Water Supply – Constrained Options Appraisal

Stakeholder Engagement Report

SES Water WRMP 2019

SES Water

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1. Introduction

Water companies are required to consult with customers and other stakeholders such as the Environment Agency and local interest groups such as wildlife trusts on their proposed options for meeting their supply deficit identified in the water resource management planning process.

SES Water organised a meeting for 16 August 2017 to discuss their options with a range of stakeholders including customer representatives from the customer scrutiny panel, local authorities, the South East Rivers Trust, and the Environment Agency.

2. Approach to Engagement

The workshop began with SES Water explaining the WRMP process (Appendix B) and that this has identified a future deficit in water supply over forecast demand. An explanation of the screening process was given for supply and demand related options. A broad outline of the types of options that could be implemented to resolve the deficit was given.

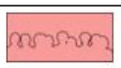
At this stage the attendees were asked to form two groups and they were presented with 'playing cards' giving the option name and type and the yield it could offer (Appendix A). Attendees were asked to identify a series of options that would add up to the volume of water required to close to deficit. Participants were asked to select which measures they would use in order to generate 35 Ml/d. Table 1 below shows the options chosen by each group in the first phase of option selection. At this stage respondents were not given any further information about the cost of implementing the measure or the environmental or social impacts.

Table 1. Option selected based on yield and option type

			Group 1	Group 2
Card Number	Type	Description	Selected Option	Selected Option
E1	Water efficiency	Sending out water efficiency devices for homeowners to install	a	
E2	Water efficiency	SES Water plumber visits to install water efficiency devices	a	a
E3	Water efficiency	Domestic plumber visits to install water efficiency devices for high consumers only	a	
E4	Water efficiency	Offer water efficiency devices to non households for self install	a	
E5	Water efficiency	Targeting properties with leaking toilets and offering a free repair	a	a
M1	Metering	Smart metering of selected households to reduce water use and wastage		
M2	Metering	Smart metering of all households to reduce water use and wastage	a	a
M3	Metering	Non-smart metering of all households to reduce water use and wastage		
L1	Leakage	Increased spend on normal leakage control to reduce leakage	a	a
L2	Leakage	Improvements to location of leaks to reduce leakage	a	a
L3	Leakage	Improvements to repair efficiency to reduce leakage	a	
L4	Leakage	Reducing pressure in the networks to reduce leakage	a	a
G1	Groundwater resource	New borehole (Mole Valley Chalk) - Fetcham Springs		
G2	Groundwater resource	Leatherhead licence increase		
G3	Groundwater resource	New Lower Mole Abstraction source		
G4	Groundwater resource	New Middle Mole Abstraction source		a
G5	Groundwater resource	North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)		a
G6	Groundwater resource	Outwood Lane		
G7	Groundwater resource	Lowering pumps at Kenley and Purley		a
P1	Pipeline	North Downs Confined Chalk AR extension 1 (Bishopsford Road)	a	
P2	Pipeline	15Ml/d bulk supply from Thames Water to SESW at Merton		
S1	Surface Water resource	Raising of Bough Beech reservoir	a	
T1	Treatment works	Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment		
T2	Treatment works	Secombe Centre UV		a
T3	Treatment works plus pipeline	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone	a	a

The next stage involved giving the two groups a new set of 'playing cards' containing more information in addition to the yield; the cost, environmental impact, carbon emissions, and potential for disruption. How these were defined and ranked was described (Appendix C). The symbols used on the cards are shown in Figure 1.

Figure 1. Ranking of impacts of options

COST	**£** LOW	**££** MEDIUM	**£££** HIGH
CARBON EMISSIONS	 LOW	 MEDIUM	 HIGH
ENVIRONMENTAL IMPACT	 POSITIVE	 NEUTRAL	 NEGATIVE
SOCIAL DISRUPTION	 NEUTRAL	 MINOR NEGATIVE	 NEGATIVE

The groups were then asked to reconsider their choices of options to meet the deficit volume in light of the new information.

Selections made following the provision of additional information are given in Table 2.

The final question to stakeholders was in light of their views from the detailed cards, would they change their option selection when given a new 'joker' card, representing temporary use bans (TUBs).

Of interest to SES Water were the priorities of stakeholders and how they weighed them against the positive and negative aspects of each scheme. This would offer a steer to what kind of options to take forward from Economic Balance of Supply and Demand (EBSD) modelling into their preferred programme.

Table 2. Option selected with information on screening findings

			Group 1	Group 2
Card Number	Type	Description	Selected Option	Selected Option
E1	Water efficiency	Sending out water efficiency devices for homeowners to install	a	a
E2	Water efficiency	SES Water plumber visits to install water efficiency devices	a	a
E3	Water efficiency	Domestic plumber visits to install water efficiency devices for high consumers only	a	
E4	Water efficiency	Offer water efficiency devices to non households for self install	a	a
E5	Water efficiency	Targeting properties with leaking toilets and offering a free repair	a	a
M1	Metering	Smart metering of selected households to reduce water use and wastage		
M2	Metering	Smart metering of all households to reduce water use and wastage	a	a
M3	Metering	Non-smart metering of all households to reduce water use and wastage		
L1	Leakage	Increased spend on normal leakage control to reduce leakage	a	
L2	Leakage	Improvements to location of leaks to reduce leakage	a	a
L3	Leakage	Improvements to repair efficiency to reduce leakage	a	a
L4	Leakage	Reducing pressure in the networks to reduce leakage	a	a
G1	Groundwater resource	New borehole (Mole Valley Chalk) - Fetcham Springs		
G2	Groundwater resource	Leatherhead licence increase		
G3	Groundwater resource	New Lower Mole Abstraction source		a
G4	Groundwater resource	New Middle Mole Abstraction source	a	a
G5	Groundwater resource	North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)		
G6	Groundwater resource	Outwood Lane		
G7	Groundwater resource	Lowering pumps at Kenley and Purley		a
P1	Pipeline	North Downs Confined Chalk AR extension 1 (Bishopsford Road)		
P2	Pipeline	15Ml/d bulk supply from Thames Water to SESW at Merton		
S1	Surface Water resource	Raising of Bough Beech reservoir	a	
T1	Treatment works	Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment		
T2	Treatment works	Secombe Centre UV		
T3	Treatment works plus pipeline	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone	a	a

3. Findings from Engagement

The main themes identified from the stakeholder group are described below.

Demand management options should always be considered ahead of new resource options, but it was appreciated that to solve the supply deficit demand management was not enough on its own. The high cost of smart metering and leakage were acknowledged compared to most new supply options from groundwater, but the group considered this cost acceptable for minimising environmental impacts. It was also widely believed that technological improvements will bring the cost of smart metering down, so will become a better option in a cost model with time.

Some stakeholders however preferred a range of groundwater options instead of few large options or the reservoir option because of concern about resilience and security of supply. It was considered better to have a range of options available than become increasingly dependent on any particular option, such as increasing the capacity of Bough Beech reservoir.

Some stakeholders recognised that some sources are not in use because of water quality problems and that it was inefficient to create new sources rather than upgrade existing sources to bring them back into supply. However when stakeholders learned that these upgrades required energy intensive treatment they were less interested in the ongoing costs and carbon emissions compared to a new, clean water source.

Some stakeholders had strong views on not accepting bulk supplies from other water companies as this was seen as not taking responsibility for the supply problem, and was passing on the impacts of meeting supply on other water company stakeholders. Others were supportive of the option as it was assumed that this water was surplus to requirements and therefore available without any negative impacts. All recognised that at this screening stage it was unknown what the source of bulk supply imported water was and it was a large area of uncertainty.

Another issue raised regarding bulk supplies was security and resilience. It was questioned whether SES Water could rely on this source to meet a significant part of the supply problem, and whether the donor water company would take the water back as soon as they needed it, leaving SES Water in deficit.

Though no exports are considered in the options appraisal because they do not help resolve the supply problem, the bulk supply discussion did raise the question of why SES Water is exporting any water when it has a projected deficit. Not exporting this water would reduce the supply problem and reduce the need for some options to be implemented.

Stakeholders also considered that better leakage reduction methods are preferable to simply increasing the amount of traditional leakage detection as they are estimated to offer a similar yield with less disruption (e.g. digging up roads).

After selecting as many demand side options as were considered sensible based on the yield benefit to meet the deficit and the cost, groundwater options with the least environmental impact were selected. Stakeholders accepted that it was inevitable that some additional water had to be taken out of the environment and the approach taken considering the location with regard to rivers, habitats, and WFD status sought to minimise the impact.

After debating these options the stakeholder group was asked whether they would accept temporary use bans (TUB) instead of new options. This was rejected unanimously by the groups, who felt that this was always available a last resort option so should not be built in to the WRMP. Implementing other options would offer resilience and flexibility that using the TUB instead would mean such improvements would not happen.

It was also questioned whether the estimated yield of a TUB would occur if they were used regularly. If no longer considered an emergency then customers may change their behaviour and not reduce water use significantly. It was also felt that this may appear to customers as a failure of the water company to meet its duties.

4. Conclusions

Stakeholders appreciated the difficult balance between ensuring there is enough water for supply while minimising environmental impacts, carbon emissions and the disruptive effects of construction work in roads and in front of customer's homes on a large and ongoing basis.

Cost did not significantly alter stakeholders' views on the options, and believed that the fixed costs used in modelling for this WRMP do not reflect how costs tend to fall with time, and so there was an expectation that options with a higher relative cost than others would not remain significantly more expensive over the planning time frame.

In summary the following demand options were selected:

- E1 Sending out water efficiency devices for homeowners to install
- E2 SES Water plumber visits to install water efficiency devices
- E3 Domestic plumber visits to install water efficiency devices for high consumers only
- E4 Offer water efficiency devices to non-households for self-install
- E5 Targeting properties with leaking toilets and offering a free repair
- M2 Smart metering of all households to reduce water use and wastage
- L1 Increased spend on normal leakage control to reduce leakage
- L2 Improvements to location of leaks to reduce leakage
- L3 Improvements to repair efficiency to reduce leakage
- L4 Reducing pressure in the networks to reduce leakage

And the following supply options were selected:

- G3 New Lower Mole Abstraction source
- G4 New Middle Mole Abstraction source
- G7 Lowering pumps at Kenley and Purley
- S1 Raising of Bough Beech reservoir
- T3 Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone

The following demand options were rejected by all stakeholders:

- M1 Smart metering of selected households to reduce water use and wastage
- M3 Non-smart metering of all households to reduce water use and wastage

These were rejected on the basis that M2 was selected, which was smart metering for all households, and therefore is mutually exclusive to the options above.

The following supply options were rejected by all stakeholders:

- G1 New borehole (Mole Valley Chalk) - Fetcham Springs

- G2 Leatherhead licence increase
- G6 Outwood Lane
- P1 North Downs Confined Chalk AR extension 1 (Bishopsford Road)
- P2 15Ml/d bulk supply from Thames Water to SESW at Merton
- T1 Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment
- T2 Secombe Centre UV

Groundwater schemes were rejected where there was an environmental impact. However schemes were also rejected that did not have an environmental impact. These were simply because demand measures were identified for a similar yield benefit, that is, they were not rejected for specific option related reasons.

