SES Water
Draft Water Resources Management Plan 2019

Options Appraisal – Supply Side

October 2017

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
Draft	24/02/2017				
Draft	06/04/2017				
Final	05/10/2017				

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Tables

1. Introduction

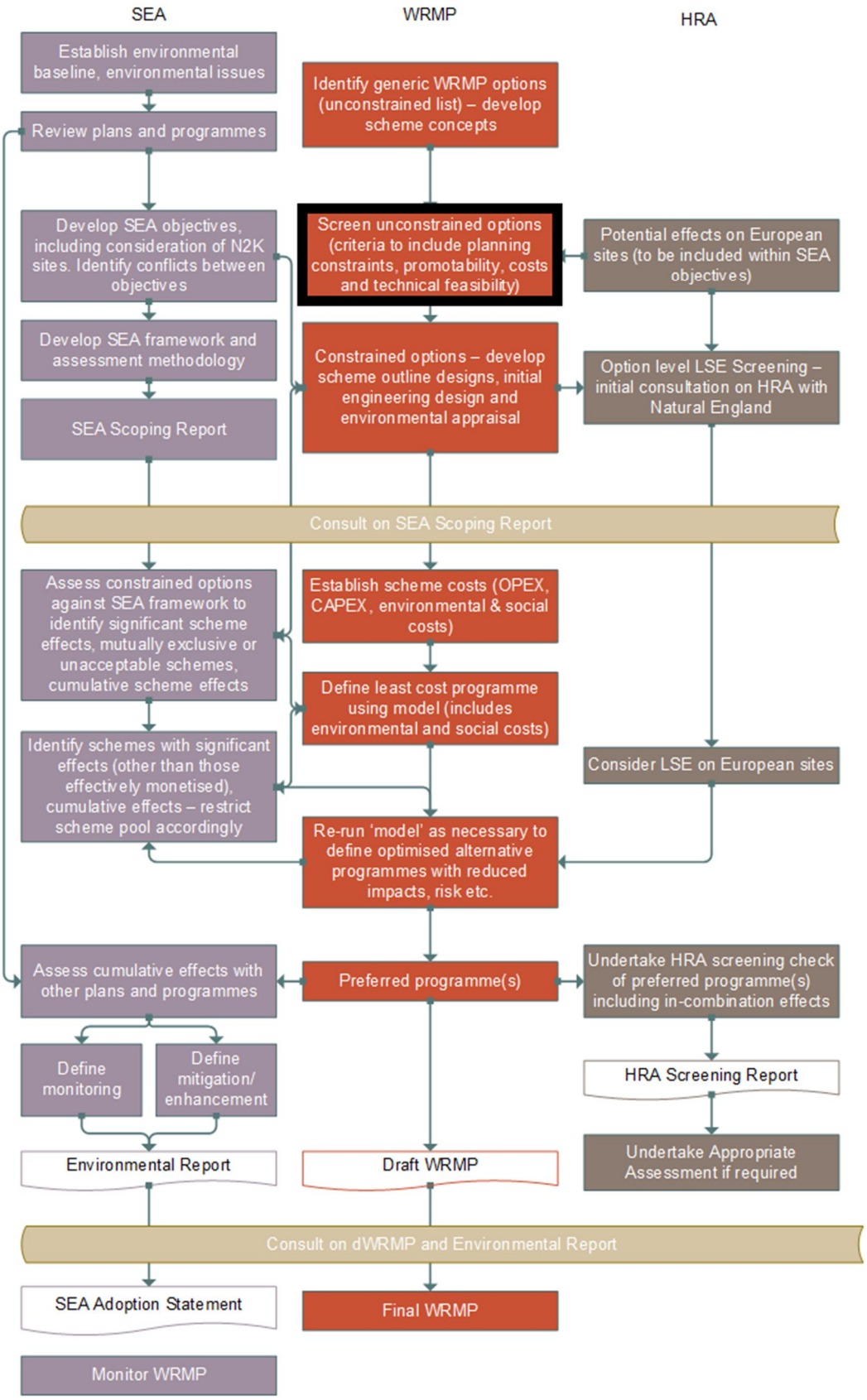
AECOM has been commissioned to undertake the Options Appraisal (OA) of SES Water Draft Water Resource Management Plan 2019 (dWRMP2019).

1.1 What is Options Appraisal?

The Options Appraisal process arises where a projected deficit in the supply-demand balance is forecast, where the Water Resources Planning Guidance (WRPG) then requires the Company to determine feasible options to address this deficit, and then complete an assessment of costs, and social & environmental impacts.

Figure 1.1 illustrates how the WRMP, Strategic Environmental Assessment (SEA), and Habitats Regulations Assessment (HRA) processes are integrated. This has been adapted from UKWIR 2012 guidance. This Options Appraisal Report element is highlighted in black in Figure 1.1.

Figure 1-1 SEA and HRA aligned with the WRMP process



1.1 Screening Methodology

Options were screened against a range of criteria. The criteria for WRMP19 follows the approach taken in WRMP14 where the options are considered against the yield uncertainty (how well is the concept understood), its technical difficulty, its promotability with regulators and customers and other stakeholders, its flexibility for change in the future (is the cost likely to be worth spending today for long-term resource availability), is it sustainable in terms of energy and material use, and does it impact on conservation or heritage sites, or have a social impact from change to the general landscape or economic changes (such as job creation).

For WRMP19, AECOM took these themes and categorised them as initial and secondary screening criteria with the aim of screening out options that are unlikely to pass crucial tests and therefore should not be considered further. These screening criteria would vary with option type (groundwater and surface water, transfers and treatment).

2. Groundwater and Surface Water Options

2.1 Existing Schemes

SES Water provided AECOM with the list of options developed in-house for screening. AECOM were also tasked with identifying where possible additional schemes that may be beneficial to SES Water and add them to the unconstrained list for screening.

Schemes brought forward from WRMP14 included those that had not been implemented to date and considered schemes that had been identified and included in WRSE. SES Water has also been consulting with other water companies about potential transfers between companies. Where these have been considered feasible they formed part of the list of options provided.

Drought options were not included in the list of feasible options as these were not considered capable of meeting the supply demand deficit on a permanent basis (the yield would not be reliable) and would involve environmental impacts that were considered a significant impediment to feasibility compared with schemes brought forward from WRMP14.

2.2 New Schemes

2.2.1 New source areas

Three schemes related to new abstraction possibilities in the Mole catchment were added, based on review of the CAMS licensing policy when screening the existing SES Water options in the Mole catchment. These relate to the water availability in the lower, middle and upper Mole areas described in the CAMS document. The new schemes are for SES Water to have a new surface water or groundwater abstraction in these catchment areas making use of the available water for licensing.

2.2.2 Trading

Three new schemes were added to the original options list involving trading within each Environment Agency licensing area. In WRMP14 SES Water wrote to all abstractors offering discussions on trading volumes, but this approach was not successful at the time.

For this WRMP the following tables present the current abstraction licence holder and licensed volume to give SES Water information ahead of any future trading discussions with licence holders. The tables have not been screened for consumptiveness but provide an overview of the major abstractors and potential opportunities in each catchment.

The Environment Agency has advised that trading to a fully consumptive use such as water supply could only be made with other consumptive abstractions. That is, a trade would not be possible with a licence holder of a low consumptiveness water use.

In the Mole catchment there are numerous smaller licence holders which may offer the opportunity for trading smaller volumes from numerous abstractors in the catchment, to be drawn at existing SES Water sources in the catchment (e.g Fetcham and Leatherhead). Licences of over 0.5 Mld are given in Table 1 below considering an assumption that licences of small volume may be able to offer 0.1 Mld, and large abstractors over 0.5 MLd, which when summed may offer SES Water in the order of 2-5 Mld. The largest abstractor is for surface water and is licensed for over 17 Mld, however it is not known how consumptive this licence is and therefore whether a significant volume would be available for consumptive use.

