

Southern Water's Water Resources Management Plan 2019 Annual Review 2020-21

December 2021

Version 1



from
**Southern
Water** 

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Executive summary

Southern Water (pursuant to section 37A(5) of the Water Industry Act 1991) is required to review its Water Resources Management Plan (WRMP) and send a statement of the conclusions of its review to the Secretary of State before each anniversary of the date of when its plan (or revised plan) was last published. Southern Water's WRMP 2019 was published on 4 December 2019 (WRMP19) (and so the statutory deadline for submitting the final annual review is 3 December each year).

This document represents the annual review of WRMP19. This document reviews WRMP19 forecast assumptions against the annual returns for 2020-21. The structure of this review is based on the EA and NRW (March 2021) Water Resource Management Plan Annual Review and Annual Data Return: Guidance for Water Companies in England and Wales.

A draft Annual Review was submitted to Defra, the Environment Agency and Ofwat in June 2021 in respect of all aspects of the WRMP save for in relation to the water resource options for the Hampshire region (referred to as the Western area in WRMP19). As agreed with the EA, the June 2021 sections have not been further updated, and so those sections (Sections 1, 2, 3 and the Eastern area and Central area parts of Section 4 and 6) state the position as at June 2021. The sections relating to the Western area (included within Sections 4.2.3, 5 and 6) are up to date as at the end of November 2021.

Following publication of WRMP19, Southern Water has started (since April 2020) delivery of AMP7 supply-demand schemes, as well as continuing work to deliver its commitments for the Western area in line with the Section 20 Agreement (s20 agreement). The s20 agreement was reached during the Public Inquiry in March 2018 that was scheduled in relation to the abstraction licence changes for the River Test and Itchen proposed by the Environment Agency. The Secretary of State approved the implementation of the abstraction licence changes (as an outcome of the Public Inquiry) in February 2019 and the Environment Agency made the changes to the abstraction licenses in March 2019. Immediately, and for the next ten years (until permanent replacement supply resources are implemented), the impact of the licence changes mean there is a supply-demand deficit in the company's Western supply area which will lead to the frequent need to implement drought interventions including water use restrictions on customers.

This annual review document provides an update on how schemes for AMP7 are progressing in line with the published WRMP19.

2020-21 was characterised by a warm and dry summer and a wetter than average winter. Coupled with the Covid-19 pandemic, this caused demand to be significantly higher (15Ml/d more household demand across the company than forecast) than we would normally see. We reached the pre-application stage for the River Test Drought Permit (within the s20 agreement) but did not need to apply for the Drought Permit. During the report year we have been developing our delivery plan in order to achieve our outage recovery profile in AMP7. This is reflected in the outage allowance, which has a smaller decrease in 2020-21 compared to the other years in AMP7. As such our outage has only reduced by 1%, causing us to marginally miss the outage allowance forecast.

We have worked through the Covid-19 pandemic to continue to deliver our T100 programme to reduce average per capita consumption (PCC). Despite this average PCC rose compared to 2019-20 as a result of warm dry summer weather coupled with the Covid-19 pandemic. This has put pressure on achieving our PCC reduction targets. Leakage is approximately 1Ml/d below the WRMP19 forecast despite reduced operational activities due to the pandemic. This has made maintaining leakage a priority, with further reductions planned when it is safe to do so.

Our catchment management programme continued to expand in 2020-21 with the progression of both water quality and water resource regulatory schemes and investigations. We have provided details on the different schemes in operation and planned for AMP7.

Southern Water has undertaken a significant number of work streams in relation to the Western area options, including preparation of submissions for RAPID Gate 2, inputs to and discussions around WRSE's preparation of the emerging draft Regional Plan to secure resilient supplies for the South East to 2100, and our own preparatory work for WRMP24. We have been involved in the RAPID Gated Process, both as a potential scheme developer and a recipient company for potential new strategic transfers from outside of our supply area. We are working closely with other water companies and made our Gate 1 submission to RAPID on an accelerated programme in September 2020, and provided an Interim Update submission in September 2021. Our Gate 2 submission will be made on 6th December 2021.

Southern Water's WRMP19 is published on our website at the following address:

<https://www.southernwater.co.uk/our-story/water-resources-planning/water-resources-management-plan-2020-70>

We published our draft Drought Plan 2022 for an eight week consultation on 7 June 2021, and published our Statement of Response following the consultation in September 2021.

1 General

1.1 Supply demand balance

1.1.1 Weather conditions

The year from 1 April 2020 to 31 March 2021 was warmer and drier than average during the months April to September as can be seen in Figure 1-1. The average rainfall was less than the warm dry year in 2018-19 and the temperature was a little cooler but still significantly above the long term (100 years) average. As such we would expect the year 2020-21 to reflect a 90th percentile. Following our forecasting method, this level of dryness and temperature would provoke a forecast “dry year” demand i.e. Dry Year Annual Average (DYAA) demand. We would expect this to result in increased consumption rates of up to 40-60MI/d across the company. An example of this is can be seen if we compare the outturn DI in 2015-16 of 520MI/d against the 2020-21 outturn DI of 563MI/d. October, December and January saw high rainfall meaning water resource availability at the end of the year was healthy.

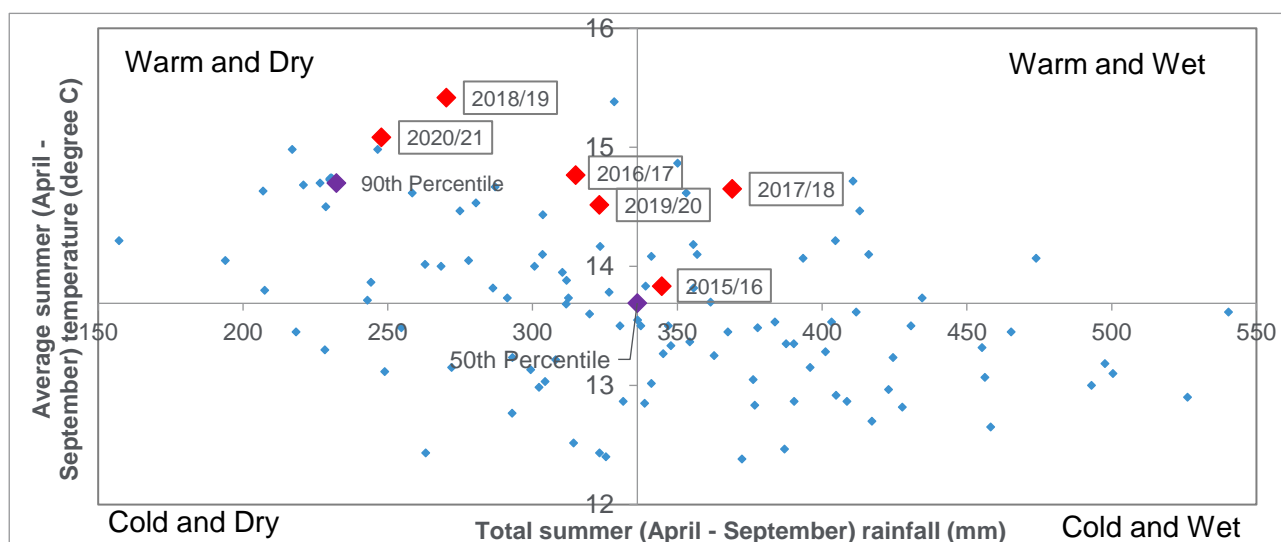


Figure 1-1: April to September weather

1.1.2 Overall supply demand balance

The outturn annual average supply demand balance as set out in the annual data return (Appendix A) is summarised within Table 1-1. This uses annual average outturn Distribution Input (DI), outturn outage and process losses, contractual imports and exports and WRMP19 deployable outputs (DOs) (1:200 drought event) and WRMP19 target headroom. This shows that, under these specific assumptions, there were potentially four water resource zones (WRZs) at risk of supply demand deficit in 2020-21. These deficits were in the Isle of Wight, Sussex North, Kent Thanet and Sussex Hastings WRZs. Figure 1-2 shows the location of these WRZs.

All these water resource zones with deficits have neighbouring zones with surpluses and, with infrastructure facilitating inter-zonal transfer to the zones with deficits. The available transfers and their capacities can be seen in Table 1-2.

We are able to use the internal transfers to cover these deficits in the event of a drought. Hampshire Southampton West WRZ would supply Isle of Wight WRZ, Sussex Worthing would supply Sussex North WRZ and Kent Medway West WRZ would supply Kent Thanet and Sussex Hastings WRZs. Our internal

transfers are assumed within WRMP19 to balance supply-demand deficits, but these are not captured in the annual review table and thus not included in the table below.

Table 1-1: Supply/Demand balance actual outturn 2020-21 for the Dry Year Annual Average planning scenario

Water Resource Zone	Deployable output (MI/d)	Process losses (MI/d)	Outage (MI/d)	Water available for use (MI/d)	Bulk Imports (MI/d)	Bulk Exports (MI/d)	DI (report year) (MI/d)	Target headroom (MI/d)	Supply/ Demand (MI/d)
Hampshire Andover	22.36	0.00	0.11	22.25	0.00	0.31	16.32	0.69	4.93
Hampshire Kingsclere	8.67	0.00	0.00	8.67	0.00	0.00	5.42	0.18	3.07
Hampshire Winchester	24.18	0.00	0.00	24.18	0.00	0.00	18.15	0.76	5.27
Hampshire Rural	12.62	0.00	1.96	10.66	0.00	0.00	7.07	0.48	3.10
Hampshire Southampton East	103.42	0.00	21.12	82.30	15.00	0.00	83.08	9.85	4.37
Hampshire Southampton West	81.73	0.00	7.25	74.48	0.00	10.00	31.23	3.51	29.74
Isle of Wight	33.50	0.00	2.14	31.36	0.00	0.00	31.41	0.43	-0.48
Sussex North	61.24	1.08	7.87	52.30	15.00	5.40	61.87	3.82	-3.79
Sussex Worthing	61.30	0.01	4.89	56.40	0.00	0.00	38.49	3.15	14.76
Sussex Brighton	98.41	0.01	11.41	87.00	0.00	0.00	80.84	4.93	1.22
Kent Medway East	96.91	0.00	6.25	90.66	0.00	6.80	73.38	5.98	4.50
Kent Medway West	103.88	0.00	3.72	100.16	0.00	12.40	45.41	0.87	41.48
Kent Thanet	51.31	0.00	15.01	36.29	0.10	0.07	44.49	2.26	-10.42
Sussex Hastings	23.09	0.00	0.84	22.25	0.00	8.00	25.50	0.88	-12.14
Southern Water	782.62	1.10	82.57	698.96	30.10	42.98	562.66	37.80	85.62

Table 1-2: Inter-zonal transfer capacities

Transfer	WRZ From	WRZ to	Capacity MI/d
Current transfers from HSW to HSE	HSW	HSE	24.0
Cross-Solent main export to IOW	HSW	IOW	18.0
HR to HSE	HR	HSE	1.1
Bi-directional transfer between SN & SW	SW	SN	15.0
Export to SB	SW	SB	17.0
Current transfers from KMW to KME	KMW	KME	44.7
Bewl-SH transfer capacity	KMW	SH	35.0
Faversham4-Fleete main transfer	KME	KT	14.0

It is important to note that this supply demand balance uses outturn annual average data against the WRMP19 DOs and target headroom, taking account of our target levels of service (section 1.7) and our contractual bulk supply agreements with other companies. The drought permits and orders which are planned for in WRMP19 (section 2.10) are built into the DO.

Nevertheless if a design drought had been experienced in 2020-21 we would have had to implement drought interventions as well as utilise inter-zonal transfers, as assumed within our WRMP19, to maintain supplies to customers.

In a design drought event, we would follow the steps laid out in our Drought Plan, focussing on the least environmentally damaging interventions first. Our draft Drought Plan 2022 was published for consultation on 7 June 2021, and we published our Statement of Response following the consultation in September 2021. Our current drought plan can be found here:

<https://www.southernwater.co.uk/our-story/water-resources-planning/our-drought-plan>

Drought interventions in the form of Temporary Use Bans (TUBs), Non-Essential Use Bans (NEUBs), drought permits and drought orders, would be used if necessary in accordance with our Drought Plan and levels of service to maintain supplies, as assumed within WRMP19. These are set out in Table 1-3 and Table 1-4 under the DYAA as well as Dry Year Critical Period (DYCP) and Minimum Deployable Output (MDO) scenarios. Whilst applications for drought permits and orders will be determined on their merits at the time of application, for the purposes of the supply demand balance, it is assumed that they will meet the necessary criteria and be granted.

During 2020-21 abstraction was able to satisfy demands within normal abstraction licence limits, without recourse to implementation of water use restrictions or drought permits or drought orders to relax abstraction licence conditions. Southern Water reached the pre-application stage for the River Test Drought Permit in Hampshire Southampton East WRZ, but did not need to apply for it, neither did we need to apply any TUBs or NEUBs to restrict water use.

Table 1-3: TUBs and NEUBs included as preferred options in WRMP19

Water Resource Zone	Assumed Tubs and NEU ban	DYAA (Ml/d)	DYCP (Ml/d)	MDO (Ml/d)
Hampshire Andover	TUBs and NEUBs - HA WRZ (2020-29)	0.05	0.13	0.05
Hampshire Southampton East	TUBs and NEUBs - HSE WRZ (2020-29)	1.22	4.61	1.22
Hampshire Southampton West	TUBs and NEUBs - HSW WRZ (2020-29)		2.14	
Isle of Wight	TUBs and NEUBs - IW WRZ (2020-29)	0.06	0.42	0.06
Sussex North	TUBs and NEUBs - SN WRZ (2020-26)	5.28		5.28
Sussex Worthing	TUBs and NEUBs - SW WRZ (2020-26)	0.88	1.80	0.88
Sussex Brighton	TUBs and NEUBs - SB WRZ (2020-26)	1.04	2.87	1.04
Kent Medway East	TUBs and NEUBs - KME WRZ (2020-24)	0.12	0.51	
Kent Medway West	TUBs and NEUBs - KMW WRZ (2020-24)	0.30	1.00	
Kent Thanet	TUBs and NEUBs - KT WRZ (2020-24)	0.32	0.97	

Table 1-4: Drought permits and drought orders included as preferred options in the WRMP19

Water Resource Zone	Drought Permits/Orders (period when potentially required)	DYAA (MI/d)	DYCP (MI/d)	MDO (MI/d)
Hampshire Southampton East	Candover Drought Order (2020-27)	20.80	20.80	20.80
Hampshire Southampton East	Lower Itchen (g/w and s/w sources) Drought Order (for 2020-24) - no additional Itchen SR	33.23	35.49	33.23
Hampshire Southampton West	Test Surface Water Drought Permit (2020-27)	69.10	33.56	69.10
Isle of Wight	Drought Permit/Order Lukely Brook, Caul Bourne, Shalcombe, Eastern Yar augmentation combined (2020-27)	5.73	5.73	5.73
Sussex North	Pulborough surface water (Phases 1 to 3) Drought Permit/Order (2020-25)	8.30	16.80	8.30
Sussex North	Weir Wood reservoir Drought Order (2020-25)*	3.60	5.40	3.60
Sussex Worthing	North Arundel Drought Permit/Order (2020-25)	1.25	1.25	1.25
Sussex Worthing	East Worthing Drought Permit/Order (2020-25)	1.25		1.25
Kent Medway East	Faversham1, Faversham2, Millstead WSWs Drought Permit/Order (2020-2024)	7.50		
Kent Medway West	Bewl Water / River Medway Scheme (stages 1 to 4) Drought Permit/Order (2020-2024)	16.20	1.00	
Kent Thanet	Sandwich Drought Permit/Order (2020-2024)	0.64	0.64	

* Weir Wood Drought Order assumed unusable due to issues at Weir Wood WSW

1.2 Progress with all outstanding, company-specific actions

Following the annual review submission for the 2019-20 year against WRMP19, we received specific feedback from the Environment Agency on a number of issues. This feedback included a list of recommended actions to address. Progress against these recommendations is reported in this section. We continue to update the Environment Agency on a quarterly basis.

1.2.1 Sussex North

The Environment Agency's review of our 2019-20 annual review concluded that customers and the environment in our Sussex North WRZ were facing a serious supply risk. Our supply/demand balance tables showed that the baseline supply-demand deficit in the MDO planning scenario in 2019-20 was 16MI/d. This was partly due to the Pulborough Wellfield groundwater scheme, which was due to be delivered in 2019-20 but upon review was considered to potentially have an environmental impact and therefore deferred until a review of the abstraction licence has taken place. This increased the supply-demand deficit under the MDO scenario by 4MI/d. The remainder of the deficit was due to the writing down of source DOs during the DO reassessment process for WRMP19. In WRMP19 this deficit was addressed by the temporary selection and utilisation, if required, of drought permits and orders during AMP7. Table 1-5 shows the up to date Minimum Deployable Output planning scenario supply-demand balance position in 2020-21.

Table 1-5: 2020-21 Minimum Deployable Output scenario

Sussex North Minimum Deployable Output planning scenario	2020/21 (MI/d)
Minimum Deployable Output	42.84
Outage Allowance	-5.59
Process Losses	-2.22
Portsmouth Water Import	15
South East Water Export	-5.4
Demand	-59.69
Target headroom	-3.82
Baseline supply-demand balance without drought permits/orders or internal transfers	-18.88
Pulborough Drought Permit	8.3
TUBS and NEU Ban - SN WRZ	5.28
Transfer from Sussex Worthing	5.32
Final supply-demand balance	0

In addition to this, we were served a prohibition notice from the Drinking Water Inspectorate (DWI) due to water quality problems at Weir Wood treatment works. The outage at this site has further caused resilience issues in the Sussex North WRZ.

We have been meeting regularly with the Environment Agency to discuss the security of supply risk affecting Sussex North WRZ and the last meeting was held on Tuesday 9 March 2021. We have used these meetings to provide updates on our progress on several work streams. We submitted a report on the 30 December 2020 detailing our plan and provided an update on the 19 May 2021.

The actions required by the Environment Agency and our solutions to address the risks are set out below.

We have taken a system thinking approach engaging with a wide range of stakeholders to improve resilience by considering multiple options to resolve the short term supply-demand deficit and reduce the risk of supply issues in 2021. The sections below provide an update on progress with delivering options to mitigate these risks.

1.2.1.1 Private abstractors

We had identified, from our DO modelling work, four abstractors upstream of our Pulborough treatment works, with the same hands off flow as us. These abstraction licenses account for around 0.4MI/d during the MDO period. We have identified and contacted the four private abstractors, progress is as follows:

- Abstractor 1 – Following our initial meeting the abstractor is engaging internally to determine the volume of water abstracted and its use during the key MDO period. Once this exercise is complete we can collaboratively agree mitigation measures where appropriate.
- Abstractor 2 – Private water supply company – as abstraction is required all year round there is no further work we can do with this abstractor.
- Abstractor 3 – Arable crop farmer, with a seasonal abstraction licence– we are exploring measures including the provision of a new lagoon and pumping equipment to increase resilience and allow the abstraction to be stopped during the MDO period.

- Abstractor 4 – Initial contact has been made, however the farm manager is new in post and has requested additional time to assess the abstraction situation – we are continuing to liaise with them to see if there are any mitigation options to progress.

We are also reviewing our assumptions behind the DO assessment work to identify if there are any further private abstractors we could start working with and this will include where there could be a benefit in the Peak Deployable Output (PDO) critical period. We plan to undertake this work in Q2 2021-22.