5. Recommendations

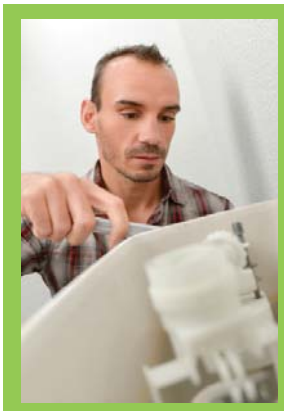
Based on stakeholders' feedback described herein, it is recommended that one additional EBSD run is conducted, whereby only the options selected by both groups are included, in order to generate a programme of measures that meets stakeholders' preferences, or alternatively a run which excludes the options that both groups did not select. These are given in Section 4 above.

Stakeholders also requested that more demand options be identified to solve the supply-demand deficit where possible. Demand side options from the unconstrained screening process should be reconsidered based on stakeholder preferences.

Some stakeholders also expressed confusion as to why the water company would export water when there is a projected deficit. It is recommended SES Water undertake additional communications to stakeholders regarding the nature of the water resources in the south east (WRSE) group and the decisions on the wider benefits of imports and exports.

Appendix A Option Cards

Card	Option	Type of Measure	Description	Average Yield (Ml/d)	Total cost per Ml/d over 25 years	Carbon Emissions (net effect of option)	Environmental Impact (Compared to present situation)	Social Disruption
E1	SESW-WEF-019	Water efficiency	Sending out water efficiency devices for homeowners to install	0.49	low	Reductions	Neutral	Neutral
E2	SESW-WEF-020	Water efficiency	SES Water plumber visits to install water efficiency devices	0.38	medium	Reductions	Neutral	Neutral
E3	SESW-WEF-305	Water efficiency	Domestic plumber visits to install water efficiency devices for high consumers only	0.31	medium	Reductions	Neutral	Neutral
E4	SESW-WEF-022	Water efficiency	Offer water efficiency devices to non households for self install	0.42	low	Reductions	Neutral	Neutral
E5	SESW-WEF-308	Water efficiency	Targeting properties with leaking toilets and offering a free repair	0.42	low	Reductions	Neutral	Neutral
M1	SESW-MET-311	Metering	Smart metering of selected households to reduce water use and wastage	0.46	medium	Reductions	Neutral	Minor Negative
M2	SESW-MET-113	Metering	Smart metering of all households to reduce water use and wastage	5.53	high	Reductions	Neutral	Minor Negative
M3	SESW-MET-113a	Metering	Non-smart metering of all households to reduce water use and wastage	3.78	medium	Reductions	Neutral	Minor Negative
L1	SESW-LEA-073i	Leakage	Increased spend on normal leakage control to reduce leakage	3.28	medium	Reductions	Neutral	Negative
L2	SESW-LEAK- 301_c	Leakage	Improvements to location of leaks to reduce leakage	2.55	medium	Reductions	Neutral	Minor Negative
L3	SESW-LEAK- 302_c	Leakage	Improvements to repair efficiency to reduce leakage	0.29	low	Reductions	Neutral	Minor Negative
L4	SESW-LEAK-AK_303	Leakage	Reducing pressure in the networks to reduce leakage	1.20	low	Reductions	Positive	Neutral
G1	SESW-NGW-R5	Groundwater resource	New borehole (Mole Valley Chalk) - Fetcham Springs	4.78	low	Small Increase	Negative	Neutral
T1	SESW-NGW-R8	Treatment works	Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment	0.38	high	Small Increase	Neutral	Neutral
G2	SESW-NGW-N4	Groundwater resource	Leatherhead licence increase	2	low	Small Increase	Negative	Neutral
G3	SESW-NGW-N5	Groundwater resource	New Lower Mole Abstraction source	5	low	Small Increase	Neutral	Minor Negative
G4	SESW-NGW-N6	Groundwater resource	New Middle Mole Abstraction source	10	low	Small Increase	Neutral	Minor Negative
G5	SESW-NGW- R21	Groundwater resource	North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)	2.16	low	Small Increase	Neutral	Neutral
G6	SESW-NGW-R22	Groundwater resource	Outwood Lane	3.4	low	Small Increase	Neutral	Neutral
G7	SESW-NGW-R28	Groundwater resource	Lowering pumps at Kenley and Purley	3.4	low	Small Increase	Neutral	Neutral
T2	SESW-NGW-R26	Treatment works	Secombe Centre UV	2.07	medium	Medium Incre	Neutral	Neutral
SW1	SESW-RES-R1	Surface Water resource	Raising of Bough Beech reservoir	4.9	high	Small Increase	Positive	Negative
P1	SESW-ASR-R2	Pipeline	North Downs Confined Chalk AR extension 1 (Bishopsford Road)	0	low	Small Increase	Neutral	Neutral
P2	SESW-CTR- R10	Pipeline	15Ml/d bulk supply from Thames Water to SESW at Merton	15	low	Small Increase	Negative	Neutral
T3P3	SESW-RTR-N8	Treatment works plus pipeline	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at	4.77	low	Medium Incre	Neutral	Neutral



E1 Water Efficiency

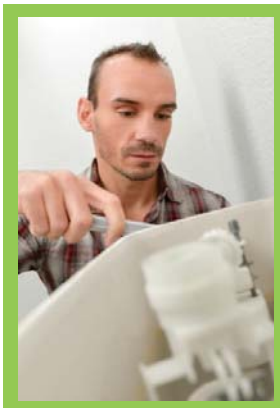
Sending out water efficiency devices for homeowners to install

½ Ml/d

E2 Water Efficiency

SES Water plumber visits to install water efficiency devices

½ Ml/d



E3 Water Efficiency

Domestic plumber visits to install water efficiency devices for high consumers only

½ Ml/d

E4 Water Efficiency

Offer water efficiency devices to non-households for self-install

½ Ml/d

E5 Water Efficiency

Targeting properties with leaking toilets and offering a free repair

½ Ml/d

M1 Metering

Smart metering of selected households to reduce water use and wastage

½ Ml/d

M2 Metering

Smart metering of all households to reduce water use and wastage

6 Ml/d

M3 Metering

Non-smart metering of all households to reduce water and wastage

4 Ml/d

L1 Leakage

Increased spend on normal leakage control to reduce leakage

3 Ml/d

L2 Leakage

Improvements to location of leaks to reduce leakage

3 Ml/d

L3 Leakage

Improvements to repair efficiency to reduce leakage

½ Ml/d

L4 Leakage

Reducing pressure in the networks to reduce leakage

1 Ml/d

G1 Groundwater resource

New borehole (Mole Valley Chalk)-Fetcham springs

5 Ml/d

T1 Treatment Works

Upgrade WTW (Lower Greensand)-The Clears ammonia and pesticide

½ Ml/d

G2 Groundwater resource

Leatherhead licence increase

2 Ml/d

G3 Groundwater resource

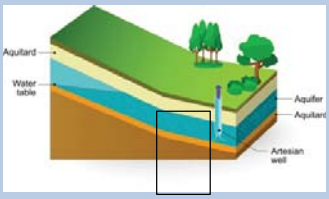
New Lower Mole Abstraction source

5 Ml/d

G4 Groundwater resource

New middle Mole abstraction source

10 Ml/d



G5 Groundwater resource

North Downs Confined Chalk Artificial Recharge extensions 2

2 Ml/d

G6 Groundwater resource

Outwood lane

3 Ml/d

G7 Groundwater resource

Lowering pumps at Kenley and Purley

3 Ml/d

T2
Treatment Works

Secombe Centre UV

2 Ml/d

P1
Pipeline

15Ml/d bulk supply from Thames Water to SESW at Merton

15 Ml/d

T3
Treatment works plus pipeline

Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood

5 Ml/d

S1
Surface Water Resource

Raising of Bough Beech reservoir

5 Ml/d

E1 Water Efficiency

Sending out water efficiency devices for homeowners to install

Ave Yield
(Ml/d) **0.5**

Cost
(per Ml/d over 25 years) **£**

Carbon Emissions

Environmental Impact

Social Disruption

E2 Water Efficiency

SES Water plumber visits to install water efficiency devices

Ave Yield
(Ml/d) **0.5**

Cost
(per Ml/d over 25 years) **££**

Carbon Emissions

Environmental Impact

Social Disruption

E3 Water Efficiency

Domestic plumber visits to install water efficiency devices for high consumers only

Ave Yield
(Ml/d) **0.5**

Cost
(per Ml/d over 25 years) **££**

Carbon Emissions

Environmental Impact

Social Disruption

E4 Water Efficiency

Offer water efficiency devices to non households for self install

Ave Yield
(Ml/d) **0.5**

Cost
(per Ml/d over 25 years) **£**

Carbon Emissions

Environmental Impact

Social Disruption

E5 Water Efficiency

Targeting properties with leaking toilets and offering a free repair

Ave Yield (Ml/d) **0.5**

Cost (per Ml/d over 25 years) **£**

Carbon Emissions

Environmental Impact

Social Disruption

M1 Metering

Smart metering of selected households to reduce water use and wastage

Ave Yield (Ml/d) **0.5**

Cost (per Ml/d over 25 years) **££**

Carbon Emissions

Environmental Impact

Social Disruption

M2 Metering

Smart metering of all households to reduce water use and wastage

Ave Yield (Ml/d) **6**

Cost (per Ml/d over 25 years) **£££**

Carbon Emissions

Environmental Impact

Social Disruption

M3 Metering

Non-smart metering of all households to reduce water use and wastage

Ave Yield (Ml/d) **4**

Cost (per Ml/d over 25 years) **££**

Carbon Emissions

Environmental Impact

Social Disruption

L1 Leakage

Increased spend on normal leakage control to reduce leakage

Ave Yield (Ml/d)	**3**
Cost (per Ml/d over 25 years)	**££**
Carbon Emissions	
Environmental Impact	
Social Disruption	

L2 Leakage

Improvements to location of leaks to reduce leakage

Ave Yield (Ml/d)	**3**
Cost (per Ml/d over 25 years)	**££**
Carbon Emissions	
Environmental Impact	
Social Disruption	

L3 Leakage

Improvements to repair efficiency to reduce leakage

Ave Yield (Ml/d)	**0.5**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

L4 Leakage

Reducing pressure in the networks to reduce leakage

Ave Yield (Ml/d)	**1**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G1 Groundwater Resource

New borehole (Mole Valley Chalk) – Fetcham Springs

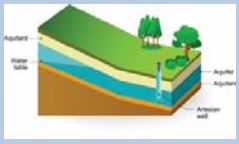
Ave Yield (Ml/d)	**5**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