In the Wandle catchment there are large abstractors offering the opportunity for a small number of trades that offer significant additional resources. Table 2 shows the licence holders for licences over 2 Mld on the basis that trades of 0.5 Mld may be possible. However

the Environment Agency estimated that many of these licences would have a low consumptiveness and therefore the Wandle catchment may have limited trading opportunities.

In the Eden catchment, SES Water abstract from surface water to fill Bough Beech reservoir. There are numerous surface water abstractors upstream of Bough Beech Reservoir so there may be opportunity for SES Water to trade upstream volumes in order to take more at Bough Beech. Table 3 shows licences over 0.5 Mld that may offer trades of 0.1 to 0.5 Mld assuming the licensed volume is not being fully used.

The Eden catchment trading scheme means that if Bough Beech reservoir were raised to create additional capacity (an existing option) it could be filled at any time using existing traded licences and not be reliant on high flows for additional abstraction under the CAMS policy.

Table 1. Mole catchment abstraction licences for potential trading

Licence Number	Licence expiry date	Source	Type of abstraction	For the purpose of	For the sub purpose of	Being used for	Max daily abstraction (m3/d)	Max annual abstraction (m3/yr)	Start of abstraction period	End of abstraction period	Name of current licence holder
28/39/32/0092	Not Applicable	THAMES SURFACE WATER - NON	Single Point / Single Purpose	Agriculture	Aquaculture Fish	Fish Farm/Cress Pond Throughflow	17712	1943179	01-Jan	31-Dec	BURY HILL FISHERIES LTD
28/39/32/0100	31/03/2017	THAMES GROUNDWATER	Single Point / Single Purpose	Industrial, Commercial And	Mineral Products	Mineral Washing	4800	1200000	01-Jan	31-Dec	Sibelco UK Ltd
28/39/32/0091	Not Applicable	THAMES SURFACE WATER - NON	Single Point / Single Purpose	Environmental	Non-Remedial River/Wetland	Make-Up Or Top Up Water	4700	4700	01-Nov	31-Mar	A PHILLIPS & D MAGUIRE
28/39/32/0003	Not Applicable	THAMES SURFACE WATER - NON	Multiple Points / Multiple Purposes	Agriculture	General Agriculture	Spray Irrigation - Direct	2618	114922	01-Mar	30-Sep	THOMPSON BROS (ESHER) LTD
TH/039/0032/001/R01	31/03/2019	THAMES SURFACE WATER - NON	Single Point / Single Purpose	Industrial, Commercial And	Golf Courses	Spray Irrigation - Storage	1450	40000	01-Nov	31-Mar	Burhill Golf and Leisure Limited
28/39/32/0051	Not Applicable	THAMES SURFACE WATER - NON	Single Point / Single Purpose	Agriculture	General Agriculture	Spray Irrigation - Direct	855	45460	01-Mar	31-Oct	SOUTHWOOD MANOR FARM LTD
28/39/32/0048	Not Applicable	THAMES SURFACE WATER - NON TIDAL	Single Point / Single Purpose	Agriculture	Horticulture And Nurseries	Spray Irrigation - Direct	820	36400	01-Mar	31-Oct	EMMETT
28/39/32/0079	Not Applicable	THAMES SURFACE WATER - NON	Single Point / Single Purpose	Amenity	Private Non-Industrial	Lake & Pond Throughflow	772	282685	01-Jan	31-Dec	PAINSHILL PARK TRUST LTD
TH/039/0032/013	31/03/2029	THAMES GROUNDWATER	Single Point / Multiple Purposes	Industrial, Commercial And	Golf Courses	Drinking, Cooking, Sanitary, Washing, (Small	720	48000	01-Apr	31-Mar	Longshot Cherkley Court Ltd

Notes:

Blue shading indicates a possible low consumptiveness for this purpose type. Therefore despite a large licence volume it is likely little could be traded to a high consumptiveness purpose (water supply)

Table 2. Wandle catchment abstraction licences for potential trading

Licence Number	Licence expiry date	Source	Type of abstraction	For the purpose of	For the sub purpose of	Being used for	Max daily abstraction (m3/d)	Max annual abstraction (m3/yr)	Start of abstraction period	End of abstraction period	Name of current licence holder
TH/039/0041/008	31/03/2025	THAMES SURFACE WATER - NON TIDAL	Single Point / Single Purpose	Production Of Energy	Electricity	Hydroelectric Power Generation	114048	3.78E+07	01-Apr	31-Mar	NATIONAL TRUST
28/39/41/0075	Not Applicable	THAMES SURFACE WATER - NON TIDAL	Single Point / Single Purpose	Industrial, Commercial And Public Services	Municipal Grounds	Make-Up Or Top Up Water	12960	4730400	01-Jan	31-Dec	GROUNDWORK MERTON
37/103/R01	31/03/2026	Southern Region Groundwater	Multiple Points / Multiple Purposes	Industrial, Commercial And Public Services	Mineral Products	Dust Suppression	11282	2454165	01-Mar	31-Oct	Tarmac Trading Limited
28/39/41/0070	Not Applicable	THAMES GROUNDWATER	Multiple Points / Single Purpose	Industrial, Commercial And Public Services	Laundry	General Washing/Process Washing	6000	650000	01-Apr	31-Mar	Berendsen UK Limited
28/39/32/0100	31/03/2017	THAMES GROUNDWATER	Single Point / Single Purpose	Industrial, Commercial And Public Services	Mineral Products	Mineral Washing	4800	1200000	01-Jan	31-Dec	Sibelco UK Ltd
9/40/01/0078/GR	Not Applicable	Southern Region Groundwater	Single Point / Multiple Purposes	Industrial, Commercial And Public Services	Food & Drink	Non-Evaporative Cooling	4567	1592860	01-Apr	31-Mar	Coca Cola Enterprises Limited
TH/039/0044/013	31/03/2025	THAMES GROUNDWATER	Multiple Points / Single Purpose	Industrial, Commercial And Public Services	Other Industrial/Commercial/ Public Services	Heat Pump	3456	1261440	01-Apr	31-Mar	WestInvest Gesellschaft fur Investmentfonds mbH
03/070	Not Applicable	Southern Region Surface Waters	Single Point / Single Purpose	Agriculture	Aquaculture Fish	General Use Relating To Secondary Category (Very Low Loss)	3456	1261400	01-Jan	31-Dec	Moore

Notes:

Blue shading indicates a possible low consumptiveness for this purpose type. Therefore despite large licensed volumes it is likely little could be traded to a high consumptiveness purpose (water supply)

Table 3. Eden catchment abstraction licences for potential trading

Licence Number	Licence expiry date	Source	Type of abstraction	For the purpose of	For the sub purpose of	Being used for	Max daily abstraction (m3/d)	Max annual abstraction (m3/yr)	Start of abstraction period	End of abstraction period	Name of current licence holder
03/070	Not Applicable	Southern Region Surface Waters	Single Point / Single Purpose	Agriculture	Aquaculture Fish	General Use Relating To Secondary Category (Very	3456	1261400	01-Jan	31-Dec	Moore
03/074	Not Applicable	Southern Region Surface Waters	Multiple Points / Single Purpose	Industrial, Commercial And Public Services	Golf Courses	Spray Irrigation - Direct	1227	40910	01-Apr	31-Aug	Lingfield Park 1991 Ltd
9/40/03/0488/CA	Not Applicable	Southern Region Surface Waters	Single Point / Single Purpose	Agriculture	General Agriculture	Spray Irrigation - Storage	1136.5	13638	01-Jan	31-Dec	Matthews
9/40/03/0193/SR	Not Applicable	Southern Region Surface Waters	Single Point / Single Purpose	Industrial, Commercial And Public Services	Machinery And Electronics	General Use Relating To Secondary Category (Very Low Loss)	1091	227300	01-Oct	30-Sep	Peek
9/40/03/0611/G	Not Applicable	Southern Region Groundwater	Single Point / Multiple Purposes	Industrial, Commercial And Public Services	Golf Courses	Lake & Pond Throughflow	1000	78910	01-Mar	31-Oct	Clubhaus (Chartham Park) Limited
9/40/03/0277/SR	Not Applicable	Southern Region Surface Waters	Single Point / Single Purpose	Agriculture	General Agriculture	Spray Irrigation - Direct	681.9	9092	01-May	30-Sep	Young

Notes:

Blue shading indicates a possible low consumptiveness for this purpose type. Therefore despite large licensed volumes it is likely little could be traded to a high consumptiveness purpose (water supply)

2.2.3 Unused Headroom

The focus for the development of options in WRMP14 was peak schemes based on the assessment of demand and supply at that time. These schemes have not been implemented to date and have been carried forward into this assessment. SES Water consider that average schemes are also required for WRMP19 considering the estimated supply demand situation during this planning period.