1.2.1.2 SES Water (SESW) Bulk Supply

We have explored the potential to rezone a number of our customers to be supplied by SESW and reduce our MDO demand by up to 5MI/d. Due to SESW's agreed customer service levels, treatment capacity constraints and network constraints, the demand reduction achievable through this bulk supply by 19 July 2021 will be limited to a maximum of around 0.4MI/d. There is the potential to increase this to around 4.1MI/d in 2022 and we are working with SESW to develop these options.

The pipework to enable the switch in supply to SESW has been installed and the final connection is dependent upon Highways permission, which is being negotiated. The current programmed date for beneficial use is 19 July 2021. The operating plan is currently being developed to ensure we understand how leakage, interruptions, flushing, sampling etc. will be dealt with and by whom. We have installed a flowmeter chamber to monitor flow into the area. Communications with customers have also commenced. The customers impacted by this re-zoning are predominantly industrial. We have been working with customers throughout March, April and May to determine if and how their manufacturing processes need to be adapted, in order to continue operating with chloraminated rather than chlorinated water supplies.

1.2.1.3 Sussex North Intra-zonal Transfer investigation

As previously advised, we have a network distribution constraint between two service reservoirs which limits our ability to transfer water from West to East in our Sussex North WRZ. We can currently transfer approximately 26MI/d between these reservoirs during our summer peak week. To increase the supply to the East of our Sussex North WRZ in 2020, we proactively tankered additional water (2MI/d) to a service reservoir in the eastern area of the WRZ.

Our technical modelling has determined that a transfer of 29MI/d should be achievable between the two reservoirs. Due to historic reports of pipe failures, when the transmission system was operated at elevated flow rates, we are progressing the following actions to determine if the current peak rate can be increased:

- Review and validate previous Non-Destructive Testing (NDT) report undertaken by 4D and MWH in 2006. This review was concluded in April 2021.
- A further NDT was then undertaken and this confirmed the outcome of the original 2006 report.
- Plan and carryout asset condition/operation review for pipeline and surge related assets. Hydraulic analysis has been undertaken and concluded that an air valve needed to be replaced and a pressure release valve needed further investigation. The final report is due by the end of June 2021.
- Our MEICA review has highlighted that further work is required to remove an interlock to enable all three pumps to run concurrently. This has also highlighted the need for an upgraded power supply for the pumps which has been requested from the DNO.
- Plan and execute physical flow tests on transmission system. Tests to commence w/c 26 July 2021.

1.2.1.4 South East Water (SEW) resilience supply

We have continued to assess new potential opportunities to avoid environmental impacts and reduce water supply risk for our customers. Through collaboration with SEW, an approximate 1Ml/d possible surplus has been identified in a WRZ adjacent to our Sussex North WRZ. This would supply a resilience benefit rather than a reliable deployable output benefit.

We are actively exploring two options with SEW which would allow us to either benefit from this supply surplus or, at least enable it to provide resilience support for our Bulk Supply provisions to South East Water customers. We are holding weekly sessions at which the feasibility and timescales for each of the options are being developed.

1.2.1.5 Use of inter-zonal transfers

We are working to reduce reliance on the drought interventions in Sussex North WRZ, including the Pulborough Drought Permit options, as requested by the Environment Agency in November 2020. We currently have a surplus of water in our Sussex Worthing WRZ, directly to the south of our Sussex North WRZ. In the event of a severe drought, we propose to transfer additional water into our Sussex North zone, from Worthing, to improve the resilience of the Sussex North WRZ and to reduce the reliance on Drought Permits and Orders at Pulborough.

1.2.1.6 Pulborough sustainability investigation

In the short term, as a resilience improvement, we aim to submit a licence variation for a previously used borehole to be included on the licence, while also including new constraints on the licence to reassure that recent levels of abstraction will not be exceeded. We are working with the Environment Agency and Natural England and taking on board their concerns to undertake a sustainability investigation into the Pulborough Groundwater abstraction licence by 2025. This review will include an update of the Pulborough Basin Groundwater Model, to understand the sustainable abstraction rate from this source. We have awarded contracts to update the Pulborough Basin Groundwater Model, and to carry out the sustainability investigation. In addition we have awarded a contract to continue groundwater monitoring at Waltham Brooks and Pulborough Brooks. We are on target to complete all elements of the sustainability investigation by March 2025.

1.2.1.7 Weir Wood WSW rebuild

We are rebuilding our Weir Wood treatment works to supply 10Ml/d by January 2024. We have commenced our "Risk and Value" (R&V) process for the scheme which allows the integrated team to select the best solution based on risk and value. Please see section 4.2 for further details on the Risk and Value process. Through our R&V process, we have identified an opportunity to increase the works capacity to 13Ml/d; without impacting the final delivery date. We shall continue to pursue this option with our Delivery Partner. We remain on target to deliver a new Weir Wood treatment works by January 2024.

1.2.1.8 Water Resource Zone (WRZ) Integrity Assessment

In our previous letter to the Environment Agency, we advised that we would complete step 1 of the WRZ Integrity Assessment (submit draft integrity assessment) in February 2021. This was not possible due to the need to incorporate the outcomes of the SESW rezoning and the intra-zonal transfer investigations into the assessment. We now expect to be able to complete step 1 by 30 June 2021.

1.2.1.9 Resilience for 2021

In our letter to the EA on 22 May 2021 we provided an updated forecast of expected demands in 2021 and our plans to meet these. We forecast summer demand in the Sussex North water resource zone (WRZ) to range between 75Ml/d and 85.8Ml/d. Our current plans to meet these demands include the assumed benefit from the SESW bulk supply, an ability to transfer more water from West to East, and the potential additional

water available from SEW. We anticipate we may also need to use tankers depending on the actual demand and amount of water available from SEW.

1.2.2 AMP6 water resources NEP schemes

There are four water resources National Environment Programme (NEP) schemes carrying over from AMP6, which are now being completed in AMP7. Three of these are now complete with just work package 2 of the Little Stour and Near Canterbury River implementation scheme to be completed. All four schemes are listed below with an update on the status of the key components.

1.2.2.1 Lukely Brook Implementation (ID: 6SOWR0002)

The scheme includes the following components:

- Landowner and stakeholder engagement – complete
- Surveys, (including instream, protected species, Invasive Non Native Species (INNS) and utilities) - complete
- Outline and detailed design – complete
- Obtain Flood Risk Assessment Permit (FRAP) –complete
- River enhancement work – Ready to mobilise upon receipt of FRAP approval. – complete
- All works completed and signed off by the Environment Agency in April 2021. – complete

1.2.2.2 Little Stour and Near Canterbury River implementation (ID: 6SOWR0006/6SOWR0007)

The scheme includes the following key components:

- WP1 – Daylighting - complete
- WP1 – In river enhancements – FRAP approval gained on 16 June 2020. Ready to mobilise with a provisional start date of 20 July 2020 - complete
- WP2 – Water mill feasibility study - complete
- WP2 – Implementation of selected mill enhancement from feasibility study – Outline design work due to start in the next month, and ongoing Project Steering Group engagement.
- Work package 1 of river improvements completed and sent to the EA on 1 December 2020 but waiting formal sign-off by the Environment Agency; extension agreed to 30/11/2021 for completion of work package 2 (Mill Weir structure fish passage improvements)

1.2.2.3 Plaish Meadows and Lukely Brook Restoring Sustainable Abstraction (RSA) investigation

- Data collation, gap analysis, initial conceptualisation - complete
- Monitoring and Investigation – complete
- Options appraisal and cost benefit analysis – complete. Awaiting final Water Framework Directive (WFD). No Deterioration note for appendix – complete
- Study report signed off in summer 2020 and the resultant agreed Lukely Brook and Newport abstraction licence variations issued by the Environment Agency in October 2020. . – complete

1.2.2.4 Anton RSA investigation

- Data collation, gap analysis, initial conceptualisation - complete
- Monitoring and Investigation – complete
- Options appraisal and cost benefit analysis – – complete
- Report concluded and signed-off by the EA in January 2021; Agreed Andover licence variation application submitted in February 2021. Application being processed by the Environment Agency at present. WFD No deterioration obligation accepted completed, no AMP7 scheme required. . – complete

1.2.3 Catchment management schemes

Southern Water is progressing a comprehensive water quality and water resources catchment management programme to meet AMP7 regulatory requirements under the Water Industry National Environment Programme (WINEP), DWI and WRMP programmes and to fulfil our Catchment Compliance Programme. We are monitoring at 89 sample points across eight river catchments, we have undertaken walkovers on all eight surface water catchments and we have been progressing implementation of regulatory schemes to reduce nitrate leaching in 36 groundwater catchments.

1.2.3.1 Understanding and addressing Catchment risks

- Building an in-house catchment risk team of nineteen, covering a range of skills including natural capital expertise, catchment management specialists, hydrogeologists and agricultural officers.
- Integrating our Catchment Compliance Programme into work processes. Catchment Compliance is our “prevention is better than cure” approach to protecting drinking water quality within the company and including our Farm Capital Grant Scheme which has focused on mitigating pesticide and manure risk from farm yards.
- We successfully implemented numerous Farm Capital Grant Schemes to mitigate water quality risk on farms. We also implemented a pesticide amnesty in partnership with the Medway Valley Country Partnership and the Environment Agency in the River Medway.
- Embedding our new Catchment Risk Assessment methodology within the business for Water Safety Planning and Catchment Risk identification and mitigation purposes.
- Expansion of our in-catchment water quality monitoring network across all drinking water catchments, and monitoring a wider array of substances to reflect the new catchment risk assessments undertaken in 2020.

1.2.3.2 Water Quality regulatory schemes and investigations

- We are underway delivering our AMP7 DWI Undertakings and Notices obligations as required and have delivered our AMP7 year 1 WINEP interim investigation and scheme obligations on track. We have also brought forward delivery of many of the milestones in the AMP7 WINEP groundwater schemes.
- We are delivering nitrate reduction schemes in 36 groundwater catchments this AMP and this includes a number of nitrate catchment schemes in WRMP19. In many groundwater catchments across the Brighton and Worthing chalk blocks, we have already rolled out incentive schemes for nitrate reduction measures to protect raw water sources for this AMP. We are also in the process of doing the same across many Hampshire and Kent catchments over the next year. As well as incentive schemes, we run a programme of farm visits, trials and engagement events.
- In protecting groundwater quality, we are continuing to work in collaboration with others - for example with The Aquifer Partnership (TAP) in the Brighton chalk block, and alongside the Arun to Adur Farmers Group (AAFG) in the Worthing chalk block. We are also liaising with the Eastern Downs Farmer Cluster in Sussex, as well as new farm clusters and farmer groups across Hampshire and Kent as those projects progress.
- Aside from the groundwater scheme delivery, we are also on track for delivering our WINEP investigations in 2022.
- We are now progressing our AMP7 plans for the implementation of WINEP pesticide schemes on the River Beult and the Western River Rother. These schemes are focused on sustainable pesticide use. To this end, we have been working with Kent Wildlife Trust in the Upper River Beult to build a farmer cluster, and have also been active with the farmer cluster in the Western Rother for a number of years now. Our catchment officers have also been engaging directly with farmers and other stakeholders via our catchment compliance programme. Work has been ongoing to define pollutant hot spots, root causes and potential mitigation options.
- Alongside this, we have also been continuing to implement our obligations under the DWI Undertaking and WRMP19 commitments for metaldehyde, by continuing our water quality monitoring, engagement

with the agricultural sector and our messaging around the risks of metaldehyde use and drinking water sources.

1.2.3.3 Water resource regulatory investigations and schemes

- We are underway delivering our AMP7 WINEP investigations, with implementing the installation of monitoring arrays to inform groundwater and eco-hydrological models for the Near Basingstoke Brook and Itchen Wetlands investigations, and on track to deliver the investigations with a regulatory completion date of 2022.
- We have completed the first two stages in the 67 WINEP listed WFD ND investigations, reviewing baseline abstraction rates, developing individual source growth factors, and determining the priority of the investigations. We have been working both with EA Solent and South Downs (SSD) and Kent, South London and East Sussex (KSLES) Areas with submitting major alterations to these investigations, and setting the correct regulatory completion dates. These are due to be delivered between 2025 and 2027, depending on the priority of the sources. We will then be progressing with Stage 3 of the investigations.
- The AMP7 implementation schemes on the Upper Anton, Lukely Brook and Lewes Winterbourne are progressing well, with them at detailed feasibility to final option outline design stages. The programmes are being detailed as the options are refined. These programmes are taking into account constraints for implementation as these are identified such as ecological windows, and flood risk. Consequently due to these constraints, the programme forecasts at this stage show them not to be meeting the 31 March 2022 completion dates. We are working closely with the EA Areas through the project steering groups, and our contractors to support major alteration requests.

1.3 Security of Supply Index

Our initial assessment of the Security of Supply Index (SoSI) for 2020-21 was 98. This is because of a large increase in demand seen across our area during the Covid-19 pandemic (31MI/d increase in household demand since 2019-20, a 4.5% increase in DI as seen in section 3.2). Where customers used to commute into other areas or into more water efficient offices, they are now working from home causing extra demand across our network. It is the atypical increase in Kent Medway East WRZ in our PDO planning scenario that would have caused the score to be less than 100.

We reviewed the situation and as agreed with the Environment Agency we have reduced our target headroom in Kent Medway East WRZ to cover for increases in demand due to the pandemic as shown in section 3.2. The target headroom is the uncertainty that we built into the forecast. Since we now know what happened during the year, and because the increase in DI was less than the target headroom that we'd allowed, we can lower the target headroom accordingly. This made our 2020/21 SoSI 100.

For the SoSI score, we assume the implementation, if necessary, of the drought interventions we selected in the WRMP19 to maintain supplies in our design drought condition. These can be seen in section 2.10. The exception to this is the Weir Wood Drought Order (3.9MI/d), which, due to ongoing issues at our Weir Wood treatment works, we would not be able to implement.

Three WRZs in Western area (Hampshire Southampton East, Hampshire Southampton West and Isle of Wight) were removed from the SoSI assessment in agreement with the Environment Agency due to the impacts of the rivers Test and Itchen licence changes on the supply-demand balances in these WRZs.

1.4 Supply Demand Balance Index

The Supply Demand Balance Index (SDBI) is a new metric replacing the SoSI metric for the Environment Agency's Environmental Performance Assessment (EPA). This uses the higher of outturn DI and WRMP19 forecasted distribution input for the reporting year, actual outage levels and actual process losses. This differs from the SoSI as it moves away from being a theoretical metric into a more realistic view of customer water security. For 2020-21 SDBI is a shadow reporting metric and we are in the process of ensuring our methodology is robust.

We are currently preparing our shadow reporting of SDBI for 2020-21. There is a risk that the SDBI could be less than 100 due to Kent Thanet WRZ which has seen higher demand throughout 2020-21 and has experienced higher than forecast outage levels. We are currently undergoing a full review of the Kent Thanet WRZ to investigate the potential deficit and to review any mitigating measures. This involves reviewing the inter-zonal transfer capacity from Faversham4 to Fleete (Kent Medway East WRZ to Kent Thanet WRZ), reviewing the actual outages in Kent Thanet WRZ and checking the deployable output values of our sources against any new information.

1.5 Comparison between annual return data and forecast data for WRMP19

The 2020-21 reporting year is on track with the WRMP19 forecast on a company level. However, on a WRZ level there are a few differences. Most notable of these differences are the outage profiles in some WRZs. For example the outturn outage in Kent Medway WRZ is significantly lower than forecast, but in neighbouring Kent Thanet WRZ it is above forecast. Outage is discussed in more detail in section 2.3

Per Capita Consumption (PCC) has been affected by the Covid-19 pandemic, causing higher demand than forecast in the WRMP19. This was due to an increase in household demand due to a large proportion of customers now working from home. This has been offset a little by non-household consumption reducing, but overall total demand is higher as a result of the pandemic. This has impacted both the SoSI and the SDBI. Whilst our water efficiency programmes are still running, it has been impacted by the restrictions introduced as a result of the pandemic rules. PCC is covered in more detail in section 3.4 and overall water efficiency in section 3.5.

Leakage on a company level is in line with the WRMP19 but there is variability at the WRZ level. We are striving to maintain leakage whilst keeping staff and customers safe. The leakage activities and outturn leakage levels can be seen in section 3.7.

1.6 Water Resource Zone boundary changes

We have had no WRZ boundary changes in 2020-21. As part of our review of Sussex North WRZ supply-demand issues, we are looking into whether Sussex North WRZ needs to be split into two zones. The WRZ integrity review of Sussex North WRZ will be carried out in 2021 and discussed with the Environment Agency.

Where your water comes from today

We supply water to more than one million homes and businesses in Kent, Sussex, Hampshire and the Isle of Wight.

Most of the region is officially classed as seriously 'water-stressed', which means that at times the demand for water can be higher than the amount available. However, each county also has different water sources and experiences different weather. It's not unusual for one area to be in drought while supplies are normal in a neighbouring area. This is also because the area we supply is divided into 14 separate 'water resource zones'.

This map shows where we supply water and the average amount of water used.



Western area

North Hampshire takes all of its water from groundwater. South Hampshire takes one-third from groundwater and two-thirds from the River Test and the River Itchen. The Isle of Wight takes its water from the River Yar, the River Medina and groundwater, but also relies on water pumped across from south Hampshire for a third of its drinking water.



Metered water use per person per day:
Hampshire – 124 litres
Isle of Wight



Unmetered water use per person per day:
Hampshire – 147 litres
Isle of Wight

Western water resource zones

- Kingsclere, Hampshire**
100% groundwater
- Andover, Hampshire**
100% groundwater
- Isle of Wight**
47% groundwater, 23% river, 30% transfers
- Rural Hampshire**
100% groundwater
- Winchester, Hampshire**
100% groundwater
- Southampton East, Hampshire**
52% river, 48% groundwater
- Southampton West, Hampshire**

Central area

Brighton, Worthing and surrounding areas take all their water from groundwater, while north Sussex has a mix of water from rivers, groundwater, a reservoir and a water supply from Portsmouth Water.