T1 Treatment Works

Upgrade WTW (Lower Greensand) – The Clears ammonia & pesticide treatment

Ave Yield (Ml/d)	**0.5**
Cost (per Ml/d over 25 years)	**£££**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G2 Groundwater Resource



Leatherhead licence Increase

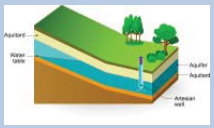
Ave Yield (Ml/d)	**2**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G3 Groundwater Resource

New Lower Mole Abstraction source

Ave Yield (Ml/d)	**5**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G4 Groundwater Resource



New Middle Mole Abstraction source

Ave Yield (Ml/d)	**10**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G5 Groundwater Resource

North Downs confined Chalk Artificial Recharge extension 2

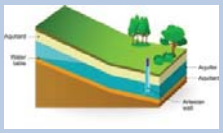
Ave Yield (Ml/d)	**2**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G6 Groundwater Resource

Outwood Lane

Ave Yield (Ml/d)	**3**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

G7 Groundwater Resource



Lowering pumps at Kenley and Purley

Ave Yield (Ml/d)	**3**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

SW1 Surface Water resource

Raising of Bough Beech reservoir

Ave Yield (Ml/d)	**5**
Cost (per Ml/d over 25 years)	**£££**
Carbon Emissions	
Environmental Impact	
Social Disruption	

P1 Pipeline

North Downs confined Chalk AR extension 1 (Bishopsford Road)

Ave Yield (Ml/d)	**0**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

P2 Pipeline

15Ml/d bulk supply from Thames Water to SESW at Merton

Ave Yield (Ml/d)	**15**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

T3P3 Treatment works plus pipeline

Pipeline linking Pains Hill, Duckpit Wood & Chalk Pit Lane to existing treatment works at Westwood and Godstone

Ave Yield (Ml/d)	**5**
Cost (per Ml/d over 25 years)	**£**
Carbon Emissions	
Environmental Impact	
Social Disruption	

T2 Treatment Works

Secombe Centre UV

Ave Yield (Ml/d)	**2**
Cost (per Ml/d over 25 years)	**££**
Carbon Emissions	
Environmental Impact	
Social Disruption	

KEY

COST	**£** LOW	**££** MEDIUM	**£££** HIGH
CARBON EMISSIONS	 LOW	 MEDIUM	 HIGH
ENVIRONMENTAL IMPACT	 POSITIVE	 NEUTRAL	 NEGATIVE
SOCIAL DISRUPTION	 NEUTRAL	 MINOR NEGATIVE	 NEGATIVE

Appendix B SES Water Presentation

Water Resource Management Plan 2019

Stakeholder Engagement

16 August 2017

Alison Murphy
Water Resources Manager

Agenda

10:30	Introduction to the planning process and our latest forecasts
11:00	Supply Demand Balance & Options Outline
11:10	Options Discussion (Base views)
12:00	Feedback
12:30	Lunch
13:00	Options Detail
13:15	Options Discussion (Informed views)
14:15	Feedback & Break
14:40	Presentation of Alternative Plans
14:50	Plans Discussion
15:20	Workshop Summary and Final Q&A
15:30	Close

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Introduction

Planning for the Future

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Water Resources Management Plan Process

- **Six stage** process
- Comparison of supply demand balance either **positive = surplus** or **negative = deficit**
- All options considered initially, then filtered to produce a '**Feasible Options**' list
- Possible options are discussed with stakeholders to produce a **Preferred Plan**

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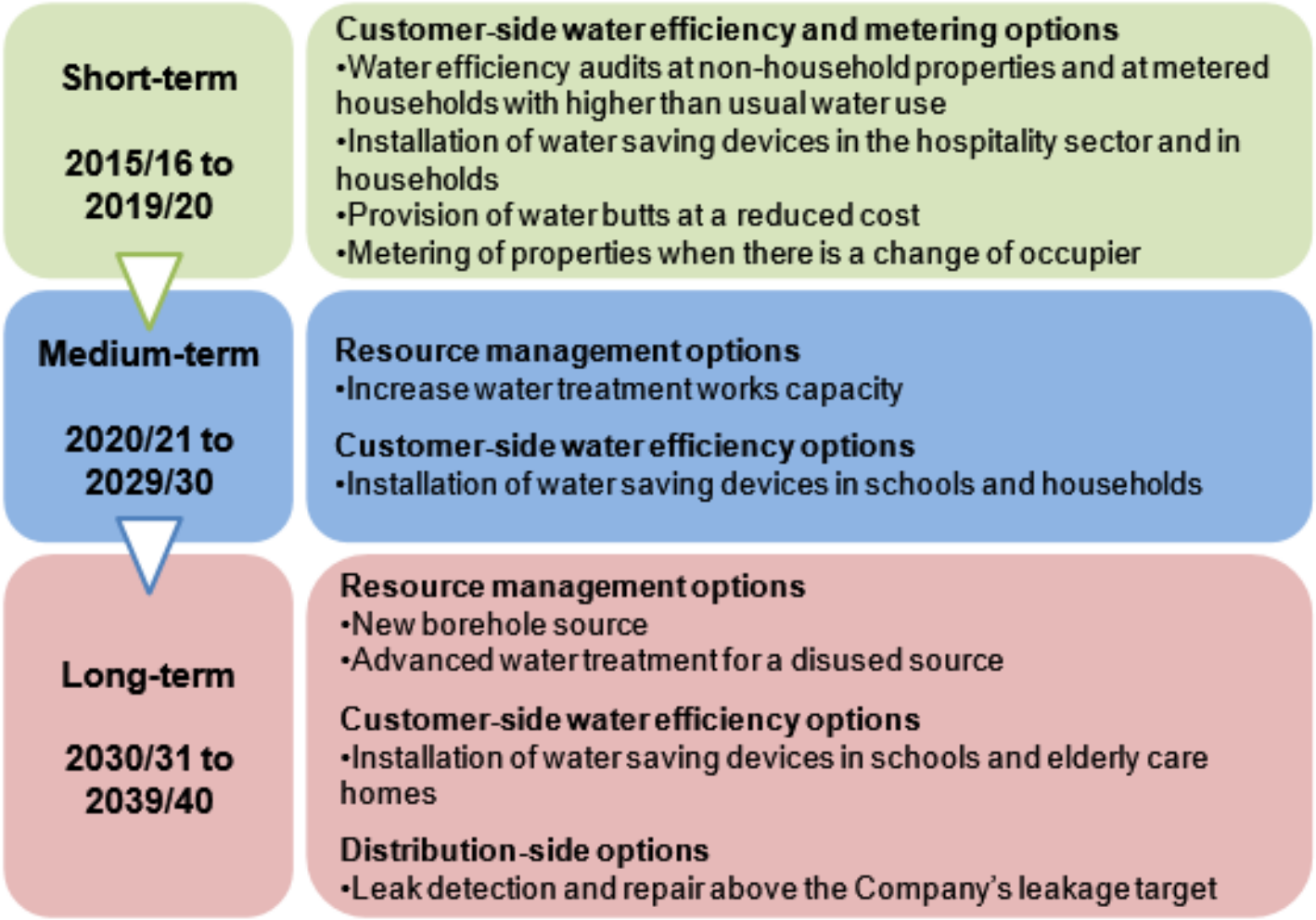
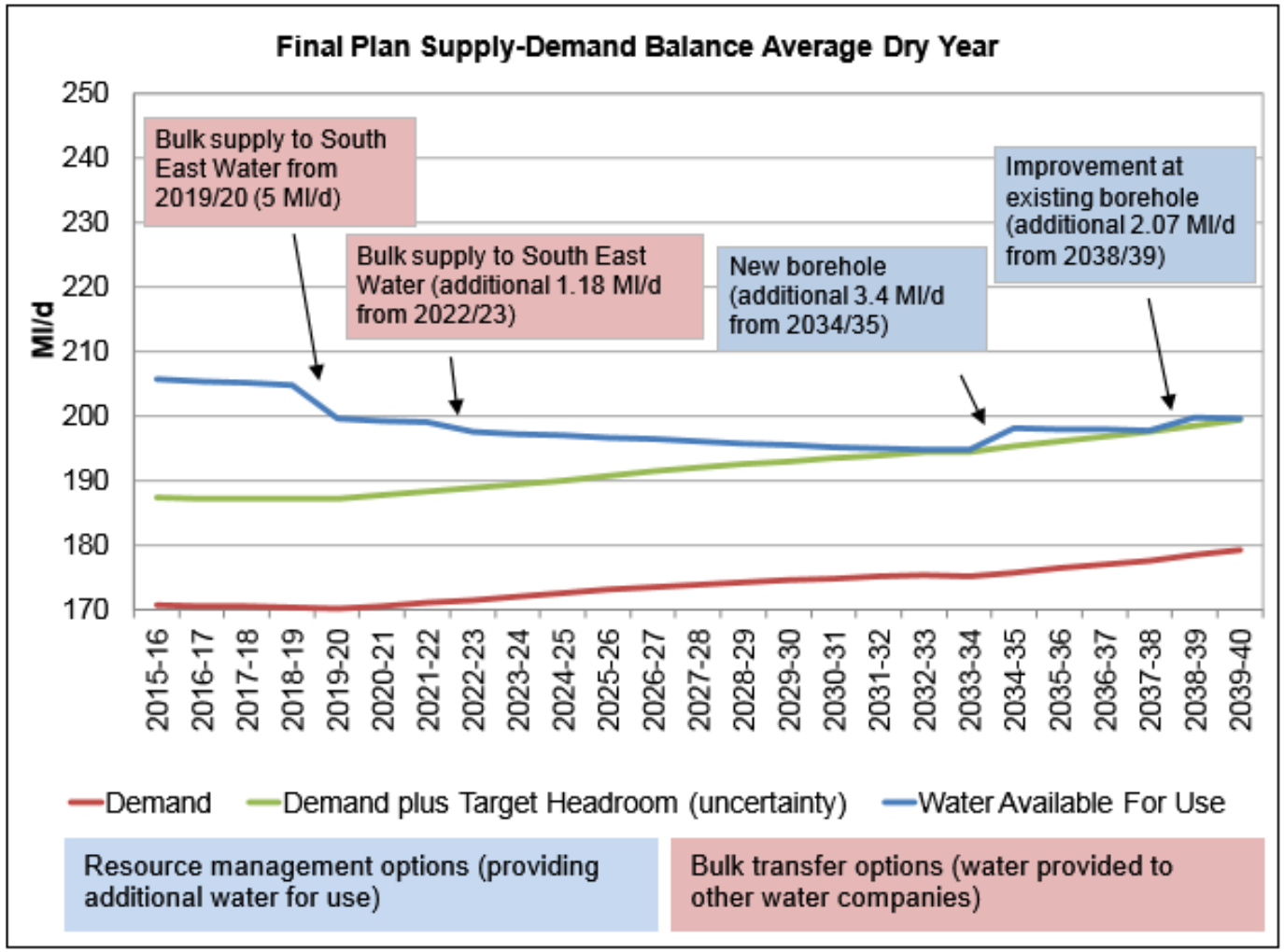
Water Resources Management Plan Process