Therefore additional consideration has been given to comparing the licensed rates at groundwater sources and the average rate used over the past five years, to indicate where existing proposed peak schemes could also offer average deployable output.

Other SES Water sources not part of the original options list have also been assessed for the difference between licensed rate and the abstraction returns data ('headroom'). The reason for these sources not abstracting their full licence has not been determined in this screening exercise. It may be either or a combination of the demand not existing in the area served (thus offering future capacity), operational inefficiency where the operation of sources is not optimised to make the most of the licence available, or a constraint preventing the source abstracting its licensed amount (to be determined from source deployable output study).

The sources with their licence rates and actual usage since 2010 are given in Table 4. Where headroom exists for an existing peak scheme, the option screening has been modified from the existing WRMP14 option list to include an average as well as peak scheme benefit. Other sources with headroom are included at this unconstrained screening stage as a general 'constraints and optimisation' option scheme as the details for each source are not currently known. Any constraints to abstracting this headroom will become apparent in the deployable output study.

Table 4. Difference between licensed and actual abstraction 2010-2016

Source	Annual Difference							Average Difference
	2010	2011	2012	2013	2014	2015	2016	2010-2016
Individual Sources								
Fetcham Springs & Borehole	-3.94	-4.41	-6.49	-4.46	-4.21	-4.80	-5.15	-4.78
Young St. & Elmer	-20.87	-21.29	-20.15	-18.88	-21.11	-19.89	-20.35	-20.36
Leatherhead								
Dorking	-1.93	-2.72	-2.16	-3.23	-3.11	-3.60	-2.50	-2.75
Buckland/Clears/Cliftons Lane	-1.87	-0.59	-1.27	-1.08	-2.27	-1.81	-2.27	-1.60
Warwick Wold/Brewer Street	-2.61	-3.21	-3.13	-1.97	-3.07	-5.25	-5.30	-3.51
Nonsuch	-7.30	-8.54	-7.25	-7.15	-7.84	-7.54	-7.15	-7.54
Cheam/Cheam Park/Springclose Lane	-4.04	-5.03	-6.51	-4.92	-6.16	-6.12	-6.10	-5.56
Secombe Centre	-4.93	-5.00	-5.00	-5.00	-5.00	-5.00	-4.14	-4.87
Sutton/Sutton Court Road	-6.97	-12.19	-11.54	-11.39	-10.07	-8.65	-9.74	-10.08
Langley Park	-1.77	-1.50	-1.20	-1.56	-1.08	-1.27	-1.05	-1.35
Bletchingley	-1.49	-1.71	-1.21	-3.09	-3.50	-2.49	-2.91	-2.34
North Park	-4.02	-4.28	-3.55	-3.71	-3.72	-3.31	-2.25	-3.55
Godstone	-1.46	-1.46	-1.28	-1.61	-1.67	-1.74	-1.79	-1.57
Flower Lane	-3.23	-3.18	-3.10	-3.52	-2.83	-3.13	-2.50	-3.07

Source	Annual Difference							Average Difference
	2010	2011	2012	2013	2014	2015	2016	2010-2016
Duckpit Wood	-0.77	-0.77	-0.77	-0.77	-0.77	-0.77	-0.77	-0.77
South Green	-1.41	-1.52	-1.31	-1.67	-1.72	-0.84	-1.38	-1.41
Water Lane	-4.99	-5.98	-5.49	-5.00	-5.47	-5.54	-5.60	-5.44
Westwood	-3.22	-2.37	-3.23	-3.28	-2.67	-3.46	-2.85	-3.01
Paines Hill	-1.37	-1.37	-1.37	-1.37	-1.37	-1.37	-1.37	-1.37
Group Licences								
Sutton/Cheam bh group	2.21	-5.04	-4.28	-2.80	-2.92	-1.36	-0.96	-2.16
Woodmansterne Group	-1.63	-4.45	-4.28	-3.33	-3.72	-3.55	-2.82	-3.40
Godstone Group	-3.34	-3.76	-2.26	-5.05	-4.85	-3.81	-2.59	-3.67
Westwood Group	-2.71	-2.96	-3.12	-3.05	-2.95	-2.92	-2.92	-2.95
Hackbridge/Goatbridge	-3.97	1.35	-1.68	-2.26	-0.24	-0.72		-1.25
Oaks/Woodcote	-0.12	-2.25	-4.47	-0.47	-1.33	-0.12	-1.05	-1.40
Purley & Kenley	-6.12	-4.88	-7.22	-4.87	-3.70	-2.99	-3.62	-4.77

Source: SES Water

There are significant unused licence quantities based on the returns data from 2010-2016. Many licences are part of a group licence, and where significant headroom exists at the individual source, the group may have limited headroom. Therefore the most potential is in sources that have significant headroom and are not limited by an overall group licence.

Significant (greater than 3 Mld) headroom exists at the following sources not restricted by a group licence with limited headroom:

- Leatherhead, Young Street and Elmer;
- Fetcham;
- Kenley and Purley;
- Warwick Wold and Brewer Street;

Significant group licence headroom existing at sources within the following group licences:

- Woodmansterne Group; and,
- Godstone Group

Average yield was added to the schemes brought forward from WRMP14 where only peak yield was sought. This is then considered as a peak and average scheme in the screening process.

2.3 Screening

AECOM developed a scoring system related to the issues and themes of each screening criterion, and for each option described the issues and gave a score. Scores were given as follows:

1. Significant impediment to scheme – that may not be possible to overcome or means to overcome may not be worth the benefit of the scheme

2. Some impediments but can be overcome, or with current information could not be considered significant

3. No impediments to scheme

A total score was calculated for each option that could be used to aid SES Water option prioritisation. If the initial screening scores included any result of ‘significant impediment’ the option was identified to be potentially screened out at this stage. That is, any score of 1 against any initial screening criteria would mean the option would be flagged for screening out, and secondary screening would not be required. Consultation with SES Water and the Environment Agency would determine whether the scoring was appropriate. This would enable a shorter, more feasible list to go forward to the costing stage as a ‘constrained’ options list.

Initial criteria related to the promotability of a scheme with regulators. Specific criteria were the CAMS and WFD status of water bodies where the option resides, whether there is water available for licensing; a risk of deterioration to the groundwater and surface water body, or designated habitat.

The scoring and description of issues related to each screening criterion were output to option information sheet proformas, providing a quick reference guide to the issues arising and decision making process. These are given in Appendix 1.

The specific considerations and scoring approach to each criterion is given in Table 5.