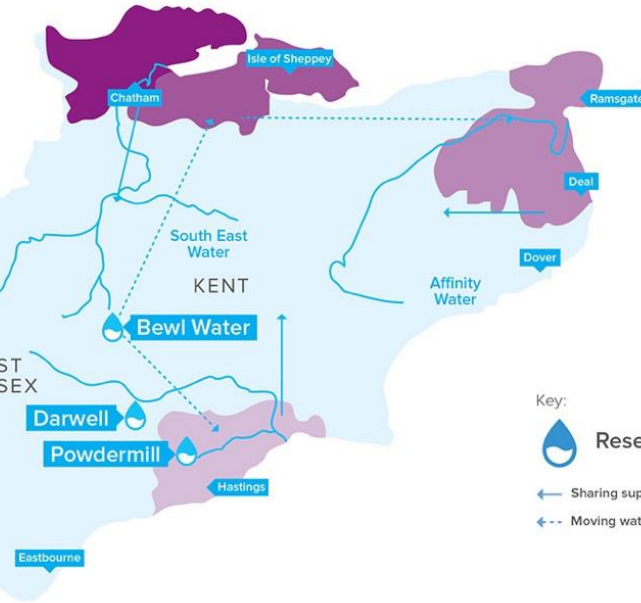
Metered water use per person per day:
127 litres



Unmetered water use per person per day:
179 litres

Central water resource zones

- North Sussex**
35% groundwater, 51% river, 8% reservoir, 6% transfers
- Worthing, Sussex**
98% groundwater, 2% transfers
- Brighton, Sussex**
100% groundwater



Key:



Reservoir

← Sharing supplies between water companies

← - - Moving water in our supply zones

Eastern area

In Kent, Medway East, Medway West and Thanet take most of their water from groundwater and the rest from the River Medway, some of which is stored in Bawl Water reservoir and later released into the River Medway. Hastings in Sussex takes most of its water from Darwell reservoir and Powdermill reservoir, with the rest from groundwater. Water is transferred by pipeline from Medway to Thanet, and from



Metered water use per person per day:
123 litres



Unmetered water use per person per day:
169 litres

Eastern water resource zones

- Medway East, Kent**
100% groundwater
- Medway West, Kent**
56% river and reservoir, 44% groundwater
- Thanet, Kent**
77% groundwater, 2% river, 21% transfers
- Hastings, Sussex**
5% groundwater, 79% reservoir, 16% transfers

Figure 1-2: Southern Water supply area

1.7 Target levels of service

Table 1-6 sets out our target levels of service which our WRMP19 is based upon and which will be achieved when initial supply-demand deficits are removed. This means that under a 1:200 year drought event we would expect to use drought permits / orders to increase supplies through the relaxation of licence conditions, increases in licensed quantities or other measures, subject to Environment Agency approval. This would be after we had taken action to reduce customer demand, including through TUBs and NEUBs.

Table 1-6: WRMP19 target levels of service

Levels of service	Annual probability	Return period	Probability of at least 1 occurrence within our 50 year planning period
Customer target levels of service			
Advertising to influence water use	20%	1 in 5 year	100%
Temporary use bans on different categories of water use	10%	1 in 10 year	99%
Drought order (Non-essential use ban) to restrict water use	5%	1 in 20 year	92%
Emergency drought order to restrict water use	0.20%	Only in a civil emergency (1 in 500 years)	10%
Environmental target levels of service			
Drought permits/orders to increase supplies through relaxation of license conditions, increase inn licensed quantities, or other measures	0.50%	1 in 200 year	22%

1.8 Performance commitments

Our outturn PCC for the 2020-21 reporting year was 137.6l/h/d and was behind target as seen in Table 1-7. Our Ofwat target is a three year rolling average of 131.8l/h/d for 2020-21. Our PCC has risen since the last reporting year (126.55l/h/d). This is due to 2020-21 being a warm dry summer, and the continued effect of Covid-19 and working from home. We have been able to reduce some of the impact of Covid-19 on PCC by continuing to drive water efficiency messaging. However, we have had to scale back some elements such as home visits during periods of lockdown.

Leakage in 2020-21 was 98.4MI/d against a three year rolling target of 98.5MI/d as also seen in Table 1-7. This is in line with the three year rolling average for this year. During last year we maintained the leakage activity work as planned however there was an increase of leakage linked to higher pressure in the network driven by higher demand. We did not consider it would be responsible to increase activity in this field due to the proximity to customers and colleagues which was against the Government advice.

Table 1-7: Outcome delivery incentive targets

Performance Commitment	Unit	Year 1	Year 2	Year 3	Year 4	Year 5
Leakage (In Year)	MI/d	98.4				
Per Capita Consumption (In Year)	l/p/d	137.6				
Leakage (3 Year Rolling Average)	MI/d	98.5	93.9	90.9	87.9	84.9
Per Capita Consumption (3 Year Rolling Average)	l/p/d	131.8	125.4	122.5	120.3	118.8



DI was 562.66MI/d against 541.78MI/d in the previous year. This is a noticeable increase caused by increased customer consumption and the impact of the pandemic on effectively finding and repairing leaks.

Our drought resilience metric has 0% risk to customers in a DYAA 1:200 year design drought.

Our outturn outage Peak Week Production Capacity (PWPC) outcome delivery incentive (ODI) metric was 9.21% against a target of 9.44%. The PWPC takes account of the asset's capacity, rather than licence or flow limitations. The outage attributed to this measure is thus when a site cannot operate at its peak capacity.

Southern Water has one AMP7 Abstraction Incentive Mechanism (AIM) scheme which is also an ODI scheme. It is to abstract at least 450MI less than the licensed aggregate monthly abstraction in September of 2280MI across the three abstraction licences at Itchen Surface Water, Itchen Groundwater and Twyford. This means the total abstraction across the three licences should not exceed 1830MI or, 61MI/d on average. The ODI is set such that the company will incur a penalty if it abstracts more than an equivalent of 1845MI (61.5MI/d on average) but, it can achieve a reward if it abstracts less than 1815 MI (60.5MI/d equivalent). Rounding up applies, such that 15.5MI/d rounds to 16MI/d and 14.49MI/d rounds down to 14MI/d. Therefore abstraction in the range 14.5MI/d to 15.49MI/d is an ODI 'neutral' band, incurring neither reward nor penalty.

In 2020, the total abstraction was 1817.74MI, equivalent to 60.59MI/d or, 15.41MI/d below the abstraction licence limit of 2280 MI. This equates to the ODI 'neutral' band; neither reward nor penalty. This is a positive outcome and reflects our commitment to reducing the abstraction from our environmentally vulnerable sources.

In achieving the 2020 result, we took as much Bulk Supply as Portsmouth Water could supply throughout September, this was just less than 15MI/d every day. Also, the River Test flow improved through August and September such that the risk of requiring a River Test Drought Permit receded and we were able to take some abstraction from the River Test and use it to support, by treated water transfer, demand that would otherwise be dependent on greater abstraction from the River Itchen source.

1.9 Covid-19

The Covid-19 pandemic has continued to have a significant effect on our operations and customer demand.

We have maintained essential service to customers and the environment during unprecedented challenges. The operational capacity of some parts of the business including water networks, customer and demand have been affected by Covid-19 due to staff resourcing issues.

Our leakage resources have switched to working from home to verify, analyse, report and review data. Our field activities to maintain data quality have continued with 85% to 100% staff availability to repair and replace data loggers, promote meter replacements and optimise our pressure managed areas. Leakage construction driven activities to deliver essential replacement meters and new assets continues but at a reduced output. Leakage detection resources within our supply chain has been maintained at around 80% to 95% availability rate across all reporting areas. We have been aiming to maintain our leakage efforts whilst keeping our staff and customers safe.

The impacts of Covid-19 have been putting increased pressure on our supply system in the first year of AMP7. Household demand has increased by 31.3MI/d (9.8%) from 2019-20 and Non Household demand has reduced by 15.09MI/d (13.4%). This is due to a lot of office workers working from home and changing the demand profiles. There is a large commuter impact, especially in our Kent area, where a lot of customers are no longer commuting into London for work. Overall DI has been approximately 20.9MI/d

(3.9%) higher than 2019-20. The majority of this increase is from the net increase of customer demand (approx. 15MI/d once the non-household gains are subtracted). We have completed work to assess the Covid-19 impact on household consumption which can be seen in section 3.2. Further work is required to assess the long term impacts of Covid-19 on demand. We are aware of the risk that Covid-19 poses to our ability to meet our PCC target and achieve an SDBI of 100 in 2020-21. We will take action where we can to reduce this risk and keep the Environment Agency informed of progress.

The Environment Agency granted some extensions based on NEP scheme type, the following extensions were granted:

3 month extension

- Salmon Action Plan investigations and options appraisals
- River Itchen and River Test. (River Itchen revised Common Standards Monitoring Guidance (rCSMG) with Portsmouth Water and SEW)
- Test Surface Water diurnal abstraction investigation and options appraisal

6 month extension

- Candover Stream investigation
- River Itchen Site of Special Scientific Interest (SSSI) wetlands
- River Itchen Southern Damsel fly
- Various WFD schemes

1.10 Peak demand contingency planning

A summer supply and demand team has been formed to build a strong supply and demand event response outside of the standby rota in line with our incident management model. This allows us to review network risk including summer headroom analysis, outage recovers, incident trigger and escalation levels and DMA level demand analysis. We can also review resilience, alternate responses, and communications for customers both household and retail.

1.11 Outage

Our levels of outage are detailed in section 2.3. The outage forecast in this case refers to the outage allowance from the WRMP19 (76.30MI/d). Average outage refers to outturn outage and is the average outage over the 12 months from April 2020 to March 2021 (82.57MI/d). Average outage during the 2020-21 reporting year was thus 6.26MI/d above the WRMP19 outage allowance for the year 2020-21 at the company level. By the end of March 2021 actual outage had reduced to 81.16MI/d. We are continuing to progress planned outage recovery for years 2-5 of AMP7 in order to achieve our outage allowance profile set out in the WRMP19.

At the WRZ level, there is some fluctuation around the WRMP19 outage allowances with Hampshire Southampton East WRZ 20MI/d behind forecast and Kent Medway West WRZ 17MI/d above forecast. In Kent Thanet WRZ outturn outage is 3MI/d above forecast which is creating a risk to the SDBI as mentioned above in section 1.4.

1.12 Drinking water quality

We have 14 water treatment works that have DWI notices. These are listed in Table 1-8 below. Further information can be seen in Appendix B. Sources with drinking water notices that are currently out of supply are Weir Wood, Manston12 and Minster IOT. In addition to this we also have a notice that covers all our groundwater sites (Ground Water Hazrev SRN 3926).

Table 1-8: Sites with drinking water inspectorate notices

Sites with Drinking Water Inspectorate notices
Test Surface Water WSW
Itchen WSW
Sandown WSW
Pulborough WSW
Brighton A WSW
Long Furlong B WSW
North Falmer A WSW, North Falmer B WSW, North Falmer C WSW
Romsey WSW
Twyford WSW
Near Rochester WSW
Weir Wood WSW
TK035 Sandwich Water Supply Works, TK024 Sandwich Water Supply Works, TK034 Near Canterbury Water Supply Works, TK042 Near Canterbury (Fleete) Water Supply Works, TK032 Birchington Water Supply Works, TK025 Manston Water Supply Works, TK028 Ramsgate Water Supply Works, TK023 Deal Water Supply Works, TK033 North Deal Water Supply Works.
Near Hastings WSW
Near Rye WSW

In addition, the region wide HazRev groundwater Notice covers improvement actions at the following water supply works:

Littlehampton	North Falmer A	Northfleet
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Arundel	Near Whitchurch	Overton
Rottingdean	Near Basingstoke	Brighton A
Barton Stacey	Newchurch	Long Furlong B
Sittingbourne3	Petworth South	River Way, Andover
Worthing	Strood	Midhurst
South Arundel	Manston	Faversham4
Cuxton	North Cuxton	Shoreham
Caul Bourne	Meopham	Sompting
Newport	Gillingham	Lewes
Long Furlong A	North Arundel	Birchington
Deal	West Langdon	Durrington
Kingsdown	North Dover	Steyning
Faversham5	Hartlip	North Deal
Winchester	Hove B	Rochester
Falmer	Ramsgate	Romsey
Worthing	North Shoreham	Alresford
Sandwich	Chatham West	Twyford Moors
Hove	North Falmer B	Twyford
Higham	North Falmer C	Ventnor New
Near Herne Bay	East Worthing	Near Canterbury

For further information please see the link below to the DWI website:

<https://www.dwi.gov.uk/water-companies/improvement-programmes/current-improvement-programmes/#southern-water>

1.13 WRMP19 assumptions

We are currently following an adaptive plan to address the uncertainties we face with forecasting supply and demand availability in future. Delivery of the WRMP19 started in 2020-21 and nothing substantial has changed in relation to our current position compared to WRMP19. The pandemic has caused some alterations around how much demand and DI we would expect, but there is no evidence yet of how much this will affect the plan in the long term. Until we have evidence to suggest that demand will permanently increase, we will remain on the current path.

Similarly, there have been no major alterations to the supply side assumptions and the current pathway is assumed to still be valid. In our Central area we are mitigating for the potential environmental impact of the Pulborough Wellfield scheme in AMP 6 as seen in section 1.2.1, and therefore do not see this as a reason to change the plan. The only changes to the pathway that we foresee come from the Western area as detailed in section 4.2.13, and our conclusions on material change in circumstances are provided in section 5.

Section of Plan	On track?	Comments
Supply demand balance	Yes	Some concerns surrounding the increase in demand due to the pandemic and higher than planned outage levels in some areas, but not altered significantly enough to change pathway to a more/less conservative pathway.

Weather conditions	Yes	Although we have seen several hot, dry summers, 2021-22 is currently following the weather patterns attributed to normal years.
Progress with all outstanding, company-specific actions	Yes	All company specific actions are progressing as stated in section 1.2. There have been slight delays to some of these due to the pandemic.
Outage	No	Outage continues to improve year on year but is currently behind forecast. It is expected that planned outage reduction schemes will bring this back in line.
Available headroom	Yes	We expect that the problems seen during 2020-21 will not be encountered in 2021-22 as demand is beginning to decrease again and as we recover our outage.
Leakage	Yes	Leakage is on track against WRMP19 forecast. Once the pandemic impact starts to reduce we will be able to proactively increase our leakage efforts once more.
AMP6 water resources NEP schemes	Yes	
Catchment management schemes	Yes	
Security of Supply Index	Yes	Covid-19 pandemic caused issues in Kent Medway East WRZ but was within target headroom.
Drought resilience enhancement and drought permit / order readiness	Yes	Drought permit readiness plan in place as seen in section 2.10
Water resource zone boundary changes	Yes	No changes
Target levels of service	Yes	
Performance commitments	No	PCC is behind target due to the impact of the pandemic
Supply	Yes	
Sustainability changes	Yes	
Deployable output	Yes	
Bulk supply agreements	Yes	
Temporary Use Bans (TUBs) and Non Essential Use Bans (NEUBs)	Yes	
Drought permits and orders	Yes	Pre-application on River Test but did not need to apply for Drought Permit
Demand	No	Pandemic has raised DI to levels above the WRMP19
Per capita consumption	No	Pandemic has raised PCC to levels above the WRMP19
Water efficiency	No	Pandemic has restricted home visits but we have continued proactive messaging as well as launching virtual visits
Household metering	Yes	
New Assets	Yes	WRMP19 schemes are underway
Target headroom	No	Target headroom adjusted for dry year PDO scenario
Options	Yes	WRMP19 schemes are underway
Delivery	Yes	WRMP19 schemes are underway
Western area	Yes	
Central area	No	WRMP19 assumed delivery of the Pulborough Wellfield groundwater scheme which we have not been able to implement, however we have a mitigation plan to address the deficit.
Eastern area	Yes	
Regional planning and WRMP24	Yes	

2 Supply

2.1 Weather

The spring and summer of 2020-21 were drier than average, with May 2020 being one of the driest Mays on record. Rainfall deficits accumulated throughout the summer. We had sustained heatwave conditions across all of South East England in early August (this, along with the very dry May were probably the most significant weather events). The breakdown of the August heatwave led to heavy rainfall in Hampshire (saving us from needing to make a Test Permit application) and a wet month. Through the winter recharge period, September and November were drier than average whilst October, December and January were wetter than average, with October being particularly wet. The spring of 2021 has again been drier than average. The monthly profile of rainfall and temperature along with the 100 year average values can be seen in Figure 2-1.

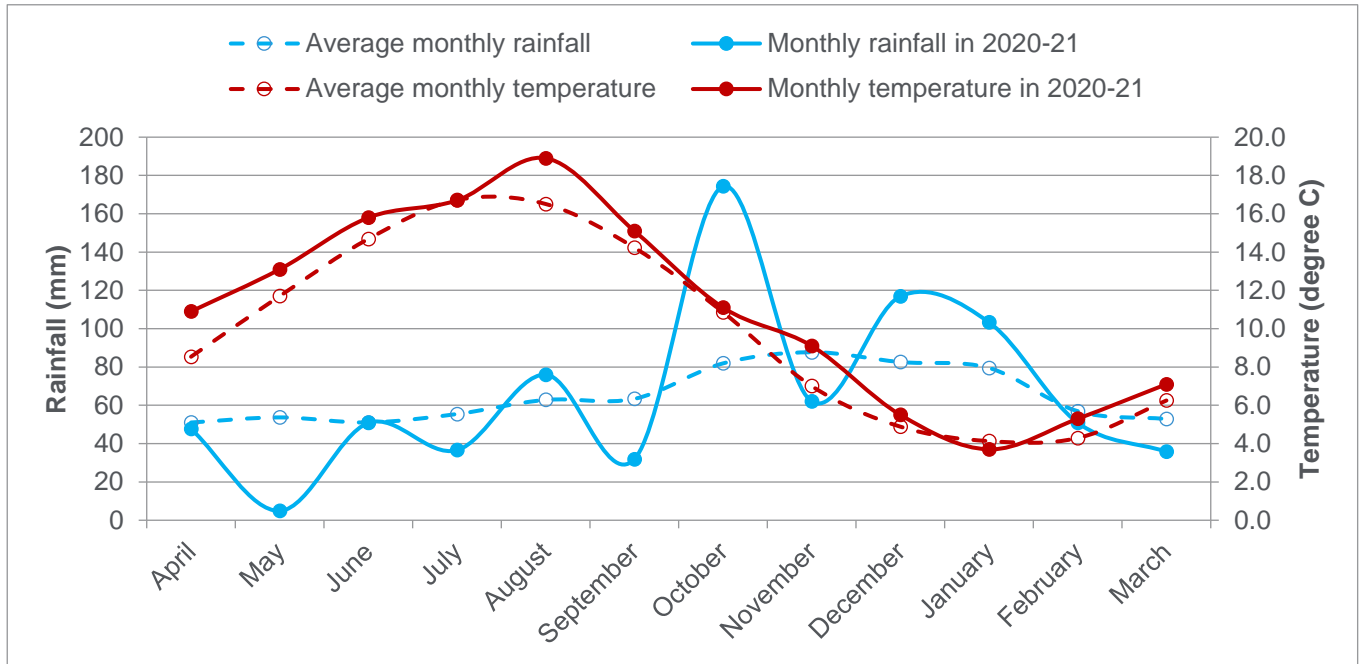


Figure 2-1: 2020-21 monthly rainfall and temperature against 100 year average

In terms of overall rainfall the 12-month total to the end of March 2021 comes out as a wetter than average year and is ranked 91st driest out of 130 years for the Test catchment. For Sussex it is ranked 106th driest out of 130 years and in Kent it was ranked 118th driest out of 130 years. Annual rainfall totals (Apr-Mar) were around 100-108% of Long-Term Average (LTA). For Apr-Mar 2018-19 rainfall totals were around 86-93% of the LTA.

The distribution of rainfall throughout the year was variable but crucially the wetter than average months occurred when they would have the greatest impact on water resources, i.e. the autumn and the winter. We are exiting the winter recharge period in 2021 with most groundwater levels at or above average, especially in Kent where they are notably high for the time of year.

2.2 Abstraction

As reported in our Annual Return 2020-21, we abstracted 239,569MI against a licenced maximum of 447,000MI. Approximately 61% of the abstraction was from groundwater sources with the remaining 39% from surface water.

No sites breached their annual licence limit during 2020-21 and only two sites, Gravesend STW and Alresford, breached the daily limit, on a total of 3 days. We recorded breaches related to other licence conditions, notably over abstracting when river flow indicated insufficient water was available and making insufficient compensation releases. We did not need to over abstract during the peak demand periods caused by the heat wave and Covid-19 during 2020.

