Winter 2023

Regional Water Resources Plan South East

Appendix **3** Study Area **M** 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.

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1 Introduction and Background

1 Introduction – Study Area M – Wexford and Wicklow

This is the Technical Report for Study Area M 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 26 water resource zones of which 22 are in County Wexford and 4 in County Wicklow. 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.

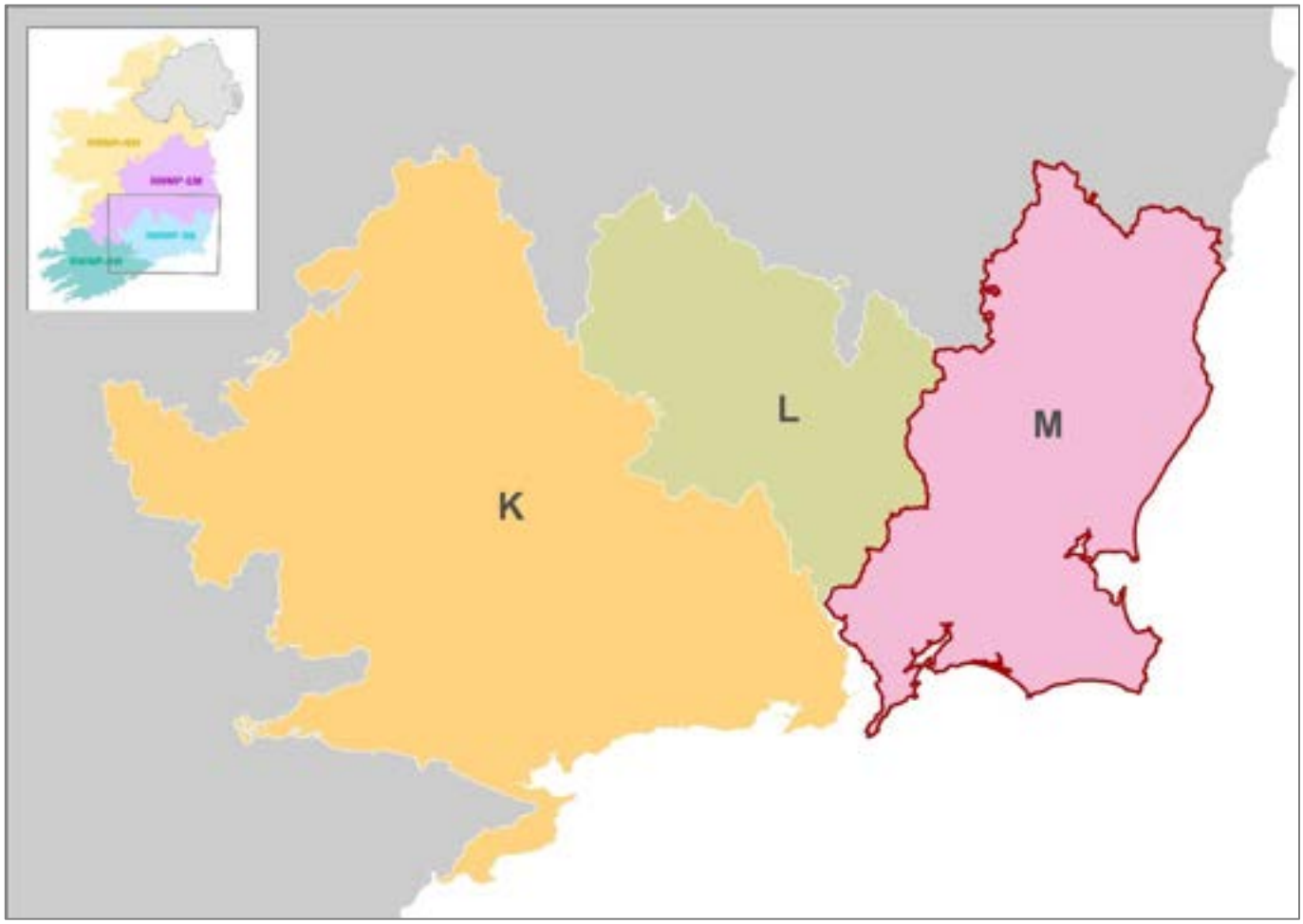

Figure 1.1 Overview of Study Areas within the South East Region.

This Technical Report is for Study Area M (SAM), which consists of 26 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

SAM consists of 26 WRZs supplying a population of approximately 100,642 people via approximately 1,716 kilometres of distribution network. The majority of the Study Area is in County Wexford, with the northeast boundary in County Wicklow. Wexford Town is the largest demand centre, with other notable towns including Gorey and Enniscorthy. The sources of water supply consist of 10 surface water abstractions and 27 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.

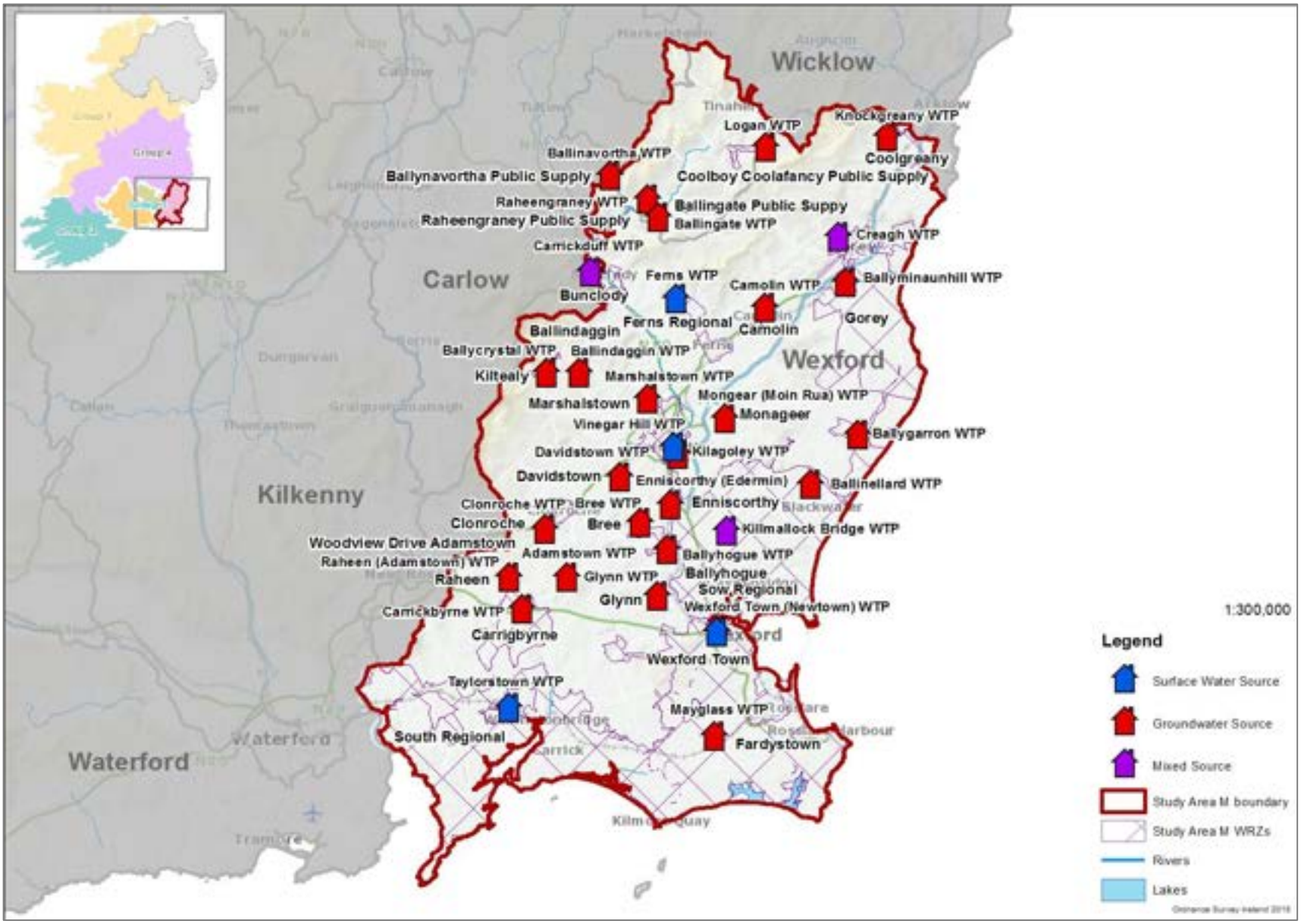

Figure 1.3 SAM Wexford and Wicklow Water Supply Study Area

Regarding surface water availability, most of SAM is within the large River Slaney & Wexford Harbour catchment, whilst elsewhere the Study Area crosses into the small catchments of the Ballyteigue-Bannow catchment in the south, and the River Owenavorragh catchment in the north east. The River Slaney rises on Lugnaquillia Mountain, draining the western Wicklow Mountains as it flows south, crossing into SAM at Bunclody, continuing south across central County Wexford, becoming tidal at Enniscorthy before entering Wexford Harbour at Wexford Town. The Slaney has a total catchment area of 1,980 km^2 and is designated as the Slaney River Valley Special Area of Conservation (SAC). In comparison, the Ballyteigue-Bannow and Owenavorragh catchments are much smaller coastal catchments characterised by several short rivers flowing to sea.

Around 50% of the water supplies to Study Area M come from surface water sources, with most of these being river abstractions from the River Slaney system. The Wexford Town WRZ, the largest WRZ in SAM, is supplied by an abstraction from the River Sow (tributary of the Slaney) and a small impounding reservoir source, Coolree, which combine to deliver up to 7,500 m^3/day to Newtown WTP. Elsewhere in the Slaney catchment, in the centre of the Study Area, the Enniscorthy WRZ is supplied by an abstraction from the main Slaney channel which feeds Vinegar Hill WTP to deliver up to 4,000 m^3/day. The Sow Regional WRZ is supplied from a combination of groundwater and an abstraction from the River Sow, feeding Killmallock Bridge WTP to deliver up to 3,200 m^3/day. In the north east of the WRZ, the Gorey WRZ is supplied from two abstractions from the River Bann (tributary of the Slaney), which are supplemented by groundwater to feed Creagh WTP to deliver up to 2,500 m^3/day. There is another notable surface water abstraction in the south of the Study Area, where the South Regional WRZ is supplied by an abstraction from the River Owenduff (part of the Owenavorragh catchment), feeding Taylorstown WTP to deliver up to 5,450 m^3/day.

Overall, 27 groundwater sources are managed by Uisce Éireann in the region The predominant aquifer type of the area is made up of poorly productive bedrock (70%), followed by productive fissured (22%), gravel (5%) and karstic (3%). Surface water abstractions dominate the total water supply for the region, highlighting the vast areas underlain by poorly productive aquifers with lower potential. There are extensive swathes of productive fissured bedrock (Rf) stretching from Gorey in the northeast to Stradbally on the coast of Waterford, which could offer potential for groundwater development however challenging.

The poorly productive rocks consist primarily of Ordovician and Cambrian Metasediments. This class of rocks will often yield enough water to supply a house or small farm and occasionally in major fracture zones may yield a good deal more. 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. The Precambrian Quartzites, which feature in the south east of the county, are characterised by the absence of an intergranular permeability and the presence of low fissure permeability. Although fractured the Ordovician rocks generally have a low permeability and are mostly regarded as a poor aquifer. The Cambrian rocks, mostly seen in southeast Wexford, generally show low aquifer potential but are occasionally capable of supplying group schemes and small commercial interests.

An extensive body of productive fissured bedrock, made up primarily of volcanics, stretches from Gorey in the northeast to Stradbally on the coast of Waterford. 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. There are some productive wellfields in this formation, such as Gorey in Wexford which has in the past supplied upwards of 7,000 m^3/day.

There are extensive swathes of regionally important karst aquifer in some areas, particularly in south east Wexford. 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 Fardystown (supplies c. 9,500 m^3/day) in Wexford. The

regionally important aquifers are generally smaller in extent in this part of the country and are banded by lesser productive bedrock aquifers.

Table 1.1 also provides an overview of the risk of failure against the Quality, Quantity, Reliability and Potential Sustainability criteria. A further breakdown of these scores is provided in Section 2.

Table 1.1 Study Area M

	Total Population	100,642	**Total Network Length (km)**	1,716	**Number of Water Resource Zones**		26
Counties in Study Area	Wexford, Wicklow						
Principle Settlements	Wexford, Enniscorthy, Gorey, Castlebridge-Blackwater, Courtown Harbour-Riverchapel-Ardamine, Piercetown, Ballygerry or Rosslare Harbour, Kilrane, Barntown, Ballymurn, The Ballagh, Grahormac, Kilmore Quay, Bridgetown, Ballycanew, Rosslare, Castle Ellis, Duncannon, Murntown, Ferns, Kilmuckridge or Ford, Danescastle, Duncormick, Kilmore, Arthurstown, Ballyhack, Campile, Taghmon, Coolgreany, Ballycullane						
Number of Water Sources	37	**Surface Water Sources**	10		**Groundwater Sources**	27	
Water Treatment Plant	**Source**	**Population**	**WTP Capacity (m³/day)**	**Quality**	**Quantity**	**Reliability**	**Potential Sustainability**
Ballinavortha WTP	Groundwater	8	1	●	●	●	●
Ballingate WTP	Groundwater	8	3	●	●	●	●
Raheengraney WTP	Groundwater	8	6	●	●	●	●
Logan WTP	Groundwater	492	215	●	●	●	●
Raheen (Adamstown) WTP	Groundwater	15	72	●	●	●	●
Camolin WTP	Groundwater	326	220	●	●	●	●
Mongear (Moin Rua) WTP	Groundwater	194	70	●	●	●	●
Adamstown WTP	Groundwater	98	20	●	●	●	●

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Wexford Town (Newtown) WTP	River Sow, Coolree Impoundment	21,790	7,500	●	●	●	●
Killmallock Bridge WTP	River Sow, Groundwater	11,774	3,200	●	●	●	●
Ballinellard WTP	Groundwater	11,774	450	●	●	●	●
Taylorstown WTP	Owenduff	10,492	5,450	●	●	●	●
Marshalstown WTP	Groundwater	89	30	●	●	●	●
Ballycrystal WTP	Groundwater	232	120	●	●	●	●
Ballygarron WTP	Groundwater	911	300	●	●	●	●
Ballyminaunhill WTP	Groundwater	12,143	10,667	TBC	TBC	TBC	TBC
Creagh WTP	Bann River (Pallis Bridge), Bann River (Kilmichael Pumping Station), Groundwater	7,154	2,500	●	●	●	●
Gylnn WTP	Groundwater	191	40	●	●	●	●
Ferns WTP	River Curralane	1,700	650	●	●	●	●
Mayglass WTP	Groundwater	15,604	12,000	●	●	●	●
Vinegar Hill WTP	Clonhasten (River Slaney)	11,758	4,000	●	●	●	●

