K Rejection Register Summary

Annex B Study Area K Rejection Register Summary

Study Area K – Coarse Screening Rejection

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-007	Rationalise Ballylanders, Kilteely, Knocklong/ Hospital and Galbally WRZs to Galtee Regional WRZ [Rossadrehid WTP and new abstraction from River Aherlow].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-010	Rationalise Kilteely and Herbertstown WRZs to Knocklong/Hospital WRZ.	Turbidity issues when over pumping at Hospital BH1 WTP. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-021	Rationalise Kilteely and Herbertstown WRZs to Knocklong/Hospital WRZ.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-022	Increase GW abstraction at Hospital BH1 and upgrade Hospital BH1 WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-023	Increase GW abstraction at Hospital BH1 and upgrade Hospital BH1 WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-024	Increase GW abstraction at Hospital BH2 and upgrade Hospital BH2 WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-025	Increase GW abstraction at Hospital BH2 and upgrade Hospital BH2 WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-033	New SW abstraction from River Drumcomoge new WTP to supply deficit.	This option required significant works for a relatively small supply. There were other viable alternative options for this WRZ. Therefore, it was not considered feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option was screened out for deliverability.		●	
TG3-SAK-034	Rationalise Ballylanders, Kilteely, Knocklong/ Hospital and Galbally WRZs to Galtee Regional WRZ [Rossadrehid WTP and new abstraction from River Aherlow].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-042	Rationalise Ballylanders, Kilteely, Knocklong/ Hospital and Galbally WRZs to Galtee Regional WRZ [Rossadrehid WTP and new abstraction from River Aherlow].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-047	Increase GW abstraction at Ballylanders BH and upgrade Ballylanders Pump Station WTP to supply deficit.	The option requires a significant length of pipeline for a WRZ not in deficit. Transferring small quantities of water over long distances can affect the quality of water. Therefore, as there were other viable options for these WRZs this option was not considered feasible at coarse screening stage due to deliverability criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-053	Rationalise Ballylanders, Kilteely, Knocklong/ Hospital and Galbally WRZs to Galtee Regional WRZ [Rossadrehid WTP and new abstraction from River Aherlow].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-056	Rationalise Anglesborough to Ballylanders WRZ for increased resilience and long term OPEX savings.	The option requires a significant length of pipeline for a WRZ not in deficit. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Deliverability criteria.		●	
TG3-SAK-061	Increase SW abstraction from River Blackwater (Mullinavat) and upgrade Mooncoin (Clonassy) WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-062	Increase SW abstractionfrom River Blackwater (Mullinavat) and upgrade Mooncoin (Clonassy) WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-063	Increase SW abstraction from Poulanassy River and upgrade Mooncoin (Clonassy) WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-064	Increase SW abstraction from Poulanassy River and upgrade Mooncoin (Clonassy) WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-067	Rationalise South Kilkenny to East Waterford WRZ [new GW abstraction and upgrade Adamstown WTP].	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-070	Interconnect South Kilkenny and East Waterford WRZ for improved resilience and supply deficit from Adamstown WTP.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-072	Increase existing GW abstraction and upgrade Jamestown WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-075	Rationalise Piltown-Fiddown to South Kilkenny WRZ [Mooncoin (Clonassy) WTP].	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-079	Rationalise Callan to Kilkenny City & Bennetts bridge WRZ.	Abstracting the volume of water might be considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-080	Rationalise Callan to Fethard WRZ [Fethard WTP].	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-082	Interconnect Callan and Fethard WRZ for improved resilience and supply deficit from Fethard WTP.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-084	Interconnect Callan and Caherlesk/Coolaghmore GWS and supply deficit from GWS.	This option is not feasible based on LA comment. There is limited information regarding the GWS. There are other alternative options which can solve the deficit for this WRZ. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-093	Supply spare capacity to neighbouring WRZs in deficit.	The option requires significant length of pipeline for interconnection. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Deliverability criteria.		●	
TG3-SAK-094	Supply spare capacity to neighbouring WRZs in deficit.	The option requires significant length of pipeline for interconnection. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Deliverability criteria.		●	