We have made and continue to implement changes to reduce reportable compliance events. These include new manual controls at wastewater sites (with telemetry pending); implementing the split release system on the River Medway Scheme reservoir releases with plans to investigate feasibility of an additional flow meter on the releases. We are overseeing an overall improvement in our response to meter failures and are in the process of installing a new, permanent metering solution at Test Surface Water. We have a target of making self-reports within 48 hours and completing Investigation reports into compliance issues within 2 weeks.

During 2020 we commenced 6 monthly 'end to end' tests (meters - telemetry - data system) and weekly manual meter reads, As of May 2021 our abstraction reporting for daily data has increased in frequency to monthly to identify issues more quickly and allow us to take appropriate measures more promptly, and this will be supported by an upgrade to Qlikview reporting.

Under the licence modernisation programme 21 abstraction licences have been submitted to the EA for modernisation, reduction or revocation and we continue to process a further 27 licences with 7 licences being modernised as part of other programmes. This programme will standardise most conditions within the licences such as the making the reporting year April to March and the daily period midnight to midnight. Our annual licence capacity will be reduced by more than 15%.

2.3 Outage

Our outage figures include full outage (greater than 90 days and less than 90 days) and partial outage. Full outage is where a site is offline completely, providing no water. Partial outage includes sites which are online, but cannot achieve their DO due to asset failures for example. The improvements by water supply area since the 2019 annual review can be seen in Table 2-1.

Table 2-1: Outage (MI/d) by water supply area, Annual Review 2021 compared to Annual Review 2019 and 2020

Water supply area	Annual Review 2019 Outage (MI/d)	Annual Review 2020 Outage (MI/d)	Annual Review 2021 Outage (MI/d)
Western area	59.77	32.11	32.58
Central area	32.10	26.61	24.18
Eastern area	37.38	25.08	25.81
Southern Water	129.26	83.80	82.57

The Western area had an average of 32.58MI/d of reported outage over 2020-21. The causes of current outage are shown in Table 2-2. As of March 2021 we have nine sites with a total outage of 30.35MI/d. Since March 2020 significant reductions in outage have been enabled at Test Surface Water and Sandown.

Table 2-2: Western area outage causes

WRZ	Site	Total outage (MI/d)	<90 day outage (MI/d)	>90 day outage (MI/d)	Partial outage (MI/d)	Outage cause	Planned return to service
IOW	Lukely Brook	0.05	0.00	0.00	0.05		
IOW	Rookley	1.00	1.00	0.00	0.00		

IOW	Ventnor	1.00	0.00	1.00	0.00	Spring - flows variable, no asset restrictions	2022
HSW	Test Surface Water	5.00	0.00	0.00	5.00	Filters OOS	
HSE	Itchen SW	12.00	0.00	0.00	12.00	Max flows are not able to achieve design flows	
HSE	Itchen GW	9.07	0.00	0.00	9.07		
HSR	Kings Sombourne	0.05	0.00	0.00	0.05	Not all boreholes available	
HSR	Romsey	1.95	0.00	0.00	1.95	Not all boreholes available	
HA	Near Whitchurch	0.24	0.00	0.00	0.25	Surge vessel OOS - can't use larger boreholes	May 2021

The Central area had an average of 24.18MI/d of reported outage over 2020-21. The causes of these outages is shown in Table 2-3. As of March 2021 we have 12 sites with a total outage of 23.81MI/d.

Table 2-3: Central area outage causes

WRZ	Site	Total outage (MI/d)	<90 day outage (MI/d)	>90 day outage (MI/d)	Partial outage (MI/d)	Outage cause	Planned return to service
SN	River Arun	0.64	0.00	0.00	0.64		
SN	Weir Wood	5.40	0.00	5.40	0.00	Off line due to water quality risk	January 2024
SW	Littlehampton	0.84	0.00	0.00	0.84		
SW	Arundel	0.31	0.00	0.00	0.31		
SW	South Arundel A UGS	1.13	0.00	0.00	1.13		
SW	East Worthing	2.61	2.61	0.00	0.00		
SW	Durrington	1.50	0.00	0.00	1.50		
SB	Falmer	2.10	0.00	2.10	0.00	Water quality failure	June 2021, (Permanent run to waste due for delivery September 2021)
SB	Brighton B	2.50	0.00	2.50	0.00	Unable to run with Brighton A due to water quality risk. Return to service is covered by DWI notice.	March 2022
SB	Shoreham	1.11	0.00	0.00	1.11	Legal –a warrant was required to install the new borehole pump. This has now been installed. Trial of two pumps is to be arranged.	December 2021
SB	Sompting	3.50	0.00	0.00	3.50	Operations have run 2nd borehole on site, but yields only increased 0.5 MI/d instead of expected 3-4 MI/d.	TBD 2021
SB	Lewes	2.17	0.00	0.00	2.17	Investigations are ongoing.	

The Eastern area had an average of 25.81MI/d of reported outage over 2020-21. The causes of these outages is shown in Table 2-4. As of March 2021 we have 22 sites with a total outage of 27.00MI/d.

Table 2-4: Eastern area outage causes

WRZ	Site	Total outage (MI/d)	<90 day outage (MI/d)	>90 day outage (MI/d)	Partial outage (MI/d)	Outage cause	Planned return to service
SH	Rye	0.93	0.00	0.00	0.93		
KME	Capstone Chalk	0.30	0.00	0.00	0.30		
KME	Capstone Greensand	1.40	1.40	0.00	0.00		
KME	Sittingbourne1	0.23	0.00	0.00	0.23		
KME	Hartlip Hill	1.20	0.00	0.00	1.20	NRV on assist booster	
KME	Newington	0.50	0.00	0.50	0.00	Site out of service	March 2025
KME	Hartlip	0.45	0.00	0.00	0.45	Only 2 out of 4 boreholes in service	
KME	Chatham West	0.70	0.00	0.00	0.70		
KME	Faversham3	2.14	0.00	0.00	2.14		
KMW	Longfield	1.93	0.00	0.00	1.93	Close hole in contact tank to increase contact time	
KMW	Gravesend South	1.28	0.00	0.00	1.28		
KMW	Higham	0.21	0.19	0.02	0.00	Multiple full outage events – now OOS again since mid-December. Motive water issue on site	February 2021
KMW	North Cuxton	0.38	0.15	0.00	0.23		
KMW	Rochester	0.45	0.00	0.45	0.00	The Security and Emergency Measures Direction (SEMD) improvements completed last year have made lifting the pump impossible without the removal of a low brick wall	April 2021
KT	Deal	4.13	0.00	4.13	0.00	To be PWPC tested by March 2021	March 2024
KT	West Sandwich	0.84	0.00	0.00	0.84	Borehole E	
KT	Manston	0.79	0.00	0.79	0.00	Site out of service	December 2025
KT	West Langdon	2.51	0.00	0.00	2.51	Undersized borehole installed 2016?	
KT	Ramsgate B	5.71	0.00	5.71	0.00	Site could be run but on reduced flows as site cannot overcome pressure in the pumping main	December 2025
KT	Kingsdown	0.64	0.12	0.00	0.52		
KT	North Deal	0.17	0.00	0.00	0.17		
KT	Sandwich	0.12	0.08	0.00	0.04		

Average outage during the 2020-21 reporting year was 6.26MI/d above the WRMP19 outage allowance for the year 2020-21. This can be seen in Figure 2-2. The end of March 2021 position was 81.16MI/d. At the WRZ level, there is some fluctuation around the WRMP19 allowance.

Outage per WRZ can be seen in Table 2-5. This shows WRZs are above the WRMP19 allowance and which are below. The WRZs with outage above the zonal allowance are Hampshire Rural, Hampshire Southampton East, Isle of Wight, Sussex North, Sussex Worthing, Sussex Brighton and Kent Thanet.

Hampshire Rural WRZ outage is caused by Romsey (1.95MI/d outage). Hampshire Southampton East WRZ actual outage is largely caused by Itchen Surface Water (12.00MI/d outage) and Itchen Groundwater

(9.07MI/d outage). Isle of Wight WRZ actual outage is largely due to Rookley and Ventnor (both 1.00MI/d outage).

Sussex North WRZ actual outage is due to Weir Wood (5.4MI/d) which is due back online in 2024. Sussex Worthing WRZ actual outage was mainly caused by East Worthing (2.61MI/d) and Durrington (1.5MI/d). Sussex Brighton WRZ actual outage was mainly caused by Falmer (2.1MI/d), Shoreham (1.11MI/d), Sompting (3.5MI/d) and Lewes (2.17MI/d).

Kent Thanet WRZ's main contributor to actual outage was Deal (4.13MI/d), Ramsgate B (5.71MI/d) and West Langdon (2.51MI/d).

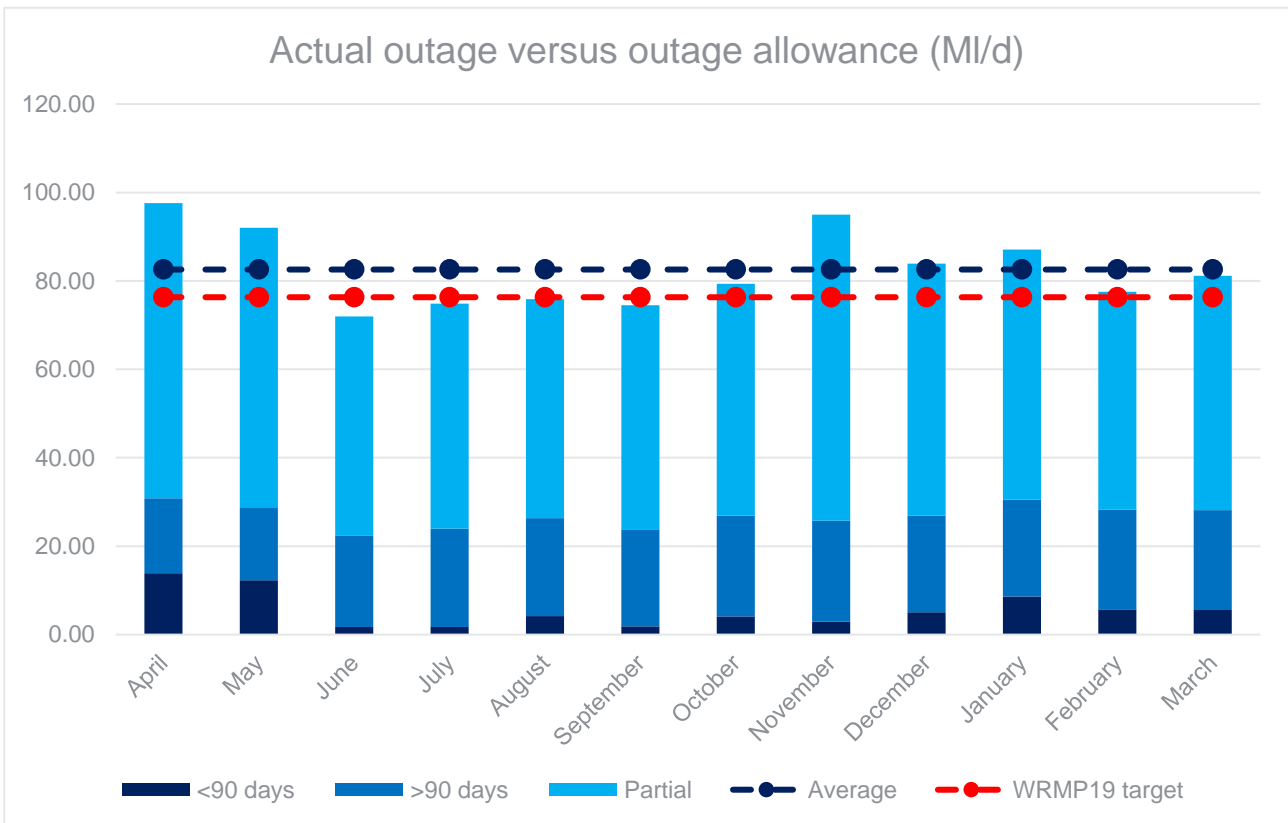


Figure 2-2: 2020-21 outage

Table 2-5: Actual outage per WRZ against the WRMP19 outage allowance

Water Resource Zone	Full outage <90 days (Ml/d)	Full outage >90 days (Ml/d)	Partial outage (Ml/d)	Total outage (Ml/d)	WRMP19 2020-21 target	
Hampshire Andover	0.01	0.00	0.10	0.11	2.14	↑
Hampshire Kingsclere	0.00	0.00	0.00	0.00	0.14	↑
Hampshire Rural	0.00	0.00	1.95	1.96	0.29	↓
Hampshire Southampton East	0.15	0.00	20.97	21.12	0.64	↓
Hampshire Southampton West	0.00	0.00	7.25	7.25	15.59	↑
Hampshire Winchester	0.00	0.00	0.00	0.00	0.36	↑
Isle of Wight	1.10	0.33	0.72	2.14	1.68	↓
Sussex North	0.00	5.40	2.47	7.87	5.59	↓
Sussex Worthing	1.16	0.00	3.73	4.89	4.25	↓
Sussex Brighton	0.65	4.15	6.62	11.41	6.01	↓
Kent Medway East	1.19	0.50	4.56	6.25	6.69	↑
Kent Medway West	0.24	0.45	3.03	3.72	20.26	↑
Kent Thanet	0.84	10.21	3.96	15.01	11.71	↓
Sussex Hastings	0.30	0.23	0.31	0.84	0.94	↑
Western Area	1.26	0.33	30.99	32.58	20.85	↓
Central Area	1.81	9.55	12.82	24.18	15.85	↓
Eastern Area	2.56	11.39	11.86	25.81	39.60	↑
Southern Water	5.64	21.26	55.67	82.57	76.30	↓

2.3.1 Outage data collection

Our Water Production team have recently reviewed and updated the way that outage is reported. This update improves the quality of the data and allows for more accurate reporting of the period of outages. This also gives more granular information on outage causes and allows for better targeted outage recovery.

The next steps are to continue to build and improve upon our outage reporting. We will continue to ensure that our current method of outage reporting is as robust as possible until such time as we can build an automated approach. We are including outage reporting within the specification for our Operational Asset Management (OAM).

2.3.2 Outage recovery profile

As can be seen in Table 2-2, Table 2-3 and Table 2-4, we have a number of outage recovery schemes planned. This list is constantly reviewed and updated to reflect where the need is greater and where it is cost efficient to resolve the outage. We continue to work towards our challenging outage recovery profile as set out in the WRMP19.

2.4 Sustainability changes

There have been no sustainability changes (reductions of deployable output) in the 2020-21 reporting year.

Sustainability reductions are expected to be one of, if not the biggest, driver of supply-demand deficits for the regional plan and next WRMP. The abstraction licence change application for the Andover source was sent to the Environment Agency for approval in February 2021.

The new abstraction licences for Newport and Lukely Brook were issued on 9 October 2020. These changes were made as part of the AMP6 NEP but did not result in a sustainability change. Likewise the Andover licence change will not lead to a sustainability change.

2.5 Deployable output

There have been three adjustments to DO in the 2020-21 reporting year, against the WRMP19 as seen in Table 2-6. The Weir Wood Drought Order in Sussex North WRZ has been removed from the DO baseline as the drought order would not have been viable during the year. North Falmer A in Sussex Brighton WRZ was forecast to be removed in the WRMP19 due to nitrate risks. This risk did not materialise and so the DO has been written back up accordingly as the site was still in use. This is the same for North Dover in Kent Thanet WRZ.

Table 2-6: Deployable Output WRMP19 against 2020-21 outturn incorporating benefit of drought interventions

Water resource zone	WRMP19 DYAA Deployable Outputs (MI/d)	DYAA Deployable Output 2020-21 (MI/d)	WRMP19 DYPDO Deployable Outputs (MI/d)	DYPDO Deployable Output 2020-21 (MI/d)	WRMP19 DYMDO Deployable Outputs (MI/d)	DYMDO Deployable Output 2020-21 (MI/d)
Hampshire Andover	22.36	22.36	26.74	26.74	21.94	21.94
Hampshire Kingsclere	8.67	8.67	9.18	9.18	8.61	8.61
Hampshire Winchester	24.18	24.18	25.33	25.33	24.03	24.03
Hampshire Rural	12.62	12.62	12.41	12.41	12.56	12.56
Hampshire Southampton East	103.42	103.42	127.96	127.96	102.54	102.54
Hampshire Southampton West	81.73	81.73	81.28	81.28	81.39	81.39
Isle of Wight	33.50	33.50	41.65	41.65	32.31	32.31
Sussex North	64.84	61.24	93.99	88.59	60.02	56.42
Sussex Worthing	61.30	61.30	71.11	71.11	60.66	60.66
Sussex Brighton	95.91	98.41	107.36	113.36	94.82	97.32
Kent Medway East	96.91	96.91	102.62	102.62		
Kent Medway West	103.88	103.88	105.98	105.98		
Kent Thanet	50.39	51.31	54.50	55.43		
Sussex Hastings	23.09	23.09	46.56	46.56		
Southern Water	782.80	782.62	906.65	908.18	498.87	497.77

We have a number of sites with potential DO write downs that we are considering for 2021-22 reporting year following a recent review of PWPC. We will confirm these with the Environment Agency once we have assessed the impact.

2.6 Bulk supply agreements

Bulk supplies to and from other companies are shown in Table 2-7 along with how they have been used in the report year compared to 2019-20.

In 2021 we hope to be signing a new Weir Wood bulk supply contract (bulk supply in the vicinity of Crawley) which is currently undergoing final iteration and review. We should also be receiving final feedback on our Darwell contract with South East Water. We aim to get both these contracts within 2021. We will also be progressing an up-to-date Sheldwich contract, aiming for sign-off within 2021.

A draft Bulk Supply contract is under review with SESW regarding a potential new supply from them. We expect it should be finalised in June 2021.

Table 2-7: Bulk supplies in 2020-21 compared to Annual Review 2020

Company	To/from WRZ	Daily Average (MI/d) 20/21	Daily Average (MI/d) 19/20	Change from 19/20	Annual Total (MI) 20/21	Annual Total (MI) 19/20	Change from 19/20
Affinity Water	Kent Thanet	0.03	0.01	↑	9.41	3.88	↑
Portsmouth Water	Sussex North	2.33	2.96	↓	849.92	1081.53	↓
South East Water	Kent Medway East	0.00	0.01	↓	0.00	0.00	↓
SES Water	Sussex North	0.00	0.00	↔	0.00	0.00	↔
Portsmouth Water	Sussex Worthing	0.00	0.00	↔	0.00	0.00	↔
Affinity Water	Kent Thanet	0.04	0.81	↓	14.62	296.36	↓
South East Water	Kent Medway East	1.40	3.74	↓	509.36	1369.82	↓
	Kent Medway East	3.13	2.83	↑	1142.50	1034.22	↑
	Kent Medway East	0.00	0.00	↓	0.00	0.01	↓
	Kent Medway West	0.01	0.01	↑	5.15	0.26	↑
	Sussex North	2.86	2.52	↑	1043.94	921.44	↑
	Kent Medway West	8.88	8.80	↑	3215.67	3250.74	↓
Wessex Water	Hants Andover	0.12	0.26	↓	85.61	96.25	↓
South East Water	Kent Medway West	12.29	10.45	↑	4486.05	3825.61	↑
	Sussex Hastings	0.98	2.14	↓	356.18	782.30	↓
British Gypsum	Sussex Hastings	0.54	0.54	↔	195.42	195.96	↓

2.7 Changes to supply forecast

There have been no changes to our supply forecast in the 2020-21 reporting year.