Water Treatment Plant	Source	Population	WTP Capacity (m^3/day)	Quality	Quantity	Reliability	Potential Sustainability
Killagoley WTP	Groundwater	11,758	576	●	●	○	●
Enniscorthy (Edermin) WTP	Groundwater	11,758	200	●	●	○	○
Davidstown WTP	Groundwater	97	80	●	○	○	○
Knockgreany WTP	Groundwater	1,052	700	●	○	○	○
Clonroche WTP	Groundwater	532	300	●	●	●	○
Carrickduff WTP	Barkers Stream, Craan River, Groundwater	1,976	768	●	●	○	○
Bree WTP	Groundwater	363	140	●	●	○	○
Ballyhogue WTP	Groundwater	359	140	●	●	○	○
Ballindaggin WTP	Groundwater	201	90	●	●	○	●
Carrickbyrne WTP	Groundwater	927	450	●	●	○	●

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 M, 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 SAM Wexford and Wicklow 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**
Ballinavortha WTP	●	●	●	●
Ballingate WTP	●	●	●	●
Raheengraney WTP	●	●	●	●
Logan WTP	●	●	●	●
Raheen (Adamstown) WTP	●	●	●	●
Camolin WTP	●	●	●	●
Mongear (Moin Rua) 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**
Adamstown WTP				
Wexford Town (Newtown) WTP				
Killmallock Bridge WTP				
Ballinellard WTP				
Taylorstown WTP				
Marshalstown WTP				
Ballycrystal WTP				
Ballygarron WTP				
Ballyminaunhill WTP	TBC	TBC	TBC	TBC
Creagh WTP				
Gylnn WTP				
Ferns WTP				
Mayglass WTP				
Vinegar Hill WTP				
Killagoley WTP				
Enniscorthy (Edermin) WTP				
Davidstown WTP				
Knockgreany WTP				
Clonroche WTP				
Carrickduff WTP				
Bree WTP				
Ballyhogue WTP				

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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**
Ballindaggin WTP	●	●	●	●
Carrickbyrne 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, 24 of the 31 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 3 WRZs within SAM on the Environmental Protection Agency (EPA) Remedial Action List (RAL), Wexford Town, Enniscorthy and Clonroche.

Uisce Éireann is currently progressing immediate corrective action in advance of the NWRP for a number of supplies within SAM. 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 SAM – Wexford and Wicklow

Critical Water Quality Requirements	Progress
1. Gorey Regional Water Supply Scheme: The project provides for a new water treatment plant (WTP) and reservoir at Ballyminaunhill, upgrades work to an existing reservoir at Ballyminaunhill and associated interconnecting infrastructure. The existing scheme is operating at maximum capacity. This project will increase capacity to the area to facilitate growth and development. This project will benefit businesses and residents of Gorey and the surrounding area through improvement of security of water supply. The proposal includes: • Additional groundwater capacity • Construction of a new WTP at Ballyminaunhill • Construction of a new reservoir at Ballyminaunhill WTP • Construction of associated interconnecting infrastructure • Upgrade existing reservoir at Ballyminaunhill • Upgrade works are also planned for Creagh water treatment plant to ensure a safe and secure drinking water supply for Gorey town.	**In progress**
2. Wexford Town RAL: Upgrade of the Newtown WTP to provide resilient water treatment facilities and thus ensure a safe drinking water supply for Wexford Town.	**In progress**
3. Enniscorthy Water Supply Scheme: Planning application has been submitted as part of upgrade to the Enniscorthy Water Supply Scheme. For replacement of the raw water intake structure at Clonhasten, County Wexford. The works will include a construction and operation of a new raw water intake to abstract water from the River Slaney, construction on a new pumping station, replacement of the raw water main and an upgrade of Vinegar Hill water treatment plants. The upgrade works will unsure a reliable and sustainable water supply for Enniscorthy and the surrounding areas.	**In progress**
4. Clonroche RAL: The complete catchment focuses engagement actions involving Uisce Éireann and the relevant stakeholders required to achieve compliance with the limits for pesticides.	**In progress**
5. Site Assessment Groundwater Programme identified for the following Water Resource Zones: • Enniscorthy • Fardystown • Wexford Town • South Regional • Sow Regional • Bunclody WS • Ferns WS • Clonroche	**Need Identified**

Critical Water Quality Requirements	Progress
6. Reservoir Cleaning Programme: A major reservoir cleaning programme has been undertaken at 13 sites, which has reduced network water quality issues.	**Complete**
7. 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 23 of the 26 WRZs in SAM, based on assessed priority basis. • Ballingate WTP • Ballinavortha WTP • Raheengraney WTP • Carrickbyrne WTP • Ballindaggin WTP • Ballyhogue WTP • Bree WTP • Carrickduff WTP • Clonroche WTP • Davidstown WTP • Vinegar Hill WTP • Killagoley WTP • Enniscorthy (Edermin) WTP • Gylnn WTP • Creagh WTP • Ballygarron WTP • Ballycrystal WTP • Taylorstown WTP • Ballinellard WTP • Wexford Town (Newtown) WTP • Adamstown WTP • Mongear (Moin Rua) WTP • Camolin WTP • Raheen (Adamstown) WTP • Knockgreany WTP Any requirements within the remaining 3 supplies will be identified via Drinking Water Safety Plans with solutions developed as part of the NWRP.	**Complete**

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.

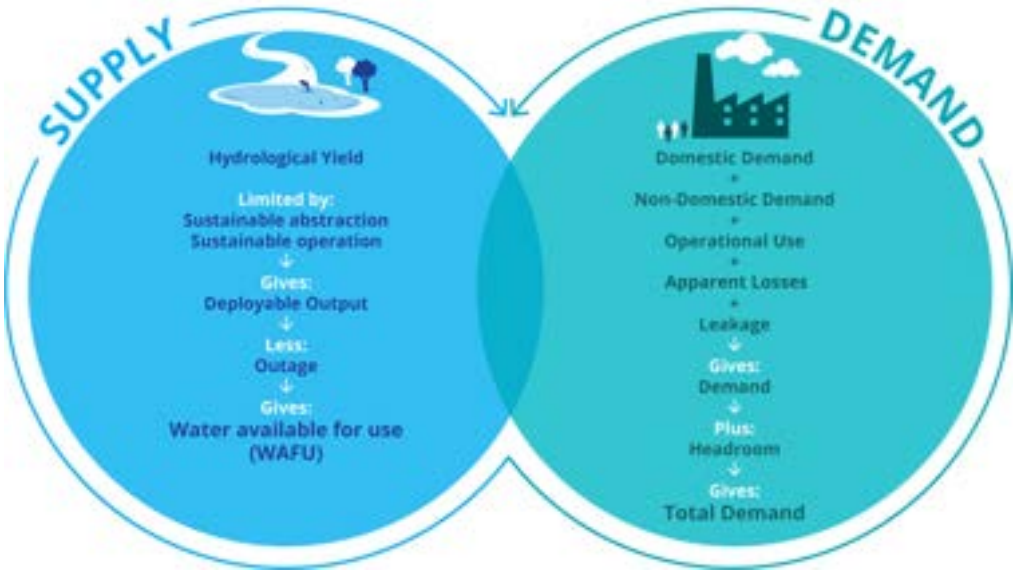

Figure 2.1 Supply Demand Balance

For each of the 26 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 SAM 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 scenario, 19 out of 26 of the WRZs in SAM have a current deficit and 19 out of 26 have a projected SDB deficit (based on a “do minimum” approach).

A summary of the SDB deficit across all 26 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

Water Resource Zone Name	Water Resource Zone Code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Ballingate Public Supply	3400SC0053	8	-1	-2	-2	-2	-2	-2
Ballynavortha Public Supply	3400SC0045	8	-2	-2	-2	-2	-2	-2
Raheengraney Public Supply	3400SC0013	8	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Coolboy Coolafancy Public Supply	3400SC0010	492	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Wexford Town	3300SC0081	21,790	-4,372	-4,799	-5,177	-5,691	-6,259	-6,713
Sow Regional	3300SC0080	11,774	-1,141	-1,236	-1,327	-1,431	-1,538	-1,624
South Regional	3300SC0079	10,492	-2,069	-2,204	-2,311	-2,395	-2,472	-2,534
Fardystown	3300SC0078	15,604	-2,727	-2,782	-2,937	-3,095	-3,252	-3,377
Bree	3300SC0077	363	-175	-179	-181	-184	-186	-188
Raheen	3300SC0066	15	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Ballyhogue	3300SC0032	359	-35	-38	-41	-43	-45	-47
Woodview Drive Adamstown	3300SC0027	98	-13	-13	-14	-15	-15	-16
Enniscorthy	3300SC0023	11,758	-1,794	-1,869	-1,990	-2,110	-2,229	-2,324

Water Resource Zone Name	Water Resource Zone Code	Population	Maximum Deficit m^3/day					
			2019	2025	2030	2035	2040	2044
Carrickbyrne	3300SC0022	927	-305	-314	-319	-324	-330	-334
Coolgreany	3300SC0020	1,052	-4	-13	-20	-26	-32	-37
Glynn	3300SC0017	191	-42	-43	-44	-46	-47	-48
Davidstown	3300SC0015	97	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Monageer	3300SC0014	194	-43	-45	-46	-47	-48	-49
Clonroche	3300SC0013	532	-74	-80	-84	-88	-92	-95
Kiltealy	3300SC0012	232	-62	-64	-66	-68	-69	-70
Ballindaggin	3300SC0011	201	-56	-58	-59	-60	-61	-61
Marshalstown	3300SC0010	89	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Bunclody	3300SC0004	2,126	-690	-693	-694	-706	-720	-732
Ferns Regional	3300SC0003	1,700	-224	-235	-244	-254	-264	-271
Camolin	3300SC0002	326	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit
Gorey	3300SC0001	20,208	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit	No Deficit

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 13,830 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 18,524 m^3/day by 2044.

Our ongoing activities to improve the Supply Demand Balance in SAM Wexford and Wicklow 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 SAM. Uisce Éireann & 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 the surface water abstraction at Wexford Town (Newtown) WTP and in the Bann river impacting the intake of Pallis for Creagh WTP. Groundwater was also impacted within levels at Ballykale WTP which serves Gorey WRZ also falling.

During our needs assessment for SAM, Uisce Éireann has identified a number of 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 SAM Critical Infrastructure Projects and Need Identification

Critical Requirement	Progress
1. **Taylorstown WTP:** The demand on the scheme is high during dry spells and the plant would operate at the maximum capacity. High lift pumps control and amend to allow operation in duty/assist mode to meet demand. Replacement of high lift pump required to allow to cover the demand.	**Completed**
2. **St. Johns Villas Watermains replacement:** The works in St. John's Villas, Enniscorthy involve the decommissioning of ageing back yard water mains and the delivery of over 270 meters of new water mains constructed along the public road to provide more reliable water supply, improve water quality, and reduce high level of leakage.	**In Progress**
3. **Wexford Town Backyard Services:** The works involve decommissioning of approximately 8 kilometres of old cast iron back yard water mains. 7.5 kilometres of new water mains will be constructed along the public road and new service connections will be installed from the new water main to each customer's property. The project also involves decommissioning of further old cast iron and lead connections in nearby areas. These works will deliver cost savings by providing improved water network operation that will require less maintenance in the future	**Completed**
4. **St. Mary's Lane Watermains Replacement:** The works on St. Mary's Lane (Wexford Town) will involve the construction of approximately 30 metres of new public water main and provision of 4 new service connections for properties at the Bride Street end of St. Marys Lane. These works will also remove lead services at the affected properties.	**Completed**
5. **Coolballow Watermains replacement:** The works on the Coolballow Road (Enniscorthy) involve the replacement of approximately 2.1 kilometres of problematic water mains with polyethylene (plastic) pipes. The works will also involve connecting customers water service connections to the new water main.	**Completed**
6. **Coolree Reservoir** Willowstick investigation undertaken to determine the sources of leaks at the reservoir. Six preferential flow paths were identified through, beneath and around the dam. The report recommends an optioneering study for the refurbishment of the core and suggests a grouting exercise as a potential solution, alternative solutions may include using a sheet piling system. Regardless of the solution site investigation works will be required and are now handed over to ID. Temporary measures have been	**In Progress**

Critical Requirement	Progress
implemented by cutting a 1.5m notch on the spillweir to keep water level low while increased surveillance is being undertaken.	
7. Fardystown Rehabilitation of existing boreholes and development of new production wells is required to provide resilience for Fardystown scheme and allow augmentation of neighbouring schemes, including Wexford Town.	**In Progress**
8. Treated Water Storage – Sow Regional New treated water storage required for Sow Regional.	**In Progress**
9. 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's 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. While at the end of 2022, the government passed the Water Environment (Abstractions and Impoundments) Act, 2022, it has not yet commenced and the associated regulations and guidelines which will further detail the types of assessment and national methodology to be used are not yet in place. As this legislation is still being developed, we do not have full visibility of the future regulatory regime. We have therefore not progressed through a theoretical licencing process on a site-by-site basis and cannot reliably include an estimation of sustainable abstraction within the SDB calculations. Instead, we use the hydrological yield, water treatment capacity and bulk transfer limitations in our calculation of DO. This 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 SAM supplies, we have assessed the potential impacts on our 10 no. surface water abstractions: Barkers Stream (Bunclody), Craan Intake (Bunclody), Clonhasten (River Slaney) (Enniscorthy), River Curralane (Ferns Regional), Bann River (Pallis Bridge) (Gorey), Bann River (Kilmichael Pumping Station) (Gorey), Owenduff (South Regional), River Sow- Sow Regional (Sow Regional), River Sow- Wexford Town (Wexford Town), Coolree Intake (Wexford Town).

2.6 presents the findings of this assessment in order to indicate the potential reductions to abstraction 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 at Barkers Stream (Bunclody), Craan Intake (Bunclody), River Curralane (Ferns Regional), Bann River (Pallis Bridge) (Gorey), Bann River (Kilmichael Pumping Station) (Gorey), Owenduff (South Regional), River Sow - Sow Regional (Sow Regional), River Sow - Wexford Town (Wexford Town), Coolree Intake (Wexford Town) may not meet sustainability guidelines during dry weather flows. However, under the proposed regulatory regime, this 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)
Barkers Stream (Bunclody)	704	247	69
Craan Intake (Bunclody)		2,921	547
Clonhasten (River Slaney) (Enniscorthy)	3,667	113,954	30,746
River Curralane (Ferns Regional)	596	1,969	467
Bann River (Pallis Bridge) (Gorey)	2,292	2,696	362
Bann River (Kilmichael Pumping Station) (Gorey)		7,241	926
Owenduff (South Regional)	4,996	10,938	2,809
River Sow - Sow Regional (Sow Regional)	2,933	5,822	1,323
River Sow - Wexford Town (Wexford Town)	6,875	4,456	1,693
Coolree Intake (Wexford Town)		969	82

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

[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.