TG3-SAK-100	Supply spare capacity to neighbouring WRZs in deficit.	The option requires a significant length of pipeline and is likely to have feasibility issues. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-101	Supply spare capacity to neighbouring WRZs in deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-103	Increase GW abstraction at Templetuohy BH and upgrade Templetuohy WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-108	Increase GW abstraction at Whitefield BH and upgrade Whitefield WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-116	Increase SW abstraction from College stream and Muskry stream and upgrade Rossadrehid WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-121	New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-131	Rationalise Galtee Regional, Clonmel and Ardfinnan Regional WRZs to the WSP.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-132	Interconnect Galtee Regional and Thurles WRZs and supply deficit from Thurles.	The option requires a significant length of pipeline and is likely to have feasibility issues. Transferring small quantities of water over long distances can affect the quality of water. Therefore, as there were other viable options for these WRZs this option was not considered feasible at coarse screening stage.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-135	Increase abstraction at Monroe BHs and upgrade Monroe WTP to partly supply deficit. Part of Group Option SAK-843 rationalising Templetney/Brackford to Clonmel.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-136	Increase abstraction at Monroe BHs and upgrade Monroe WTP to partly supply deficit. Part of Group Option SAK-844 interconnecting Templetney/Brackford to Clonmel.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-137	Increase abstraction at Monroe BHs and upgrade Monroe WTP to partly supply deficit. Part of Group Option SAK-845 interconnecting Ardfinnan Regional with Clonmel.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-147	Rationalise Galtee Regional, Clonmel and Ardfinnan Regional WRZs to the WSP.	Abstracting the volume of water required is considered unfeasible. Not a suitable option for Cork WRZ due to location. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-149	Increase abstraction from Glenary River and upgrade Glenary WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-150	Increase abstraction from Glenary River and upgrade Glenary WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-151	Increase SW abstraction from Poulavanogue stream and upgrade Poulavanogue WTP to address water quality issues and partly supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-154	Increase SW abstraction from Glengalla stream [Ahernes Glen Abstraction] and upgrade Goatenbridge WTP to partly supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-155	Increase SW abstraction from Kildanoge stream [Glenbreda Stream] and upgrade Goatenbridge WTP to partly supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-158	Interconnect Ardfinnan Regional with Clonmel WRZ and supply deficit from Clonmel [increase GW abstraction].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-160	Rationalise Galtee Regional, Clonmel and Ardfinnan Regional WRZs to the WSP.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-164	Increase SW abstraction from Muiteen [East] River and upgrade Stooke WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-167	Interconnect Dundrum Regional with Fethard Regional WRZs and supply deficit from Fethard Regional WRZ.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-169	New SW abstraction from Muiteen [East] River further south of Stooke WTP to replace existing abstraction and upgrade Stooke WTP	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-170	Rationalise Dundrum Regional to Thurles WRZ.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-175	Rationalise Hollyford to Stooke WTP. Rationalisation within WRZ.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-179	Increase GW abstraction from Fawnagown (Cordangan) BH and upgrade Tipperary town WTP to supply deficit.	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		
TG3-SAK-189	Rationalise Templetney/Brackford Bridge to Clonmel (increase GW abstraction)	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-191	Interconnect Templetney/Brackford Bridge and Clonmel WRZs and supply deficit from Clonmel (increase GW abstraction).	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-196	Abandon Crotty Lake WTP and rationalise to Linguan WTP. Rationalisation within WRZ.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		
TG3-SAK-197	Increase GW abstraction from Coolnamuck BH and upgrade Coolnamuck WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-198	Increase SW abstraction from Crottys Lake and upgrade Crottys Lake WTP to partly supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-199	Increase SW abstraction from Lingaun River and upgrade Linguan WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		
TG3-SAK-210	New SW abstraction from Clodiagh River and upgrade Crottys Lake WTP to partly supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-215	Increase SW abstraction from Burncourt River and upgrade Glengarra WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-224	Increase abstraction at Mullinbawn spring and upgrade Mullinbawn WTP to supply deficit to neighboring WRZ in deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-229	Increase SW abstraction from Anner River and upgrade Fethard WTP to supply spare capacity to neighbouring WRZ in deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-230	Increase SW abstraction from Anner River and upgrade Fethard WTP to supply spare capacity to neighbouring WRZ in deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-231	Increase SW abstraction from Anner River and upgrade Fethard WTP to supply spare capacity to neighbouring WRZ in deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-234	Increase GW abstraction from Tullohea spring and upgrade Tullohea WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-238	Reintroduce old Toor GWS source and upgrade Tullohea WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-241	Interconnect Coalbrook/Commons and Thules WRZs and supply deficit from Thurles.	The option requires a significant length of pipeline for interconnection. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, as there were other viable options for these WRZs this option was not considered feasible at coarse screening stage.		●	