- Where there is a **deficit** forecast in the supply demand balance in any 5-year period, a range of **options** must be considered and then tested against **scenarios** (sensitivity analysis)
- The effects of **Climate Change** on both supply and demand are assessed
- **Regional solutions**, e.g. transfers between water companies (as modelled by Water Resources in the South East group) are included
- **Consultation** with Regulators (including EA & Natural England), customers and relevant groups must be completed
- The Draft plan is submitted to **Defra**, with the final plan published once they are satisfied with the plan and our response to the consultation

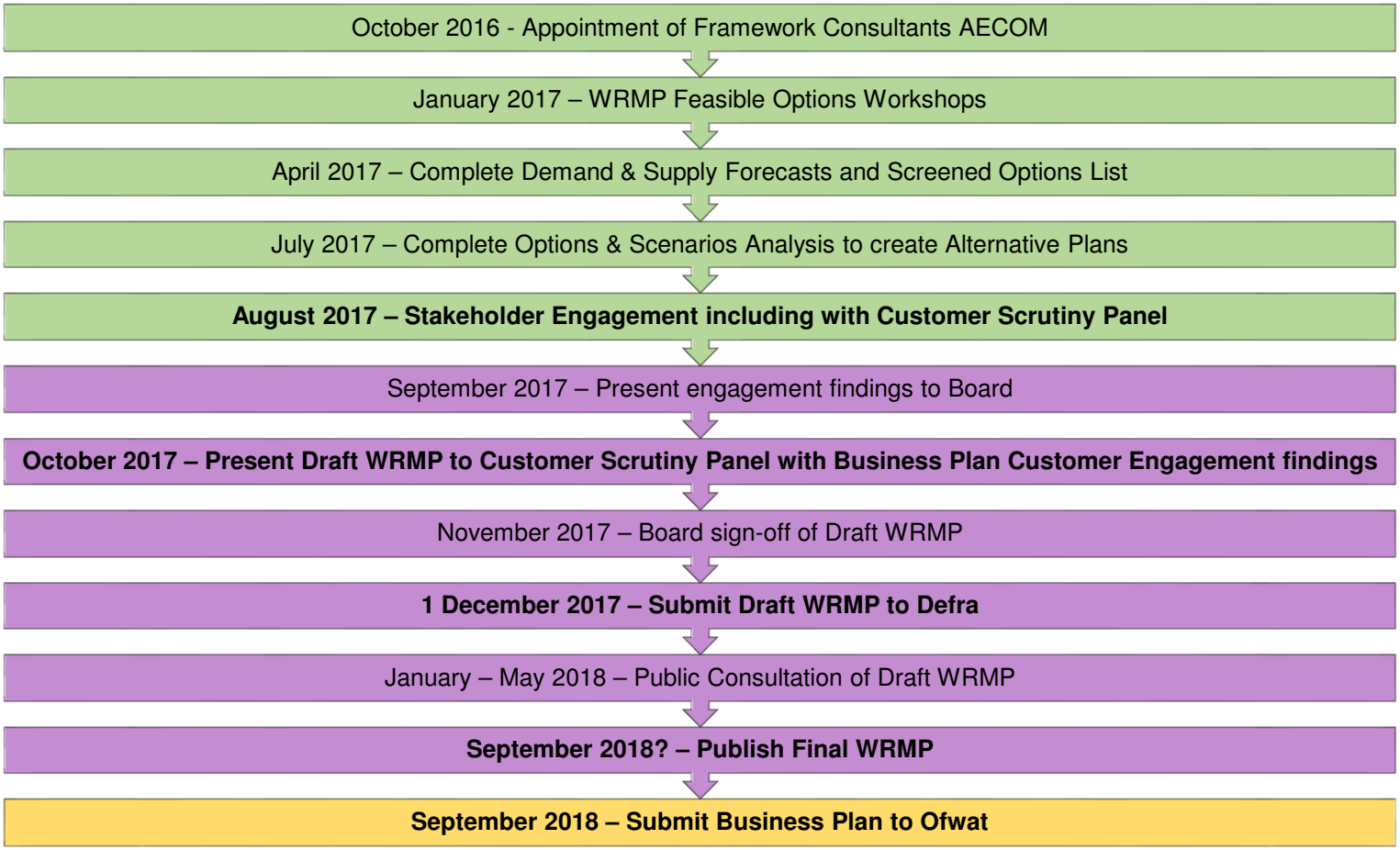
Our Current Plan – WRMP14



Our Current Plan – WRMP14



Key Dates in Planning Timetable



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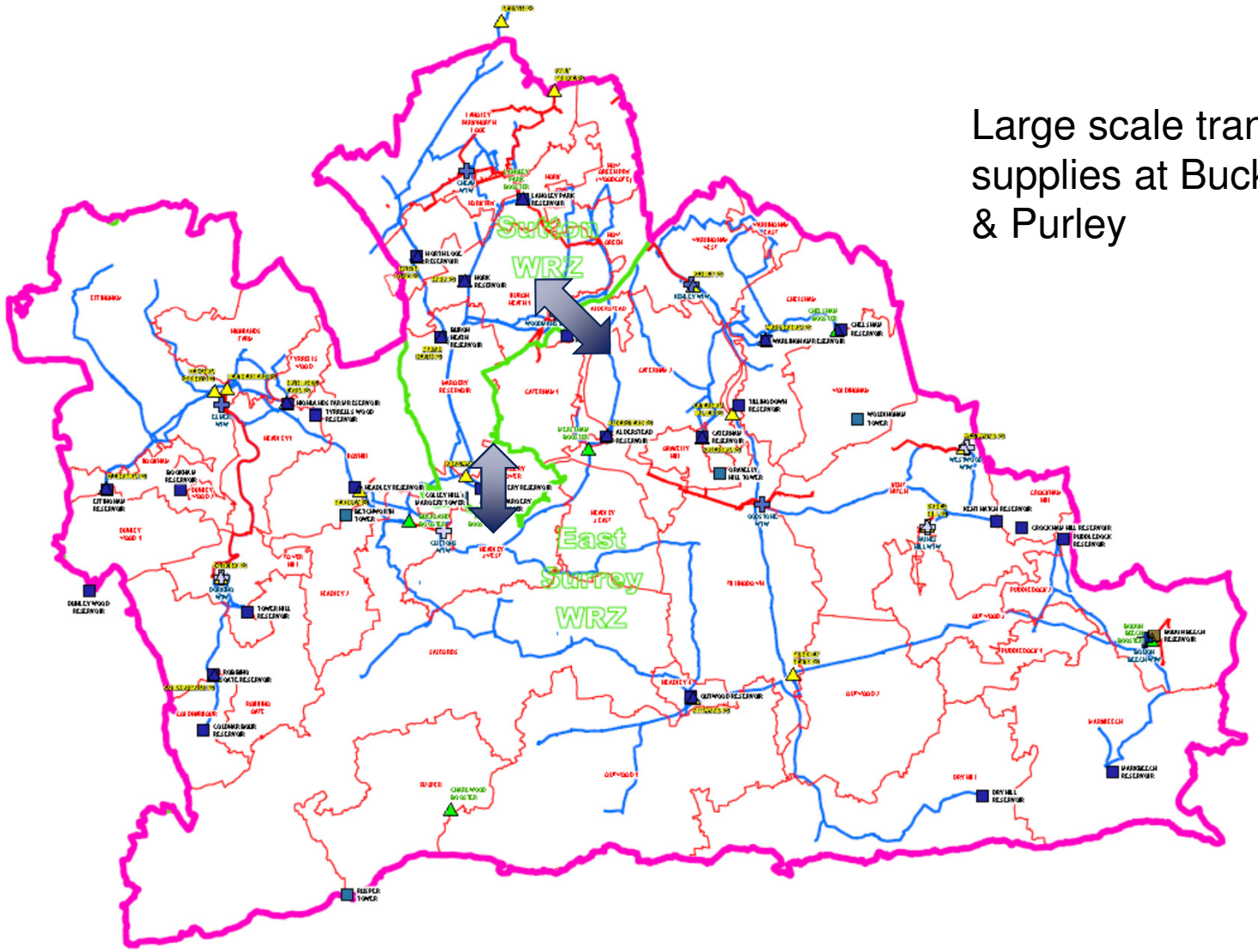
Our Approach

Key Changes, Supply and Demand Forecasts

Our Approach: Key Changes

- WRMP19 will cover a 60 year period from 2020 to 2080 – compared to the current 25 year plan
- This allows more consideration of long term options and aligns with the approach being used in the Water Resources in the South East companies
- We are using more advanced methods including simulated weather generation (known as stochastics) for our supply forecasts and drought risk assessment so that we test the resilience of the plan
- Demand forecasts are more in depth with future population estimated using a hybrid approach including econometric methods
- We have assessed that our plan should be based on one Resource Zone due to improved interconnectivity between the current two WRZ zones
    - there is a broadly similar risk of supply failure across the whole area regardless of water source or treatment works