Table 2.6 Potential Change to SDB Based on Potential Abstraction Reductions

Source (WRZ)	Potential change in SDB[4] (m^3/day)
Barkers Stream (Bunclody)	None
Craan Intake (Bunclody)	None
Clonhasten (River Slaney) (Enniscorthy)	None
River Curralane (Ferns Regional)	-196
Bann River (Pallis Bridge) (Gorey)	None
Bann River (Kilmichael Pumping Station) (Gorey)	None
Owenduff (South Regional)	-2,703
River Sow- Sow Regional (Sow Regional)	None
River Sow- Wexford Town (Wexford Town)	-3,041
Coolree Intake (Wexford Town)	

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.

[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.

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 M 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	Nett leakage reduction 238 m³/day in the region Additional Leakage Targets of 5,241 m³/day to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500 m³/d
	Interim additional supplies of 13,830 m³/day within 10 years Total of 18,524 m³/day 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 Clonhasten (River Slaney) (Enniscorthy). Based on this initial assessment, the volumes of water abstracted at Barkers Stream (Bunclody), Craan Intake (Bunclody), River Curralane (Ferns Regional), Bann River (Pallis Bridge) (Gorey), Bann River (Kilmichael Pumping Station) (Gorey), Owenduff (South Regional), River Sow - Sow Regional (Sow Regional), River Sow - Wexford Town (Wexford Town), Coolree Intake (Wexford Town) 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 M

3 Solution Types Considered in Study Area M

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

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 SAM 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 SAM 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
- Nett 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 1,500m^3/day, see Table 3.1.

Table 3.1 SELL Targets for WRZ in SAM

WRZ	Nett Leakage Reduction applied to SDB(m^3/day)	Additional leakage Targets to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500m^3/day (m^3/day)	Total Leakage Targets (m^3/day)
Wexford Town		214	214
Sow Regional		155	155
South Regional		757	757
Fardystown	119	2,121	2,240
Bree		66	66
Enniscorthy	48	112	160
Carrickbyrne		94	94
Coolgreany		39	39

WRZ	Nett Leakage Reduction applied to SDB(m^3/day)	Additional leakage Targets to achieve SELL and reduce leakage levels to 21% of demand in WRZs with demand in excess of 1,500m^3/day (m^3/day)	Total Leakage Targets (m^3/day)
Monageer		26	26
Clonroche		43	43
Ballindaggin		30	30
Bunclody		149	149
Ferns Regional		7	7
Gorey	71	1,428	1,499

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 SAM and include:

- Stand-alone groundwater options, across the region
- Stand-alone surface water options, across the region
- Transfers
- Rationalisations
- Conjunctive use
- Water Treatment Plant Upgrades for water quality purposes

4 Option Development SAM

4 Option Development for Study Area M

This chapter describes how our options assessment methodology was applied to produce a Feasible Options list to meet the identified needs.

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 SAM, 273 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 Unconstrained Options

No. of Options	Option Type
73	Groundwater
32	Surface Water
108	Transfers
47	Rationalisation
1	Conjunctive use
7	Upgrade WTP (WQ only)
1	Advance Leakage Reduction
4	Desalination

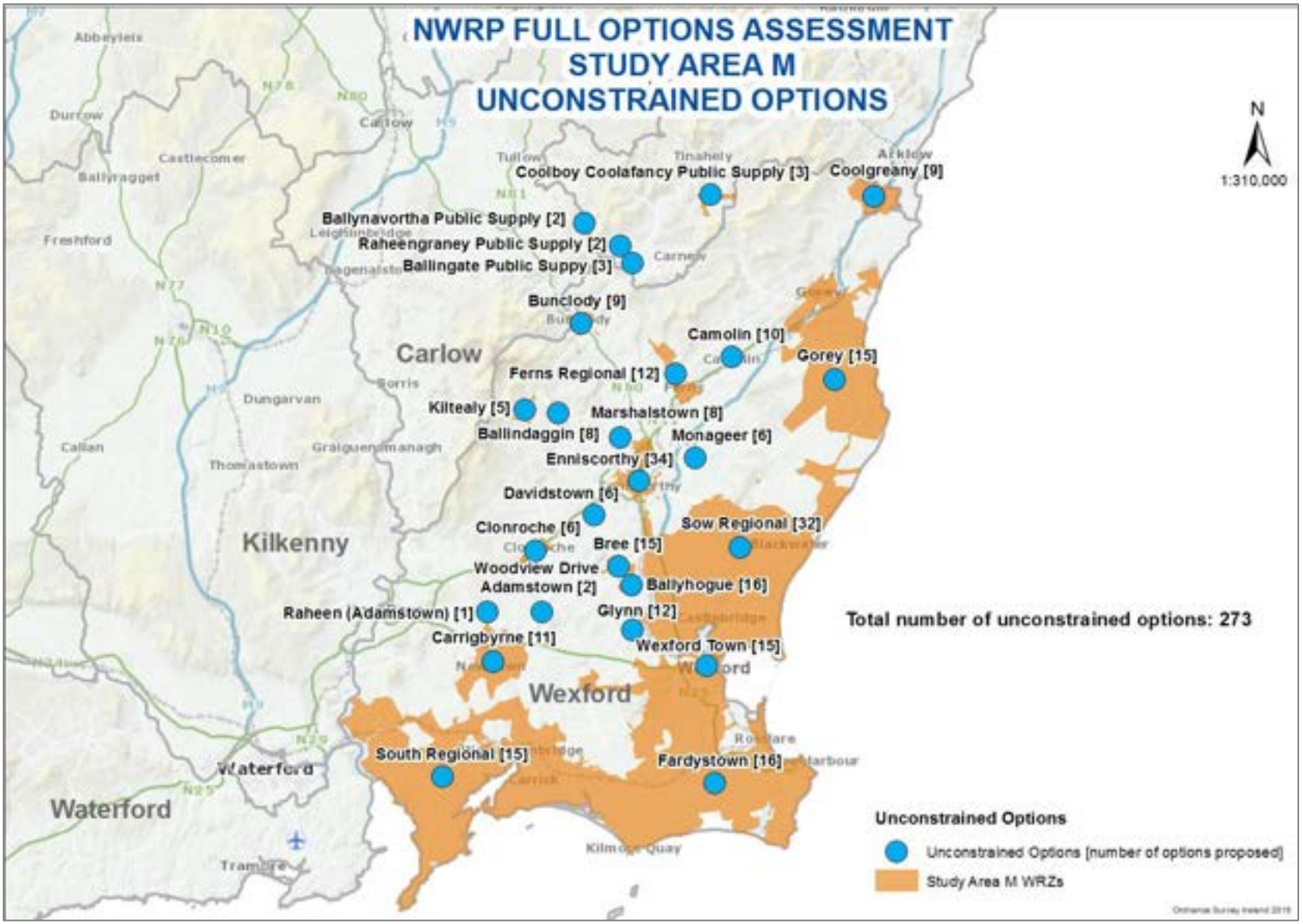

Figure 4.1 SAM Unconstrained Options

The 273 options were filtered through our screening process to eliminate those with potentially unviable environmental impacts or feasibility issues. This process is summarised below.

4.2 Coarse Screening

The 273 identified Unconstrained Options were assessed through Coarse Screening against the criteria of:

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

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

Ninety-one (91) 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 Ballyhogue WRZ in study area M.

Example Rejected Option

Option SAM-095

Rationalise Ballyhogue to Sow Regional WRZ (Killmallock Bridge WTP).

Rejection Reason

Not enough capacity to supply full deficit in Sow regional and rationalise Ballyhogue. This option also requires long pipeline for relatively small deficit.

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 182 options were progressed to further assessment through the Fine Screening process.

Table 4.3 SAM Remaining Options after Course Screening

No. of Options	Option Type
42	Groundwater
10	Surface Water
94	Transfers
28	Rationalisation
1	Conjunctive use
7	Upgrade WTP (WQ only)

4.3 Fine Screening

The 182 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 182 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 SAM Remaining Options after Fine Screening (Feasible Options)

No. of Options	Option Type
42	Groundwater
10	Surface Water
94	Transfers
28	Rationalisation
1	Conjunctive use
7	Upgrade WTP (WQ only)

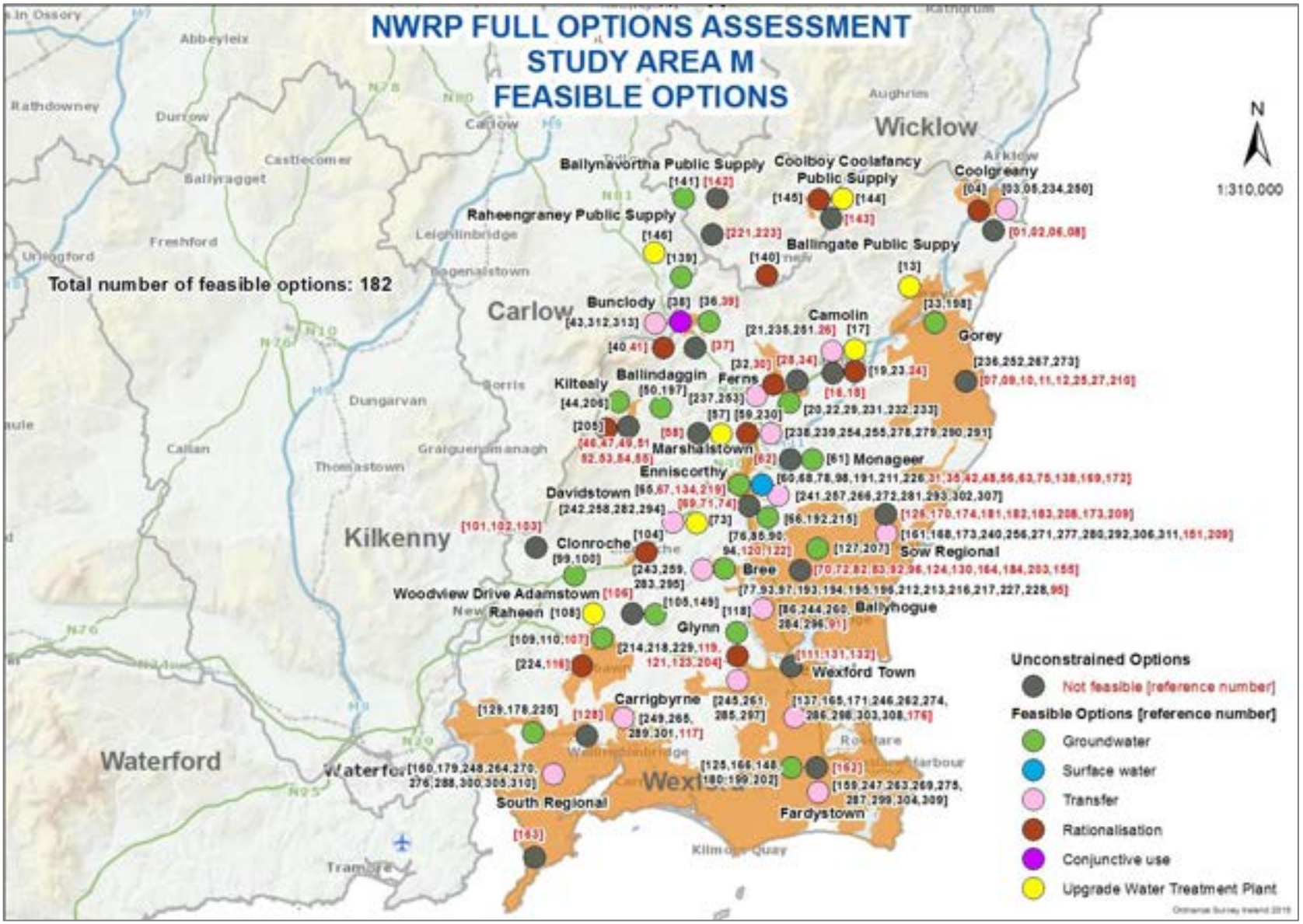

Figure 4.2 SAM Spatial Overview of the Feasible Options

4.4 Options Assessment Summary

The SDB deficit in the region ranges between 13,766 m^3/day in 2019 during normal conditions, to a maximum of 18,219 m^3/day in 2044 during dry conditions. During the options assessment stage, a total of 273 unconstrained options were assessed. Of these, 91 options were screened out for the reasons summarised in Table and recorded in Annex B.

Table 4.5 Rejected Options Summary

No. of Options	Reason for Rejection
29	Resilience, Deliverability & Flexibility, Sustainability
52	Deliverability & Flexibility
1	Resilience
9	Other

The remaining 182 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 M. From this table it can be noted that there are 39 WRZ Options and 143 options which can be merged to form 35 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 SAM Feasible Options Summary

Water Resource Zone Name	Option Type	
	WRZ Option	SA Grouped Option
Ballingate Public Supply	1	1
Ballynavortha Public Supply	1	0
Raheengraney Public Supply	1	0
Coolboy Coolafancy Public Supply	1	1
Wexford Town	1	11
Sow Regional	2	11
South Regional	2	11
Fardystown	4	11
Bree	1	12

Water Resource Zone Name	Option Type	
	WRZ Option	SA Grouped Option
Raheen	1	0
Ballyhogue	1	12
Woodview Drive Adamstown	1	0
Enniscorthy	3	19
Carrickbyrne	2	5
Coolgreany	1	4
Glynn	1	7
Davidstown	1	4
Monageer	1	4
Clonroche	2	1
Kiltealy	1	1
Ballindaggin	2	1
Marshalstown	1	6
Bunclody	2	4
Ferns Regional	2	7
Camolin	1	5
Gorey	2	5

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 M.

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's 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 Nett 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.