Table 5. Groundwater and Surface Water Options Screening Criteria Scoring

Criteria	Issues to consider and scoring
Initial Screening	
CAMS status	If no water available, put 2 for peak scheme, 1 for average. If water available 3 for any scheme
WFD status	If Good then 3 for any scheme, if moderate then 2 for peak scheme, 1 to average, 1 to any scheme for water body at Poor status
WFD Risk of Deterioration	If not at risk then 3, if at risk then 1 to average and 2 to peak. If on sustainable catchments list and also at risk then 1 for any scheme
Risk to Designated Sites	If groundwater dependent sites and CAMS status water available then 3 as assumed headroom above gwdte needs. If no water or restricted water available then average 1, peak scheme 2. if no designated sites or sites not groundwater dependent then 3. Or pipeline route through site (score 1), or long route around possible (score 2), or no sites in vicinity (score 3)
if score of 1 for any of the above then potentially screen out, otherwise continue to secondary screening	
Secondary Screening	
Customers	Customers opinions with type of source, groundwater or surface water preferences. Or are there active local groups for river restoration? Score 3 if no information, 2 if preference is not for this option type, 1 if there are active groups opposing abstraction or promoting local environmental improvements (e.g high environmental awareness)
Other water companies	Is there any risk of impact to other water companies, eg does increased abstraction affect other abstraction downstream? High risk (abstraction nearby) score 1, abstraction in catchment=2, no abstraction or singificant distance=3
Yield uncertainty	Is the yield well understood, eg existing site or well known aquifer properties (score 3). Or a new aquifer block not well known (score 1 or 2 on judgement)
Water Quality	WRMP14 raised concerns about landfill pollution to LGS sources. If scheme is LGS source near old landfill score 2, otherwise 3 if no landfill, 3 for chalk schemes and LGS confined schemes. If scheme source area has known pollution problems then score 1
DO of scheme	Is the yield high or low? (e.g. less than 2 Mld score 1, 2-5 Mld, score 2, over 5 Mld score 3). A higher score means the scheme is significant to meeting the supply-demand deficit
Flexibility	Is this option a one-off or stand-alone (score 1), could it be enlarged, used with other schemes (score 3) ? Needs to consider capacity of network and treatment works to accept additional water from scheme
Technical Difficulty	Is the option very complex to implement or significant impediments such as multiple dependencies to bring to fruition, is yield high to make it worthwhile? Highly complex score 1, straight forward, score 3, in between score 2
Sustainability	Is option material, energy or carbon intensive? High score 1, low score 3.
Social Impact (people and places)	Would the scheme enhance community, jobs or green space? Would it damage existing green spaces? Or no effect? Score 3 unless negative
Social Impact (flood Resilience)	Would scheme improve flood resilience, eg groundwater scheme in gw flooding prone area, or surface water scheme abstracting winter high flows? If yes score 3, neutral or some potential to improve flooding outcomes score 2, if possibly detrimental score 1
Social Impact (drought resilience)	Would scheme improve drought resiilence thus reducing risk of drought permits, hoespipe bans etc. Score 3 for ASR scheme, 2 for groundwater, 1 for surface water
Landscape and Heritage	Would scheme damage heritage sites or general landscapes? Score 3 unless negative

2.4 Screening Results

The screening of groundwater and surface water options identified the catchment trading options received the highest scores because there are no significant impediments from a licensing or WFD perspective as no additional water is proposed to be taken from the catchments. These sources already have proven yields and all infrastructure is in place. However contact with licence holders has not been made as part of the unconstrained screening so these options are not taken forward. The screening process has identified them as potential options for SES Water to look into outside of the WRMP.

The general scheme for removal of constraints and optimisation of the management of a source with headroom has only been screened to the initial stage because each source would require secondary screening individually. But in principle these schemes are making use of water already licensed and so would also be expected to score highly.

The new options identified in the lower Mole, middle Mole, and upper Mole catchments score highly because they make use of water that the Environment Agency has identified as available for abstraction as it is surplus to environmental needs. Therefore there are no regulatory impediments and with existing infrastructure nearby throughout the Mole catchment, infrastructure technical difficulties, cost and sustainability rank highly.

The limiting factor is that water is not available year round, with low flow periods generally having no water availability. These options enable water to potentially be taken from an area with availability for at least half the year reducing the need to using existing Mole catchment sources. Therefore during low flow periods less water will have been taken from existing sources, improving environmental flows, and leaving more water available on each licence to meet demand. This potentially offers improved resilience at low flows without additional environmental impacts.

In terms of existing options from WRMP14, high scoring options were R21 (Bishopsford Road extension) as these are part of the Wandle artificial recharge scheme which is considered sustainable and has no environmental impacts of concern to the Environment Agency. R5 (Fetcham borehole) scores highly as there is water available, and the infrastructure is largely in place. R22 (Outwood Lane) identifies a peak scheme in this area and the Environment Agency confirmed there were no significant concerns with short term abstraction at peak times. This scheme also has unused average headroom within licence so offers average and peak resource potential with all infrastructure already in place. Similarly R28 (Kenley and Purley) offers increases in peak and average deployable output with limited infrastructure requirements, and is within the existing licence so raises no significant regulatory issues. However water quality issues have been raised regarding this site and therefore to ensure resilience, increasing output at Kenley and Purley would need to be accompanied by treatment upgrades.

Bough Beech reservoir increased capacity (R1) is the only surface water resource option and scored favourably due to water availability and the resilience offered, and environmental improvements made possible by rerouting the inflowing streams. However it did not score as highly as groundwater options due to the significantly greater material and carbon inputs, and technical difficulty.

Option information sheets describing the rationale for scoring each criteria are given in Appendix 1.

2.5 Constrained Options

In WRMP14 all options were taken through to constrained options, where engineering, environmental, carbon, and social costs were developed.

In this planning cycle it was decided to use the more detailed scoring system to take the best options through to costing only. It was agreed to take approximately half the options under

each option type. As some criteria are not relevant to some option types, if all options were considered together it would bias the results to those with the most relevant criteria (thus giving a higher overall score). Therefore options were considered against other options of the same type. This also ensured resilience was built in to the process by selecting options from each type.

However where a dependency across option types exists then both options should be treated in the same way. For example if there is a groundwater option to increase yield, and a treatment option to upgrade the treatment works receiving this water, then it would not be sensible to screen in one option type and not the other related to the same source.

The groundwater and surface water options taken through to constrained stage are given in Table 6. The yield benefit at average (ADO) and peak (PDO) is also given based on the information provided from WRMP14 and the assessment of headroom in section 2.2.3.

The highest scoring options have been selected and are shaded in blue. Option N2 has been excluded because the yield isn't likely to be very small, and R6 is being considered alongside other pipeline related options in Section 4. Similarly R2 will also be considered against other pipeline options. Option N9 as described in Section 2.2.3 has no secondary screening scores as the issues related to optimising different sources is being investigated in the deployable output study.

The trading options scored highly but have unknown yields at this time until SES Water can confirm the licence holders are willing to trade and the Environment Agency will enable the trade. They are documented here as favourable options but for these reasons are not taken forward for costing which is anticipated to involve assessing existing pump and network capacities at existing SES Water sources to abstract the additional traded volume.

Bough Beech reservoir raising did not score in the top half of the list but in the treatment screening (Section 3) the upgrading of the Bough Beech treatment works was the highest scoring scheme. Therefore it is sensible to take the water resource option for Bough Beech forward as well as the treatment option.

Table 6. Groundwater and Surface Water Options Scoring Summary and Constrained List

		Yield Benefit			
Code	Name	ADO	PDO	Initial Screening	Total Score
N1	Mole catchment 3rd party licence trading	3	3	12	45
N3	Eden catchment 3rd party licence trading	3	3	12	44
R22	Outwood Lane	3.4	5	12	44
R5	New borehole (Mole Valley Chalk) - Fetcham Springs	4.78	3.148	9	43
N2	Wandle catchment 3rd party licence trading	1	1	12	42
N6	New Middle Mole Abstraction source	40	40	11	42
R21	North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)	2.16	5	9	42
R28	Lowering pumps at Kenley and Purley	3.4-4.7 ?	14.5	11	42
R6	New borehole (Lower Greensand) - Chalk Pit Lane mains connection	3.4	3.4	10	41
N4	Leatherhead licence increase	2	2	11	40
N5	New Lower Mole Abstraction source	17	17	11	40
N7	Leatherhead new boreholes	20	0	11	39
R1	Raising of Bough Beech reservoir	4.9	0	10	38
R23	Duckpit Wood replacement borehole (not Chalk Pit Lane)	1.37	2.14	10	38
R3	North Downs Unconfined Chalk AR (recharge at Eyhurst Park, Kingswood)	0	5	10	38
R4	North Downs LGS ASR (recharge at Eyhurst Park, Kingswood)		2.5	11	38
R7	Enhance borehole output (Lower Greensand) - Water Lane increase in pump capacity & pesticide treatment	2.95	1.85	10	37
R2	North Downs Confined Chalk AR extension 1 (Bishopsford Road)	0	5	0	33
N9	Removal of constraints and or optimisation of WRZ source use	19	0	10	

Note: option R1 is put through to the constrained list because its dependent treatment option P1c scored highly in the treatment option screening

3. Treatment Options

3.1 Existing Schemes

SES Water provided AECOM with the list of options developed in-house for screening. AECOM were also tasked with identifying where possible additional schemes that may be beneficial to SES Water and add them to the unconstrained list for screening.