TG3-SAK-242	Rationalise Coalbrook/Commons to Thurles WRZ.	The option requires a significant length of pipeline for interconnection. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, as there were other viable options for these WRZs this option was not considered feasible at coarse screening stage.		●	
TG3-SAK-243	Increase GW abstraction from Coalbrook BHs (no. 4) and upgrade Coalbrook WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		
TG3-SAK-244	Increase GW abstraction from Ballincurry BH and upgrade Ballincurry WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		
TG3-SAK-245	Increase GW abstraction from Commons BH and upgrade Commons WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		
TG3-SAK-246	Increase SW abstraction from Ballyshonock Impoundment and upgrade East Waterford (Adamstown) WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option is screened out**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-249	Increase GW abstraction from Kilcash Spring and upgrade Kilcash WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-253	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-255	Increase SW abstraction from Clodiagh River and upgrade East Waterford (Adamstown) WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-256	Increase SW abstraction from Ballyshonock Impoundment and upgrade East Waterford (Adamstown) WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-257	Increase SW abstraction from Mahon River and upgrade East Waterford (Adamstown) WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-263	Rationalise Glennagad to Clonmel WRZ [Glenary WTP].	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-267	Rationalise Poulavanogue (Waterford) to Clonmel WRZ [Glenary WTP].	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-297	Increase abstraction from exisitng spring and upgrade Glengar WRZ to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-301	Increase GW abstraction at Hollyford spring and upgrade Hollyford WTP to partly supply deficit.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option does not meet the Deliverability and Flexibility criteria.		●	
TG3-SAK-302	Rationalise Glengar to Dundrum regional WRZ.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option does not meet the Deliverability and Flexibility criteria.		●	
TG3-SAK-363	Increase SW abstraction from Clodiagh River, Ballyshonock impoundment and Mahon river and upgrade East Waterford (Adamstown) WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-364	Increase SW abstraction from Ballyshonock Impoundment and upgrade East Waterford (Adamstown) (resolve algae issues) WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-366	New GW abstraction and new WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option screened out**		
TG3-SAK-367	New GW abstraction and new WTP to supply deficit.	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option screened out**		
TG3-SAK-368	Increase GW abstraction from existing BH and upgrade LCB Ballyduff WTP to partly supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-369	Increase GW abstraction from existing BH and upgrade LCB Cappoquin WTP to partly supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-370	Increase GW abstraction from existing BH and upgrade LCB Cappoquin WTP to partly supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-374	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit.	This option is a duplicate of group 972 and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-376	New GW abstraction and upgrade WTP LCB Cappoquin WTP to partly supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-377	Increase GW (to include commissioning new TW) abstraction from existing BH and upgrade LCB Lismore Deerpark WTP to supply deficit.	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		
TG3-SAK-378	New GW abstraction and upgrade WTP LCB Cappoquin WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-379	New GW abstraction and upgrade WTP LCB Cappoquin WTP to supply deficit.	Deermore is the favoured approach and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-381	New SW abstraction from Blackwater River and new WTP to supply deficit.	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-383	New SW abstraction from Blackwater River and new WTP to supply deficit.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option does not meet the Deliverability and Flexibility criteria.		●	
TG3-SAK-390	New GW abstraction and new WTP - potentially in deficit.	When unconstrained options list was originally drawn up this WRZ was identified as having a deficit; however, due to an updated SDB, there is no longer an identified deficit in this WRZ. Therefore, the option did not progress to fine screening.	**WRZ not in deficit**		
TG3-SAK-395	New SW abstraction from Mahon River and new WTP to supply deficit	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-396	Rationalise Ballyogarty to Kilmacthomas WRZ [new SW abstraction from Mahon River]	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-401	Rationalise Ballyogarty to Kill/Ballylneen WRZ.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-409	Rationalise Moores Well to Lismore/ Cappoquin/ Ballyduf (LCB) WRZ [new GW abstraction and upgrade Cappoquin WTP].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-412	Rationalise Stradbally to East Waterford WRZ [new SW abstraction from River Suir].	Rationalising Graiguenageeha WRZ to Stradbally WRZ is more preferable solution. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.		●	