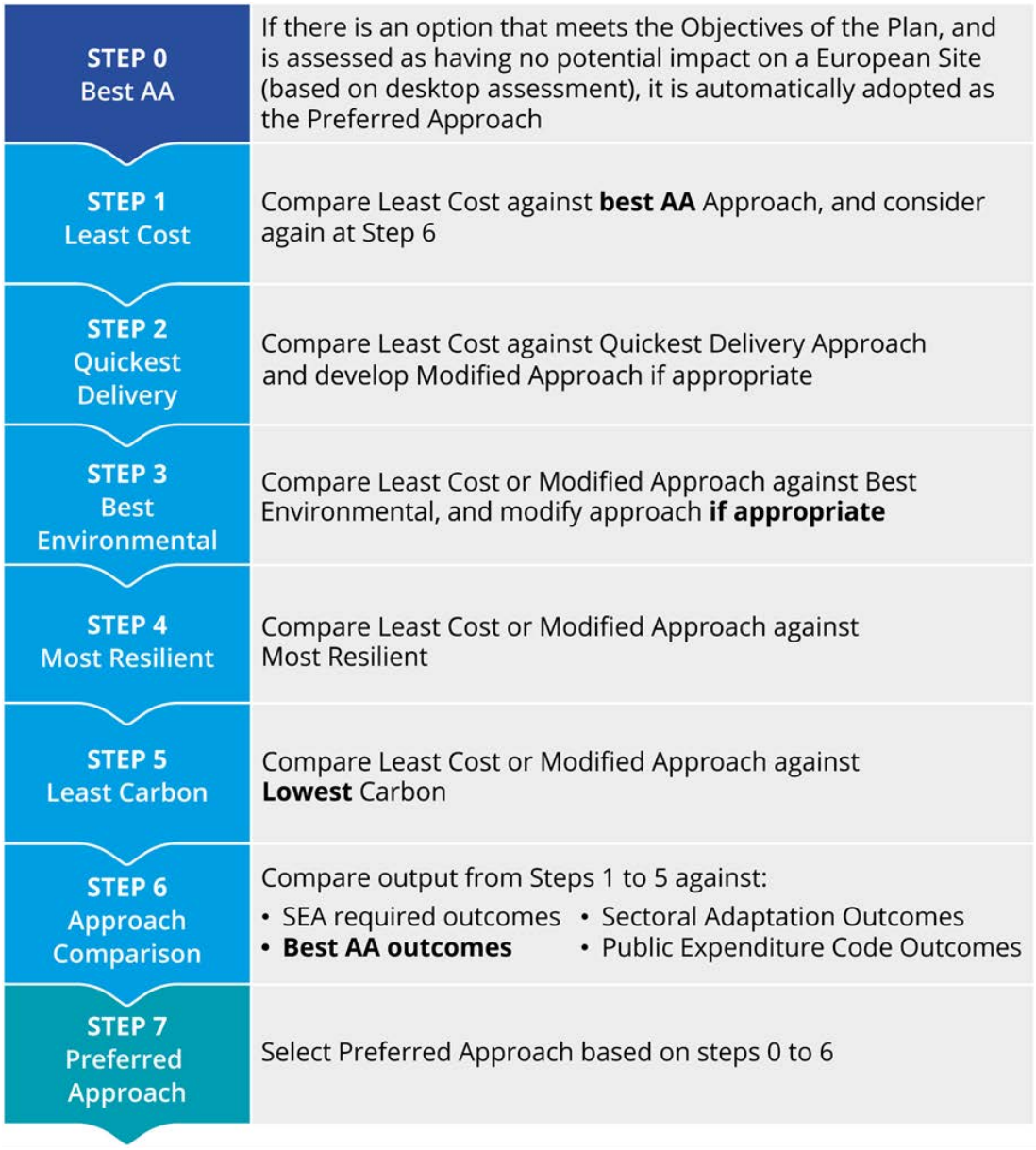

Figure 5.1 Figure of the 7-step assessment process

This methodology which is futured 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 SAM.

5.2 Preferred Approach Development Process for Study Area M

5.2.1 Stage 1 – WRZ Level Approach

As outlined in Section 4.4 of this technical report there are 182 feasible options. 39 of these options are WRZ Options while 143 options are merged to form 35 Study Area Options. Table 5.2 outlines the 39 WRZ options for SAM, providing option reference numbers and detailing the WRZs they provide a solution to. These 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 SAM Feasible Options

Water Resource Zone Name	Feasible Options SAM Wexford	
	Option Code	Option Description
Ballindaggin	SAM-050	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit.
Ballindaggin	SAM-197	New GW abstraction and new WTP to supply deficit.
Ballingate Public Supply	SAM-139	Increase GW abstraction and upgrade Ballingate WTP to supply deficit.
Ballyhogue	SAM-090	Increase GW abstraction and upgrade WTP to supply deficit.
Ballynavortha Public Supply	SAM-141	Increase GW abstraction and upgrade Ballynavortha WTP to supply deficit.
Bree	SAM-076	Increase GW abstraction and upgrade Bree WTP to supply deficit.
Bunclody WS	SAM-036	New GW abstraction and upgrade Carrickduff WTP to supply deficit.
Bunclody WS	SAM-038	Conjunctive use of Clody River during winter to allow GW recharge to use GW during summer. Involves increased GW abstraction and upgrade of Carrickduff WTP to supply partial deficit.
Camolin WSS	SAM-017	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Carrickbyrne WS	SAM-109	Increase GW abstraction and upgrade WTP to partly supply deficit.
Carrickbyrne WS	SAM-110	New GW abstraction/wellfield to supply deficit at Carrickbyrne and new WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAM Wexford	
	Option Code	Option Description
Clonroche	SAM-099	Increase GW abstraction and upgrade WTP to partly supply deficit.
Clonroche	SAM-100	New GW abstraction and upgrade Clonroche WTP to supply full demand.
Coolboy Coolafancy Public Supply	SAM-144	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Coolgreany WS	SAM-003	Interconnect Coolgreany with neighbouring Killinierin GWS and supply deficit.
Davidstown	SAM-073	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Enniscorthy Town	SAM-065	Increase GW abstraction and upgrade Killagoley WTP to partly supply deficit.
Enniscorthy Town	SAM-066	Increase GW abstraction and upgrade Edermin WTP to partly supply deficit.
Enniscorthy Town	SAM-068	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.
Fardystown	SAM-125	Increase GW abstraction from existing Fardystown scheme to partly supply deficit.
Fardystown	SAM-148	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply).
Fardystown	SAM-199	New GW abstraction and new WTP in the NE or SW of Rkd aquifer to supply deficit.
Fardystown	SAM-202	New groundwater abstraction in the regionally important fissured (Rf) bedrock – c. 2000m3/day from a number of wellfields and new WTP to supply deficit.
Ferns WS	SAM-029	New GW abstraction and new WTP to supply deficit
Ferns WS	SAM-231	Commission TW's (drilled near reservoir) to supplement new GW and replace existing WTP to partly supply full demand (abandon existing SW source).
Glynn WS	SAM-118	Increase GW abstraction and upgrade WTP to supply deficit.

Water Resource Zone Name	Feasible Options SAM Wexford	
	Option Code	Option Description
Gorey	SAM-013	Upgrade existing WTPs for water quality improvements. The WRZ is not in deficit.
Gorey	SAM-198	Rationalise Kilmuckridge WTP to new Ballyminaunhill WTP. Rationalisation within WRZ.
Kiltealy	SAM-044	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit.
Marshalstown	SAM-057	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Monageer	SAM-061	Increase GW abstraction and upgrade Monageer WTP to supply deficit.
Raheen (Adamstown)	SAM-108	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Raheengraney Public Supply	SAM-146	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
South Regional	SAM-129	New GW wellfield at Adamstown and new WTP to supply deficit.
South Regional	SAM-178	New GW abstraction and new WTP to supply deficit.
Sow Regional	SAM-127	Increase GW abstraction and upgrade WTP to partly supply deficit.
Sow Regional	SAM-207	New GW and new WTP to partly supply deficit.
Wexford Town	SAM-149	New GW wellfield at Adamstown and new WTP to supply deficit.
Woodview Drive Adamstown	SAM-105	Increase GW abstraction and upgrade 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 SAM Alignment of WRZ Options with Approach Categories

Water Resource Zone Name	Feasible Options SAM Wexford		Approach					
	No. of options in WRZ	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Ballindaggin	2	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	-	✓	-	-	-
Ballingate Public Supply	1	Increase GW abstraction and upgrade Ballingate WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Ballyhogue	1	Increase GW abstraction and upgrade WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Ballynavortha Public Supply	1	Increase GW abstraction and upgrade Ballynavortha WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Bree	1	Increase GW abstraction and upgrade Bree WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Bunclody WS	2	New GW abstraction and upgrade Carrickduff WTP to supply deficit.	✓	✓	✓	✓	✓	✓
		Conjunctive use of Clody River during winter to allow GW recharge to use GW during summer. Involves increased GW abstraction and upgrade of Carrickduff WTP to supply partial deficit.	-	-	✓	-	-	✓
Camolin WSS	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Approach					
	No. of options in WRZ	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Carrickbyrne WS	2	Increase GW abstraction and upgrade WTP to partly supply deficit.	✓	✓	✓	✓	✓	-
		New GW abstraction/wellfield to supply deficit at Carrickbyrne and new WTP to supply deficit.	-	-	✓	-	-	✓
Clonroche	2	Increase GW abstraction and upgrade WTP to partly supply deficit.	✓	✓	✓	✓	✓	-
		New GW abstraction and upgrade Clonroche WTP to supply full demand.	-	-	✓	-	-	✓
Coolboy Coolafancy Public Supply	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Coolgreany WS	1	Interconnect Coolgreany with neighbouring Killinierin GWS and supply deficit.	✓	✓	✓	✓	✓	✓
Davidstown	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Enniscorthy Town	3	Increase GW abstraction and upgrade Killagoley WTP to partly supply deficit.	-	✓	✓	-	✓	-
		Increase GW abstraction and upgrade Edermin WTP to partly supply deficit.	✓	-	-	-	-	-
		Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	-	-	-	✓	-	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Approach					
	No. of options in WRZ	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Fardystown	4	Increase GW abstraction from existing Fardystown scheme to partly supply deficit.	-	-	-	-	-	-
		New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply).	-	-	-	✓	-	✓
		New GW abstraction and new WTP in the NE or SW of Rkd aquifer to supply deficit.	-	-	✓	-	✓	✓
		New groundwater abstraction in the regionally important fissured (Rf) bedrock – c. 2000m3/day from a number of wellfields and new WTP to supply deficit.	✓	✓	✓	-	-	-
Ferns WS	2	New GW abstraction and new WTP to supply deficit	✓	-	-	-	✓	✓
		Commission TW's (drilled near reservoir) to supplement new GW and replace existing WTP to partly supply full demand (abandon existing SW source).	-	✓	✓	✓	-	-
Glynn WS	1	Increase GW abstraction and upgrade WTP to supply deficit.	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Approach					
	No. of options in WRZ	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Gorey	2	Upgrade existing WTPs for water quality improvements. The WRZ is not in deficit.	✓	-	✓	✓	✓	✓
		Rationalise Kilmuckridge WTP to new Ballyminaunhill WTP. Rationalisation within WRZ.	-	✓	✓	✓	✓	✓
Kiltealy	1	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Marshalstown	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Monageer	1	Increase GW abstraction and upgrade Monageer WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Raheen (Adamstown)	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
Raheengraney Public Supply	1	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓
South Regional	2	New GW wellfield at Adamstown and new WTP to supply deficit.	✓	-	✓	-	✓	✓
		New GW abstraction and new WTP to supply deficit.	-	✓	✓	✓	-	-
Sow Regional	2	Increase GW abstraction and upgrade WTP to partly supply deficit.	✓	✓	✓	✓	✓	-
		New GW and new WTP to partly supply deficit.	-	-	✓	-	-	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Approach					
	No. of options in WRZ	Option Description	Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient
Wexford Town	1	New GW wellfield at Adamstown and new WTP to supply deficit.	✓	✓	✓	✓	✓	✓
Woodview Drive Adamstown	1	Increase GW abstraction and upgrade WTP to supply deficit.	✓	✓	✓	✓	✓	✓

The 7 Step Process outlined in Figure 5.1 was then applied to each WRZ in SAM, 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 SAM at WRZ level, include the following:

- In terms of Best AA, 5 WRZ options score a 0 in relation to potential impact on a designated European Site;
- In 19 of the 26 Water Resource Zones, the Preferred Approach consists of the same Plan Level options as the Best AA and Best Environmental Approaches.
- 1 WRZ option has 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 and for this reason a potential alternative approach must be identified. One of the preferred WRZ level approaches has a -3 AA associated with them,
  Preferred Approaches at WRZ level are outlined in Table 5.4.

Table 5.4 SAM WRZ Approach Options

Water Resource Zone Name	Feasible Options SAM Wexford		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Ballindaggin	SAM-050	Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ballingate Public Supply	SAM-139	Increase GW abstraction and upgrade Ballingate WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ballyhogue	SAM-090	Increase GW abstraction and upgrade WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Ballynavortha Public Supply	SAM-141	Increase GW abstraction and upgrade Ballynavortha WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Bree	SAM-076	Increase GW abstraction and upgrade Bree WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Bunclody WS	SAM-038	Conjunctive use of Clody River during winter to allow GW recharge to use GW during summer. Involves increased GW abstraction and upgrade of Carrickduff WTP to supply partial deficit.	-	-	-	✓	-	-	✓	✓
Camolin WSS	SAM-017	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Carrickbyrne WS	SAM-110	New GW abstraction/wellfield to supply deficit at Carrickbyrne and new WTP to supply deficit.	-	-	-	✓	-	-	✓	✓
Clonroche	SAM-100	New GW abstraction and upgrade Clonroche WTP to supply full demand.	-	-	-	✓	-	-	✓	✓
Coolboy Coolafancy Public Supply	SAM-144	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Coolgreany WS	SAM-003	Interconnect Coolgreany with neighbouring Killinierin GWS and supply deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Davidstown	SAM-073	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Enniscorthy Town	SAM-068	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	-	-	-	-	✓	-	✓	✓
Fardystown	SAM-148	New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply).	-	-	-	-	✓	-	✓	✓
Ferns WS	SAM-029	New GW abstraction and new WTP to supply deficit	-	✓	-	-	-	✓	✓	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Glynn WS	SAM-118	Increase GW abstraction and upgrade WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Gorey	SAM-198	Rationalise Kilmuckridge WTP to new Ballyminaunhill WTP. Rationalisation within WRZ.	✓	-	✓	✓	✓	✓	✓	✓
Kiltealy	SAM-044	Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Marshalstown	SAM-057	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
Monageer	SAM-061	Increase GW abstraction and upgrade Monageer WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Raheen (Adamstown)	SAM-108	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	✓	✓	✓	✓	✓	✓	✓	✓
Raheengraney Public Supply	SAM-146	Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.	-	✓	✓	✓	✓	✓	✓	✓
South Regional	SAM-129	New GW wellfield at Adamstown and new WTP to supply deficit.	-	✓	-	✓	-	✓	✓	✓

Water Resource Zone Name	Feasible Options SAM Wexford		Zero AA	Approach						Preferred Approach
	Option Code	Option Description		Least Cost	Quickest Delivery	Best AA	Best SEA	Lowest Carbon	Most Resilient	
Sow Regional	SAM-127	Increase GW abstraction and upgrade WTP to partly supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
	SAM-207	New GW and new WTP to partly supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Wexford Town	SAM-149	New GW wellfield at Adamstown and new WTP to supply deficit.	-	✓	✓	✓	✓	✓	✓	✓
Woodview Drive Adamstown	SAM-105	Increase GW abstraction and upgrade 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 projects or options; however, looking at a wider, more holistic, spatial scale benefits the plan level assessment 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 35 Study Area options.