3.2 New Schemes

Treatment works capacities were reviewed as part of considering whether additional sources of supply could be delivered to existing works or whether treatment works upgrades would be required. The treatment works where new sources of supply would be delivered typically have spare capacity.

In instances where this was identified to be a constraint a description was given in the option information sheet under the flexibility and technical difficulty secondary screening criteria. Therefore in some instances a groundwater or surface water option will also include a treatment works upgrade, and so is not duplicated in this section.

Therefore new schemes are included in this section if they are an identified constraint or offers a network efficiency. One scheme was added following discussions with SES Water during the screening of existing options. This scheme considers the delivery of additional raw water to Westwood WTW and Godstone WTW from the Duckpit Wood, Chalk Pit Lane, and Pains Hill sources as an alternative to works at each source (existing options).

A review of these treatment works identified that spare capacity exists for this volume of water, such that there was no need for a separate treatment works upgrade option to screen but it is recorded here. This scheme also forms a new pipeline-related option addressed in Section 4.

3.3 Screening

AECOM developed a scoring system related to the issues and themes of each screening criterion, and for each option described the issues and gave a score. This is described in Section 2.3.

The initial criteria related to the promotability of a scheme with regulators and are generally not relevant to treatment options. However the source of water for treatment was given in the screening. Therefore the secondary screening has been the focus for treatment options. Consequently options could not be screened out based on the initial screening results.

The scoring and description of issues related to each screening criterion were output to option information sheet proformas, providing a quick reference guide to the issues arising and decision making process. These are given in Appendix 2.

The specific considerations and scoring approach to each criterion is given in Table 7.

Table 7. Treatment Options Screening Criteria Scoring

Criteria	Issues to consider and scoring
Initial Screening	
CAMS status	Not directly relevant. Options scored for source of water to be treated as per Table 5
WFD status	Not directly relevant. Options scored for source of water to be treated as per Table 5
WFD Risk of Deterioration	Not directly relevant. Options scored for source of water to be treated as per Table 5
Risk to Designated Sites	Not directly relevant. Options scored for source of water to be treated as per Table 5
Secondary Screening	
Customers	Not relevant
Other water companies	Not relevant
Yield uncertainty	Not relevant
Water Quality	WRMP14 raised concerns about landfill pollution to LGS sources. If scheme to treat LGS source near old landfill score 2, otherwise 3 if no landfill, 3 for chalk schemes and LGS confined schemes. If scheme source area has known pollution problems then score 1
DO of scheme	Is the increase in deployable output derived from treatment option significant compared to broad consideration of likely relative cost and complexity? (Score 3 for large yield, 2 for medium, 1 for small yield benefit derived)
Flexibility	Not relevant
Technical Difficulty	Is the option very complex to implement or significant impediments such as multiple dependencies to bring to fruition, is nature of treatment difficult? Highly complex score 1, straight forward, score 3, in between score 2
Sustainability	Is option material, energy or carbon intensive? High score 1, low score 3.
Social Impact (people and places)	Would the scheme enhance community, jobs or green space? Would it damage existing green spaces? Or no effect? Score 3 unless negative
Social Impact (flood Resilience)	Not relevant
Social Impact (drought resilience)	Not relevant
Landscape and Heritage	Would scheme damage heritage sites or general landscapes? Score 3 unless negative

3.4 Screening Results

The screening of treatment options identified the Bough Beech treatment upgrade as scoring more favourably than the remaining options. This was based on a cleaner source of water, standard treatment requirements, and a large deployable output benefit.

Options R8 scores more highly than R25 and R25 due to the size of the increase in deployable output only. R24 is more sustainable than R8, R26 and R25 in terms of requiring standard treatments, however SES Water consider this site to have higher maintenance costs, so this led to the options being scored equally for sustainability leaving only the deployable output variation to discriminate between them.

Option information sheets describing the rationale for scoring each criteria are given in Appendix 2.

3.5 Constrained Options

As described in Section 2.5, in this planning cycle it was decided to use the detailed scoring system to take the best options through to costing only. It was agreed to take approximately half the options under each option type while also considering dependencies across option types.

The Bough Beech options have the same scores as the screening criteria cannot differentiate between the option variants and therefore as in WRMP14, P1c was taken through to constrained stage on the basis that the items 2&3 were CAPEX components that are not essential to the scheme.

Scoring for other options gave very similar results that offer no clear direction on which options should be preferred.

Options R24 and R25 had the lowest scores and must also be considered against the new scheme described in Section 3.2 which is an alternative pipeline option and therefore mutually exclusive to these treatment options. Discussions with SES Water comparing the options R24 and R25 against a new pipeline to Westwood and Godstone WTWs were favourable for the new pipeline option.

The treatment options taken through to constrained stage are given in Table 8 and shaded in blue. The yield benefit at average (ADO) and peak (PDO) is also given based on the information provided from WRMP14.

Table 8. Treatment Options Scoring Summary and Constrained List

		Yield Benefit		
Code	Name	ADO	PDO	Total Score
P1	Increase Bough Beech WTW capacity from 50Ml/d to 70Ml/d - Items 1, 2 & 3	-0.6	20	21
P1b	Increase Bough Beech WTW capacity from 50Ml/d to 70Ml/d - Items 1 & 2	-0.6	20	21
P1c	Increase Bough Beech WTW capacity from 50Ml/d to 70Ml/d - Items 1	-0.6	20	21
R8	Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment	1.6	2.57	28
R26	Secombe Centre UV	2.07	4.54	28
R24	Duckpit Wood hydrogen sulphide treatment	0	0.77	29
R25	Pains Hill Springs refurb including UV	1.37	1.37	29

4. Transfer and Bulk Supply Options

4.1 Existing Schemes

SES Water provided AECOM with the list of options developed in-house for screening which incorporated transfers between water companies that were considered feasbile. AECOM were also tasked with identifying where possible additional schemes that may be beneficial to SES Water and add them to the unconstrained list for screening.

4.2 New Schemes

The SES Water pipeline network was reviewed at screening stage for any obvious limitations in the ability to deliver the volumes of water proposed in the groundwater and surface water options. It was considered that the existing schemes list had identified all of the pipeline related constraints.

One scheme was added following discussions with SES Water during the screening of existing options. This scheme considers the delivery of additional raw water to Westwood WTW and Godstone WTW from the Duckpit Wood, Chalk Pit Lane, and Pains Hill sources as an alternative to treatment works upgrades at each source. This would involve treatment at source for the specific quality issues rather than full treatment, with delivery of this water to existing treatment works for the full standard treatments. This was considered to be more efficient than full treatment works for small quantities at three locations.

4.3 Screening

AECOM developed a scoring system related to the issues and themes of each screening criterion, and for each option described the issues and gave a score. This is described in Section 2.3.

The initial criteria related to the promotability of a scheme with regulators and are generally not relevant to transfer and bulk supply options as they relate to pipeline routing rather than the sources of water. Therefore the secondary screening has been the focus for treatment options. Consequently options could not be screened out based on the initial screening results.

The scoring and description of issues related to each screening criterion were output to option information sheet proformas, providing a quick reference guide to the issues arising and decision making process. These are given in Appendix 3.

The specific considerations and scoring approach to each criterion is given in Table 9.