2.8 Delivery of new schemes

In line with WRMP19, no new supply solutions have been delivered in 2020-21 but we are on track to deliver new solutions from 2021-22. There is a slight delay to the West Sandwich & Sandwich licence change which was supposed to be completed by end of March 2021. Further discussions with NE and EA are planned for July 2021. We have been progressing our risk and value workshops for future schemes to ensure that they can be delivered in a timely manner. This can be seen in more detail in section 4.2.

2.9 TUBs and NEUBs

One of the short term mitigation options in case of drought is to implement TUBs when we reach a 1 in 10 year drought event, and NEUBs when we reach a 1-in-20 year drought event. The annual probability of these occurring are 10% and 5% respectively. The proposed measures with their assumed benefits within the WRMP19 are shown in Table 1-3. We did not implement any TUBs or NEUBs in the 2020-21 reporting year.

2.10 Drought permits and orders

Another short term mitigation option is to implement drought permits and drought orders to increase supplies through a relaxation of licence conditions, increase in licensed quantities or other measures. These would be implemented if we reach a 1:200 year design drought providing we do not have a supply-demand deficit, with an in-year probability of 0.5%. These drought permits and orders would need to be agreed and signed off by the Environment Agency or Defra before use. The list of drought permits and orders selected as options in our WRMP19 is shown in Table 1-4. An example of this is the River Test Drought Permit which we carried out the pre-application stage for in 2020-21. Although we reached the 35 day trigger we did not need to submit the application. Of the drought permits and orders we have excluded Weir Wood from our supply demand balance as we would not currently be able to utilise this.

As part of our drought planning, we are developing our drought permits and orders to a state of application readiness. For example, we have developed a suite of draft application documents for the River Test surface water Drought Permit which aligns with the 2019 drought permit guidance.

We will develop further draft application documents based on a consistent template for our other highest priority drought permits and orders. We have prioritised these according to the likelihood of an application, environmental sensitivity and monitoring requirements and we will develop draft application documents in line with the timetable shown in Table 2-8.

Table 2-8: Priority drought permits and orders for application readiness

Drought Permit / Order	Prioritisation for application readiness	Delivery date for draft application readiness documents
Pulborough	1	31 September 2021
Bewl / River Medway Scheme	1	31 December 2021
River Test Drought Order	2	28 February 2022

Candover Augmentation Scheme	2	31 March 2022
Lower Itchen	2	31 July 2022
North Arundel	2	31 December 2022
Lukely Brook	2	31 December 2022

3 Demand

3.1 Weather

The year from 1 April 2020 to 31 March 2021 was warmer and drier than average during the months April to September. The average rainfall was less than the warm dry year in 2018-19 and the temperature was a little cooler. As such we would expect the year 2020-21 to reflect a “dry year” as compared to the 90th percentile. This indicates an expected increase in demand compared to a “normal year”. We would expect this to result in increased consumption rates of up to 40-60MI/d across the company. During the 2020-21 year there were no risks to customers and no need to implement TUBs or NEUBs.

3.2 Covid-19 impact on demand

In 2020-21 we saw a 4.5% increase in DI across the company compared to the average DI from January 2010 to March 2020. We carried out an analysis adjusting for max temperature. The effect of Covid-19 was more pronounced in some WRZs than others as seen in Table 3-1. This varies between a decrease of 6.9% against average in Sussex Worthing WRZ and an increase of 36.0% against average in Hampshire Southampton West WRZ.

Further to this we carried out a more in depth analysis for Kent Medway East WRZ and Kent Medway as a whole. After adjusting for maximum temperature and residential population growth and after removing leakage and non-household consumption, there is a remaining Covid-19 Impact of 3.63MI/d in Kent Medway East WRZ. We have reduced our target headroom in the dry year DYPDO scenario by this amount as seen in section 4.1. The figure for Kent Medway as a whole is 9.32MI/d. All WRZ have been impacted by Covid-19 to different degrees but in the Eastern area, it had a more significant impact on the supply demand balance.

Table 3-1: Increase in DI during 2020-21

Regional & Water Resource Areas	DI Results Adjusted For Max Temperature			
	Max Temp Adjustment Average DI value (MI/d) Apr 2020 - Mar 2021	Max Temp Adjustment Average DI value (MI/d) Jan 2010 - Mar 2020	Variance	Statistical Impact
Overall	540.9	517.5	4.5%	YES
Isle of Wight	27.7	26.2	5.7%	YES
Hampshire Kingsclere	4.7	4.5	4.3%	NO
Hampshire Andover	15.0	14.1	6.6%	YES
Hampshire Rural	6.1	5.6	8.8%	YES
Hampshire Winchester	16.5	16.5	0.0%	NO
Hampshire Southampton West	31.7	23.3	36.0%	YES
Hampshire Southampton East	81.7	85.8	-4.7%	YES
Sussex North	55.1	55.3	-0.5%	NO
Sussex Worthing	38.4	41.2	-6.9%	YES
Sussex Brighton	79.4	76.2	4.2%	YES
Sussex East (Hastings)	24.3	22.7	6.9%	YES
Kent Medway West	46.4	42.2	10.0%	YES
Kent Medway East	75.5	66.8	13.0%	YES
Kent Thanet	39.8	38.3	3.9%	YES

3.3 Changes to demand forecast

As part of the annual return process, population forecasts are verified against the Office of National Statistics (ONS) mid-year estimates for local authorities. This comparison continues to be within 5% for 2020-21 indicating that the forecast is still in line with what we would expect. The population growth for the WRZs are thus in line with the forecast in the WRMP19.

Table 3-2 shows outturn DI, against the dry year forecast in the WRMP19. Consumption is higher than forecast in six WRZs; Hampshire Andover, Sussex North, Kent Medway East, Kent Medway West, Kent Thanet and Sussex Hastings.

Leakage is below forecast in eight WRZs; Hampshire Kingsclere, Hampshire Winchester, Hampshire Rural, Isle of Wight, Sussex North, Kent Medway East, Kent Medway West and Sussex Hastings.

This means that only five of our WRZs have lower DI than forecast; Hampshire Southampton East, Hampshire Southampton West, Sussex Worthing, Sussex Brighton and Kent Thanet, which as way of

example has higher household demand than forecast but lower leakage than forecast, resulting in a marginally lower DI figure than forecast. The other nine WRZs have higher DI than forecast, due to a combination of increased consumption due to a warm dry summer, increased consumption due to the pandemic and increased leakage due to inability to be as effective whilst following pandemic safety guidelines.

We do not consider that there is a need to change our WRMP19 demand forecast.

Table 3-2: DI components from WRMP19 against 2020-21 outturn

Water Resource Zones	WRMP19 DYAA consumption (MI/d)	Water Balance outturn consumption (MI/d)		WRMP19 DYAA leakage (MI/d)	Water Balance outturn leakage (MI/d)		WRMP19 DYAA other use (MI/d)	Water Balance outturn other use (MI/d)		WRMP19 DYAA Distribution Input (MI/d)	Water Balance outturn Distribution Input (MI/d)	
Hampshire Andover	11.53	12.28	↓	3.99	3.67	↑	0.30	0.37	↓	15.81	16.32	↓
Hampshire Kingsclere	3.55	3.26	↑	1.57	2.08	↓	0.09	0.08	↑	5.21	5.42	↓
Hampshire Winchester	15.00	14.15	↑	2.18	3.67	↓	0.31	0.34	↓	17.49	18.15	↓
Hampshire Rural	5.78	5.23	↑	0.66	1.69	↓	0.12	0.16	↓	6.56	7.07	↓
Southampton East	72.86	71.08	↑	14.22	9.59	↑	1.81	2.41	↓	88.89	83.08	↑
Southampton West	27.38	27.10	↑	6.22	3.31	↑	0.63	0.81	↓	34.23	31.23	↑
Isle of Wight	26.78	24.83	↑	3.35	5.38	↓	0.87	1.20	↓	31.00	31.41	↓
Sussex North	47.52	48.39	↓	11.88	12.68	↓	1.21	0.80	↑	60.61	61.87	↓
Sussex Worthing	34.13	32.58	↑	6.14	4.81	↑	0.92	1.09	↓	41.19	38.49	↑
Sussex Brighton	67.68	66.12	↑	12.39	12.11	↑	2.04	2.62	↓	82.11	80.84	↑
Kent Medway E	50.96	52.16	↓	15.74	18.07	↓	1.42	3.14	↓	68.12	73.38	↓
Kent Medway W	31.83	33.16	↓	8.45	10.60	↓	0.72	1.64	↓	41.01	45.41	↓
Kent Thanet	34.08	36.24	↓	9.44	7.21	↑	1.05	1.04	↑	44.57	44.49	↑
Sussex Hastings	19.79	20.89	↓	3.38	3.54	↓	0.88	1.06	↓	24.06	25.50	↓
SWS	448.88	447.46	↑	99.61	98.42	↑	12.36	16.78	↓	560.86	562.66	↓

3.4 Per capita consumption

Average PCC for 2020-21 was 137.58 l/h/d. This is 11 l/h/d higher than 2019-20 and 6 l/h/d higher than forecast. This splits down into an average measured household PCC of 130.41 l/h/d and an average unmeasured household PCC of 188.33 l/h/d. PCC is much higher this year due in part to the warm, dry spring/summer that we had and largely due to the effect of the pandemic on the home consumption.

The change in consumption over the last three years can be seen in Table 3-3. This shows that in general household consumption has gone up and non-household consumption has gone down. This is contrary to the years prior to 2018-19 where we had been bringing PCC down from an average of 160l/h/dd. This is most likely because customers are now largely working from home and using water they would otherwise be using at their work place.

Table 3-3: Household and non-household consumption last three years

Water Resource Zones	Household consumption MI/d 2018-19	Household consumption MI/d 2019-20	Household consumption MI/d 2020-21	Non-Household consumption MI/d 2018-19	Non-Household consumption MI/d 2019-20	Non-Household consumption MI/d 2020-21
Hampshire Andover	9.88	8.91	9.50	3.52	3.25	2.78
Hampshire Kingsclere	3.35	2.46	2.64	0.81	0.65	0.62
Hampshire Winchester		8.78	9.69		5.29	4.46
Hampshire Rural		3.58	4.10		1.29	1.13
Southampton East		49.02	54.18		18.92	16.91
Southampton West		18.35	20.64		7.43	6.47
Hampshire South	79.99	79.72	88.60	33.48	32.93	23.37
Isle of Wight	17.28	16.91	18.55	7.90	7.34	6.28
Sussex North	36.43	35.41	38.73	11.91	11.05	9.66
Sussex Worthing	24.23	24.36	26.63	7.04	6.73	5.95
Sussex Brighton	49.56	50.22	53.58	19.49	15.96	12.54
Kent Medway E		39.36	42.74		9.98	9.42
Kent Medway W		22.20	24.56		9.42	8.59
Kent Medway	61.72	61.56	67.31	19.86	19.40	18.01
Kent Thanet	26.59	24.43	28.07	10.91	9.72	8.16
Sussex Hastings	15.03	14.90	16.56	5.27	5.35	4.33
Southern Water	324.06	318.90	350.17	120.20	112.38	97.29

The comparison against the WRMP19 forecast can be seen in Table 3-4. It is clear that all but Hampshire Andover have lower non-household consumption than forecasted, whereas 10 out of our 14 water resource zones have higher household demand than forecasted.

Table 3-4: Household and non-household consumption compared to the WRMP19 forecast for 2020-21

Water Resource Zones	Household consumption MI/d 2020-21	WRMP19 household consumption MI/d 2020-21		Non-Household consumption MI/d 2020-21	WRMP19 non-household consumption MI/d 2020-21	
Hampshire Andover	9.50	9.00	↓	2.78	2.60	↓
Hampshire Kingsclere	2.64	2.79	↑	0.62	0.78	↑
Hampshire Winchester	9.69	10.03	↑	4.46	5.05	↑
Hampshire Rural	4.10	3.96	↓	1.13	1.86	↑
Southampton East	54.18	53.01	↓	16.91	20.29	↑
Southampton West	20.64	20.37	↓	6.47	7.20	↑
Isle of Wight	18.55	19.67	↑	6.28	7.18	↑
Sussex North	38.73	36.95	↓	9.66	10.85	↑
Sussex Worthing	26.63	26.95	↑	5.95	7.40	↑
Sussex Brighton	53.58	47.03	↓	12.54	21.00	↑
Kent Medway E	42.74	41.22	↓	9.42	10.12	↑
Kent Medway W	24.56	23.35	↓	8.59	8.69	↑
Kent Thanet	28.07	25.43	↓	8.16	8.89	↑
Sussex Hastings	16.56	15.05	↓	4.33	4.84	↑
SWS	350.17	334.81	↓	97.29	116.74	↑

3.5 Water efficiency

We have progressed through year one of AMP7. During this year we have continued to make it easier for customers to save water, energy and money, as well as doing their bit to protect the environment. We continue to provide advice, support, products and incentives to help customers use less water in their homes, schools, businesses and communities. We have also put together plans to achieve our Target 100 milestone, achieving an average of 100 litres per person per day (l/p/d) by 2040.

In the last year we completed 2,500 home visits during the months where government restrictions allowed visits to occur (August 2020 to January 2021). We had forecast to undertake 5,000 home visits. For each of those visits we followed government guidelines of social distancing and wearing PPE. We are currently progressing the option of virtual home visits where we can provide our water efficiency service throughout these difficult times.

We have installed and supplied 3,987 water saving products between the months of August 2020 and January 2021 where government guidelines allowed. These products have saved on average 26 litres per property.

We have collaborated on a water website tool which helps customers to save water. This tool is now up and running on our website and is called "GetWaterFit" This tool can be found here:

<https://www.southernwater.co.uk/help-advice/getwaterfit-your-water-saving-calculator>

We have been tackling our customer side leakage between September 2020 and January 2021. This helps reduce customer bills by reducing the amount of wasted water that our customers have because of leaks, thus also reducing DI.

We are progressing our leaky loos campaign with a trial in Sussex North WRZ where we sent strips to test for leaky loos. In this process we located and fixed 94 leaky loos. However, this trial proved not to be cost efficient due to the cost of sending out the letters, so we are revisiting our approach.

We have been attending water efficiency talks via Zoom to the fuel and water advisory service and South Downs National Park. After the talks we then sent out any requested water efficiency products.

In addition to the above water efficiency programs we have also led live education web events with other water companies. Not only does this help to spread our water efficiency message, it allows a consistent message to be used across the water companies.

We are also planning an education centre on the Isle of Wight in order to improve customer understanding of water. This will help customers to understand how they can save water and more importantly, why they should save water.

3.6 Household metering

There were no performance commitments for household metering levels in 2020-21. Table 3-5 shows the percentage of household metering by WRZ. These figures exclude void properties. There are preferred options in AMP7 to increase the metering percentage in selected WRZs. By increasing the metering percentage in these WRZs we should see an increase in water efficiency.

Table 3-5: Water resource zone household metering percentage

Component	Total households with a meter installed
Hampshire Andover	89%
Hampshire Kingsclere	78%
Hampshire Winchester	89%
Hampshire Rural	90%
Hampshire Southampton East	90%
Hampshire Southampton West	95%
Isle of Wight	95%
Sussex North	86%
Sussex Worthing	91%
Sussex Brighton	80%
Kent Medway East	89%
Kent Medway West	88%
Kent Thanet	86%
Sussex Hastings	78%
Southern Water	88%

3.7 Leakage

3.7.1 Leakage position

The outturn leakage in 2020-21 was 98.42MI/d, which is better than the WRMP19 forecast of 99.61MI/d. The breakdown by WRZ can be seen in Table 3-6. We are behind our leakage forecast in Hampshire Kingsclere, Hampshire Rural, Hampshire Winchester, Isle of Wight, Sussex North, Kent Medway East, Kent Medway West and Sussex Hastings. However, we are ahead of forecast in the other WRZs. January and February 2021 saw a cold weather spell that increased the levels of leakage during that period. This increase due to cold weather was highlighted by all companies at the Dry Weather monitoring group held in January.

Table 3-6: Outturn leakage against WRMP19

Water Resource Area	2020-21 outturn	WRMP19 leakage 2020-21	
Hampshire Andover	3.67	3.99	↑
Hampshire Kingsclere	2.08	1.57	↓
Hampshire Winchester	3.67	2.18	↓
Hampshire Rural	1.69	0.66	↓
Hampshire Southampton East	9.59	14.22	↑
Hampshire Southampton West	3.31	6.22	↑
Isle of Wight	5.38	3.35	↓
Sussex North	12.68	11.88	↓
Sussex Worthing	4.81	6.14	↑
Sussex Brighton	12.11	12.39	↑
Kent Medway East	18.07	15.74	↓
Kent Medway West	10.60	8.45	↓
Kent Thanet	7.21	9.44	↑
Sussex Hastings	3.54	3.38	↓
Southern Water	98.42	99.61	↑

During 2020-21, Covid-19 impacted domestic water usage patterns due to home working arrangements. This is an ongoing situation that we are monitoring the impact of in relation to our leakage levels. Furthermore and by following government advice, during the pandemic, we did not consider it to be responsible to increase our leakage activities due to the proximity and close contact between our colleagues and customers that this would require. Despite this we maintained leakage in line with the WRMP19.

We have seen an increased volume (163% on last year) of customer driven leak repairs (reactive) in the reporting period, to the detriment of our proactive leakage activities. Our Find and Fix teams have remained stable during the Covid-19 restrictions. They have been operating at equal to or greater than 85% of normal Full Time Employees (FTE). We have completed 23,200 leak repairs within the 2020-21 reporting year.

We resumed customer side leakage appointments on the 12 April 2021 following the Covid-19 restriction break. This has resulted in a reduction of customer generated appointments, impacting customer side leakage. The backlog of these appointments are being scheduled.

In summary, we have maintained our leakage activities in line with our programme. The increase on water demand due to the pandemic increased customer demand and subsequent higher network pressures which are related to leakage. The increase in leakage during January and February 2021 due to cold weather was highlighted by all companies at the Dry Weather Monitoring group held in January. Although we expect leakage to increase in winter, the leakage performance has been abnormally higher compared to the data recorded over AMP6. This comparison again highlights the potential impact from the Covid-19 pandemic.

3.7.2 New technology

We have over 5,000 acoustic loggers operating in the water network to find leaks. We have fully deployed these new sensors across the region. We have installed 600 NB-IoT (Narrowband Internet of Things) enabled loggers, which is the first large deployment of this type of sensor in the country. We are reviewing the data from the sensors with area based teams on a daily basis to optimise Active Leakage Control (ALC) resources. The time from point of interest to confirmation of a leak is improving and in some areas is moving to a 60% success rate.

3.7.3 New assets

We have identified DMA's for wholesale water mains replacement. Two of these schemes will commence in year three of AMP7. Mains replacement is being completely reviewed as part of our water strategy approach and at present we have plans for mains renewals schemes to manage water quality risks (lead and appearance) in parts of Hampshire, East Kent and the Isle of Wight. Work is also ongoing outside of these areas including adopting a different approach which will see us invest in our Calm Networks strategy. This will aim to deliver longer asset life by investment in more sensors to help us understand the performance of our water network better and introduce improved intelligent closed loop pressure management as an alternative means of quietening the network down to help us prioritise areas of leakage effort.

3.7.4 New systems

In 2019-20 we replaced our leakage monitoring and reporting system. We implemented all phases of capability including leakage targeting, leakage reporting, DI and abstraction reporting (of which data used to monitor licences is now being loaded into the system) and overall regulatory water balance reporting. In 2020-21 we continued to improve upon this new system by applying two updates, one to improve data and another to implement the meter audit module. Further developments of the system are being proposed which will be deployed across the wider business over the next three to four years.