Table 5.5 SAM Grouped Options

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Coolgreany WS	SAM-501	Coolgreany WS - Rationalise Coolgreany to Arklow WRZ (SA 1 increase GW abstraction).	Group 1
Coolgreany WS	SAM-502	Coolgreany WS - Interconnect Coolgreany with Arklow WRZ (SA 1 increase GW abstraction) and supply deficit.	Group 2
Camolin WSS Ferns WS	SAM-506	Rationalise Camolin with Ferns WRZ. New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). Commission TW's (drilled near reservoir) to supplement new GW and replace existing WTP to partly supply full demand (abandon existing SW source).	Group 6
Camolin WSS Ferns WS	SAM-507	Interconnect Camolin with Ferns WRZ for increased resilience. New GW abstraction and new WTP to partly supply full demand (abandon existing SW source). Commission TW's (drilled near reservoir) to supplement new GW and replace existing WTP to partly supply full demand (abandon existing SW source).	Group 7

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Camolin WSS Ferns WS Gorey	SAM-511	Rationalise Camolin to Gorey WRZ. Rationalise Ferns to Gorey via Camolin WRZ. New GW abstraction (no.3 BHs) and upgrade existing wells (no.8 BHs). New Ballyminaunhill WTP (proposed WTP capacity of 8MLD) - currently under development.	Group 11
Bunclody WS	SAM-513	Rationalise Bunclody to Carlow Central Regional WRZ (new GW abstraction) and supply deficit.	Group 13
Bunclody WS	SAM-515	Interconnect Bunclody and Carlow Central Regional WRZ (new GW abstraction) and supply deficit.	Group 15
Marshalstown Enniscorthy Town	SAM-519	Rationalise Marshalstown to Enniscorthy WRZ (River Slaney). Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	Group 19
Bree Enniscorthy Town	SAM-525	Rationalise Bree to Enniscorthy WRZ (River Slaney). Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	Group 25
Bree Ballyhogue	SAM-529	Increase GW abstraction and upgrade Bree WTP to supply deficit. Interconnect Bree and Ballyhogue WRZs and supply deficit.	Group 29
Bree Ballyhogue	SAM-532	Rationalise Ballyhogue to Bree WRZ. Increase GW abstraction and upgrade Bree WTP to supply deficit.	Group 32
Ballyhogue Enniscorthy Town	SAM-534	Rationalise Ballyhogue to Enniscorthy WRZ (River Slaney) via Bree. Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	Group 34
Clonroche New Ross	SAM-535	Rationalise Clonroche to New Ross WRZ (SA K - new GW abstraction at Adamstown)	Group 35

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Ballingate Public Supply Tinahely	SAM-547	Rationalise Ballingate to Tinahely WRZ (not in deficit).	Group 47
Coolboy Coolafancy Public Supply Tinahely	SAM-549	Rationalise Coolboy Coolafancy to Tinahely WRZ (not in deficit).	Group 49
Wexford Town Fardystown South Regional Sow Regional Enniscorthy	SAM-553	Interconnect Wexford Town, Fardystown, South Regional, Sow Regional and Enniscorthy WRZs and supply deficit.	Group 53
Wexford Town Fardystown	SAM-557	Interconnect Wexford Town with Fardystown and increase from current Fardystown scheme to partly supply deficit. New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction)	Group 57
Sow Regional Enniscorthy Town	SAM-558	Interconnect Sow Regional WRZs and Enniscorthy and supply deficit. Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	Group 58
Wexford Town Sow Regional Enniscorthy Town	SAM-559	Interconnect Wexford Town and Sow Regional WRZs with Enniscorthy and supply deficit. Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	Group 59
South Regional Fardystown	SAM-562	Interconnect South Regional with Fardystown and increase from current Fardystown scheme to partly supply deficit. New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction).	Group 62

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Enniscorthy Town Bree Ballyhogue	SAM-566	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree to Enniscorthy WRZ (River Slaney). Rationalise Ballyhogue to Enniscorthy WRZ (River Slaney) via Bree.	Group 66
Enniscorthy Town Bree Ballyhogue	SAM-567	Increase GW abstraction and upgrade Edermin WTP to partly supply deficit. Rationalise Bree and Ballyhogue WRZs to Enniscorthy Town and Environs WSS (Edermin borehole WTP).	Group 67
Ballindaggin Kilteely	SAM-569	Rationalise Ballindaggin to Kilteely. Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit.	Group 69
Enniscorthy Town Bree Ballyhogue Glynn WS	SAM-571	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue and Glynn to Enniscorthy WRZ.	Group 71
Enniscorthy Town Bree Ballyhogue Glynn WS	SAM-572	Increase GW abstraction and upgrade Edermin WTP to partly supply deficit. Rationalise Bree, Ballyhogue and Glynn to Enniscorthy WRZ.	Group 72
Carrickbyrne WS South Regional	SAM-575	Rationalise Carrickbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit.	Group 75
Enniscorthy Town Bree Ballyhogue Glynn WS Marshalstown	SAM-576	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ.	Group 76

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Gorey Enniscorthy Wexford Town Fardystown South Regional Sow Regional Coolgreany Camolin Ferns Marshalstown Monageer Davidstown Bree Ballyhogue Glynn Carrickbyrne	SAM-577	Interconnect Gorey, Enniscorthy, Wexford Town, Fardystown and South Regional with GDA via Ballinapark (Vartry connection). Rationalise Sow Regional, Coolgreany, Camolin, Ferns, Marshalstown, Monageer, Davidstown, Bree, Ballyhogue, Glynn and Carrickbyrne WRZs.	Group 77
Gorey Enniscorthy Sow Regional Wexford Town Fardystown South Regional Coolgreany Camolin Ferns Marshalstown Monageer Davidstown Bree Ballyhogue Glynn Carrickbyrne	SAM-578	Rationalise Gorey, Enniscorthy, Sow Regional, Wexford Town, Fardystown, South Regional, Coolgreany, Camolin, Ferns, Marshalstown, Monageer, Davidstown, Bree, Ballyhogue, Glynn and Carrickbyrne WRZs to GDA via Ballinapark (Vartry connection).	Group 78
Gorey Enniscorthy Wexford Town Fardystown South Regional Sow Regional	SAM-579	Interconnect Gorey, Enniscorthy, Wexford Town, Fardystown and South Regional with GDA via Ballinapark (Vartry connection). Rationalise Sow Regional WRZ.	Group 79

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Gorey Enniscorthy Sow Regional Wexford Town Fardystown South Regional	SAM-580	Rationalise Gorey, Enniscorthy, Sow Regional, Wexford Town, Fardystown and South Regional to the GDA via Ballinapark (Vartry connection).	Group 80
Enniscorthy Wexford Town Fardystown South Regional Sow Regional Marshalstown Monageer Davidstown Bree Ballyhogue Glynn Bunclody Carrickbyrne	SAM-581	Interconnect Enniscorthy, Wexford Town, Fardystown and South Regional with GDA via Rathvilly. Rationalise Sow Regional, Marshalstown, Monageer, Davidstown, Bree, Ballyhogue, Glynn, Bunclody and Carrickbyrne WRZs.	Group 81
Enniscorthy Wexford Town Fardystown South Regional Sow Regional Marshalstown Monageer Davidstown Bree Ballyhogue Glynn Bunclody Carrickbyrne	SAM-582	Rationalise Enniscorthy, Wexford Town, Fardystown and South Regional, Sow Regional, Marshalstown, Monageer, Davidstown, Bree, Ballyhogue, Glynn, Bunclody and Carrickbyrne WRZs to the GDA via Rathvilly.	Group 82
Enniscorthy Wexford Town Fardystown South Regional Sow Regional	SAM-583	Interconnect Enniscorthy, Wexford Town, Fardystown and South Regional with GDA via Rathvilly. Rationalise Sow Regional WRZ.	Group 83

Feasible Options SAM			
Water Resource Zone Name	**Option Code**	**Option Description**	**SA Grouped Option**
Enniscorthy Wexford Town Fardystown South Regional Sow Regional	SAM-584	Rationalise Enniscorthy, Wexford Town, Fardystown, South Regional, and Sow Regional to the GDA via Rathvilly.	Group 84

The 35 Study Area options result in 41 SA Combinations including WRZ level Approach. The 41 SA Combinations in terms of the types of options within each combination are summarised in Table 5.6 below.

Table 5.6 SAM Combinations

Key	WRZ Approach Option	○	SA Grouped Option	□

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option [illegible])	SA Combination 2 (SA Grouped Option [illegible])	SA Combination 3 (SA Grouped Option [illegible])	SA Combination 4 (SA Grouped Option [illegible])	SA Combination 5 (SA Grouped Option [illegible])	SA Combination 6 (SA Grouped Option [illegible])	SA Combination 7 (SA Grouped Option [illegible])	SA Combination 8 (SA Grouped Option [illegible])	SA Combination 9 (SA Grouped Option [illegible])	SA Combination 10 (SA Grouped Option [illegible])	SA Combination 11 (SA Grouped Option [illegible])	SA Combination 12 (SA Grouped Option [illegible])	SA Combination 13 (SA Grouped Option [illegible])	SA Combination 14 (SA Grouped Option [illegible])	SA Combination 15 (SA Grouped Option [illegible])	SA Combination 16 (SA Grouped Option [illegible])	SA Combination 17 (SA Grouped Option [illegible])	SA Combination 18 (SA Grouped Option [illegible])	SA Combination 19 (SA Grouped Option [illegible])	SA Combination 20 (SA Grouped Option [illegible])
Coolgreany WS	○	○	○	○	○	□	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○
Gorey	○	□	○	□	□	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○
Camolin WSS	○	□	□	□	□	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○
Ferns WS	○	○	○	○	○	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○
Bunclody WS	○	□	□	□	□	□	○	○	○	□	□	○	○	○	○	○	○	○	○	○	○
Kilteely	○	○	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ballindaggin	○	○	○	□	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Marshalstown	○	□	○	○	□	○	○	○	○	○	○	□	○	○	○	○	○	○	○	○	○
Monageer	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Enniscorthy Town	○	○	□	○	□	○	○	○	○	○	○	□	□	○	○	□	○	○	○	○	○

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option	SA Combination 2 (SA Grouped Option	SA Combination 3 (SA Grouped Option	SA Combination 4 (SA Grouped Option	SA Combination 5 (SA Grouped Option	SA Combination 6 (SA Grouped Option	SA Combination 7 (SA Grouped Option	SA Combination 8 (SA Grouped Option	SA Combination 9 (SA Grouped Option	SA Combination 10 (SA Grouped Option	SA Combination 11 (SA Grouped Option	SA Combination 12 (SA Grouped Option	SA Combination 13 (SA Grouped Option	SA Combination 14 (SA Grouped Option	SA Combination 15 (SA Grouped Option	SA Combination 16 (SA Grouped Option	SA Combination 17 (SA Grouped Option	SA Combination 18 (SA Grouped Option	SA Combination 19 (SA Grouped Option	SA Combination 20 (SA Grouped Option
Davidstown	○	□	□	○	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Bree	○	○	○	○	○	○	○	○	○	○	○	○	□	□	□	○	○	○	○	○	○
Ballyhogue	○	□	□	□	○	○	○	○	○	○	○	○	○	□	□	□	○	○	○	○	○
Clonroche	○	○	□	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Woodview Drive Adamstown	○	○	○	□	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Raheen (Adamstown)	○	□	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Carrickbyrne WS	○	○	○	□	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Glynn WS	○	○	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Fardystown	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	□	□
Sow Regional	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
South Regional	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	□

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option [illegible])	SA Combination 2 (SA Grouped Option [illegible])	SA Combination 3 (SA Grouped Option [illegible])	SA Combination 4 (SA Grouped Option [illegible])	SA Combination 5 (SA Grouped Option [illegible])	SA Combination 6 (SA Grouped Option [illegible])	SA Combination 7 (SA Grouped Option [illegible])	SA Combination 8 (SA Grouped Option [illegible])	SA Combination 9 (SA Grouped Option [illegible])	SA Combination 10 (SA Grouped Option [illegible])	SA Combination 11 (SA Grouped Option [illegible])	SA Combination 12 (SA Grouped Option [illegible])	SA Combination 13 (SA Grouped Option [illegible])	SA Combination 14 (SA Grouped Option [illegible])	SA Combination 15 (SA Grouped Option [illegible])	SA Combination 16 (SA Grouped Option [illegible])	SA Combination 17 (SA Grouped Option [illegible])	SA Combination 18 (SA Grouped Option [illegible])	SA Combination 19 (SA Grouped Option [illegible])	SA Combination 20 (SA Grouped Option [illegible])
Ballingate Public Supply	○	□	□	○	□	○	○	○	○	○	○	○	○	○	○	○	○	□	○	○	○
Ballynavortha Public Supply	○	○	○	□	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Coolboy Coolafancy Public Supply	○	○	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	□	○	○
Raheengraney Public Supply	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Wexford Town	○	○	○	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	□	○