Table 9. Transfer and Bulk Supply Option Screening Criteria Scoring

Criteria	Issues to consider and scoring
Initial Screening	
CAMS status	Not relevant
WFD status	Not relevant
WFD Risk of Deterioration	Not relevant
Risk to Designated Sites	Does the pipeline route cross any designated habitats and if so can they be easily rerouted? Score 3 for no impediments, 2 for issues to be resolved around site, 1 for only possibility of avoiding site is significant cost and complexity.
Secondary Screening	
Customers	Customers opinions on characteristics or perceived difference in quality of supply from alternative WRZs or objections to extensive civil works to implement scheme. Score 3 if no information or no preference, 2 if preference is not for this supply source or resistance to works, 1 if there are active / vocal objections.
Other water companies	Is there any risk of impact to other water companies/zones, e.g. does transfer affect robustness of donor zone supply? High risk (donor zone suffers reduced supply resilience) score 1, some affect on donor zone supply resilience=2, no effect on donor zone supply resilience=3
Yield uncertainty	Is the yield well understood, e.g. supply taken from Thames Water London ring main (score 3). Or from trunk mains less well understood (score 1 or 2 on judgement)
DO of scheme	Is the yield high or low? (e.g. less than 2 Mld score 1, 2-5 Mld, score 2, over 5 Mld score 3). A higher score means the scheme is significant to meeting the supply-demand deficit
Flexibility	Is this option a one-off or stand-alone (score 1), could it be enlarged, used with other schemes (score 3) ? Needs to consider capacity of network and treatment works to accept additional water from scheme
Technical Difficulty	Is the option very complex to implement or significant impediments such as multiple dependencies to bring to fruition, is yield high to make it worthwhile? Highly complex score 1, straight forward, score 3, in between score 2
Sustainability	Is option material, energy or carbon intensive? High score 1, low score 3.
Social Impact (people and places)	Would the scheme enhance community, jobs or green space? Would it damage existing green spaces? Or no effect? Score 3 unless negative
Social Impact (flood Resilience)	Not relevant
Social Impact (drought resilience)	Not relevant
Landscape and Heritage	Would scheme damage heritage sites or general landscapes? Score 3 unless negative

4.4 Screening Results

The screening of treatment options identified the options relating to internal transfers between Sutton WRZ and East Surrey WRZ as the most favourable. These were R12, R13 and the reverse flow option for these schemes.

Option R2 scores highly as it involves connections for new groundwater sources to an existing network.

Other high scoring options include bulk supplies from Thames Water to Sutton WRZ at Merton (R10 and R11). Then several schemes had the same score, including the new pipeline option (N8) for linking existing abstractions requiring treatment upgrades and delivering the water to existing treatment works with capacity, as well as another bulk supply option from Thames Water to East Surrey WRZ at Effingham (R16), and bulk supplies with South East Water able to flow in both directions from Outwood to Maidenbower (R15 and n/a 2).

Two schemes were not scored because there was no benefit identified to SES Water. These involved releasing water from Bough Beech reservoir to the River Eden for South East Water to abstract downstream (Bough Beech to Forstall). No reciprocal import is identified so there are no environmental or engineering considerations. An export to South East Water (n/a 2) was included because there was a reciprocal import. However discussions with SES Water determined that there was a high level of uncertainty around this option, requiring Bough Beech capacity to be increased first (R1), and additional treatment of imported water from South East Water (R15) which has not been studied to date, so these options were not considered to be feasible options in terms of WRPG for the WRMP19.

Option information sheets describing the rationale for scoring each criteria are given in Appendix 3.

4.5 Constrained Options

The pipeline options not associated with a specific yield (R12, R13, and ‘reverse’) were not taken forward because although the screening has identified that they would be beneficial to SES Water in WRMP19 compared to other possible options, they represent resilience measures rather than enabling a new source of water to be delivered to the network, and therefore are not suitable for the constrained stage.

Discussions with Thames Water during at the conclusion of this screening process identified that the water that would provide the bulk supply option R16 is not available at this time and therefore cannot be take through to constrained stage. This screening process has identified this as a high scoring option and therefore still forms a valuable record of potential future options for SES Water.

As described in Section 2.5, in this planning cycle it was decided to use the detailed scoring system to take the best options through to costing only. However due to the limitations described above it was not possible to take approximately half the options as was done for groundwater, surface water and treatment options.

Schemes R9, R10 and R11 are mutually exclusive with each other, so the highest scoring scheme R10 was taken through to costing stage.

The transfer and bulk supply options taken through to constrained stage are given in Table 10 and shaded in blue. The yield benefit at average (ADO) and peak (PDO) is also given based on the information provided from WRMP14.

Table 10. Transfer and Bulk Supply Option Scoring Summary and Constrained List

		Yield Benefit		
Code	Name	ADO	PDO	Total Score
R13	12Ml/d transfer from Sutton WRZ (Langley Park/North Looe Reservoirs) to East Surrey WRZ (Buckland)	12	12	34
R12-Reverse	20Ml/d transfer from East Surrey WRZ (Outwood PS) to Sutton WRZ (Langley Park/North Looe Reservoirs)	20	20	34
R13-Reverse	12Ml/d transfer from East Surrey WRZ (Outwood PS) to Sutton WRZ (Langley Park/North Looe Reservoirs)	12	12	34
R2	North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14	0	5	33
R12	20Ml/d transfer from Sutton WRZ (Langley Park/North Looe Reservoirs) to East Surrey WRZ (Outwood PS)	20	20	33
R10	15Ml/d bulk supply from Thames Water (London WRZ) to SESW (Sutton WRZ) at Merton	15	15	32
R11	5Ml/d bulk supply from Thames Water (London WRZ) to SESW (Sutton WRZ) at Merton (maximum existing capacity requiring no mains upgrade works)	5	5	31
R15	10Ml/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to East Surrey WRZ (Outwood PS)	10	10	31
R16	10Ml/d bulk supply from Thames Water (Shalford WTW, Guildford WRZ) to SESW (Effingham SR, East Surrey WRZ)	10	10	31
n/a 2	10Ml/d bulk supply from SESW East Surrey WRZ (Outwood PS) to SEW RZ2 (Maidenbower/Whitely Hill)	-10	-10	31
N8	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone	4.77	5.54	41
R9	30Ml/d bulk supply from Thames Water (London WRZ) to SESW (Sutton WRZ) at Merton	30	30	30
R14	5Ml/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to East Surrey WRZ (Outwood PS)	5	5	30
n/a 1	5Ml/d bulk supply from SESW East Surrey WRZ (Outwood PS) to SEW RZ2 (Maidenbower/Whitely Hill)	-5	-5	30
n/a 4	10Mld (ADO) & 15Ml/d (PDO) Bough Beech to Blackhurst (SEW) treated water transfer (1)	-10	-15	29
n/a 5	10Mld (ADO) & 15Ml/d (PDO) Bough Beech to Blackhurst (SEW) treated water transfer (2)	-10	-15	29
n/a 8	10Ml/d (ADO) & 15Ml/d (PDO) Bough Beech to Riverhill (SEW) treated water transfer	-10	-15	29
n/a 3	5Mld (ADO or PDO) Bough Beech to Blackhurst (SEW) treated water transfer	-5	-5	28
n/a 6	1.5Mld (ADO) & 5Ml/d (PDO) Release from Bough Beech to Forstall (R. Medway, SEW)	-1.8	0	0
n/a 7	3Mld (ADO) & 10Ml/d (PDO) Release from Bough Beech to Forstall (R. Medway, SEW)	-3.6	0	0

5. Conclusions

For WRMP19 a screening process has been undertaken using the general themes as those used in WRMP14 but a detailed scoring and initial screening has been added. The options from WRMP14 have been reassessed and augmented with new options.

The screening process has been able to discriminate benefits and dis-benefits of the options in order to decide which options should be costed, and provides a record of the issues involved in each option. This has enabled a short-list to emerge for costing as a constrained options list, while also considering related options across different types, that is, groundwater and surface water resources, treatment, and pipeline transfer and bulk supplies.

The recommended constrained options list across all option types is given in Table 11.