Our Approach: One Resource Zone



Large scale transfer of supplies at Buckland PS & Purley

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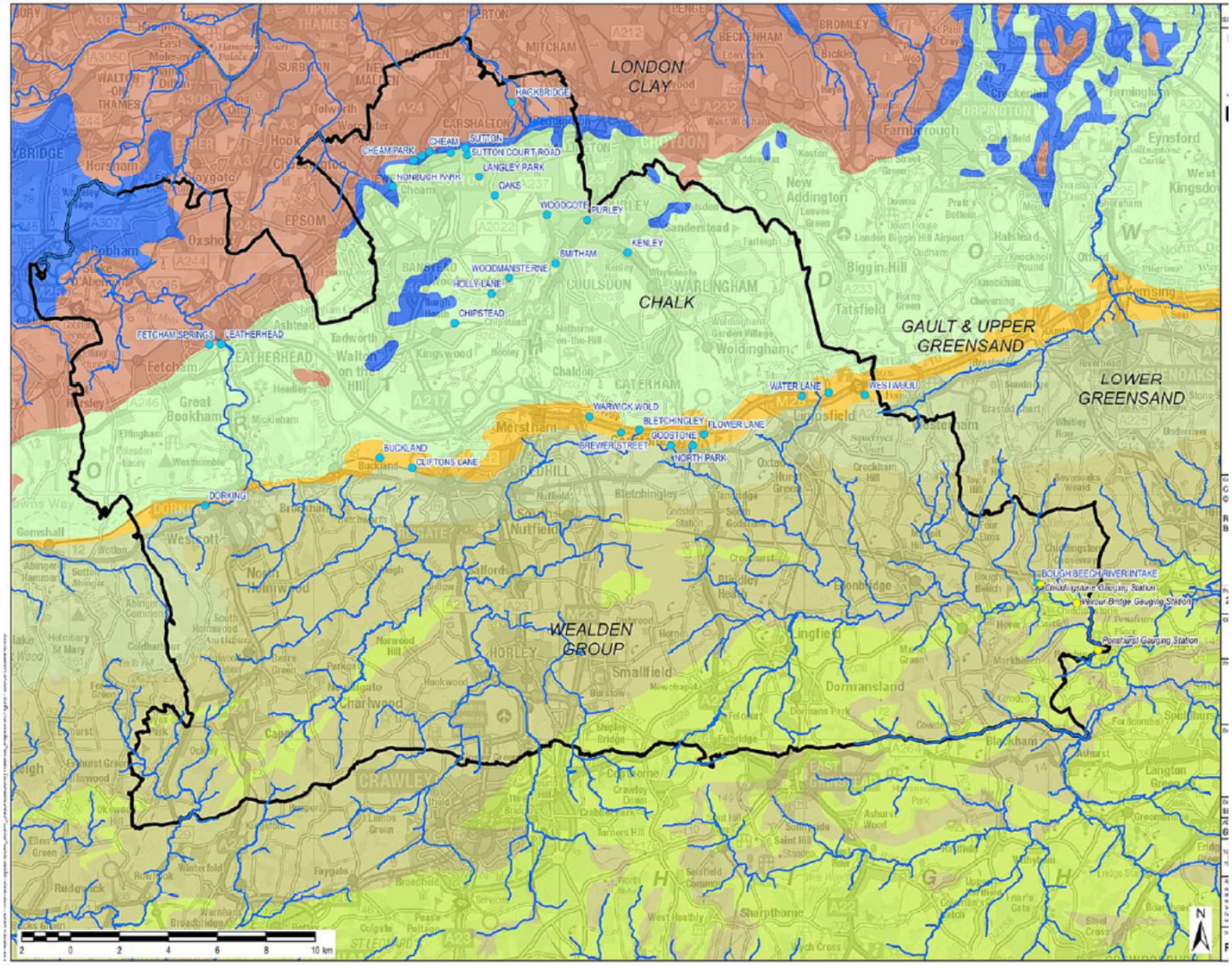
Our Approach: Supply Forecast



Our Approach: Supply Forecast

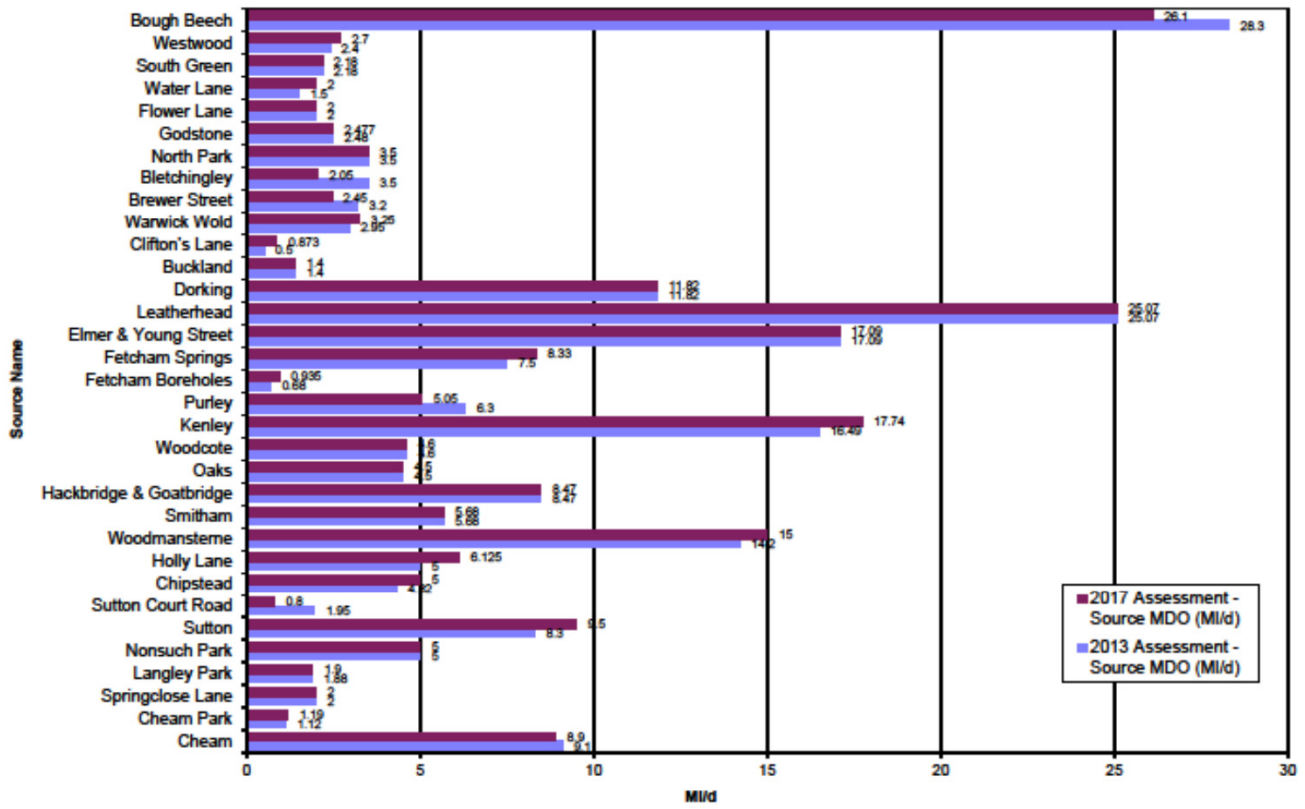
- We have analysed data from our sources to calculate how much water can be abstracted from each source or set of sources – this is known as Deployable Output (DO). This may be limited by:
  - Yield (how much water is available hydrologically)
  - Abstraction licence
  - Pumping constraints
  - Mains capacity
  - Treatment works capacity
- DO is based on a Dry Year (around 10% above average), and is calculated for both average and peak conditions
- Yields are based on historical data using modelling techniques

Our Approach: Supply Forecast

2017 Deployable Output Assessment

Groundwater source deployable outputs for worst drought on historic record and for 1:50 year event

Figure 4



K:\jobs\60527524 SESW Water Resources and Drought Plan\400_TECH\420_SUPPLY\08 Summary of DO\
Summary DO plots 2017.xls\Minimum DO Chart
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Our Approach: Outage & Climate Change

Outage

- Outage is the risk of a temporary or short term loss of supply. This must be included in the assessment as it reduces the amount of DO available for use.
- It is calculated from looking at recent actual events and forecasting by assessing future vulnerabilities including water quality issues such as methaldehyde and algal blooms
- We are looking at investment options which reduce outage and improve resilience, such as maintenance programmes

Climate Change

- Firstly we have to assess our vulnerability to climate change in terms of the likelihood and severity of impacts
- We then select a technique to quantify the impacts. We have employed H R Wallingford to carry out this assessment using MET Office projections.

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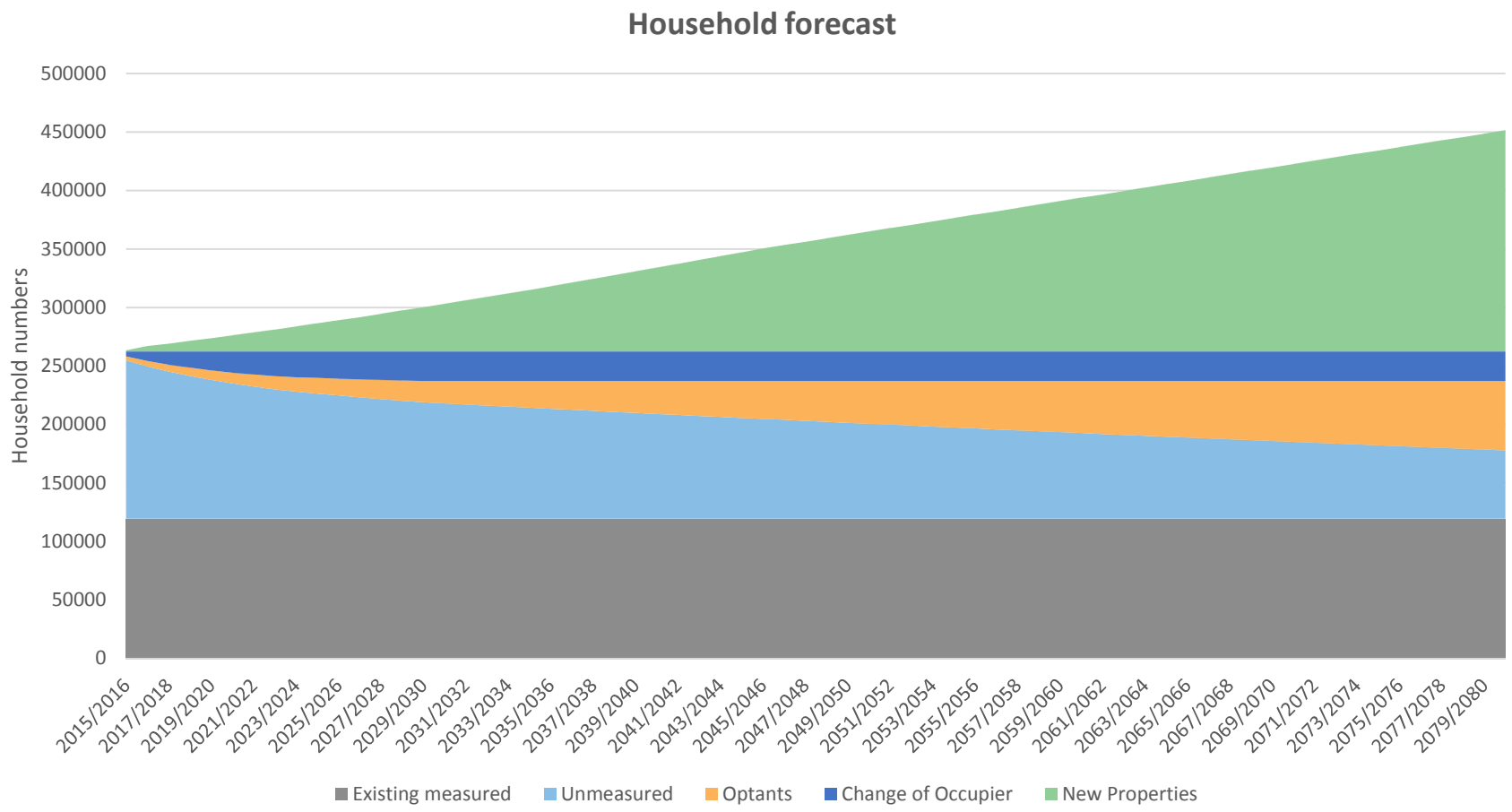
Our Approach: Demand Forecast