WRZ	SA Combination 21 (SA Grouped Option 66)	SA Combination 22 (SA Grouped Option 67)	SA Combination 23 (SA Grouped Option 69)	SA Combination 24 (SA Grouped Option 71)	SA Combination 25 (SA Grouped Option 72)	SA Combination 26 (SA Grouped Option 6)	SA Combination 27 (SA Grouped Option 7)	SA Combination 28 (SA Grouped Option 75)	SA Combination 29 (SA Grouped Option 76)	SA Combination 30 (SA Grouped Option 77)	SA Combination 31 (SA Grouped Option 78)	SA Combination 32 (SA Grouped Option 79)	SA Combination 33 (SA Grouped Option 80)	SA Combination 34 (SA Grouped Option 81)	SA Combination 35 (SA Grouped Option 82)	SA Combination 36 (SA Grouped Option 83)	SA Combination 37 (SA Grouped Option 84)	SA Combination 38 (SA Grouped Option 53)	SA Combination 39 (SA Grouped Option 58)	SA Combination 40 (SA Grouped Option 59)	SA Combination 41 (SA Grouped Option 1, 47, 81)
Coolgreany WS	○	○	○	○	○	○	○	○	○	□	□	○	○	○	○	○	○	○	○	○	□
Gorey	○	○	○	○	○	○	○	○	○	□	□	□	□	○	○	○	○	○	○	○	○
Camolin WSS	○	○	○	○	○	□	□	○	○	□	□	○	○	○	○	○	○	○	○	○	○
Ferns WS	○	○	○	○	○	□	□	○	○	□	□	○	○	○	○	○	○	○	○	○	○
Bunclody WS	○	○	○	○	○	○	○	○	○	○	○	○	○	□	□	○	○	○	○	○	□
Kilteely	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ballindaggin	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Marshalstown	○	○	○	○	○	○	○	○	□	□	□	○	○	□	□	○	○	○	○	○	□
Monageer	○	○	○	○	○	○	○	○	○	□	□	○	○	□	□	○	○	○	○	○	□
Enniscorthy Town	□	□	○	□	□	○	○	○	□	□	□	□	□	□	□	□	□	□	□	□	□
Davidstown	○	○	○	○	○	○	○	○	○	□	□	○	○	□	□	○	○	○	○	○	□
Bree	□	□	○	□	□	○	○	○	□	□	□	○	○	□	□	○	○	○	○	○	□
Ballyhogue	□	□	○	□	□	○	○	○	□	□	□	○	○	□	□	○	○	○	○	○	□

WRZ	SA Combination 21 (SA Grouped Option 66)	SA Combination 22 (SA Grouped Option 67)	SA Combination 23 (SA Grouped Option 69)	SA Combination 24 (SA Grouped Option 71)	SA Combination 25 (SA Grouped Option 72)	SA Combination 26 (SA Grouped Option 6)	SA Combination 27 (SA Grouped Option 7)	SA Combination 28 (SA Grouped Option 75)	SA Combination 29 (SA Grouped Option 76)	SA Combination 30 (SA Grouped Option 77)	SA Combination 31 (SA Grouped Option 78)	SA Combination 32 (SA Grouped Option 79)	SA Combination 33 (SA Grouped Option 80)	SA Combination 34 (SA Grouped Option 81)	SA Combination 35 (SA Grouped Option 82)	SA Combination 36 (SA Grouped Option 83)	SA Combination 37 (SA Grouped Option 84)	SA Combination 38 (SA Grouped Option 53)	SA Combination 39 (SA Grouped Option 58)	SA Combination 40 (SA Grouped Option 59)	SA Combination 41 (SA Grouped Option 1, 47, 81)
Clonroche	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Woodview Drive Adamstown	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Raheen (Adamstown)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Carrickbyrne WS	○	○	○	○	○	○	○	□	○	□	□	○	○	□	□	○	○	○	○	○	□
Glynn WS	○	○	○	○	○	○	○	○	□	□	□	○	○	□	□	○	○	○	○	○	□
Fardystown	○	○	○	○	○	○	○	○	○	□	□	□	□	□	□	□	□	□	○	○	□
Sow Regional	○	○	○	○	○	○	○	○	○	□	□	□	□	□	□	□	□	□	□	□	□
South Regional	○	○	○	○	○	○	○	□	○	□	□	□	□	□	□	□	□	□	○	○	□
Ballingate Public Supply	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	□
Ballynavortha Public Supply	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

WRZ	SA Combination 21 (SA Grouped Option 66)	SA Combination 22 (SA Grouped Option 67)	SA Combination 23 (SA Grouped Option 69)	SA Combination 24 (SA Grouped Option 71)	SA Combination 25 (SA Grouped Option 72)	SA Combination 26 (SA Grouped Option 6)	SA Combination 27 (SA Grouped Option 7)	SA Combination 28 (SA Grouped Option 75)	SA Combination 29 (SA Grouped Option 76)	SA Combination 30 (SA Grouped Option 77)	SA Combination 31 (SA Grouped Option 78)	SA Combination 32 (SA Grouped Option 79)	SA Combination 33 (SA Grouped Option 80)	SA Combination 34 (SA Grouped Option 81)	SA Combination 35 (SA Grouped Option 82)	SA Combination 36 (SA Grouped Option 83)	SA Combination 37 (SA Grouped Option 84)	SA Combination 38 (SA Grouped Option 53)	SA Combination 39 (SA Grouped Option 58)	SA Combination 40 (SA Grouped Option 59)	SA Combination 41 (SA Grouped Option 1, 47, 81)
Coolboy Coolafancy Public Supply	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Raheengraney Public Supply	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Wexford Town	○	○	○	○	○	○	○	○	○	□	□	□	□	□	□	□	□	□	○	□	□

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.

In accordance with Section 7.2.2 of the RWRP SE, where options or combinations of options achieve similar, although not exactly identical scores under the six approach types, UÉ takes a wider look at the comparable combinations /options to consider which to categorise as the "Best" approach within each category. In particular, UÉ takes into account whether the option or combination of options meets the SEA and Habitats objectives outlined in the Framework Plan. This is an example of the professional judgement from the multi-disciplinary teams, identified in section 8.3.7.4 of the Framework Plan.

For SAM, 22 SA combinations had a very similar ranking under the Least Cost category, within 5% of each other. These included:

- WRZ Approach
- SA Combination 1 (Grouped Option 1, 47, 75 and 76)
- SA Combination 2 (Grouped Option 2, 49, 62 and 67)
- SA Combination 3 (Grouped Option 6, 47, 70 and 72)
- SA Combination 6 (Grouped Option 1)
- SA Combination 7 (Grouped Option 2)
- SA Combination 9 (Grouped Option 13)
- SA Combination 10 (Grouped Option 15)
- SA Combination 11 (Grouped Option 19)
- SA Combination 12 (Grouped Option 25)
- SA Combination 13 (Grouped Option 29)
- SA Combination 14 (Grouped Option 32)
- SA Combination 15 (Grouped Option 34)
- SA Combination 16 (Grouped Option 35)
- SA Combination 17 (Grouped Option 47)
- SA Combination 18 (Grouped Option 49)
- SA Combination 22 (Grouped Option 67)
- SA Combination 23 (Grouped Option 69)
- SA Combination 24 (Grouped Option 71)
- SA Combination 25 (Grouped Option 72)
- SA Combination 28 (Grouped Option 75)
- SA Combination 29 (Grouped Option 76)

The Least Cost Approach is determined using an Uisce Éireann Net Present Value assessment tool. The NPV tool uses a strict set of requirements and is limited in what flexibility it offers. Therefore, as set out in further detail in Section 7.2.1 of the RWRP SE, where an Option or Combination of Options provide similar NPV costs, and in some circumstances to ensure that no option is discounted at this early stage by reference only to "Least Cost" only, Uisce Éireann has considered that all options within a 5% NPV cost margin are in principle eligible to be identified as the "Least Cost" option. This approach recognises the

desktop nature of the NPV assessment and the fact that the figures will almost certainly change at project stage.

When we compared the 22 SA Combinations against each other to identify which should go forward as the Least Cost approach, SA Combination 1 scores best in Most Resilient Approach and Best Environmental Approach and scores comparable to the other combinations against the Lowest Carbon, Best AA and Quickest Delivery Criteria. Therefore, SA Combination 1 was taken forward as the Least Cost Approach in the Approach Development Stage. Table 5.7.1 below outlines all 22 SA Combinations which cost within 5% of least cost.

Table 5.7.1 SAM Summary of SA Combination of Performance against Approach Type to determine Least Cost Approach among 22 SA combination which are 5% within the Least Cost

Ranked order (best to worst)	Best														Worst

WRZ	WRZ Approach Options	SA Combination 1 (SA Grouped Option 1, 47, 75 and	SA Combination 2 (SA Grouped Option 2, 49, 62 and	SA Combination 3 (SA Grouped Option 6, 47, 70 and	SA Combination 6 (SA Grouped Option 1)	SA Combination 7 (SA Grouped Option 2)	SA Combination 9 (SA Grouped Option 13)	SA Combination 10 (SA Grouped Option 15)	SA Combination 11 (SA Grouped Option 19)	SA Combination 12 (SA Grouped Option 25)	SA Combination 13 (SA Grouped Option 29)	SA Combination 14 (SA Grouped Option 32)	SA Combination 15 (SA Grouped Option 34)	SA Combination 16 (SA Grouped Option 35)	SA Combination 17 (SA Grouped Option 47)	SA Combination 18 (SA Grouped Option 49)	SA Combination 22 (SA Grouped Option 67)	SA Combination 23 (SA Grouped Option 69)	SA Combination 24 (SA Grouped Option 71)	SA Combination 25 (SA Grouped Option 72)	SA Combination 28 (SA Grouped Option 75)	SA Combination 29 (SA Grouped Option 76)
Quickest Delivery															Best							Worst
Best AA biodiversity	1 -3 AA impact	1 -3 AA impact	3 -3 AA impact	2 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	0 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	2 -3 AA impact	1 -3 AA impact	2 -3 AA impact	2 -3 AA impact	1 -3 AA impact	1 -3 AA impact
Lowest Carbon																			Best			Worst
Most Resilient	Worst	Best																				
Best Environmental		Best														Worst						

Table 5.7.2 SAM Summary of SA Combination of Performance against Approach Type to determine Preferred Approach

Ranked order (best to worst)	Best															Worst

WRZ	SA Combination 1 (SA Grouped Option 1, 47, 75	SA Combination 4 (SA Grouped Option 2, 7, 32,	SA Combination 5 (SA Grouped Option 1, 6, 15,	SA Combination 8 (SA Grouped Option 11)	SA Combination 19 (SA Grouped Option 57)	SA Combination 20 (SA Grouped Option 62)	SA Combination 21 (SA Grouped Option 66)	SA Combination 26 (SA Grouped Option 6)	SA Combination 27 (SA Grouped Option 7)	SA Combination 30 (SA Grouped Option 77)	SA Combination 31 (SA Grouped Option 78)	SA Combination 32 (SA Grouped Option 79)	SA Combination 33 (SA Grouped Option 80)	SA Combination 34 (SA Grouped Option 81)	SA Combination 35 (SA Grouped Option 82)	SA Combination 36 (SA Grouped Option 83)	SA Combination 37 (SA Grouped Option 84)	SA Combination 38 (SA Grouped Option 53)	SA Combination 39 (SA Grouped Option 58)	SA Combination 40 (SA Grouped Option 59)	SA Combination 41 (SA Grouped Option 1,47,81)
Least Cost	Best										Worst										
Quickest Delivery		Best									Worst										
Best AA biodiversity	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	2 -3 AA impact	2 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	0 -3 AA impact	0 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	1 -3 AA impact	0 -3 AA impact
Lowest Carbon											Worst										Best
Most Resilient																		Worst			Best
Best Environmental									Worst												Best

The SA Combinations in Table 5.7.2 are assessed to determine the approach categories as summarised in Table 5.8. SA Combination 1 was identified in Table 5.7.2 as the Best in the Approach category of Least Cost. SA Combination 41 was identified as the Best in the Approach Categories of Best Environmental, Most Resilient, Lowest Carbon and Best AA. SA Combination 4 was identified as the Best in the Quickest Delivery Approach category.

Table 5.8 Best Combinations

Approach Categories	Best Performing Combination
Least Cost (LCo)	SA Combination 1
Best Environmental (BE)	SA Combination 41
Quickest Delivery (QD)	SA Combination 4
Most Resilient (MR)	SA Combination 41
Lowest Carbon (LC)	SA Combination 41
Best AA (BA)	SA Combination 41*

*Note: SA Combination 34, SA Combination 35 and SA Combination 41 score the same numbers of AA impacts, however SA Combination 41 was selected as the Best AA as it is also the Best Environmental Approach.

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.

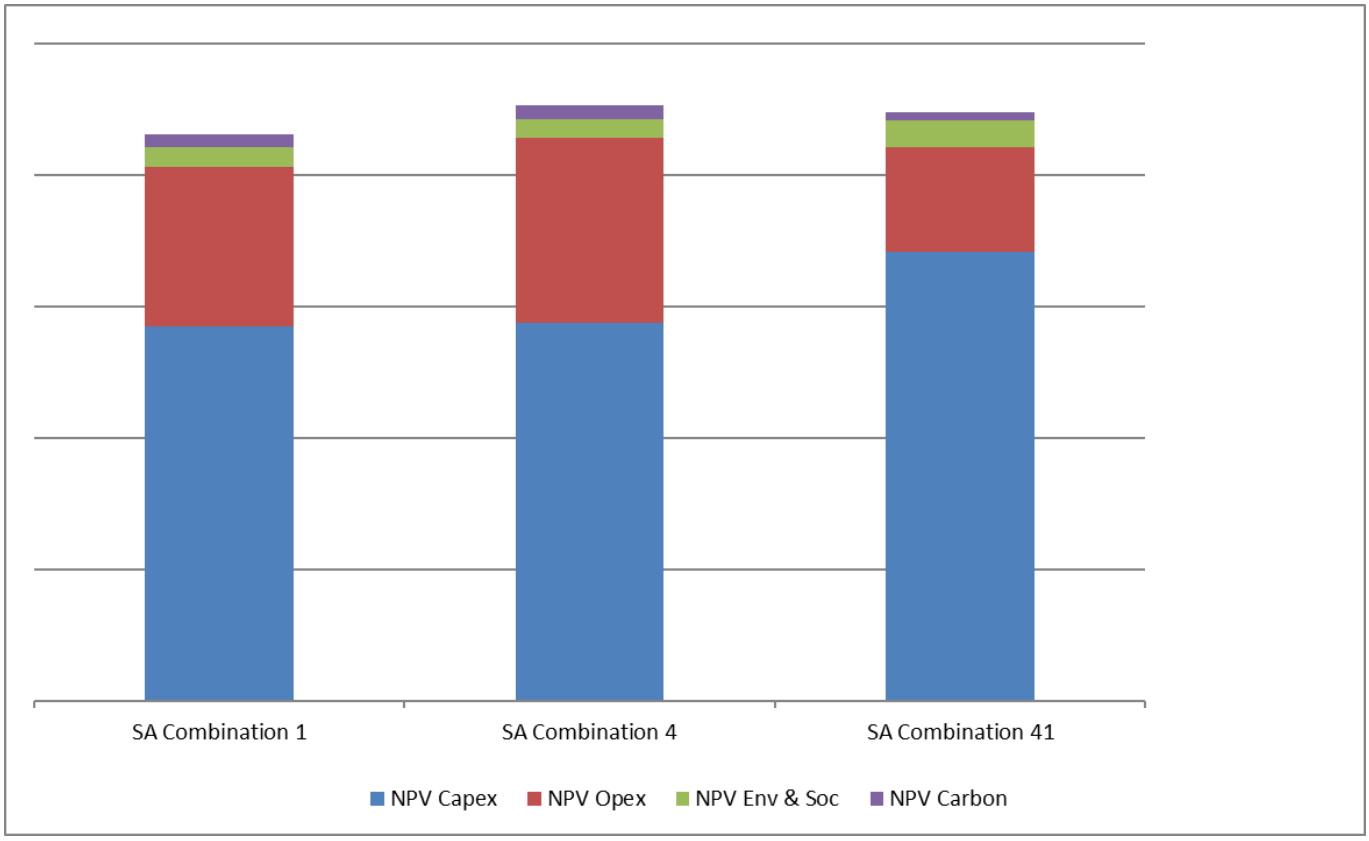

Figure 5.2 NPV Costs for WRZ and SA Approaches

In accordance with the Options Methodology, these approaches are then compared against each other using the 7-Step process in Figure 5.2 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 1) against the Best AA Approach (SA Combination 41). The Best AA Approach (SA Combination 41) performs better than the Least Cost Approach (SA Combination 24) against the Approach categories of Lowest Carbon, Most Resilient and Best Environmental criteria, however the difference in scores between the approaches against these criteria are not significant when contrasted against the poorer performance against the Quickest Delivery criteria. This is because an there is urgent need in this Region as 11 out of 26 WRZs have limited connection capacity due to the water supply constraints described in Water Supply Capacity Register[5]. The Least Cost Approach (SA Combination 1) involves the development of groundwater sources which can be developed relatively quickly. Whilst the development of a groundwater source means the combination has an extra -3 AA impact, the development of the groundwater source will include a site-based assessments which will determine a safe abstraction yield. This should enable the -3 AA impact to be prevented. The Best AA Approach (Combination 41) is dependent upon the development of the New Shannon Source which is expected to take significantly longer to deliver. Therefore, the Least Cost Approach was retained at this stage.
- Step 2 – We compared the Quickest Delivery Approach (SA Combination 4) against the Least Cost Approach (SA Combination 1). The Quickest Delivery Approach performed poorly against the Least Cost, Lowest Carbon, and Environmental criteria when compared to the Least Cost Approach. In addition, the Quickest delivery Approach did not perform significantly better against the Quickest