We have completed a review of domestic night use allowances and have approved these for use from January 2021. These allowances will be backdated to 1 April 2020 and will result in a possible net lowering

of reported leakage. This improvement improves the accuracy of our reporting and therefore improves the targeting for our leakage activity. This coincided with a review of our continuous use (plumbing losses) allowances. We have been accommodating and understanding the new way of reporting leakage, aligning with new Industry-wide methodology.

3.7.5 New network calming

71 pressure management schemes are now being delivered in AMP7. 26 of these schemes were completed in 2019-20. In 2020-21 we commissioned 35 pressure management schemes which affected 3.54% of customer properties and 2.99% of our mains. The remainder of the pressure management schemes are being progressed in the early part of AMP7 under the Calm Network Scheme.

3.7.6 New resilience

We continue to operate with 320 detection and repair FTE 'on the ground' resources for detecting and repairing leaks. Given our extra effort in this activity we have seen a reduction in leakage from its peak of between 12% and 15% of DI in the last 18 months. We are looking to target a lesser number of repairs with a higher leakage benefit rather than a larger number of perceived smaller leak repairs. We have promoted and repaired in the region of 23,800 leak repairs in the year. The increase in our acoustic logging capabilities enables us to utilise a lesser number of more experienced technicians to deliver field based activities. The number of management and support teams remains stable to optimise the delivery of our ALC efforts.

Our new leak detection framework will be awarded by July 2021, final negotiations are taking place (May 2021) with the preferred bidder. This framework will replace the existing agreement which expires after an eight year period. The new framework will offer us the benefits of changing the way we approach ALC resources and target leakage reduction within the remainder of the AMP. Performance measures and targets within the new framework are directly linked to our ODI outputs.

Utilising our new reporting system we are looking to target and repair the larger volume leaks. The SLI's performance measures under the existing Leak Detection framework have been changed to reflect this change. We are also looking to repair leaks in a faster time to reduce leak repair run times, this being a consequence of the new leakage methodology.

3.7.7 Other leakage reporting

The objectives defined in our Business Plan was to establish processes and procedures to enable us to report leakage under the common water industry standard 'Convergence' methodology. To facilitate this requirement and meet the Ofwat guidance we had to develop and implement a new leakage reporting system which has been successfully completed. The delivery of this change in process has enabled us to obtain the required data to establish the entry point to commence leakage reporting in AMP7. As such Ofwat leakage reporting and EA leakage reporting are now aligned.

4 Headroom and options

4.1 Target headroom

Target headroom refers to a planning margin that allows for uncertainty in the supply and demand forecasts and is defined as the threshold of minimum acceptable headroom (i.e. a surplus of supply over demand). If the target headroom is breached, it would represent an increased risk to the company in being able to meet its desired target Levels of Service (LOS). The 2016 Water Resource Planning Guideline does not prescribe what level of risk is acceptable for planning purposes. It is left to each company to determine the appropriate level of risk that is used in its WRMP.

The only change to target headroom was in the DYPDO scenario for Kent Medway East WRZ. The target headroom has been reduced due to an analysis on Covid-19 impact on demand as seen in section 3.2. Target headroom figures can be seen in Table 4-1.

Table 4-1: WRMP14 and WRMP19 Target Headroom

Water Resource Zones	WRMP19 DYAA Target Headroom (MI/d)	WRMP19 DYPDO Target Headroom (MI/d)	WRMP19 DYMDO Target Headroom (MI/d)	Changes to 2020-21 target headroom
Hampshire Andover	0.69	0.68	0.69	
Hampshire Kingsclere	0.18	0.17	0.18	
Hampshire Winchester	0.76	0.60	0.76	
Hampshire Rural	0.48	0.36	0.48	
Hampshire Southampton East	9.85	8.20	9.85	
Hampshire Southampton West	3.51	9.13	3.51	
Isle of Wight	0.43	1.39	0.43	
Sussex North	3.82	4.20	3.82	
Sussex Worthing	3.15	3.87	3.15	
Sussex Brighton	4.93	5.03	4.93	
Kent Medway E	5.98	6.36		DYPDO target headroom reduced to 2.73 following Covid analysis (section 3.2)
Kent Medway W	0.87	3.94		
Kent Thanet	2.26	2.57		
Sussex Hastings	0.88	1.53		

4.2 Delivery and progress on WRMP19 options

Delivery against WRMP19 is carried out in line with the Company's Asset Lifecycle Process (ALP). Southern Water utilises a Risk and Value (R&V) checkpoint system in its ALP, to ensure that the best outcome for the business and its customers is selected for individual schemes. There are several stages of R&V that cover the process from risk identification and need validation (R&V1) through to delivery of the scheme and post investment appraisal (R&V6). R&V workshops are held at each stage of the process, to ensure that the risk and solution is validated and developed by an integrated team. A schematic showing the ALP can be seen in Figure 4-1.

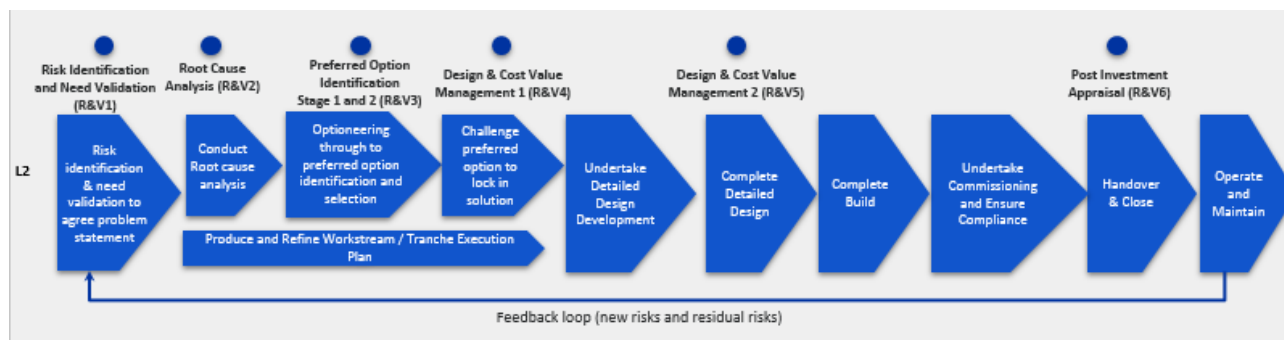


Figure 4-1: Asset Lifecycle Process, showing Risk and Value stages.

4.2.1 Central area

In the Central area we have begun progressing several of our WRMP19 preferred options and provide an update on key WRMP19 schemes and DWI notices in Sussex as below:

- Petersfield WSW – Scheme to investigate the release of additional deployable output from Petersfield WSW. Delivery on track for March 2025. We have scheduled in the risk and value 1 workshop for September 2021.
- West Chilmington WSW – This scheme has progressed through risk identification and need validation (R&V 1) and root cause analysis (R&V 2) and a preferred solution has been selected (R&V 3).
- Ford Water Recycling - We have scheduled the risk and value 1&2 workshop in September 2021.
- Shoreham Desalination- Need validation (R&V 1) has preliminary been set for July 2021, to allow investigations to begin as early as possible.
- SESW bulk supply – A scheme to facilitate a bulk supply from SES Water (SESW). We are forecasting beneficial use at the start of July 2021. This is a solution to improve resilience in Sussex North and reduce the deficit caused by the Pulborough Wellfield option from WRMP14 not being delivered.
- Long Furlong B Nitrates – A scheme to mitigate high nitrates at Long Furlong B, Littlehampton and Long Furlong A WSW. A blending solution has been selected and is due for delivery by 31 December 2022. Updated nitrate models are currently being reviewed. This is covered by the Drinking Water Inspectorate notice SRN_2018_---13.
- Brighton A nitrates – Need identification and root cause analysis (R&V 1&2) workshop was completed on the 9 of June 2021. This is covered by DWI notice LI/SRN/2018/00032.
- Brighton East Nitrates – A scheme to mitigate high nitrates within the Lewes Valley at North Falmer A WSW, North Falmer B B WSW and North Falmer B C WSW. Optioneering and selection of the preferred option by the integrated team (R&V 3.1) for this scheme was completed in January 2020. Currently this project is undertaking land purchase and planning discussions to determine the final solution.
- Aquifer Storage and Recovery (ASR) in the Sussex Worthing water resource zone – ASR has been halted as it was deemed as technically infeasible due to lack of availability of a suitable location to develop a pilot plant. We are reviewing the need for an alternative scheme through the Water Resource South East regional planning process.
- The following are schemes with a Drinking Water Inspectorate driver:
 - Pulborough WSW – Risks identified by our Hazard review (Hazrev) assessment at site are currently being delivered as part of DWI notice (notice reference LI/SRN/2018/00021). This has progressed through the risk and value 1&2 workshops. A review of capital maintenance activities is due to be completed in June 2021 to allow further risks at site to be delivered as part of the capital maintenance budget.

- We currently have a companywide DWI notice (notice reference SRN3926) that covers all of our groundwater sites. This notice is related to mitigating risks identified by our Hazrev programme in a phased approach until 2025. Phase 2 actions at Worthing WSW, South Arundel WSW, Hove WSW and Lewes WSW have progressed through to risk and value stage 3.2 workshop and are currently on track for completion by March 2022.
- Falmer WSW – Currently out of service awaiting the installation of a run to waste facility. This has progressed through the risk and value process and we expect to have a temporary run to waste in place by June 2021 and a permanent run to waste solution in place by September 2021.
- Weir Wood WSW – A new scheme to rebuild Weir Wood WSW was included in our delivery plan and is set for a 2024 delivery. A need identification, risk identification and root cause analysis (R&V 1&2) workshop for this was completed in March 2021. Optioneering and the selection of a preferred solution began on the 17 June 2021 and a planning application is in preparation for the necessary improvement works.

4.2.2 Eastern area

In the Eastern area we have begun progressing several of our WRMP19 preferred options and the update on key schemes and notices in the Eastern area is as below:

- Bulk supply import from South East Water – We are working with South East Water to progress this scheme.
- West Sandwich and Sandwich licence variation – the scheme was due to be implemented by March 2021 but discussions are ongoing as to the scope of work required to support the licence variation application. Further discussions with NE and EA are planned for July 2021.
- Licence variations at Faversham1, Faversham2 and Millstead sources (UGS) enabling up to 20% of existing summer volume to be made available for winter abstraction, providing it has not been used in the summer period – A licence variation proposal has been set out and agreed internally and in principle with the EA. We will engage the EA and NE again for an up-to-date view of the proposal.
- Thanet nitrates – the Thanet nitrates solution includes nitrate plant installations at Near Canterbury WSW, Sandwich WSW and West Langdon WSW (treating raw water from North Deal WSW). These nitrate removal plants will over-treat water to provide very low nitrate water to blend within the trunk main system with high nitrate water from other sites. The nitrate removal plant at West Langdon WSW will include connections to West Langdon as well as North Deal to allow additional resilience benefit of being able to treat water from either site. The outline design is almost complete, including completion of all site surveys. In terms of preparing for the construction stage, early procurement of the nitrate removal plants and other long-lead items about to take place. Planning applications have been submitted and land purchases are in advanced stages of negotiations with landowners. Start on site is planned for Autumn 2021.
- Utilise the full existing transfer capacity of the Faversham4-Fleete pipeline – this scheme involves modifying both Faversham4 & Faversham3 underground sources to allow more water to transfer to Kent Thanet WRZ. An R&V workshop will be set up to progress this in time for the 2027 delivery date.
- Medway water recycling – the R&V 1 workshop has been completed and a need statement established. Key next steps are to understand the water quality and establish the sampling programme to inform the process requirements.

4.2.3 Western area

In our draft Annual Review submission in June 2021, Southern Water provided an interim update on the Western area. Set out below is a summary of progress in respect of the Strategic Resource Options (SROs) under the RAPID gated process (which includes options from WRMP19). This has been prepared following additional technical and engagement work and the carrying out of, and completion of, the Options Appraisal Process pursuant to the RAPID Gated Process, since our draft Annual Review in June 2021.

4.2.3.1 Summary of our WRMP19 Western area proposals

Changes made to our abstraction licences in Hampshire in 2019 resulted in a significant loss of our available water in drought conditions. These changes were the subject of an Abstraction Licence Public Inquiry in March 2018 during which we signed a Section 20 Operating Agreement (s20 agreement) with the Environment Agency. The s20 agreement acknowledged the threat to supplies and the protection required for the environment, and committed both ourselves and the Environment Agency to a series of measures in the short term to protect the environment and customers' supplies in drought conditions. In particular, the s20 agreement included commitments to deliver significant environmental monitoring; mitigation and compensation packages; and to secure the delivery of sustainable alternative water resources for the long term.

WRMP19 reflected the commitments we made in the s20 agreement. In particular, in clause 11 we agreed to use all best endeavours *"to implement the long term scheme for alternative water resources set out in its final WRMP19, as may be revised by future WRMPs"*.

WRMP19 is an adaptive plan, and it set out both our preferred strategy for the Western area, and also potential alternative schemes which should be investigated as part of the preferred strategy in order to mitigate against risks relating to the potential non-delivery of any of the solutions in the preferred strategy. In this way, alternative measures would be available on a timely basis if needed. For the most part, the schemes we will need to develop are complex engineering projects, with considerable environmental investigations required in advance of planning and other permissions being able to be secured.

The key resource development schemes forming part of our preferred plan in WRMP19, and alternatives to them are summarised in Table 4-2.

Table 4-2: Key resource development schemes and their alternatives forming part of the preferred plan in WRMP19

Preferred Plan Scheme	Potential alternative to be assessed
75MI/d desalination plant on the Solent	Water reuse schemes to the Lower Itchen
21MI/d bulk supply from Portsmouth Water	Potential for larger desalination plant
20MI/d bulk supply from Bournemouth	Potential for larger desalination plant
9MI/d bulk supply from Portsmouth Water	Industrial Water Reuse at Southampton Water
9MI/d Water Reuse scheme at Sandown	9MI/d desalination plant at Sandown

The WRMP19 Western area strategy is summarised in Figure 4-2 below, which is a graphic from WRMP19.

Western Supply Area

SUMMARY

The Western Area supplies 366,000 homes and 867,000 people across 7 water resource zones. During the course of the next 50 years we anticipate that each of these zones would face a water shortage if we did nothing at all.

SCHEMES WE ARE PROPOSING TO MEET THE FUTURE CHALLENGES

Reduce leakage by 50% by 2050

This will reduce the need to generate more water by using what we have more efficiently

Work with customers to save more water

Our customers are already some of the most efficient in England and Wales. Over the next couple of decades we will work with them to help save more water so that average water use falls to 100 l/h/d.

Drought plan measures

In the short term the EA and SWS have put in place a legal agreement, which sets out a modified drought permit process and the inclusion of force majeure clauses in proposed licence changes to ensure supplies are maintained in the western area. This agreement has been incorporated into our Drought Plan. The agreement terminates in 2030

Catchment management

Develop additional nitrate and pesticide treatment at identified sources and implement catchment management activity at these sources, together with in stream catchment management in the upper Test and the River Itchen.

Additional metering

Undertake extension of the universal metering programme to achieve 92% metering of households through implementation of a compulsory metering programme in AMP7.

Water transfers

- Work with Portsmouth Water to secure the additional bulk supplies in a phased manner - 9MI/d by 2024, and a further 21MI/d, relying on the development of Havant Thicket reservoir.
- Develop the 20MI/d bulk supply from South West Water from the Bournemouth area by 2027
- Develop increased transfer capacity between our water resources zones, with development of a new reversible link main in Southampton, and the development of the Hampshire grid scheme to provide greater system resilience to the Western area.

Desalination

Plan for implementation of a 75MI/d desalination scheme at Fawley by 2027, including the potential for a larger or smaller scale plant in combination with water reuse schemes, and direct industrial water re-use.

Water reuse

Plan and develop a 9MI/d water reuse scheme at Sandown by 2027

Asset enhancement

Increase supplies from Newbury WSW in 2027 and investigate a scheme to reinstate the WSW near Cowes in 2065

Strategic alternatives

Investigate strategic alternative schemes in parallel with the preferred strategy including Itchen Water Reuse

INCREASING DROUGHT RESILIENCE

This WRMP, coupled with our Drought Plan, seeks to put in place measures to ensure a continuity of supplies during severe and extreme droughts.

While climate change and population growth put further pressure on water supplies, our proposed infrastructure developments coupled with our leakage reduction programme, water efficiency campaigns and drought interventions would be sufficient to ensure we can maintain supplies during severe and extreme droughts.

The Western area has the biggest sustainability reductions to licences. By 2029 we anticipate there will be a deficit of approximately 190MI/d if we do nothing. In the short term we solve this using our drought plan measures. In the medium term we will import more water from neighbouring water companies (particularly from the Havant Thicket reservoir) and we will continue to use water efficiently by reducing leakage and helping customers save water. In the longer term we will also use a desalination plant to treat sea water to drinking water standards.



Reduce leakage by 50% by 2050



Consume 100l/h/d by 2040



Improve water quality



Regional water supply grid



Produce up to 75MI/d of desalinated water



Sandown water reuse

Figure 4-2: Summary of our WRMP19 Western area strategy

4.2.3.2 Progress reporting

We regularly report progress on the delivery of WRMP19 with our regulators, and also undertake ongoing engagement with, and updating of, our wider stakeholders, both directly and through our website. An update of our progress on options for the 2020-21 financial year is provided below. In particular, we set out a summary of our progress made against each of the key aspects of the WRMP19 proposals for the Western area. These proposals are being taken forward under the umbrella of our Water for Life Hampshire project (WfLH) and through the RAPID gated process. The summary focuses on actions to be undertaken in AMP7, including preparatory work on schemes needing to be investigated and consented in AMP7, and those actions required for implementation in AMP8.

Given the significance of the RAPID Gated Process for the Western area, the following section summarises progress on that process in overall terms, before an update is provided for different schemes.

4.2.3.3 Ofwat final determination and RAPID gated process

Through its consideration and determination of water company business plans for the 2020-2025 period, Ofwat has incentivised further joint working and collaboration on SROs. Ofwat has included an allowance of £450 million for companies to investigate and develop integrated SROs during 2020-25. Through RAPID, water companies and other partners will collaborate effectively and efficiently, to identify assess and progress regional solutions that protect and enhance the environment and benefit wider society.

Ofwat has established a 'gated process' through which proposals can be evaluated and progressed alongside each other, enabling robust and consistent decision making across water companies on SRO delivery. Decisions on funding and allowable expenditure to assess and promote the SROs are made as part of a series of decision gates. At Gate 1, Ofwat approved further funding for the evaluation of our large scale desalination options, water reuse options, and large scale transfers from other water companies (some of which rely on new resource developments elsewhere).

We have been actively participating in the gated process, both as a potential scheme developer and a recipient company for potential new strategic transfers from outside of our supply area. We are working closely with other water companies and made our Gate 1 submission to RAPID on an accelerated programme in September 2020. We submitted an Interim Update in September 2021 and our Gate 2 submission is on 6 December 2021. The information in this Annual Review is fully consistent with and based on the information in the Gate 2 submission documents.

In WRMP19 we stated we would progress strategic alternative options in parallel with preferred options. The principal alternative to the Fawley desalination scheme specified in WRMP19 was an indirect water re-use scheme (or water recycling) to the lower River Itchen.