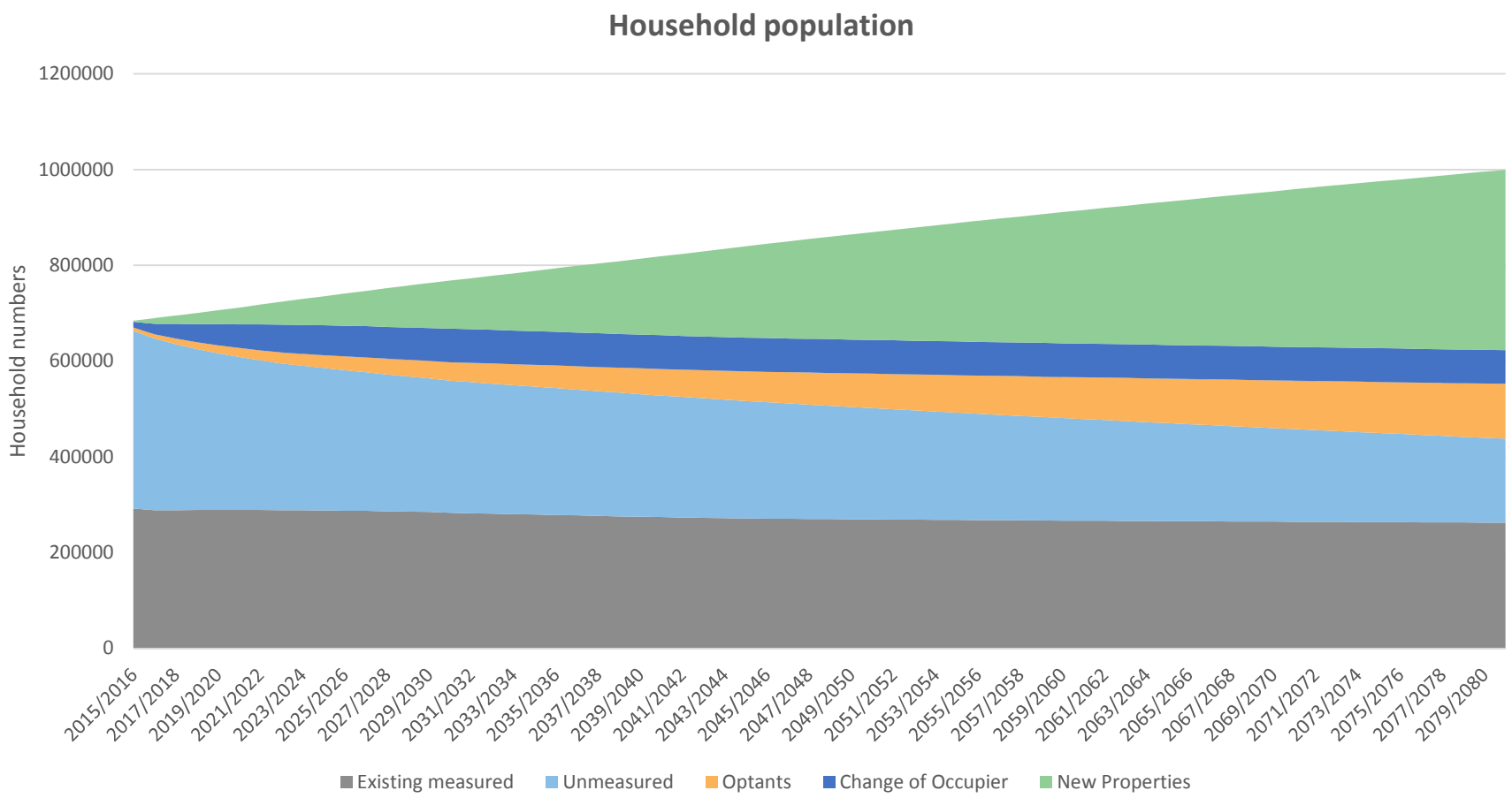
Population and Property Forecasts

- We took part in a club project with the other SE water companies – using Experian to produce new household forecasts
- The forecasts were based on a combination of population trends (from the Office for National Statistics), Local Authority Plans and econometric analysis – i.e. a hybrid approach
- We then aligned the forecasts to our annual report figures for 2015/16 and projected growth to 2080
- Over time the projections increase in uncertainty

Our Approach: Demand Forecast



Our Approach: Demand Forecast

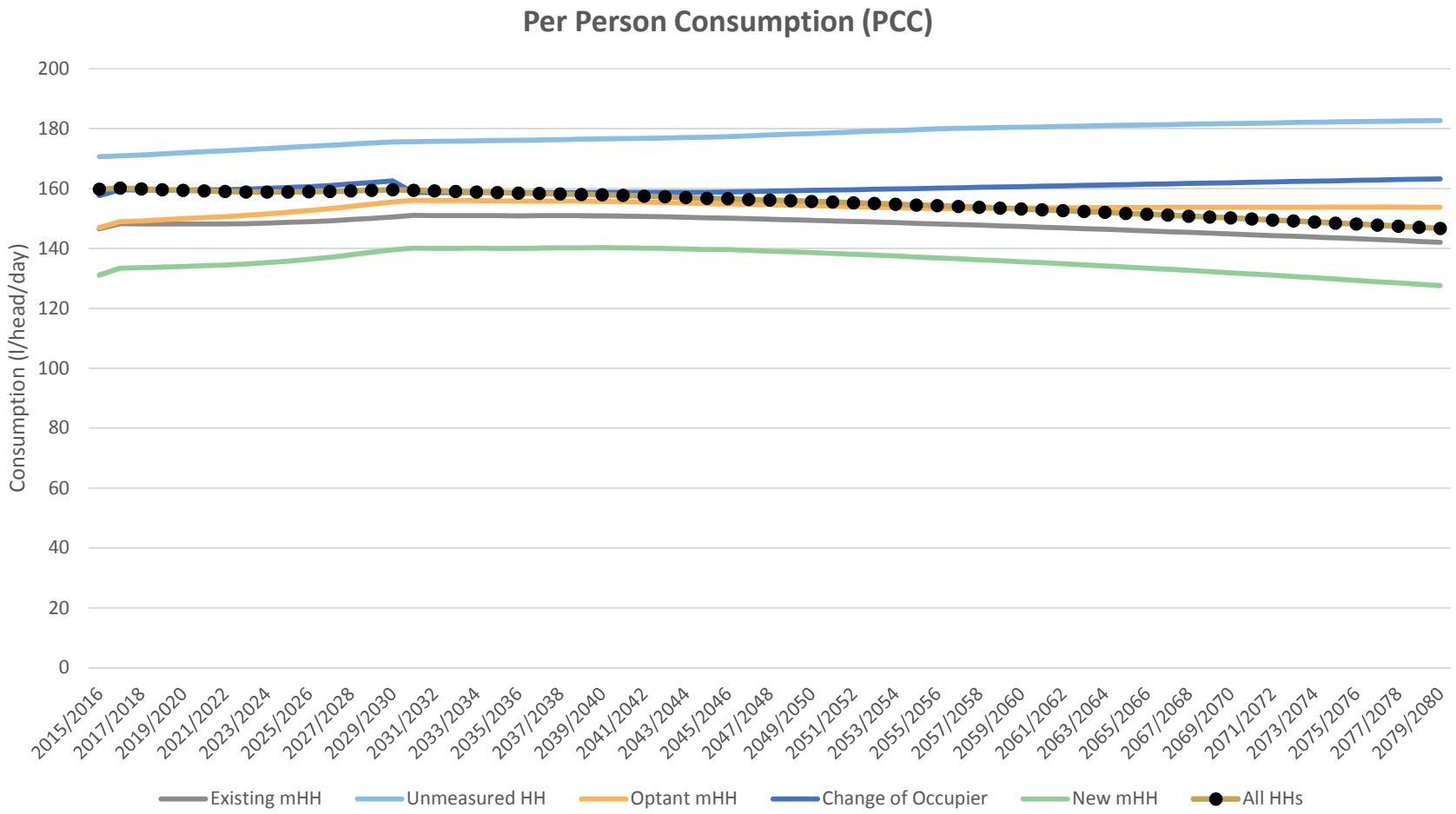


Our Approach: Demand Forecast

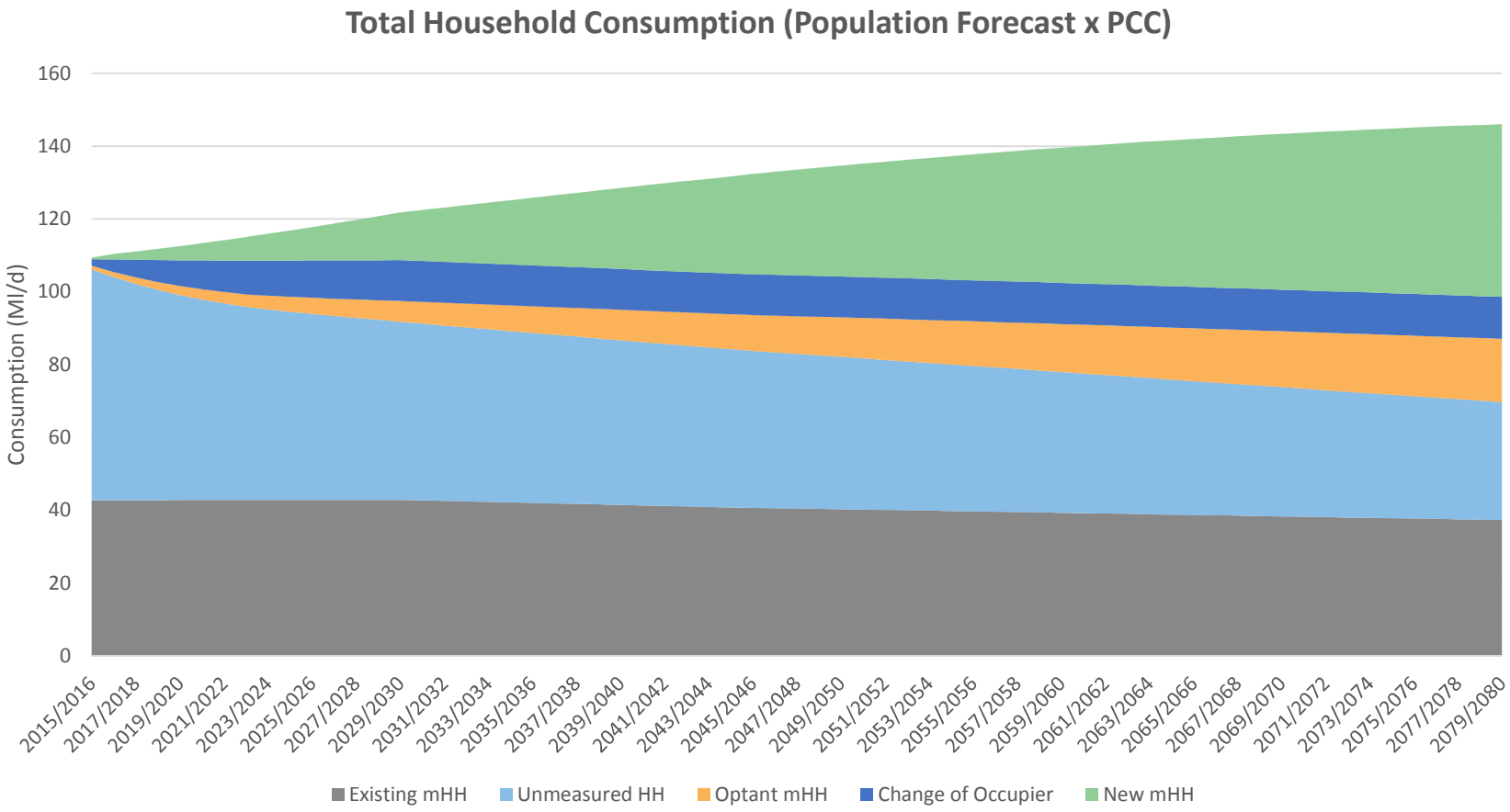
Per Capita Consumption

- We selected a component method using water industry guidance to forecast changes in ownership, volume and frequency of types of use, e.g.
  - Toilet flushing
  - Shower use
  - Clothes washing
  - External use
- Effect of metering (new properties, change of occupancy and optants) and baseline water efficiency is then included
- Calculations will be based on the Maximum Likelihood Estimation (MLE) method – this is a change from the current approach and so the levels are lower than current published figures
- We make an allowance for climate change for both average and peak conditions