[5] Further details can be found in the RWRP-SE Chapter 7, Section 7.5

Delivery Criteria compared to the Least Cost Approach therefore the Least Cost Approach was retained at this stage.

- Step 3 - We compared the Least Cost Approach (SA Combination 1) against the Best Environmental Approach (SA Combination 41). As discussed in Step 1, the environmental and resilience gains obtained with this Approach did not outweigh the benefits of the quicker delivery of the Least Cost Approach as there is an urgent need in this region. The Least Cost Approach was therefore retained at this stage.
- Step 4 – We compared the Least Cost Approach (SA Combination 1) against the Most Resilient Approach (SA Combination 41). There is no significant difference in resilience score for both approaches and the Most Resilient Approach performs poorly against the Least Cost and Quickest Delivery Approach compared to the Least Cost Approach. Therefore, the Least Cost Approach was retained at this stage.
- Step 5 - We compared the Least Cost Approach (SA Combination 1) against the Least Carbon Approach (SA Combination 41). As discussed in Step 1 the small carbon benefits obtained through the Least Carbon Approach do not outweigh the benefits of the quicker delivery of the Least Cost Approach as there is an urgent need in this region. Therefore, the Least Cost Approach was retained at this stage.
- Step 6 – A final assessment of the Least Cost Approach (SA Combination 1) was completed against the Least Carbon, Best AA, Best Environmental, Quickest Delivery and Most Resilient Approaches. Whilst the Best AA Approach performs better than the Least Cost Approach against the Lowest Carbon, Most Resilient and Best Environmental criteria the difference in scores between the Approaches is not considered to be significant when weighed against the quicker delivery of the Least Cost Approach due to the urgent need in the Study Area. The Least Cost Approach was retained at this stage.
- Step 7 – The Least Cost Approach 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 1 represents the Preferred Approach for Study Area M, which consists of the options listed in Table 5.9.

Table 5.9 Preferred Approach for SAM

WRZ Name	Preferred Approach Option Description SA Combination 1
Camolin WSS	SAM-017 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Ferns WS	SAM-029 New GW abstraction and new WTP to supply deficit.
Bunclody WS	SAM-036 New GW abstraction and upgrade Carrickduff WTP to supply deficit.
Kiltealy	SAM-044 Increase GW abstraction and upgrade Ballycrystal WTP to supply deficit.

WRZ Name	Preferred Approach Option Description SA Combination 1
Ballindaggin	SAM-050 Increase GW abstraction and upgrade Ballindaggin WTP to supply deficit.
Monageer	SAM-061 Increase GW abstraction and upgrade Monageer WTP to supply deficit.
Davidstown	SAM-073 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Clonroche	SAM-100 New GW abstraction and upgrade Clonroche WTP to supply full demand.
Woodview Drive Adamstown	SAM-105 Increase GW abstraction and upgrade WTP to supply deficit.
Raheen	SAM-108 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Sow Regional	SAM-127 Increase GW abstraction and upgrade WTP to partly supply deficit.
Sow Regional	SAM-207 New GW and new WTP to partly supply deficit.
Ballynavortha Public Supply	SAM-141 Increase GW abstraction and upgrade Ballynavortha WTP to supply deficit.
Coolboy Coolafancy Public Supply	SAM-144 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.
Raheengraney Public Supply	SAM-146 Upgrade existing WTP for water quality improvements. The WRZ is not in deficit.

WRZ Name	Preferred Approach Option Description SA Combination 1
Fardystown	SAM-148 New GW abstraction and upgrade Mayglass WTP to supply deficit. Bring unused BHs back to production (GW abstraction from existing BHs currently not in supply).
Wexford Town	SAM-149 New GW wellfield at Adamstown and new WTP to supply deficit.
Gorey	SAM-198 Upgrade Creagh WTP for water quality improvements. Rationalise Kilmuckridge WTP to new Ballyminaunhill WTP. Rationalisation within WRZ.
Coolgreany WS	Group 1 Rationalise Coolgreany to Arklow WRZ (SA1 increase GW abstraction).
Ballingate Public Supply	Group 47 Rationalise Ballingate to Tinahely WRZ (SA1).
Carrickbyrne WS South Regional	Group 75 Rationalise Carrickbyrne to South Regional WRZ. New GW abstraction and new WTP to supply deficit.
Marshalstown Enniscorthy Town Bree Ballyhogue Glynn WS	Group 76 Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit. Rationalise Bree, Ballyhogue, Glynn and Marshalstown to Enniscorthy WRZ.

The Preferred Approach (SA Combination 1) is shown schematically in Figure 5.3.

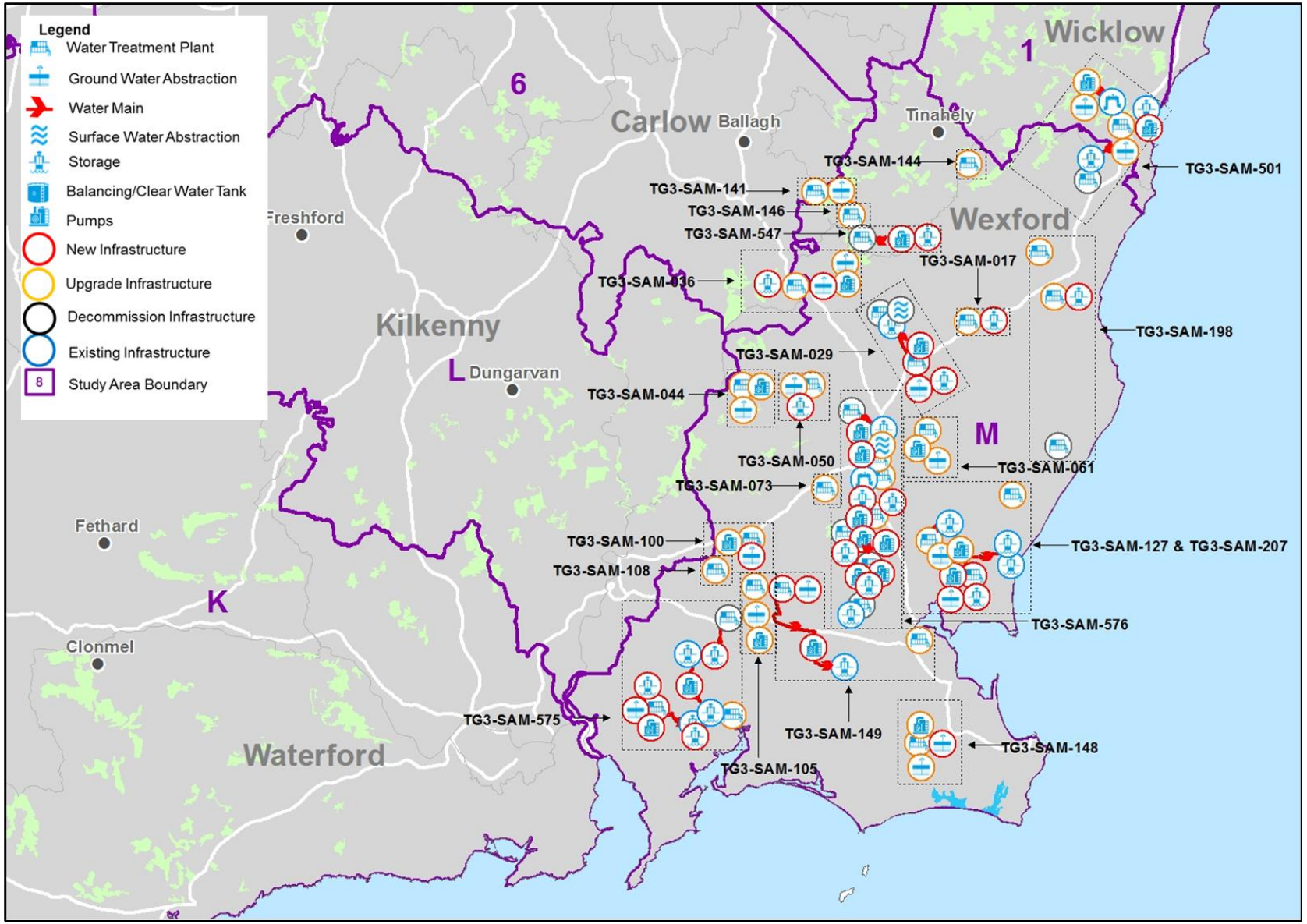

Figure 5.3 SAM Preferred Approach

The Preferred Approach for SAM 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 SAM, 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 SAM Interim Options

WTP Name	Interim Option
Ballyminaunhill WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Ballygarron WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Creagh WTP	Upgrade WTP to UÉ Standards
Camolin WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Ferns WTP	Upgrade WTP to UÉ Standards
Carrickduff WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Marshalstown WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Ballindaggin WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballycrystal WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Clonroche WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Monageer (Moin Rua) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Davidstown WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Gylnn WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Knockgreany WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Carrickbyrne WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Enniscorthy (Edermin) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Killagoley WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Vinegar Hill WTP	Upgrade WTP to UÉ Standards
Adamstown WTP	Refurb existing Borehole, and upgrade UÉ to UÉ Standards
Ballyhogue WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution

WTP Name	Interim Option
Raheen (Adamstown) WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Bree WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution
Mayglass WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Taylorstown WTP	Upgrade WTP to UÉ Standards
Ballinellard WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Killmallock Bridge WTP	Refurb existing Boreholes, and upgrade WTP to UÉ Standards
Wexford Town (Newtown) WTP	Upgrade WTP to UÉ Standards
Logan WTP	Refurb existing Spring, and upgrade WTP to UÉ Standards
Raheengraney WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballinavortha WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards
Ballingate WTP	Refurb existing Borehole, and upgrade WTP to UÉ Standards – Potential site for a containerised solution

Small Towns and Villages Growth Programme Uisce Éireann's 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 the Ballindaggin 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 SAM is shown in Table 7.1.

Table 7.1 Sensitivity Analysis for SAM

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)	+6,000 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 SAM that would be impacted from sustainability reductions. However, our Preferred Approach is designed to relieve pressure on these sources by supplementing from more resilient groundwater and surface water sources. This includes developing new groundwater supplies and increasing the abstraction from the River Slaney at Enniscorthy WRZ.
			Based on this scenario, the Preferred Approach remains the optimal solution.
Climate Change	High (international climate change targets have not been met)	+700 m^3/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

Uncertainty	Likelihood	Increase / Decrease in Deficit	Impact on Preferred Approach
			operations on a more environmentally 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)	-18,524 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 26 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)	238 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)	5,241 m^3/day	**Increased leakage savings beyond SELL would reduce the supply demand balance deficit and the overall need requirement.** The need drivers in SAM Clare are across all 26 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 SAM 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 M

8 Summary of Study Area M

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 SAM (summarised in Table 5.8 and Figure 5.3) consists of local WRZs solutions for 17 of the 26 WRZs, primarily driven by the small scale of the supplies and difficulties in transporting small volumes of water over long distances.

There are 9 WRZs that involve constructing connections across one or more supplies. The Preferred Approach will result in a reduction of WRZs from 26 to 22. Four (4) of the existing 26 abstractions in SAM are proposed to be decommissioned, providing significant environmental benefit.