TG3-SAK-417	Rationalise Ballysaggart / Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ [increase GW abstraction at LCB Lismore Deerpark WTP].	This option is a duplicate of group 972 and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-418	Rationalise Ballysaggart / Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ [new SW abstraction from Blackwater River and new WTP].	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option does not meet the Deliverability and Flexibility criteria.		●	
TG3-SAK-430	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-431	Increase GW abstraction from Kilmacthomas School (spring) and upgrade Kilmacthomas WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-434	New SW abstraction from Mahon River and new WTP to supply deficit	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria	●	●	●
TG3-SAK-435	New SW abstraction from Mahon River and new WTP to supply deficit	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria	●	●	●
TG3-SAK-440	Increase GW abstraction from Ballymacarbry BH (no.2) and upgrade Ballyrohan WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-443	New SW abstraction from Nier River and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small deficit. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-445	Increase GW abstraction from Tooraneena BH and upgrade Touraneena WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-447	New SW abstraction from Finisk River and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small deficit. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-448	New SW abstraction from Finisk River and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-449	Rationalise Boolavonteen / Kilcooney / Tooraneena to Kilbrien WRZ.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-452	New SW abstraction from Tay River and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small deficit. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-454	Rationalise Adramone / Kilrossanty to East Waterford WRZ [new SW abstraction from River Suir].	The local solution is more feasible. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-456	Rationalise Adramone / Kilrossanty to Kilmacthomas WRZ [Kilmacthomas WTP].	The option requires a significant length of pipeline for a WRZ not in deficit. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability criteria.		●	
TG3-SAK-459	Rationalise to Adramone / Kilrossanty Dungarvan WRZ.	The option requires a significant length of pipeline for a WRZ not in deficit. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability criteria.		●	
TG3-SAK-460	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	The WRZ is in deficit, therefore, this option based on water quality improvements is not suitable.	**WRZ in deficit, therefore option is not feasible**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-463	New GW abstraction from Mapestown wellfield and new WTP and supply defict.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria. Other versions of the option that meet full deficit are considered.		●	
TG3-SAK-464	New GW abstraction from Mapestown wellfield and new WTP and supply defict.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability criteria. Other versions of the option that meet full deficit are considered.		●	
TG3-SAK-471	Increase existing GW abstraction from Rathgormack BH and upgrade Rathgormack WTP to supply spare capacity to neighbouring WRZs in deficit.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability criteria. Other versions of the option that meet full deficit are considered.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-474	Leakage Reduction	This option refers to a “Tactical Option” as planned works are underway across all our WRZs as part of the National Leakage Reduction Programme. However, it is unlikely to meet the full deficit on its own. IW is committed to Leakage reduction and targets are included in SDB. As leakage reduction targets will progress in conjunction with other supply options, this option was screened out of the Preferred Approach development phase at coarse screening.	**This option is a tactical option and is unlikely to meet the full deficit. This will likely be implemented along with a new supply option**		
TG3-SAK-480	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	The WRZ is in deficit, therefore, this option based on water quality improvements is not suitable.	**WRZ in deficit, therefore option is not feasible**		
TG3-SAK-487	New SW abstraction from Ballyshunnock impoundment and new WTP	The desktop assessments undertaken indicate that the abstraction cannot increase due to WFD AA limits and other constraints such as water quality issues. Therefore, there is no scope to increase abstraction. This option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-503	Rationalise Faha to Kilmacthomas WRZ [Kilmacthomas WTP].	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-506	Rationalise Graiguenageeha to East Waterford WRZ [new SW abstraction from River Suir].	Rationalising Graiguenageeha WRZ to Stradbally WRZ is more preferable solution. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-510	Increase existing GW abstraction from Kilbrien BH and upgrade Kilbrien (Ballinakill) WTP to supply spare capacity to neighboring WRZs in deficit.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-511	Rationalise Kilbrien to Dungarvan WRZ.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-512	Rationalise Kilbrien to Boolavoonteen/Kilcooney/Touraneena WRZ.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-513	Rationalise Kilbrien to Boolavoonteen/Kilcooney/Touraneena WRZ [new SW abstraction from Finisk River and new WTP].	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-523	Rationalise Garrahylish to East Waterford WRZ [new SW abstraction from River Suir].	Local solution is more preferable. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-518	Rationalise Lacken to Lismore / Cappoquin / Ballyduff (LCB) WRZ [Cappoquin WTP].	Deermore is the favoured approach and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-527	New SW abstraction from Knockaderry impoundment and new WTP to supply deficit.	As per Local Authority information this reservoir is out of use, therefore not an option. Screened out due to resilience and sustainability issues.	●		●