Our Approach: Demand Forecast



Our Approach: Demand Forecast



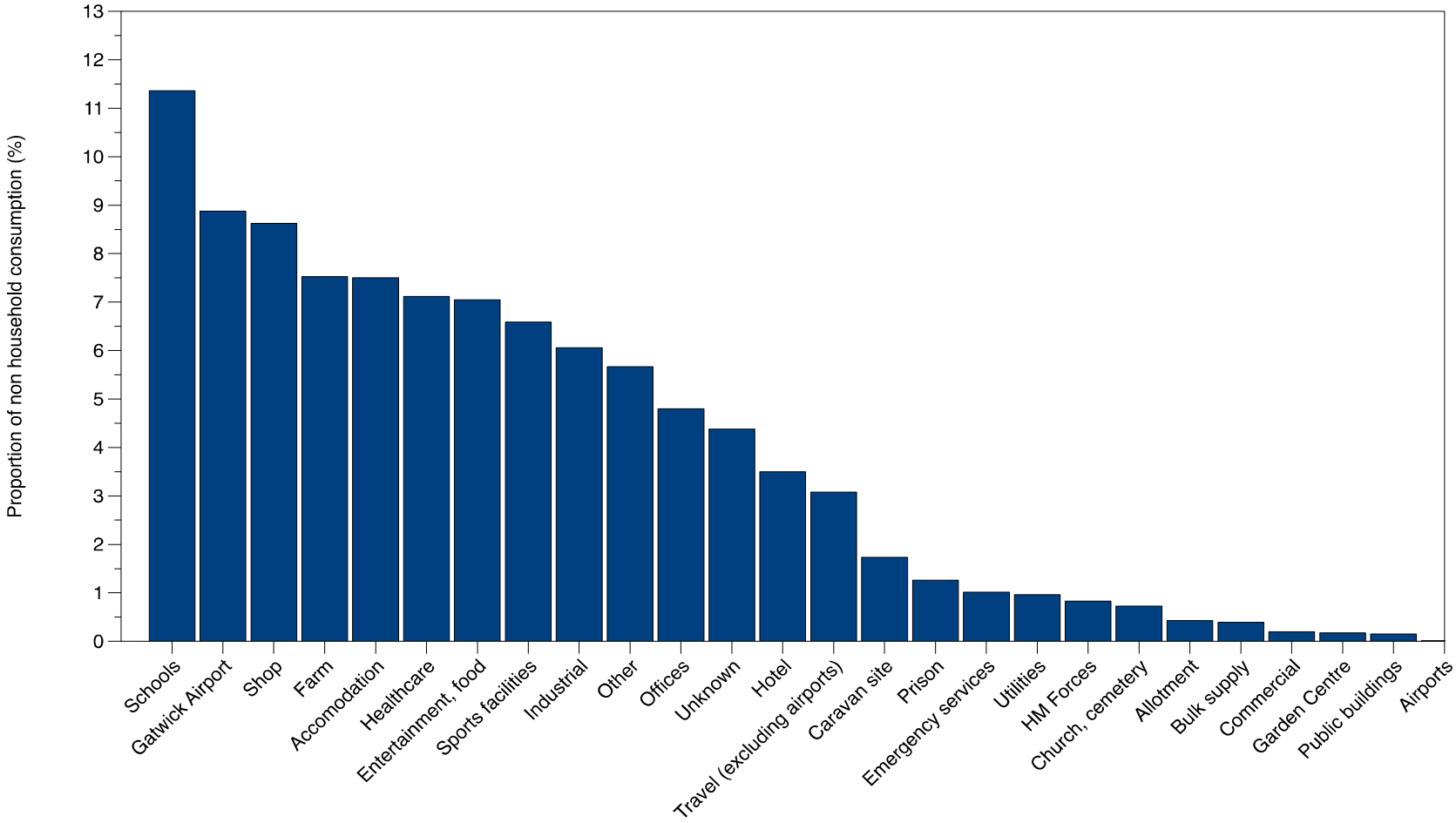
WRMP14 Comparison – 141.0 Ml/d by 2040

Our Approach: Demand Forecast

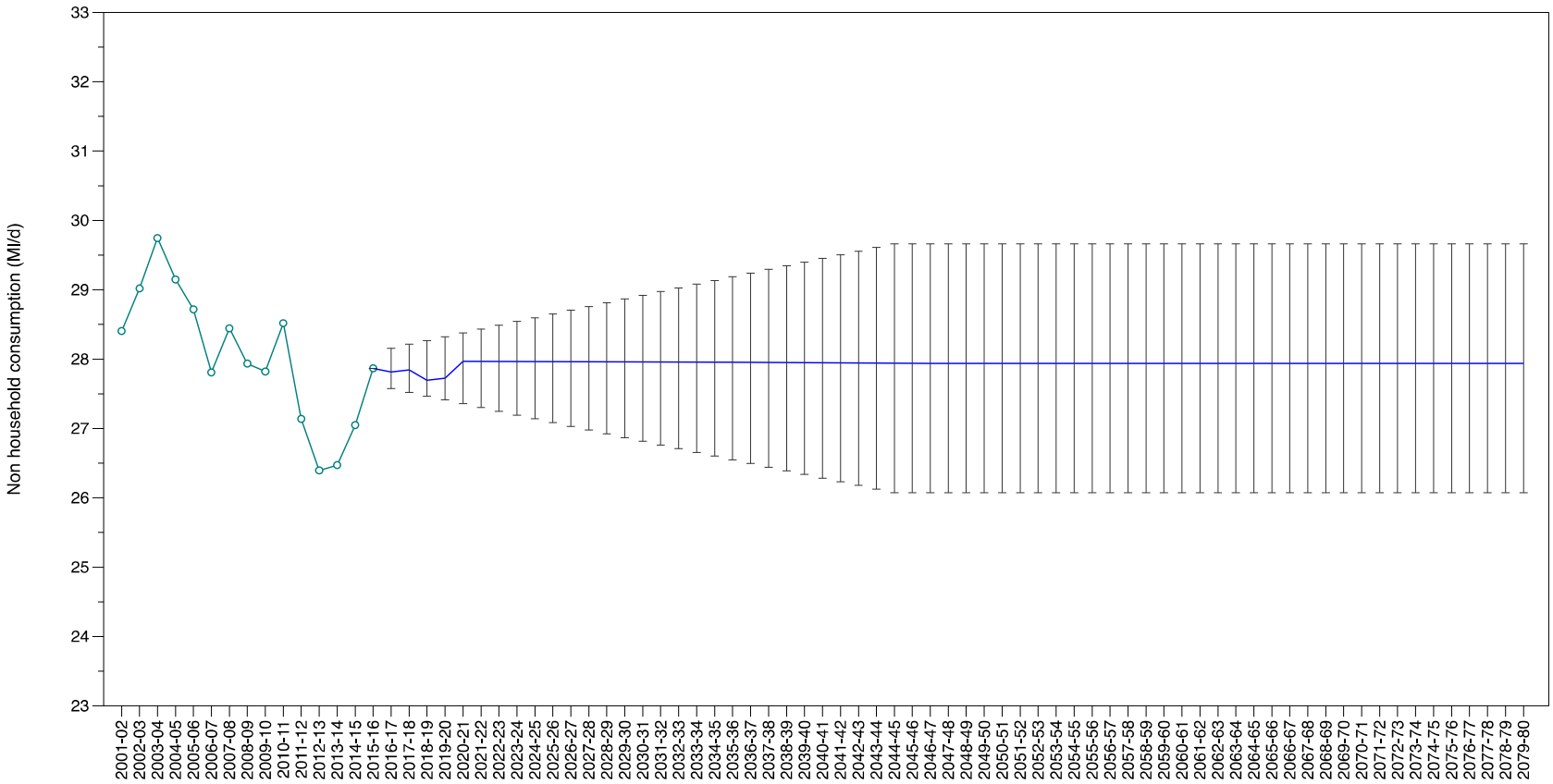
Non-Household Consumption

- In the current plan this component was projected to have no growth or decline
- We have segmented data using Post Office Address Base categories
- For each category consumption is forecast using econometric modelling, and tested against impacts including market reform, Brexit and Gatwick expansion
- Central forecast remains at stable consumption