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 SAM Wexford/Wicklow 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).
- Nett leakage reduction in Gorey, Enniscorthy and Fardystown Water Resource Zones, amounting to 238 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 SAM, 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 M Water Treatment Plants

WTP Asset Name	Local Plant Names
Ballinavortha WTP	Ballinavortha WTP
Ballingate WTP	Ballingate WTP
Raheengraney WTP	Raheengraney WTP
Logan WTP	Logan WTP
Raheen (Adamstown) WTP	Raheen (Adamstown) WTP
Camolin WTP	Camolin WTP
Mongear (Moin Rua) WTP	Mongear (Moin Rua) WTP
Adamstown WTP	Adamstown WTP
Wexford Town (Newtown) WTP	Wexford Town (Newtown) WTP
Killmallock Bridge WTP	Killmallock Bridge WTP
Ballinellard WTP	Ballinellard WTP
Taylorstown WTP	Taylorstown WTP
Marshalstown WTP	Marshalstown WTP
Ballycrystal WTP	Ballycrystal WTP
Ballygarron WTP	Ballygarron WTP
Ballyminaunhill WTP	Ballyminaunhill WTP
Creagh WTP	Creagh WTP
Gylnn WTP	Gylnn WTP
Ferns WTP	Ferns WTP
Mayglass WTP	Mayglass WTP
Vinegar Hill WTP	Vinegar Hill WTP
Killagoley WTP	Killagoley WTP
Enniscorthy (Edermin) WTP	Enniscorthy (Edermin) WTP
Davidstown WTP	Davidstown WTP
Knockgreany WTP	Knockgreany WTP
Clonroche WTP	Clonroche WTP
Carrickduff WTP	Carrickduff WTP
Bree WTP	Bree WTP
Ballyhogue WTP	Ballyhogue WTP
Ballindaggin WTP	Ballindaggin WTP
Carrickbyrne WTP	Carrickbyrne WTP

Annex B Study Area M Rejection Register Summary

Annex B Study Area M Rejection Register Summary

Study Area M – Coarse Screening Rejection

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-001	Increase GW abstraction and upgrade Knockgreany WTP to supply deficit.	Nitrate issues at the source. Preferable solution is to move away from this source as it does not meet the Resilience criteria. As a result, this option did not meet the Resilience criteria.	●		
TG3-SAM-002	New SW abstraction from River Clonough and new WTP to supply deficit.	This option required significant works for a relatively small supply. Therefore, it was not considered feasible at coarse screening stage, due to age of water and sedimentation. As a result, this option did not meet the Deliverability and Flexibility criteria.		●	
TG3-SAM-006	Rationalise Coolgreany to Gorey WRZ.	The option requires a significant length of pipeline rationalisation. 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-SAM-007	New GW abstraction (no.3 BHs) and upgrade existing wells (no.8 BHs). New Ballyminaunhill WTP (proposed WTP capacity of 8MLD) - currently under development.	The option requires a significant length of pipeline rationalisation. 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.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-008	Interconnect Coolgreany with Gorey for increased resilience and supply deficit from Gorey.	The option requires a significant length of pipeline 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 and Flexibility criteria.		●	
TG3-SAM-009	New GW abstraction (no.3 BHs) and upgrade existing wells (no.8 BHs). New Ballyminaunhill WTP (proposed WTP capacity of 8MLD) - currently under development.	The option requires a significant length of pipeline 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 and Flexibility criteria.		●	
TG3-SAM-010	Increase SW abstraction from River Bann (Pallis Upper) and upgrade Creagh 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-SAM-011	Increase SW abstraction from River Bann (Kilmichael) and upgrade Creagh 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-SAM-012	New SW abstraction from River Owenavorragh 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-SAM-016	Increase GW abstraction and upgrade Camolin WTP to supply 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, no new supply option is required.	**WRZ no longer in deficit**		

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-018	New SW abstraction from River Bann and new WTP to supply 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, no new supply option is required.	**WRZ no longer in deficit**		
TG3-SAM-024	Rationalise Camolin to Gorey WRZ.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-025	New GW abstraction (no.3 BHs) and upgrade existing wells (no.8 BHs). New Ballyminaunhill WTP (proposed WTP capacity of 8MLD) - currently under development.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-026	Interconnect Camolin and Gorey WRZs for increased resilience.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-027	New GW abstraction (no.3 BHs) and upgrade existing wells (no.8 BHs). New Ballyminaunhill WTP (proposed WTP capacity of 8MLD) - currently under development.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-028	Increase SW abstraction from Ballingale Stream and upgrade Ferns WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. Therefore, this option did not meet the requirements of the Deliverability and Flexibility criteria.	●	●	●
TG3-SAM-030	Rationalise Ferns to Enniscorthy WRZ (River Slaney).	The option requires a significant length of pipeline rationalisation. 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-SAM-031	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The option requires a significant length of pipeline rationalisation. 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-SAM-034	Interconnect Ferns with Enniscorthy for increased resilience and supply deficit.	The option requires a significant length of pipeline 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 and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-035	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The option requires a significant length of pipeline 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 and Flexibility criteria.		●	
TG3-SAM-037	Increase SW abstraction from Bakers Stream and Clody River and upgrade Carrickduff 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-SAM-039	Increase GW abstraction and upgrade Kilmyshall 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-SAM-041	Rationalise Bunclody to Enniscorthy WRZ (River Slaney).	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-042	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-046	New SW abstraction from River Urinn and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-047	Rationalise Kiltealy to Enniscorthy WRZ via Ballindaggin and Marshalstown (River Slaney).	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-048	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-049	Interconnect Kiltealy with neighbouring Rathnure/Blackstairs GWS and 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-SAM-051	Interconnect Ballindaggin with neighbouring Rathnure/Blackstairs GWS and 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-SAM-052	New SW abstraction from River Urinn and new WTP to supply deficit.	This option required significant works for a relatively small supply. There were other viable alternative options for this WRZ. This option was not considered feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the Deliverability and Flexibility criteria.		●	
TG3-SAM-053	Leakage Reduction in Ballindaggin	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-SAM-054	Interconnect Ballindaggin and Bola Beg WTP and 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-SAM-055	Rationalise Ballindaggin to Enniscorthy WRZ (River Slaney).	The plan required a significant length of the pipeline rationalisation. 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-SAM-056	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The plan required a significant length of the pipeline rationalisation. 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-SAM-058	Increase GW abstraction and upgrade Marshalstown WTP to supply 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, no new supply option is required.	**WRZ no longer in deficit**		
TG3-SAM-062	Rationalise Monageer to Enniscorthy WRZ (River Slaney).	The plan required a significant length of the pipeline rationalisation. 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-SAM-063	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The plan required a significant length of the pipeline rationalisation. 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-SAM-067	New GW abstraction and new WTP to supply Enniscorthy Town deficit.	Addressed in a different option.	**This option is assessed as part of a different feasible option**		
TG3-SAM-069	Rationalise Enniscorthy to Sow Regional WRZ.	Abstracting the volume of water required is considered unfeasible. This option also requires a significant length of pipeline. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAM-070	Increase GW abstraction at Kilmallock Bridge WTP to supply deficit.	Abstracting the volume of water required is considered unfeasible. This option also requires a significant length of pipeline. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAM-071	Interconnect Enniscorthy with Sow Regional WRZ for increased resilience and supply deficit.	The plan required a significant length of the pipeline. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Rationalisation of the WRZs individually or in smaller groups was considered in other options. This option has also yield issues. 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-SAM-072	Increase GW abstraction at Kilmallock Bridge WTP to supply deficit.	The plan required a significant length of the pipeline. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. Rationalisation of the WRZs individually or in smaller groups was considered in other options. This option has also yield issues. As a result, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAM-074	Rationalise Davidstown to Enniscorthy WRZ (River Slaney) for increased resilience.	The plan required a significant length of the pipeline rationalisation. 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-SAM-075	Increase SW abstraction from River Slaney and upgrade Vinegar Hill WTP to supply deficit.	The plan required a significant length of the pipeline rationalisation. 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-SAM-082	Interconnect Bree with Sow Regional WRZ for increased resilience and 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-SAM-083	Increase GW abstraction at Kilmallock Bridge 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-SAM-091	Interconnect Ballyhogue with Sow Regional WRZ (Kilmallock Bridge WTP) and 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-SAM-092	Increase GW abstraction at Kilmallock Bridge 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-SAM-095	Rationalise Ballyhogue to Sow Regional WRZ (Killmallock Bridge 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-SAM-096	Increase GW abstraction at Kilmallock Bridge 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-SAM-101	New SW abstraction from River Aughnaglaur and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-102	New SW abstraction from River Boro and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small supply. 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-SAM-103	Interconnect Clonroche with neighbouring Rathnure/Blackstairs GWS and 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-SAM-106	Rationalise Woodview Drive Adamstown to Carrigbyrne WRZ	The option requires a significant length of pipeline rationalisation. 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-SAM-107	Increase GW abstraction and upgrade WTP to supply Carrigbyrne WS deficit.	The option requires a significant length of pipeline rationalisation. 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.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-111	New SW abstraction from River Corock and new WTP to supply deficit.	The plan required a significant length of the pipeline for a relatively small supply. 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. Rationalisation of the WRZs individually or in smaller groups was considered in other options.		●	
TG3-SAM-116	Rationalise Carrigbyrne WRZ to New Ross WRZ (SA K - new GW abstraction at Adamstown).	The option requires a significant length of pipeline rationalisation. 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-SAM-117	Interconnect Carrigbyrne WRZ with New Ross WRZ (SA K - new GW abstraction at Adamstown) and supply deficit.	The option requires a significant length of pipeline 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 and Flexibility criteria.		●	
TG3-SAM-119	Rationalise Glynn to Ballyhogue WRZ.	The option requires a significant length of pipeline 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 and Flexibility criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-120	Increase GW abstraction and upgrade WTP to supply Ballyhogue deficit.	The option requires a significant length of pipeline rationalisation. Transferring small quantities of water over long distances can affect the quality of water. Therefore, this option did not meet the Deliverability criteria.		●	
TG3-SAM-121	Rationalise Glynn to Bree (increase GW abstraction) via Ballyhogue. Interconnect Bree and Ballyhogue WRZs	The option requires a significant length of pipeline rationalisation. 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-SAM-122	Increase GW abstraction and upgrade Bree WTP to supply deficit.	The option requires a significant length of pipeline rationalisation. 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-SAM-123	Rationalise Glynn to Sow Regional WRZ.	The option requires a significant length of pipeline rationalisation. 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-SAM-124	Increase GW abstraction at Kilmallock Bridge WTP to supply deficit.	The option requires a significant length of pipeline rationalisation. 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.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-126	Increase GW abstraction and new no. 3 well at Ballinellard 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-SAM-128	Increase SW abstraction from River Owenduff and upgrade Taylorstown WTP to partly supply deficit.	The desktop assessments undertaken indicate that increase of surface water abstraction is not feasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAM-130	Increase SW abstraction from River Sow and upgrade Killmallock Bridge WTP to partly supply deficit.	The desktop assessments undertaken indicate that increase of surface water abstraction is not feasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAM-131	Increase SW abstraction from Coolree impoundment and upgrade Newtown WTP to partly supply deficit.	The desktop assessments undertaken indicate that increase of surface water abstraction is not feasible. Therefore, this option did not meet the requirements of the Environmental, Resilience or Deliverability criteria.	●	●	●
TG3-SAM-164	Interconnect Wexford Town, Fardystown, South Regional and Sow Regional WRZs and New desalination plant to supply full demand	This option has very high costs and is energy intensive. Not feasible as there are better feasible alternatives to solve supply demand balance deficits. Therefore, this option did not meet the Deliverability criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-163	Interconnect Wexford Town, Fardystown, South Regional and Sow Regional WRZs and New desalination plant to supply full demand	This option has very high costs and is energy intensive. Not feasible as there are better feasible alternatives to solve supply demand balance deficits. Therefore, this option did not meet the Deliverability criteria.		●	
TG3-SAM-162	Interconnect Wexford Town, Fardystown, South Regional and Sow Regional WRZs and New desalination plant to supply full demand	This option has very high costs and is energy intensive. Not feasible as there are better feasible alternatives to solve supply demand balance deficits. Therefore, this option did not meet the Deliverability criteria.		●	
TG3-SAM-132	Interconnect Wexford Town, Fardystown, South Regional and Sow Regional WRZs and New desalination plant to supply full demand	This option has very high costs and is energy intensive. Not feasible as there are better feasible alternatives to solve supply demand balance deficits. Therefore, this option did not meet the Deliverability criteria.		●	
TG3-SAM-155	Interconnect Sow Regional with Enniscorthy and supply deficit.	The plan required a significant length of the pipeline. This option was considered not feasible at coarse screening stage, due to age of water and sedimentation. Therefore, this option did not meet the Deliverability criteria. Rationalisation of the WRZs individually or in smaller groups was considered in other options.		●	
TG3-SAM-134	New GW abstraction and new WTP to supply Enniscorthy Town deficit.	The plan required a significant length of the pipeline. This option 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-SAM-142	Rationalise Ballynavortha to Tinahely WRZ (not in deficit).	The option requires a significant length of pipeline rationalisation. 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-SAM-143	New GW source and upgrade WTP to supply Coolboy Coolafancy Public Supply 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, no new supply option is required.	**WRZ no longer in deficit**		
TG3-SAM-170	New GW abstraction and new WTP to supply Sow Regional 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-SAM-174	New GW abstraction and new WTP to supply Sow Regional deficit.	The overall plan required a significant length of the pipeline. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. As a result, this option did not meet the Deliverability criteria.		●	
TG3-SAM-176	Interconnect Wexford Town with Sow Regional and supply deficit.	The overall plan required a significant length of the pipeline. Therefore, it was considered not feasible at coarse screening stage, due to age of water and sedimentation. As a result, this option did not meet the Deliverability criteria.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-181	Develop Ballyfarnoge well and new 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-SAM-182	Increase GW abstraction and new no. 1 well at Ballinellard WTP to partly supply deficit.	This is a duplicate option and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**This option is a duplicate option and is assessed as part of a different feasible option**		
TG3-SAM-183	Develop Ballyfarnoge well and new WTP to partly supply deficit.	This is a duplicate option and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**This option is a duplicate option and is assessed as part of a different feasible option**		
TG3-SAM-184	Increase GW abstraction at Kilmallock Bridge WTP to supply deficit.	This is a duplicate option and as a result, is not taken forward to the fine screening stage as it is assessed as part of a different feasible option.	**This option is a duplicate option and is assessed as part of a different feasible option**		
TG3-SAM-203	Increase GW abstraction at Kilmallock Bridge WTP to supply deficit.	The option requires a significant length of new and upgraded pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. As a result, this option did not meet the Deliverability criteria. There is a better alternative rationalisation for Glynn WRZ.		●	
TG3-SAM-204	Rationalise Glynn to Sow Regional WRZ.	The option requires a significant length of new and upgraded pipeline for a relatively small demand. Transferring small quantities of water over long distances can affect the quality of water. As a result, this option did not meet the Deliverability criteria. There is a better alternative rationalisation for Glynn WRZ.		●	

Option Reference	Option Description	Rejection Reasoning	Resilience	Deliverability & Flexibility	Sustainability
TG3-SAM-208	New GW and new WTP in Castlebridge village.	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-SAM-209	Interconnect Sow Regional and Gorey and 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-SAM-210	Increase abstraction in Gorey and interconnect with Sow 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.	●	●	●
TG3-SAM-219	New shallow wells and new WTP located in the vicinity of River Slaney to supply deficit	The desktop assessments undertaken indicate that 15 boreholes are required to meet the full deficit which is not realistic. Therefore, this option did not meet the requirements of the Deliverability criteria.		●	
TG3-SAM-221	Rationalise Raheengraney to Tinahely WRZ.	The plan required a significant length of the pipeline for a rationalisation. 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-SAM-223	Rationalise Ballingate to Carlow Central Regional WRZ (SA 6).	The option requires a significant length of pipeline for rationalisation. 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.		●	