TG3-SAK-549	Rationalise Carrigeen to Fews WRZ [Fews WTP].	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water., this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-550	Rationalise Carrigeen to Rathgormack WRZ.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water., this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-558	Increase GW abstraction from Fews BH and upgrade Fews WTP to supply deficit.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water., this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-561	New SW abstraction from Clodiagh River and new WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-571	Rationalise Monatarriff to Lismore / Cappoquin / Ballyduff (LCB) WRZ [increase GW abstraction at LCB Lismore Deerpark WTP].	This option is a duplicate of group 972 and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-572	Rationalise Ballysaggart / Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ [new SW abstraction from Blackwater River and new WTP].	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-584	Rationalise Ballyknock to Garravoone WRZ.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-590	Increase existing GW abstraction from Garravoone BH and upgrade Garravoone WTP to supply spare capacity to neigbouring WRZ in deficit.	The plan required a significant length of the pipeline for a relatively small demand. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-592	Increase existing GW abstraction from Garravoone BH and upgrade Garravoone WTP to supply spare capacity to neigbouring WRZ in deficit.	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		
TG3-SAK-602	Increase SW abstraction from Mahon River and upgrade Ballylaneen WTP to supply spare capacity to neighbouring WRZ in deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-612	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply partial deficit.	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-613	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit.	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		
TG3-SAK-621	Increase existing GW abstraction and upgrade Carrignagower WTP to supply deficit.	Abstracting the volume of water required to make this a feasible option is considered likely to result in the waterbody not achieving WFD objectives. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-627	Rationalise Ballysaggart / Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ [new SW abstraction from Blackwater River and new WTP].	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-628	Rationalise Ballysaggart / Carrignagower to Lismore / Cappoquin / Ballyduff (LCB) WRZ [increase GW abstraction at LCB Lismore Deerpark WTP].	This option is a duplicate of group 972 and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-634	New GW abstraction (no.2 wellfields) and treat at Adamstown WTP to supply deficit.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-635	New SW abstraction from River Suir upstream of Carrick-on-Suir. Pump raw water to Adamstown WTP and treat at Adamstown WTP to supply deficit.	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability and Flexibility criteria.		●	
TG3-SAK-638	Rationalise Kill/Ballylaneen to East Waterford WRZ [new GW abstraction].	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability and Flexibility criteria.		●	
TG3-SAK-639	Rationalise Kill/Ballylaneen to East Waterford WRZ [new SW abstraction from River Suir].	The option requires a significant length of pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the requirements of the Flexibility and Deliverability and Flexibility criteria.		●	
TG3-SAK-642	Increase GW abstraction at Knocklong Church Road and upgrade Knocklong Church Road WTP to supply deficit. Interconnect with Martinstown WRZ (SA 8).	This option is screened out and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-643	Rationalise Knocklong/Hospital to Limerick City (Clareville WTP).	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAK-645	Rationalise Carrigmore to Limerick City (Clareville WTP).	WRZ is already rationalised and as a result, is not taken forward to the fine screening stage.	**WRZ previously rationalised**		
TG3-SAK-647	Rationalise Carrigmore to Murroe / Cappamore Foileen WRZ (SA 8).	This option is a duplicate of group 986 and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**Option assessed as part of a different feasible group**		
TG3-SAK-650	Rationalise Callan to Kilkenny City - Troyswood WTP (SA L).	The option requires a significant length of pipeline for a relatively small demand. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.		●	
TG3-SAK-761	New SW abstraction from Aherlow river and upgrade Rossadrehid WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAK-762	Interconnect Tipperary Town and Galtee Regional and supply deficit from Galtee Regional.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●