Following the PR19 final determination and the creation of the Strategic Resource Option 'gated process' supervised by RAPID, Southern Water was required to consider a number of additional alternative schemes that were not specifically included in WRMP19. In particular, certain recycling options were added including the use of an environmental buffer at the Itchen treatment works (the creation of new lakes and wetlands to store treated water) and the enhanced use of the Havant Thicket reservoir which is under development by Portsmouth Water on our behalf. The enhanced use of the Havant Thicket reservoir (HTR) involves the creation of a direct raw water pipeline from the HTR to Itchen and using the HTR as an environmental buffer for recycled water from a water recycling plant.

In view of the continuing challenges of the Fawley desalination option, we re-evaluated all the WRMP19 and additionally identified options against the Base Case (75MI/d desalination), in order to determine whether the 75 MI/d Fawley desalination option remained the best option or whether there was a better performing alternative.

The summary section of our Interim Update submission to RAPID dated September 2021 (the 'Interim Update') set out the outcomes of our work on all of the Options being considered through the Gated Process. The Interim Update¹ stated:

- *The Options that enhance the daily volume of water that can be extracted from the HTR are the highest ranking*
- *Water recycling Options that deliver the raw water to a new environmental buffer at one of our treatment works on the River Itchen are middle ranking*
- *The desalination Options are the lowest ranking in our assessment, and the site at Fawley presents difficulties such that we consider these Options are not likely to be consentable at this location at this time*
- *SW has come to the view that it is appropriate to no longer progress with any further work on the desalination Options as there is now clear evidence to show that these are the least preferable Options at this location and time*
- *Therefore, no further work is to be carried out on the Desalination Options at Fawley*

Work on the Fawley desalination options therefore ceased in September 2021.

Further technical work and engagement and revalidation of the Options Appraisal Process has been undertaken since the submission of the Interim Update in September 2021. This additional work and the conclusions from it are reported below and in section 6 (the Forward Look).

4.2.3.4 Strategic Resource Options

In WRMP19 the largest element of our preferred strategy was a large desalination plant on the Solent. We anticipated that this could be required to provide up to 75MI/d when in full operation, although we planned to also investigate alternative capacities. We identified that there was the potential that the scale of the desalination plant could be reduced if we were to develop a water recycling scheme to transfer highly treated wastewater to increase flows in the Lower Itchen. We also identified that this water recycling option would be the strategic alternative should desalination not be capable of being progressed.

We have summarised above the work undertaken as part of the RAPID Gated Process. Our RAPID Gate 1 submission in September 2020 included nine SROs including those previously identified and funded, together with a new water transfer option we had identified based on enhanced use of the proposed Havant Thicket reservoir. As part of our ongoing work to progress the development of the desalination plant on the Solent through the consenting process, we undertook a non-statutory planning public consultation in early 2021 (<http://www.southernwater.co.uk/water-for-life-hampshire>). This summarised the outcomes of our work

¹ [Interim Update Submission summary](#) (Sept 2021)

to date and our plan to build the desalination plant. It invited public and other responses on our emerging potential back up proposals, including locations for key infrastructure and potential pipeline route corridors.

From work completed at that time on the indirect potable recycling schemes to the Lower Itchen (61MI/d), the level of risk associated with the acceptability of these options remained as identified in WRMP19. In its Gate 1 decision dated 28 January 2021, Ofwat directed that we should eliminate the option of discharging to the Lower Itchen. This was “because of concerns raised by Natural England and the Environment Agency about the potential impact of the discharge on the integrity of the River Itchen Special Area of Conservation (SAC) in terms of flow and quality.”² At the same time, at Gate 1, Ofwat allowed funding for consideration of our alternative option involving transfer from Havant Thicket reservoir.

Based on the EA and NE feedback at Gate 1, the WRMP19 Lower Itchen recycling options involving discharges to the River Itchen SAC are no longer considered to be deliverable alternative options, this reduced the range of WRMP19 alternative options available to meet the supply demand balance in the Western area. Our continuing work to investigate recycling options therefore focused on those options involving the transfer of recycled water to an environmental buffer before treatment, such as a lake or reservoir, rather than to the River Itchen.

Southern Water ceased work on the strategic desalination options following the Interim Update (see 4.2.3.3 above), and has undertaken further work to revalidate the Options Appraisal Process in respect of the remaining Options prior to Gate 2.

Southern Water is reporting its full Options Appraisal Process, stakeholder engagement and other technical work to RAPID in its Gate 2 submission in December 2021. Relevant Annexes to the Gate 2 submission will be shared with the EA immediately following submission of Gate 2 documentation on 6 December.

Although Southern Water's Gate 2 submission date (being 6 December 2021) post-dates this WRMP19 Annual Review, the following summary of relevant information from the Gate 2 submission sets out the outcomes of this work. The summary is provided under the following headings (and the Gate 2 submission documents we will be providing are set out in brackets):

- The Options Appraisal Process and selection of the strategic option (Annex 5 Options Appraisal Process, Annex 4 Water Resources Modelling Annex, Annex 12 Outline Option Evolution Plans, Annex 13 Detailed Option Evolution Plans for B.4 and B.5 of the Gate 2 submission)
- Engagement with stakeholders in relation to the options (Annex 9 of the Gate 2 submission)
- Delivery timescales for the strategic option (Schedule Section of Level 3A Havant Thicket Solutions document of the Gate 2 submission)

Southern Water will be providing the following documentation in support of this annual review following Gate 2 submission on 6 December 2021.

- The Options Appraisal Process Annex (Annex 5)
- The Water Resources Modelling Annex (Annex 4)

² Strategic regional water resource solutions: Accelerated gate one final decision for water recycling, January 2021, section 6.1

- The Outline Option Evolution Plans (Annex 12)
- The Detailed Option Evolution Plans for B.4 and B.5 (Annex 13)
- Annex 9 – Stakeholder Engagement Methodology
- Schedule Section of Level 3A Havant Thicket Solutions

The Options Appraisal Process and reasons for selection of the strategic option

An Options Appraisal Process (OAP) was designed and implemented in order to identify a Selected Option and a Back-Up Option from the remaining six Options for Gate 2. The outcome of the Options Appraisal will be rigorously tested and potentially challenged in future consenting and decision-making processes, and SW has therefore developed a robust OAP drawing on best practice, policy and guidance. We have developed and applied, in consultation with key stakeholders, a structured methodology to assess how the Options compared to one another.

The purpose is to identify an Option which provides 'Best Value' for customers (as defined by the Water Resources Planning Guideline (WRPG)³), whilst also being in conformity with legal and regulatory requirements and meeting SW's Strategic Objectives for the SRO.

The table below shows each of the Options and their components:

Option	Description
Direct transfer from Havant Thicket (D.2)	Abstraction (75 MI/d) at Havant Thicket & Transfer (c40km) to Itchen WSW Treatment at Itchen WSW
Water Recycling to Itchen (B.2)	Abstraction from Portsmouth Harbour WTW Treatment at a New Water Recycling Plant (61 MI/d) Transfer (c40km) to an Environmental Buffer at Itchen WSW Abstraction & Treatment at Itchen WSW
Water Recycling to Itchen (B.5)	Abstraction from Portsmouth Harbour & Fareham WTW Treatment at a New Water Recycling Plant (75ml/d) Transfer (c40km) to an Environmental Buffer at Itchen WSW Abstraction (75 MI/d) & Treatment at Itchen WSW
Water Recycling to Havant Thicket and then transfer to Itchen (B.4)	Abstraction from Portsmouth Harbour WTW Treatment at a New Water Recycling Plant (15 MI/d) Transfer to Havant Thicket (c6km) Abstraction (75 MI/d) at Havant Thicket & Transfer (c40km) to Itchen WSW Treatment at Itchen WSW
WRMP19 Lower Itchen Option	Abstraction from Portsmouth Harbour & Fareham WTW Treatment at a New Water Recycling Plant (75ml/d) Transfer (c40km) & Discharge to the Lower Itchen

³ Environment Agency, Natural England and Ofwat, Water Resources Planning Guideline, July 2021, Section 9.1

Abstraction (75 MI/d) at Lower Itchen, Transfer to Itchen WSW (c15km)* Treatment at Itchen WSW
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At the Interim Update we identified our Emerging Preferred Option (EPO) and Emerging Back-Up Option (EBO), based on our initial OAP. In our Interim Update we committed to undertake further work prior to Gate 2 to test and revalidate the outcome of the initial OAP, and in particular the scope for each Option to meet SW's future need (identified in a Future Need Statement). This work was undertaken and resulted in the identification of the Selected Option and Back-Up Option for reporting at Gate 2. A summary of the steps taken in the OAP, together with the outcomes of this process are included in this document.

The specific steps followed in the Options Appraisal are detailed in the following table.

Table 3 - OAP steps

Initial Options Appraisal	Site and Route Assessment: Which identified and recommended a configuration for each Option.
	Consenting Evaluation: Which assessed each of the Options for consenting risks (based on the recommended configurations and the information available at this time) and ranked the Options relative to each other in terms of levels of consenting risk.
	Multi-Criteria Decision Assessment (MCDA): Which ranked each of the Options in terms of their performance against a number of criteria selected to represent and reflect Best Value
	Interim Update Decision-making process: Which ranked the Options based on the outcomes of the MCDA and Consenting Evaluation and also assessed against the agreed Water for Life Hampshire (WfLH) Legal and Policy Obligations and Strategic Objectives. It identified an Emerging Preferred Option (EPO), which also met the necessary levels of solution resilience for a 1 in 200 year drought event.
Future Needs Assessment	Future Needs Statement: Which identified and quantified the revised Supply Demand Balance Deficit for the SRO and the regional future needs to be resolved by the SRO to a horizon of 2040 (including future 1-in-500-year drought events).
	Outline Option Evolution Plans: Which considered the potential for each Option to evolve to meet the necessary levels of solution resilience in a 1 in 500 year drought event, and identified any changes to the parameters of the Options in order to achieve this.
	Sensitivity Test of Consenting Evaluation: Which assessed the changes to the parameters of the 'evolved' Options as set out in the Outline Option Evolution Plans for consenting risks and ranked the 'evolved' Options relative to each other in terms of levels of consenting risk.
	Sensitivity Test of Multi-Criteria Decision Assessment (MCDA): Which ranked the 'evolved' Options in terms of their performance against a number of criteria selected to represent and reflect Best Value.
	Option Appraisal Revalidation/Final Decision Making Process: Which revalidated and tested the findings of the initial OAP in the context of the Future Needs Assessment. A Selected Option meeting the necessary levels of solution resilience was identified to take forward at Gate 2.
	Detailed Option Evolution Plan: Which details all additional activities to progress option evaluation and mitigate identified risks.

The OAP identified Option B.4 (water recycling and direct transfer to Itchen via Havant Thicket) as the Selected Option and Option B.5 (water recycling and direct transfer to Itchen via environmental buffer lake) as the Back-Up Option. The reasons for the selection of each of these options is set out in Annex 5 to the Gate 2 submission.

Engagement with stakeholders in relation to the options

- The Gate 2 submission includes the methodology and results for customer and stakeholder engagement on the Water Recycling and Havant Thicket solutions.
- This includes summarising the ongoing stakeholder engagement with regulators, other statutory bodies and stakeholder groups, including the largest engagement event which was the non-statutory planning consultation in spring 2021.
- This part of the submission also summarises the 'Customer Insights' workstream, which has been progressed in parallel to the Gated Process so that the insights gained through the engagement can be considered as SW develops each of the SRO solutions. This includes surveys with customers and more detailed customer engagement through various forums, such as the Customer Action Group and SW's young persons group, Water Futures 2050.

Delivery timescales for the strategic option

- The Gate 2 submission includes schedule information for each of the Options included within the Gate 2 submission.
- This includes key solution-specific milestones to delivery, such as forecasted dates for submitting planning applications, the grant of planning consent, procurement milestones and the overall delivery and operation of each Option.
- This section also sets out the key assumptions that underpins the milestone dates and activities in the schedule.

4.2.3.5 WRMP19 Water transfers

In WRMP19 we said that during AMP7, we planned to secure the transfer of an additional 9MI/d of water from Portsmouth Water, through the recently constructed new transfer pipeline into Hampshire Southampton East WRZ. We also planned to improve our existing transfer pipelines between Hampshire Southampton West and Hampshire Rural WRZs by replacing valves and making the transfer bi-directional. In AMP8 we planned to develop the Southampton Link main scheme (from Hampshire Southampton West WRZ to Hampshire Southampton East WRZ), as a bi-directional transfer, and our planned water transfer grid between the Hampshire Southampton East, Hampshire Winchester, and Hampshire Andover WRZs, again as a bi-directional transfer. We also planned to have a new 21MI/d import from Portsmouth Water (reliant on the construction of Havant Thicket reservoir) and a new pipeline transfer of water, up to 20MI/d, from South West Water to Hampshire Southampton West WRZ.

We have continued to work with neighbouring water companies, our environmental regulators and with our engineering and environmental partners to progress these key schemes during the past year (2020 to 2021). An update on each is provided below.

An additional 9MI/d of water from Portsmouth Water

This scheme planned to take advantage of water potentially available from Portsmouth Water's sources, transferring through the recently installed transfer main in Hampshire Southampton East WRZ. In WRMP19 there was some uncertainty around the sustainability of the scheme at Source J which Portsmouth Water intended to implement to provide the additional water for this bulk transfer. As such, WRMP19 included a scenario where this option was not available, to help us to understand the sensitivity of the preferred strategy in WRMP19 to the 9MI/d bulk supply from Portsmouth Water and to include sufficient alternative schemes within WRMP19 in case the 9MI/d of water from Portsmouth Water could not be delivered.

Further work has been undertaken by Portsmouth Water in conjunction with the Environment Agency to more clearly understand the long-term availability of the water, and risks associated with this proposed transfer of water from Portsmouth Water resources. Portsmouth Water is planning to implement exploratory boreholes to enable additional investigation of the potential from this source. Pending the outcome of the planned additional work, the level of risk and uncertainty relating to our planned 9MI/d import from Portsmouth Water (reliant on abstraction at Source J) remains. We are not yet able to conclude with certainty whether this option will or will not be able to proceed, and as a result we have continued to assess potential alternatives available to us, including potential SROs and alternative capacities of these. For planning and supply demand balance modelling purposes, we have assumed that only half of the WRMP19 9MI/d transfer (4.5MI/d) will now be available, pending confirmation through the additional investigations Portsmouth Water is undertaking.

Planned new 21MI/d import from Portsmouth Water (reliant on Havant Thicket reservoir)

Following signing of the Bulk Supply Agreement with Portsmouth Water (July 2019), significant progress has been made on the 21MI/d bulk transfer that relies on Havant Thicket reservoir. Planning applications for the reservoir were considered by the two local planning authorities in June 2021, and planning permissions for the reservoir and transfer pipeline were granted in October 2021. This is a significant milestone for the project as the planning permissions unlock the next phase of the project's implementation.

We are continuing to work closely with Portsmouth Water to identify and assess technical solutions relating to reservoir utilisation and transfers. We have also been assessing the potential for alternative utilisation of the reservoir storage capacity as part of our work further to the RAPID Gated Process. As part of this work we have identified and assessed a new SRO, being a potential pipeline directly from Havant Thicket to Itchen and a water recycling component for refilling Havant Thicket reservoir which could provide resilience benefit to Portsmouth Water and Southern Water. Further information is provided in section 4.2.1.10 below.

A new transfer of water from South West Water to Hampshire Southampton West WRZ, of up to 20MI/d.

This transfer option would be reliant on utilising currently available headroom within a Bournemouth Water licensed abstraction to transfer water into our Hampshire Southampton West WRZ. WRMP19 included a scenario where this option was not available, to help us to understand the sensitivity of the option as part of the overall preferred strategy, and to include sufficient alternative schemes within WRMP19 in case it could not be delivered.

We have worked closely with South West Water to review and understand the likely long-term availability of the water, and risks associated with this. Environmental studies undertaken by South West Water and shared with the Environment Agency and Natural England suggest that there would be potential impacts to the environment if the currently available headroom in the abstraction licence (which would be used to provide the transfer to Southern Water) were to be removed in a licence change.

Our current understanding is that a planned abstraction licence change will remove the available headroom in the abstraction licence. On this basis, we are now sufficiently confident that we can conclude that the WRMP19 planned 20MI/d import from South West Water (reliant on abstraction at Import from Bournemouth Water) will not be able to proceed. We have continued to assess the alternative WRMP19 options available to us, including potential SROs and alternative capacities of these. However, as a result of the above we have assumed that there will be no water available from this WRMP19 transfer from Import from Bournemouth Water.

Hampshire water grid bi-directional pipeline transfers

We have continued to progress our engineering and environmental technical work on the planned pipeline transfers, including optioneering and optimisation of the proposals, ahead of planned applications for the necessary consents during AMP7 and the planned implementation of the schemes in AMP8. These bi-directional schemes include the Southampton Link main scheme (from Hampshire Southampton West WRZ to Hampshire Southampton East WRZ), and our planned water transfer grid between the Hampshire Southampton East, Hampshire Winchester, and Hampshire Andover WRZs. Our work on these bi-directional transfers is being undertaken in parallel with our consideration of strategic resource options as part of the Water for Life Hampshire programme. Through this, we can ensure that these key transfers are resilient solutions consistent with the wider strategic option selection process.

4.2.3.6 Other water reuse

In WRMP19 we said that during AMP8 we planned an indirect potable water reuse scheme on the Isle of Wight, at Sandown (8.5Ml/d) to provide more secure supplies to customers. Alongside this, we would assess an alternative desalination option (8.5Ml/d) on the Isle of Wight if the proposed solution was not deliverable. We also identified a potential industrial water reuse option at Southampton Water as an alternative option in WRMP19.

We have been continuing to undertake environmental and engineering assessments of our water reuse proposals, as part of our continued optioneering and optimisation work. As part of this work we have increased our understanding of the technical, environmental and related consenting issues associated with water reuse schemes, particularly as part of the progression of the SROs (as noted above), and are able to use this information to benefit the consideration and progression of the Sandown scheme. We have further developed our water resources simulation model for Hampshire to include the Isle of Wight so we can assess the Sandown options alongside other schemes under consideration in Hampshire.

4.2.3.7 Reducing Leakage, Target 100 and Metering

Our WRMP19 proposals for the Western Area proposed leakage reduction, media and education campaigns as the first part of our Target 100 initiative, and increased metering and meter reading.

We have reported progress against forecast leakage and water efficiency at a company level in Section 3 of this annual review. We continue to carry out our water efficiency campaigns in the Western area but due to the pandemic the benefit has been difficult to quantify. The summary for leakage in the Western area can be seen in Table 4-4. We have outperformed against forecast in our Hampshire Southampton East and Hampshire Southampton West WRZs.

Table 4-4: Western area leakage against WRMP19

Water Resource Zone	2020-21 outturn	WRMP19 leakage 2020-21	
Hampshire Andover	3.67	3.99	↑
Hampshire Kingsclere	2.08	1.57	↓
Hampshire Winchester	3.67	2.18	↓
Hampshire Rural	1.69	0.66	↓
Hampshire Southampton East	9.59	14.22	↑
Hampshire Southampton West	3.31	6.22	↑
Isle of Wight	5.38	3.35	↓

4.2.3.8 Drought Plan Measures, including s20 commitments

In WRMP19 we said we would need to implement TUBs in Hampshire, and to apply for drought permits and orders under the interim abstraction scheme from the s20 agreement until new long term supplies were developed. We also committed in the s20 agreement to the implementation of a significant package of environmental monitoring, mitigation and compensations plans.