Our Approach: Demand Forecast



Our Approach: Demand Forecast



WRMP14 Comparison: 25.1 Ml/d by 2040

Our Approach: Demand Forecast

Leakage

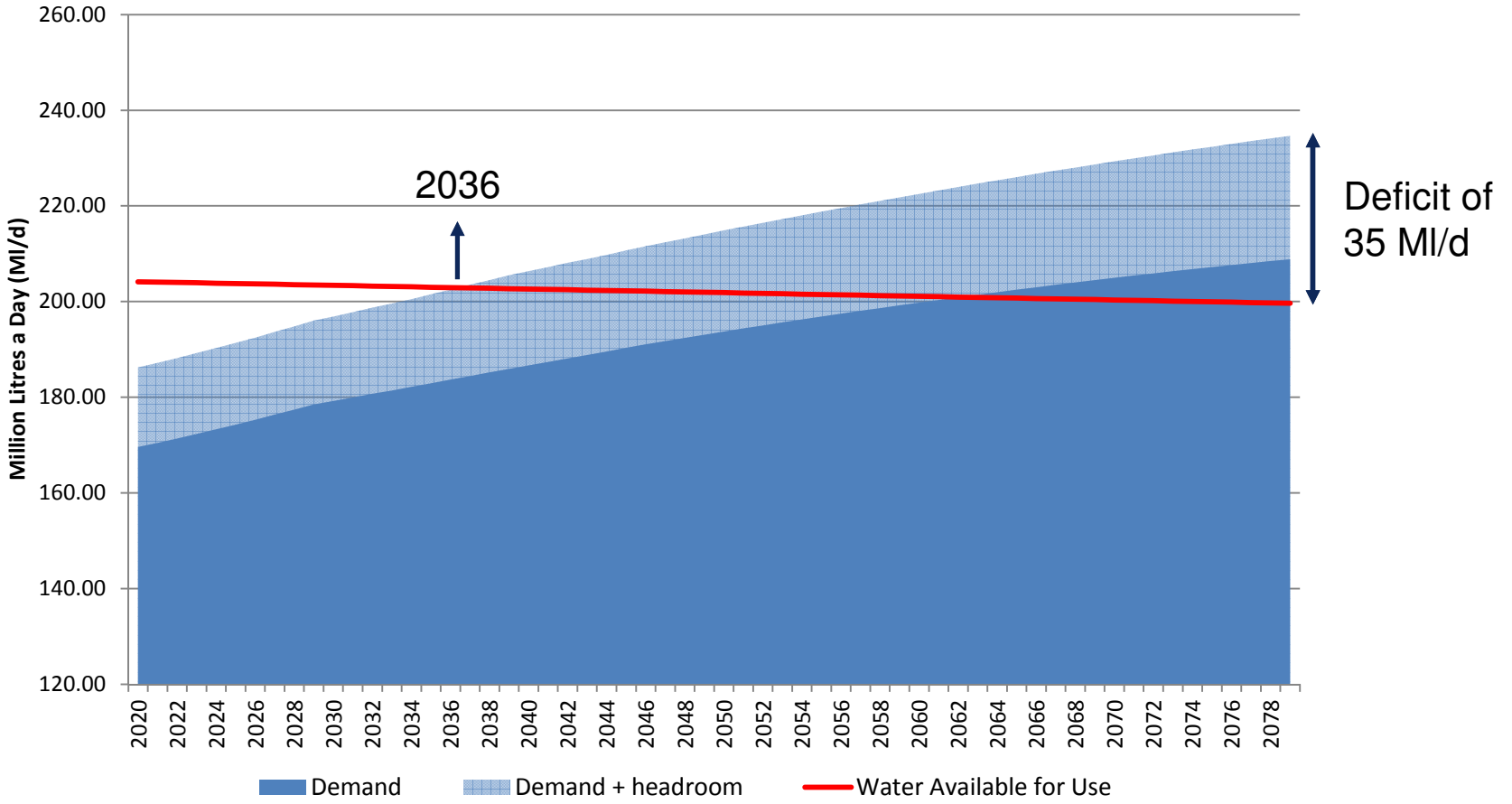
- For our baseline forecast we have included a steady leakage level from 2020 (at 24 Ml/d) to the end of the planning period
- This requires a reduction in leakage per property due to growth
- We are recalculating our Economic Level of Leakage based on new data for each district which is then used in our options analysis

Minor Components

- We also calculate the amount of water used in our distribution system for have operational use and consumption in empty (void) properties
- For our baseline forecast we have assumed a flat profile from 2020 (at 4.2 Ml/d)

Supply-Demand Balance

Supply-Demand Balance: Baseline



Supply Demand Balance: Options Appraisal

- We identified options needed to address the deficit using those from the current plan, generic industry options, regional solutions (transfers) and third party options
- In conjunction with the Environment Agency these options were screened using a systematic scoring process. Separate lists were created for supply (including third parties), transfers and demand management options
- Feasible options were then costed in terms of
    - Capital costs
    - Operating costs
    - Social costs
    - Environmental costs

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Options Appraisal: Screening Results

Type of Option	No of Unconstrained Options	No of Selected Options for modelling
Supply – New sources / increase capacity of existing sources	13	8
Supply – Treatment	7	3
Supply – Bulk Transfers (imports only)	2	1
Supply – Artificial Recharge Scheme	3	0
Supply – Licence Trading	23	0 (Investigations needed)
Demand – Leakage	9	5
Demand – Metering	6	3
Demand – Water Efficiency	14	8
Demand – Rainwater harvesting and Greywater recycling	5	1
Demand – tariffs	8	2

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Appendix C AECOM Presentation

Water Resource Management Plan 2019

Stakeholder Meeting

16 August 2017

Demand Options – Screening 1

- 98 options in the unconstrained list
  - Water efficiency
  - Leakage
  - Rain water and grey water harvesting
  - Metering
  - Tariffs
- Initial screening by SES Water staff and Artesia
  - Removed options that are already done or technically infeasible
  - Group some options together

Demand options - Screening 2

42 options taken forward: detailed screening

Criteria	Description
Yield uncertainty	What is the risk and uncertainty of the option delivering its estimated yield?
Lead Time	What is the time required to fully deliver the water savings?
Flexibility	Can an option be enlarged in the future?
Security of Supply	The likelihood of yield reducing over time ?
Environmental impact	Impacts on biodiversity, landscape, heritage. Use of materials, generation of waste or pollution.
Sustainability	The scheme's impacts on energy use, social effects, carbon footprint, etc.
Promotability	Is the option socially acceptable? Will customers think that it's a good idea?
Suitability	Will the option provide the correct amount of water at the right time (e.g. in terms of seasonality)
Technical difficulty	Technical complexity, engineering practicability and difficulty of implementation.

19 options taken forward to full costs and benefits appraisal

Demand options – leakage reduction

Reducing the volume of treated water that leaks from the distribution system

L1: Increased spend on normal leakage control to reduce leakage

L2: Improvements to location of leaks to reduce leakage

L3: Improvements to repair efficiency to reduce leakage

L4: Reducing pressure in the networks to reduce leakage

Demand options – metering

Metering or smart metering to help customers save water

- Identifying leaky fittings and appliances
- Identifying high consumption
- Providing feedback to manage how much water is used

M3: Non-smart metering of all households to reduce water and wastage

M2: Smart metering of all households to reduce water use and wastage

M1: Smart metering of selected households to reduce water use and wastage

NB: Savings on the cards are total volume across the WRZ

Demand options – water efficiency

E2: SES Water plumber visits to install water efficiency devices

E3: Domestic plumber visits to install water efficiency devices for high consumers only

NB: Savings on the cards are total volume across the WRZ

E1: Sending out water efficiency devices for homeowners to install

E4: Offer water efficiency devices to non-households for self-install

E5: Targeting properties with leaking toilets and offering a free repair

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Supply Options Screening 1

Options types are groundwater abstraction, increasing size of reservoir, upgrading treatment works to enable more flow from existing sources, imports from other water companies.
Options were screened against criteria including:

- Regulatory – water available for licensing, status of water resources (WFD), presence of sensitive ecosystems
- Flexibility & Resilience - could scheme be increased later, or enable other schemes or yield to be realised?
- Sustainability – it is material or carbon intensive?
- Social – does scheme affect public spaces, amenity, create jobs, affect heritage and landscape?

Scored 1-3 for positive to negative effects or impediments to implementing scheme

Supply Options Screening 2

- 20 options taken forward: detailed screening
- Costing CAPEX (build costs) and OPEX (operational costs) and environment and social assessment
- Pipeline options without enabling a specific source yield not used in EBSD but taken forward as resilience measures

T1, Upgrade WTW (Lower Greensand)-The Clears ammonia and pesticide

SW1, raising Bough Beech Reservoir

T2, Secombe Centre UV treatment

T3P3, Pipeline linking Pains Hill, Duckpit Wood & Chalk Pit Lane to existing treatment works at Westwood and Godstone

P1, North Downs confined Chalk AR extension 1 (Bishopsford Road)

P2, Bulk supply from Thames Water

Supply Options Screening 3

- 20 options taken forward: detailed screening
- Costing CAPEX (build costs) and OPEX (operational costs) and environment and social assessment
- Pipeline options not used in EBSD but taken forward as resilience measures

G1, New borehole (Mole Valley Chalk)-Fetcham springs

G2, Leatherhead licence increase

G3, New Lower Mole Abstraction source

G4, New middle Mole abstraction source

G5, North Downs Confined Chalk AR extensions 2

G6, Outwood lane

G7, Lowering pumps at Kenley and Purley

KEY QUESTIONS – SET 1 CARDS

- Why have you selected that set of Options?
- Why have you focused more on demand/supply?
- Did you consider and then dismiss any other options? Which and why?
- Are there any options that you outright dismissed? Which and why?
- Have you given any thought to the likely impacts of the options you've selected? What sorts of impacts do you expect? What about the level of impact?

Option Impacts

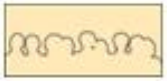
Demand Option Impacts

- Costs
  - Some high cost options may have benefits elsewhere in the company
- Carbon emissions:
  - Demand options reduce the amount of water treated and pumped, therefore often reduce emissions
- Environmental impact:
  - Largely neutral for demand options
- Social disruption:
  - Largely neutral, but some options do result in short term disruption to pedestrians and road traffic

Supply Option Impacts

- Costs
  - Groundwater options generally lower cost compared to treatment, reservoir costs high
- Carbon emissions:
  - Groundwater and reservoir options mean more pumping so additional carbon emissions. Treatment options are more energy intensive so higher carbon emissions
- Environmental impact:
  - Base case model runs consider all abstractions near a river as a minor negative as more water is taken but is within current licensing policy. Other sources not near rivers and other studies have shown no significant impact.
  - Treatment options are on existing sites, no additional land take so neutral
  - Environmental model run excludes options in WFD bodies potentially at risk of deterioration
- Social disruption:
  - Largely neutral, but some options do result in short term disruption to pedestrians and road traffic for construction

Summary of Impacts

COST	**£** LOW	**££** MEDIUM	**£££** HIGH
CARBON EMISSIONS	 LOW	 MEDIUM	 HIGH
ENVIRONMENTAL IMPACT	 POSITIVE	 NEUTRAL	 NEGATIVE
SOCIAL DISRUPTION	 NEUTRAL	 MINOR NEGATIVE	 NEGATIVE

KEY QUESTIONS – SET 2 CARDS

- Would you change your original choice of options now you have more information on the impacts? Why?
- What would you select now? Why?
- Which impacts are more important to you? Why?

Temporary Use Ban

- If you had the option of reducing some of the deficit by introducing a temporary use ban would you consider it? Would you swap with one of the options you selected? Which one? Why?
- Why do you think it is unacceptable?

KEY QUESTIONS – SET 2 CARDS

- Are there any options you think we have missed? If so, please complete a blank card.
- Share with other stakeholders on the table. What do others think?
- Which options would you replace with the new card(s)?

Draft Preferred Plans

- Economic Balance of Supply and Demand (EBSD)
- Run 009 Least cost
- Run 010 Best Environmental
- Run 011 Demand only
- Run 012 Least cost with level of service increased from 1:10 to 1:20

Thank you