We continue to closely monitor environmental conditions as part of our drought preparedness, and are working closely with the Environment Agency, Natural England and other partners to ensure that our drought permit and orders are 'application ready' should they be required.

During the last year we have also updated our Drought Plan and published it for consultation. The consultation commenced on 7 June 2021 and our Statement of Response following consultation was published in September 2021.

Alongside this we are well advanced with our plans to implement the package of environmental monitoring, mitigation and compensation measures that we agreed as part of the s20 agreement. We are working closely with our environmental partners to develop the detailed proposals and expenditure plans to enable these measures to be fully implemented.

4.2.3.9 Catchment Management

Separate from the environmental commitments in the s20 agreement, in WRMP19 we said that we planned in AMP7 to introduce catchment management (and infrastructure solutions) to mitigate the impact of nitrates affecting our Twyford and Romsey sources, and to protect against pesticides at Sandown and the Test surface water source, and to remove nitrates from our Test Surface Water source in AMP8. We also planned to deliver in AMP8 'in river' restoration measures to provide increased environmental resilience to the abstraction of water in the Upper Test and Itchen in times of drought.

As mentioned in sections 1.2.3.1 we have begun implementation of nitrate reduction measures in our Hampshire catchments and are continuing to manage pesticide water quality via in catchment monitoring within the Test catchment.

4.2.3.10 Asset Enhancement

In WRMP19 we said that we planned to deliver an asset enhancement scheme at a source south of Newbury which will increase the resilience of the Hampshire Kingsclere WRZ.

We are undertaking environmental and engineering assessments of our proposals, as part of our continued optioneering and optimisation work, ahead of planned applications for necessary consents and the planned implementation of the scheme. We are also considering, as a strategic alternative, extending the Hampshire grid from Hampshire Andover to Hampshire Kingsclere WRZ. We will review the resilience benefits of both options.

4.2.3.11 Western area summary

We have summarised in Table where our plans now differ from the WRMP19 strategy:

Table 4-4: Current plans compared to WRMP19 preferred Western Area strategy

Topic	Summary conclusion
Water transfers	The level of risk and uncertainty relating to our planned 9MI/d import from Portsmouth Water (reliant on abstraction at Source J) means we are not yet able to conclude with certainty whether or not this option will be able to proceed. We are assuming that only 4.5MI/d may be available from this source, and this is subject to further assessment with Portsmouth Water.
Water transfers	We have sufficient confidence in information now available to be able to conclude that the WRMP19 planned 20MI/d import from South West Water (reliant on abstraction at Import from Bournemouth Water) will not now be able to proceed.
Water transfers	Following signing of the Bulk Supply Agreement, significant progress has been made with Portsmouth Water on the 21MI/d bulk transfer that relies on Havant Thicket reservoir.
Desalination and SROs	<p>In our Interim Update in September 2021 we confirmed we would stop work on desalination options in Hampshire, since these were considered not to be consentable in the proposed location at this time, and have undertaken further work to test and revalidate the OAP in respect of the remaining options, relating to the future use of Havant Thicket reservoir (Options D.2 and B.4) and water recycling (Options B.2 and B.5).</p> <p>We confirmed in our RAPID Gate 2 submission in December 2021 that the Selected Option is Option B.4 and the Back-Up Option is Option B.5.</p>
Water recycling	<p>In our Accelerated Gate 1 submission in September 2021 we stated that as a result of Environment Agency and Natural England objections we no longer considered the WRMP19 alternative Lower Itchen indirect recycling options discharging to the River Itchen to be deliverable. In its decision in January 2021, OFWAT directed us to eliminate the water recycling option discharging to the River Itchen.</p> <p>We have investigated in detail the remaining water recycling options for the Western Area, involving a discharge to an environmental buffer (such as a lake or reservoir) before treatment. We confirmed in our RAPID Gate 2 submission in December 2021 that the Selected Option is Option B.4 and the Back-Up Option is Option B.5. Alongside this, we continue to plan to deliver the WRMP19 Sandown water recycling scheme on the Isle of Wight.</p>

5 Consideration of the potential for a material change to WRMP19

Context

Southern Water is required to prepare and publish a revised WRMP (in accordance with the procedure set out in section 37B of the Water Industry Act 1991 (WIA)) following conclusion of its annual review, where the annual review indicates a "material change of circumstances".

There is limited guidance available as to what constitutes a "material change in circumstances". In England, the Water Resources Planning Guideline – Version 9 published in February 2021 ("the Guideline") provides at section 3.9 that "*...you must consult with the Environment Agency and/or Natural Resources Wales on any substantial changes that you wish to make to your final plan. For example, implementation of new resources not mentioned in your plan. If the changes are 'material' you must prepare a revised draft plan for re-consultation. Material changes are those likely to significantly impact customers through higher bills, changing their security of supply or significantly affect the environment. The Environment Agency and/or Natural Resources Wales will provide technical guidance to the relative governments.*"

Any such material change of circumstances will require a consultation exercise in accordance with the procedure set out in section 37B and section 37C of the WIA. In particular, SW would be required to publish the proposed revisions to its WRMP in a way "*calculated to bring it to the attention of persons likely to be affected by it.*" These statutory duties are enforceable by the Secretary of State (SoS) pursuant to section 18 of the WIA.

Southern Water has reviewed WRMP19 and the associated consultation documentation to determine the extent to which it considers a material change in circumstances has or could arise, including as a result of options under consideration in lieu of the 75MI/d desalination at the Fawley site (the Base Case). This is necessary as some of the options under consideration were either not specifically included in the consultations in relation to WRMP19 or in WRMP19 itself (as the preferred solution or as strategic alternatives) and/or were not included at the sites or in the configurations which are now under consideration.

Southern Water considers that a change from the Base Case to one of the options that was not included in WRMP19 could fall within the definition of a "material change", as noted in the Water Resources Planning Guideline, but only **if** the inclusion of a different solution could '*significantly impact customers through higher bills, changing their security of supply or significantly affect the environment*' – being the tests set out in the WRPG.

However, it is equally possible that a change from the Base Case to one of the options not included in WRMP19 may fall outside of the definition of a 'material change' of circumstances. It is not the case that if an individual option is *materially different* it automatically follows that a 'material change' of circumstances has taken place. It is necessary to consider the facts and details on a case by case basis to determine this.

WRMP19 Strategy for the Western area

- The WRMP19 Preferred Strategy is predicated on the import of water into Southern Water's Hampshire WRZs, and the generation of new water within those WRZs as a result of the deficit arising principally (but not exclusively) from the abstraction licence changes on the Rivers Test and Itchen. This position remains the case.

- WRMP19 identified a Preferred Strategy and also strategic alternatives to be investigated in parallel in order for there to be sufficient confidence in the delivery of either the Preferred Strategy or alternative options in line with the timings set out in WRMP19. WRMP19 is an adaptive plan, and the strategy adopted and supporting information published in WRMP19 specifically highlighted the risks and uncertainties relating to implementation, and that alternatives would need to be investigated and potentially promoted, in order to secure the necessary improvements in the supply demand balance. This position remains the case.

Option B.4 (water recycling and direct transfer to Itchen via Havant Thicket)

- WRMP19 Preferred Strategy included additional bulk supplies from Portsmouth Water which themselves required the development of Havant Thicket reservoir, and additional output from another existing source (Source J). The supply to Southern Water was not coming from those sources (i.e. either the Havant Thicket reservoir or Source J), but those sources enabled Portsmouth Water to release water to Southern Water that would otherwise be needed to supply Portsmouth Water customers. It should be noted that Annex 9 of WRMP19 expressly refers to the direct transfer pipe from Havant Thicket Reservoir.
- WRMP19 identified and assessed as an option a new 21Ml/d transfer pipeline from import from Portsmouth Water to Itchen – an option which was included within WRMP19 notwithstanding significant Natural England (NE) concerns about the number of pipeline crossings of the river Itchen using the route identified in WRMP19. It was always known and planned that route optimisation would be needed as part of the Options Appraisal Process and feasibility stage, to either avoid the River Itchen crossings, or demonstrate the lack of alternatives and that impacts would be minimised.
- Southern Water accepts that the scale of transfer being considered is higher than that advanced under WRMP19, and the use of Havant Thicket for enhanced drought storage was not an option included within the WRMP19 Preferred Strategy. However, WRMP19 Annex 9 specifically referred to the fact that “*water storage within south Hampshire may have a role to play in protecting supplies to customers during different potential drought events ...*” and “*... we are committing to further investigating all potential storage options within south Hampshire during the initial part of AMP7*” (2020-2025 period). The Annex went on to state that “*The above could be supported or enhanced by optimising the operation of the Havant Thicket reservoir scheme, which may allow greater DO benefits to be realised ...*”.
- Option B.4 – even at a scale of transfer larger than anticipated in WRMP19, together with drought storage in Havant Thicket and a WRP – remains in line with the WRMP19 strategy of importing additional water from Portsmouth Water, and the planned additional investigation of storage options earlier in the 2020s.
- Southern Water considers that on the basis of information currently available there is a strong case that when compared with Fawley desalination, the adoption of Option B.4 would not significantly impact customers through higher bills, change their security of supply or significantly affect the environment. On the contrary, it is considered that Option B.4 has fewer environmental impacts than the option included within WRMP19, such that lesser environmental impacts would result. In addition, B.4 is less expensive to deliver than Fawley desalination, and so would not be expected to significantly impact customers through higher bills – indeed, it could result in lower bills than would have been the case with Fawley desalination. It is also not considered that selection of Option B.4 would significantly impact customers through changing their security of supply as against the option in WRMP19. This is reported in Annex 5 of the Gate 2 submission.

Option B.4 (water recycling and direct transfer to Itchen via Havant Thicket) and Option B.5 (water recycling and direct transfer to Itchen via environmental buffer lake)

- WRMP19 proposed a desalination plant of up to 75Ml/d (desalination options at 25, 50, 75 or 100Ml/d were available for potential selection in WRMP19 modelling), and WRMP19 had water

reuse to the Lower Itchen as a strategic alternative to it. As with the transfer option above, the water reuse to the Lower Itchen was included within WRMP19 notwithstanding significant Natural England and Environment Agency concerns about the potential acceptability of the options. The concerns related firstly to discharge of highly treated effluent into the Lower Itchen, and secondly the impacts of routing an additional large transfer pipeline from the Lower Itchen up to Itchen for treatment (it would need to follow a similar route to the Import from Portsmouth Water to Itchen transfer above).

- In arriving at the Lower Itchen reuse option, other water reuse options involving discharges higher up the Itchen, e.g. at Itchen were rejected by Natural England and the Environment Agency, and the Lower Itchen Reuse option was retained in WRMP19 as the only large scale water re-use option left. In the absence of any re-use options in WRMP19 there was simply no large scale alternative option available within the necessary timescales should the desalination option not proceed.
- The WRMP19 Water Recycling options were to be subject to further optioneering, feasibility and assessment alongside the desalination option. This work has been undertaken and the position now reached is that the desalination options are not considered consentable in the proposed locations, at this time, based on the assessment work that has been undertaken, and the Lower Itchen reuse option is not acceptable to the Environment Agency and Natural England. This is reported in Annex 5 to the Gate 2 submission.
- Therefore, variants to the Lower Itchen reuse option have been explored, utilising Havant Thicket reservoir for storage and blending, or through use of an environmental buffer near Itchen before treatment and utilisation by Southern Water. These are clear variants to the WRMP19 option involving a discharge to the Lower Itchen and then abstraction for treatment at Itchen.
- Southern Water considers that the water recycling options under consideration for Gate 2 (B.2, B.4 and B.5) are each an evolution of the Lower Itchen water reuse options in WRMP19, with these options specifically designed so as to avoid and mitigate for environmental risks and impacts associated with the direct discharge to the River Itchen SAC as proposed in the WRMP19 Lower Itchen reuse options.
- Options B.2, B.4 and B.5 even at scales different than anticipated in WRMP19, and discharging to different locations, nevertheless remain in line with the WRMP19 alternative strategy of taking highly treated effluent and discharging it to the environment before re-abstracting and treating it for public water supply. The sources of water (the wastewater treatment works) and the destination (Itchen) are consistent with WRMP19.
- SW considers that on the basis of information currently available, and including consideration of the customer insight work and non-statutory consultation undertaken earlier in 2021 on Fawley desalination and strategic alternatives, as described in Section 5, and the Options Appraisal Process undertaken to date, the adoption of Options B.4 or B.5 would not significantly impact customers through higher bills, change their security of supply or significantly affect the environment relative to Fawley desalination. On the contrary, it is considered that Options B.4 and B.5 have fewer environmental impacts than the options included within WRMP19, such that lesser environmental impacts would result. In addition, these options are less expensive to deliver than Fawley desalination, and so would not be expected to significantly impact customers through higher bills – indeed, they could result in lower bills than would have been the case with Fawley desalination. It is also not considered that selection of any of these options would significantly impact customers by changing their security of supply as against the option in WRMP19. This is reported in Annex 5 of the Gate 2 submission.

On the basis of the above, Southern Water concludes that although the strategic options being progressed through the RAPID Gated Process differ from those identified in WRMP19, a material change in circumstances has not occurred. Southern Water considers therefore that there is no requirement for the preparation of a revised WRMP19 and re-consultation on a revised WRMP19. Notwithstanding this position, however, the preparation of WRMP24 is already underway, and through the preparation and consultation on

draft WRMP24 there will be a mechanism for consultation and engagement around the changes from WRMP19.

In addition, recognising that there is a continuing need to update and engage with stakeholders on its proposals, Southern Water is committed to publicising and engaging with its stakeholders on this Annual Review document. This engagement will take place alongside and as part of the WRMP24 pre-consultation being undertaken by Southern Water in January-February 2022, at the time of the publication of the emerging draft WRSE Regional water resources plan.

Following on from that, engagement on the options will continue ahead of the planned submission of the draft WRMP24 to Defra in summer 2022, and ahead of the planned RAPID Gate 3 submission later in 2022.

6 Forward Look

The following section provides a summary of our planned work to deliver the preferred schemes and the alternatives set out in WRMP19 with a particular focus on the Western area (where we have a legal obligation to use 'all best endeavours' to implement the preferred strategy in WRMP19, as may be amended by future WRMPs).

6.1 Western area

As is clear from the review for the Western area outlined in section 4.2.3, we are making significant progress with the investigation and planning for our major new infrastructure schemes, alongside implementing catchment management, leakage reduction, metering and Target 100 schemes and initiatives. Our Western area strategy represents a unique systems thinking approach to protecting and enhancing the environment whilst maintaining customer levels of service and providing additional resilience. We are delivering our strategy by working collaboratively with a number of partners and adopting innovative technologies.

The outcomes of our feasibility and environmental assessments of options, and engagement and consultation responses we have received, has all fed in to our assessment and decision making processes. WRMP19 was specifically designed as an adaptive plan, and included a number of strategic alternatives to our preferred strategy.

Moving from planned to alternative schemes identified within WRMP19 was designed to be capable of being achieved without changing the fundamental WRMP19 strategy, and would not constitute a material change in circumstances such that we would need to re-consult and prepare an updated WRMP19.

In our Interim Update submissions to RAPID in September 2021 we indicated that the desalination options (including the 75Ml/d desalination plant at Fawley referred to in the WRMP19 Preferred Strategy) are not considered to be consentable in the proposed location at this time, and that no further work would be carried out on those options at this time. In our Gate 2 submission to RAPID in December 2021 we confirmed that the Selected Option is B.4 and the Back-Up Option is B.5.

Gate 2 is a major milestone in the feasibility assessments of potential SROs, and our optioneering underpinning this work is being undertaken to be consistent with both RAPID requirements and the WRSE regional plan approach. The emerging proposals from WRSE for the regional plan are key influencing and determining factors which may further change the basis on which we need to plan and deliver solutions within our Western area. These factors will be taken into account as part of our continuing work towards our

RAPID Gate 3 submission and our draft WRMP24, which will be submitted to the Secretary of State in summer 2022 ahead of a period of public consultation.

As noted in Section 5 of this document, based on this Annual Review, we do not consider that the proposals we are seeking to promote, and secure consents for, constitute a 'material change in circumstances' to WRMP19, requiring us pursuant to section 37B of the Water Industry Act 1991, to re-consult and prepare an updated WRMP19. However, the preparation of WRMP24 is already underway, and through the preparation and consultation on draft WRMP24 there will be a mechanism for consultation and engagement around the changes from the WRMP19 preferred plan. We will also continue to engage with stakeholders and customers, both in the context of this Annual Review and our RAPID Gate 2 submissions. This engagement will then lead onto specific public consultations on our proposed SRO solutions and draft WRMP24, both of which will take place in 2022.

6.2 Central area

As seen in section 4.2.1 we are currently progressing our WRMP19 options through our risk and value workshop process. The risk and value workshops are designed to explore the options in the WRMP19 and business plan in order to identify the best approach to achieving the WRMP outcome. The schemes from the WRMP19 and business plan are split into phases depending on when they are to be delivered. The main element of the first phase is the West Chiltington scheme to bring it back into service. A second phase including the Petersfield and Midhurst scheme, instream catchment management and nitrate options, has started work.

In addition, due to the Pulborough Wellfield scheme not being delivered in 2019-20, work is in progress to implement mitigation options as seen in section 1.2.1. This will ultimately improve the Sussex North WRZ supply-demand balance with a particular focus on the Minimum Deployable Output critical period scenario due to the supply-demand deficit which has been created. We are aware of the current risks affecting this WRZ and are working closely with the Environment Agency to agree the best strategy for achieving a long term sustainable abstraction regime (by revised abstraction licences) and for removing the supply-demand deficit. This summer, we expect to have reduced the peak demand on the service reservoir near Crawley as described in section 1.2.1 and thereby reducing our potential need for tankering.

6.3 Eastern area

We are currently working on the risk and value workshops for the projects in AMP7 as seen in section 4.2.2. This includes a SEW import, the West Sandwich and Sandwich licence variation, Thanet nitrates, utilising the full transfer capacity of the Faversham4 to Fleete main and the Medway water recycling project.

6.4 Regional planning and WRMP24

We are actively engaged with the Water Resources South East (WRSE) group which is developing a regional multi-sector resilience plan to 2100 to meet the requirements of the Environment Agency's Water Resources National Framework. The regional resilience plan will inform development of our 2024 Water Resources Management Plan (WRMP24) ensuring we consider and implement the best solutions for the South East as a whole in the best interests of customers, stakeholders, other water users and the environment.

The WRSE regional modelling for the draft regional plan consultation in January 2022 is complete. Further modelling iterations will be undertaken, including incorporating best value planning by April 2022. As part of

the data inputting to the WRSE modelling, we have continued to review our deployable outputs, some of which may change in light of new constraints, improved data quality or updated modelling. We will keep the Environment Agency fully informed of any changes which could have a material impact upon our WRMP19 assumptions. We will keep the Environment Agency updated on progress with the technical work required for the WRSE work programme which will feed into development of our WRMP24 through both the WRSE Programme Management Board meetings, which the Environment Agency attends, and direct liaison with our water company lead at the Environment Agency.

Further to this we are collaborating as part of the WRSE drought planning group. This group means that the water companies in the South East are aligned and consistent when it comes to drought planning and drought terminology. It provides an easier to understand drought plan for customers and allows for better sharing of resources and customer communication should an area enter a drought scenario.