Table 11. Supply Side Options Constrained List

Type	Code	Name
Groundwater	R22	Outwood Lane
Groundwater	R5	New borehole (Mole Valley Chalk) - Fetcham Springs
Groundwater	N6	New Middle Mole Abstraction source
Groundwater	R21	North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)
Groundwater	R28	Lowering pumps at Kenley and Purley
Groundwater	N4	Leatherhead licence increase
Groundwater	N5	New Lower Mole Abstraction source
Surface water	R1	Raising of Bough Beech reservoir
Treatment	P1c	Increase Bough Beech WTW capacity from 50Ml/d to 70Ml/d - Items 1
Treatment	R8	Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment
Treatment	R26	Secombe Centre UV
Pipeline	R2	North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14
Pipeline	R10	15Ml/d bulk supply from Thames Water (London WRZ) to SESW (Sutton WRZ) at Merton
Pipeline + treatment	N8	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone

Appendix 1

Groundwater and Surface Water Option Information Sheets

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Raising of Bough Beech reservoir	
Option Code	R1	
Description of Scheme	Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. This option has been included to demonstrate the costs and likely increases in average yield from such a scheme. Based on available drawings of the earth dam alignment, a 3m raising of the embankment would appear to be feasible. It is likely that some realignment of the embankment locally to the small housing development on the north side of the embankment would be required. A detailed study would be necessary to confirm the viability of this scheme. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600Ml. The Aquator model of the Bough Beech reservoir system was used to estimate the additional average yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5Ml/d, but no increase in peak output which is constrained by the WTW capacity.	
Initial Screening		Score
CAMS status	Medway CAMS, no water available in the uper Eden catchment and tributaries. Scheme will draw surface water from the River Eden for Bough Beech reservoir. Additional water available approximately 37 days per year at a rate of approximately 100 Ml/d depending on hands-off flow locally on the River Eden as well as on the Middle Medway at Teston. Current licence would has sufficient headroom to abstract for 37 days if water is available. Licence up for renewal 2018. If can agree summer intake it may avoid need for drought permit. Therefore there is potential to fill the additional reservoir capacity.	2
WFD status	Lower Eden Surface Water Body situated at the Bough Beech surface water abstraction. Classified as Moderate status with surface water element Moderate. Potential improvement in WFD as west and east branch to be joined and watercourse created around embankment to west and fish passage lengthened. Stream with low gradient on west side to be created similar to scheme near Canterbury (Broad Oak). Scheme will lengthen watercourse. Compensation flow to be separate. Less inflow from streams to reservoir brings less silt.	3
WFD Risk of Deterioration	Surface water body classified At Risk of not supporting Good Ecological Status and classified At Risk of deterioration. Not a problem at low flow -check category. Surface water abstraction for reservoir is on the Sustainable Catchments list so EA may not want more abstraction here. Should be acceptable to abstract under CAMS policy and not cause deterioration.	2
Risk to Designated Sites	There are no Habitats Directive sites in the Lower Eden catchment. Abstraction according to CAMS policy should not affect any downstream habitats. Benefit to have diverted streams inflowing downstream of weir for ease of fish passage. Benefit if fish passage added to existing weir/gauging station. Local Wildlife Site near reservoir is designated and impacts should be considered as part of the raising option i.e. lowland meadow, wet grassland, ancient woodland and key breeding/ overwintering wading bird habitat and great crested newt breeding ponds.	3
Initial Screening Decision	SCREEN IN	10

Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Water available under licensing policy so no effect on existing abstractors other than taking the available water and therefore will not be available to others in future.	3
Yield uncertainty	Yield related to capacity of raised reservoir and likelihood of filling it to give average DO. Risk of not achieving DO is during extended drought.	2
Water Quality	No significant issues raised. Silt benefit and metaldehyde benefit if inflows diverted.	3
Change in DO of scheme	Medium sized	2
Flexibility	Significant water resource offers average DO management year-round. Unlikely to be able to increase reservoir again. Existing design capacity in treatment works to increase flow. Rejoining streams to north of reservoir and outflow stream to the south will reduce need to manage reservoir outflows.	2
Technical Difficulty	Significant structural engineering requirements to reservoir otherwise mains and treatment in place. SESW have looked at pumping arrangements. Can use as duty assist rather than duty standby.	2
Sustainability	Significant material needs and carbon emissions for construction.	1
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Scheme involves additional abstraction to fill raised reservoir at high flows, reducing flood risk nearby. Check volume of offtake compared with flow - flood reduction likely to be small proportion but still improvement. EA can provide flow at which flooding occurs.	3
Social Impact (drought resilience)	No water available at low flows in River Eden to abstract. Surface water resource likely to be depleted before groundwater resources but flow also restored faster than groundwater to refill reservoir.	2
Landscape and Heritage	Change in landscape with higher profile to reservoir. Small population in area to see reservoir.	2
	Total Score	38

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14	
Option Code	R2	
Description of Scheme	Bishopsford Rd borehole was drilled and constructed in 2008. This scheme connects the borehole into the Cheam WTW East Main at Goatbridge. The objective of the scheme is to increase the PDO of the licence group by allowing recovery of the artificially recharged volume at Hackbridge at a higher abstraction rate over a shorter period of time during the subsequent peak demand period. In order to realise this 5 Ml/d increase in PDO, a licence variation would be required allowing a 5 Ml/d increase in the daily licence from 19 Ml/d to 24 Ml/d.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Water source is downgradient of recharge areas so no affect on upstream asbtractions. Abstracting from an injection mound so no significant effect down gradient	3
Yield uncertainty	Existing source well understood	3
Water Quality	Confined Chalk abstraction. No significant concerns.	3
Change in DO of scheme	Medium size	2
Flexibility	Could be enlarged depending on how mound is managed. Offers flexibility in how much is taken from different boreholes. Low environmental impact so should be seen favourably by EA to increase abstraction in confined aquifer at the expense of unconfined sources. Cheam treatment works has significant spare design capacity to accept additional flows.	3
Technical Difficulty	No significant impediments, scheme infrastructure already in place, requiring extension of mains connections to new borehole.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Scheme involves injection and abstraction from confined aquifer, no connection to surface waters.	1
Social Impact (drought resilience)	Increased artificial recharge that could be drawn during drought periods when other sources have low yield.	3
Landscape and Heritage	Neutral	3
	Total Score	33

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	North Downs Unconfined Chalk AR (recharge at Eyhurst Park, Kingswood)	
Option Code	R3	
Description of Scheme	Under this scheme groundwater would be abstracted from the unconfined aquifer at Leatherhead at times of high groundwater levels and average demand and then pumped to the top of the North Downs and down into the unconfined Chalk aquifer as artifiicial recharge. The aim of this is to support subsequent summer groundwater levels in the unconfined Chalk aquifer further to the north and down the dry valley e.g. Chipstead, Holly Lane, Woodmansterne, Smitham and Purley. Historical abstraction suggests that there may be between approximately 5 - 25 Ml/d available from the Leatherhead Group licence to transfer for artificial recharge over a 5-month winter period. Turbidity would be removed by new pressure filters and the partially treated raw water would be transferred, via a new pumping station and 13km transfer main, to a new recharge borehole to recharge the North Downs Chalk aquifer. It is expected that the recharge of the aquifer and resulting increase in peak period DO would be approximately 5Ml/d. It has been assumed that the recharge borehole would also be used as a production borehole during the summer months, with a new 2.2km 300mm dia. raw water transfer main to an existing WTW.	
Initial Screening		Score
CAMS status	Mole CAMS, water available above Q70 flows in the River Mole, with some restricted availability at lower flows subject to the River Thames hands-off flow. Therefore the scheme to take water at higher groundwater levels is not restricted by CAMS policy.	3
WFD status	Mole (Horley to Hersham) Surface Water Body. Moderate Ecological Status and Good chemical status relevant to abstraction point of water to be transferred. The supporting flow element has not been assessed.	2
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Dorking North Downs Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters.	2
Risk to Designated Sites	There are no designated sites in the unconfied chalk in the area of the Woodmansterne Group abstractions that would abstract the injected waters. No additional drawdown anticipated because groundwater mounding would be created by injection to be drawn down by abstraction.	3
Initial Screening Decision	SCREEN IN	10

Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Water source to be abstracted is considered available so should not derogate downstream abstractors in the confined London Chalk aquifer. Additional abstraction at Woodmansterne Group will capture imported water so does not derogate catchment water resources.	3
Yield uncertainty	Borehole yields at Leatherhead well understood, groundwater mound at site not tested but volume and flow should be feasible.	2
Water Quality	Scheme provides additional groundwater to existing Chalk sources. No significant concerns. Quality of Leatherhead Chalk groundwater would need comparison to Wandle Chalk and any treatment to make acceptable prior to injection.	3
Change in DO of scheme	Medium size	2
Flexibility	Could be enlarged depending on how mound is managed as there is additional water availability at the source at Leatherhead if required across much of the year. Potential for ADO scheme. Low environmental impact so should be seen favourably by EA making more water available without additional unconfined water table drawdown.	2
Technical Difficulty	Requires 13 km transfer main, mostly rural area and no designated sites so no significant impediments other than significant amount of design work. Also requires 2.2 km pipeline to treatment works if injection borehole used for abstraction in summer and expansion of treatment works to higher design capacity (or 6+ km pipeline to Cheam WTW).	1
Sustainability	Significant construction works for pipeline and energy cost pumping of water approximately 100m uphill.	1
Social Impact (people and places)	Neutral once pipeline constructed and buried, assuming minimal maintenance required.	3
Social Impact (flood resilience)	Groundwater mounding is near area of groundwater flooding vulnerability in Caterham Bourne. Requires investigation into direction of flow of mound such that it would be drawn down in intended area and not flow to vulnerable areas.	2
Social Impact (drought resilience)	Increased artificial recharge that could be drawn during drought periods when other sources have low yield.	3
Landscape and Heritage	Neutral	3
	Total Score	38

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	North Downs LGS ASR (recharge at Eyhurst Park, Kingswood)	
Option Code	R4	
Description of Scheme	Under this scheme groundwater would be abstracted from the unconfined aquifer at Leatherhead at times of high groundwater levels and average demand and then pumped to the top of the North Downs and down into the confined Lower Greensand aquifer. The aim of this Aquifer Storage and Recovery scheme is to abstract surplus water, within existing licence, that would otherwise have been lost to high winter flows in the River Mole at Leatherhead and to pump this down into the Lower Greensand aquifer for storage and subsequent re-abstraction during peak demand periods at a new borehole at the top of the North Downs. Historical abstraction suggests that there may be between approximately 5 - 25 Ml/d available from the Leatherhead Group licence to transfer for artificial recharge over a 5-month winter period. Turbidity would be removed by new pressure filters and the partially treated raw water would be transferred, via a new pumping station and 13km transfer main, to a new recharge borehole to recharge the Lower Greensand aquifer. It is expected that the recharge of the aquifer and resulting increase in peak period DO would be approximately 2.5Ml/d. It has been assumed that the recharge borehole would also be used as a production borehole during the summer months, with a new 2.2km 300mm dia. raw water transfer main to an existing WTW.	
Initial Screening		Score
CAMS status	Mole CAMS, water available above Q70 flows in the River Mole, with some restricted availability at lower flows subject to the River Thames hands-off flow. Therefore the scheme to take water at higher groundwater levels is not restricted by CAMS policy. The injection and reuse sites are in the confined Lower Greensand aquifer which does not contribute baseflow to the River Wandle north of the site. Therefore the Wandle catchment status in the London CAMS is not relevant. The scheme enhances water availability here to then be abstracted so there should be no licensing impediments.	3
WFD status	Mole (Horley to Hersham) Surface Water Body. Moderate Ecological Status and Good chemical status relevant to abstraction point of water to be transferred. The supporting flow element has not been assessed. Wandle (Croydon to Wandsworth) and the R. Gra Surface Water Body. Classified as Heavily Modified. Moderate Status 2015. Surface water elements Good by 2027. Epsom Chalk Groundwater Body. Poor Status 2015 (no further target available). Scheme will abstract new water imported to catchment from Leatherhead which should be acceptable under CAMS policy conditions, should not affect WFD status. New imported water to the Wandle WFD surface water bodies so re-abstraction and use here is status neutral.	3
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Dorking North Downs Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. Wandle Surface Water Body classified Not at Risk of not supporting Good status or potential except Carshalton Branch, considered At Risk. Probably not at risk of deterioration, except Carshalton Branch, classified At Risk. Epsom Chalk Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters.	2
Risk to Designated Sites	There are no designated sites in the area of the Woodmansterne Group abstractions that would abstract the injected waters. Abstraction of injected water in confined aquifer.	3
Initial Screening Decision	SCREEN IN	11

Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No other known abstractors in the Lower Greensand in the area.	3
Yield uncertainty	Borehole yields at Leatherhead well understood, groundwater mound at site not tested but volume and flow should be feasible, less experience in Lower Greensand aquifer so less certain than Chalk scheme.	2
Water Quality	Source water is Chalk to be injected into Lower Greensand aquifer. Chalk water may need treatment prior to injection. Abstraction from confined Lower Greensand aquifer, protected from surface contamination. (Note Thames Water testing Darent to see whether 'bubble' of water will remain.) Fe and Mn considerations.	1
Change in DO of scheme	Medium size	2
Flexibility	Could be enlarged depending on how mound is managed as there is additional water availability at the source at Leatherhead if required across much of the year. Also dependent on volume accepted by Lower Greensand aquifer. Potential for ADO scheme. Low environmental impact so should be seen favourably by EA making more water available without additional unconfined water table drawdown using confined aquifer.	2
Technical Difficulty	Requires 13 km transfer main, mostly rural area and no designated sites so no significant impediments other than significant amount of design work. Also requires 2.2 km pipeline to treatment works if injection borehole used for abstraction in summer and expansion of treatment works to higher design capacity (or 6+ km pipeline to Cheam WTW). Treatment works may need additional processes for Lower Greensand waters as sites currently process chalk waters.	1
Sustainability	Significant construction works for pipeline and pumping of water approximately 100m uphill	1
Social Impact (people and places)	Neutral once pipeline constructed and buried, assuming minimal maintenance required	3
Social Impact (flood resilience)	Additional abstraction at Leatherhead may improve flood outcomes in Leatherhead area. Groundwater mounding in confined Lower Greensand should not increase flood risk.	3
Social Impact (drought resilience)	Increased artificial recharge that could be drawn during drought periods when other sources have low yield.	3
Landscape and Heritage	Neutral	3
	Total Score	38

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	New borehole (Mole Valley Chalk) - Fetcham Springs	
Option Code	R5	
Description of Scheme	The PDO of the Fetcham Spring/Boreholes source could potentially be increased by 3.148Ml/d to the peak licence by the installation of new boreholes which would allow abstraction above the current potential yield of the source. The scheme comprises the installation of a collector well and radiating horizontal boreholes to intercept natural springflow and minimising drawdown thereby reducing the environmental impact on natural groundwater flow to the River Mole. Scheme has not been implemented to date (from Peter Isherwood). Potential for an ADO scheme based on licence usage, assuming works described above enable additional yield to be abstracted. Fetcham springs averages 8.516 MLd compared to a licensed daily rate 13.675 Mld. Data from 2010-16 indicates that the licence offers 4.78 Mld on average if borehole can be made to yield.	
Initial Screening		Score
CAMS status	Mole CAMS, water available above Q70 flows in the River Mole, with some restricted availability at lower flows subject to the River Thames hands-off flow. The scheme is within licence with new boreholes drilled to achieve the licensed peak or average unused headroom. Therefore the scheme does not add to existing licensed volumes so should not be restricted by CAMS policy. EA likely to impose restriction of abstraction at low flow.	2
WFD status	Mole (Horley to Hersham) Surface Water Body. Moderate Ecological Status and Good chemical status. The supporting flow element has not been assessed. The Fetcham boreholes are in the Dorking North Downs Chalk groundwater body which has a Poor status due to the water balance test. As the surface water dependence test is Good then the cause of the failure may not be in the Leatherhead Chalk area where the Fetcham abstraction draws its water. However this status represents an impediment in the sense that it requires clarification before this scheme can be implemented.	2
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. The site is on the Sustainable Catchments list for risk of Serious Damage. Scheme for peak abstraction may be acceptable to EA for short periods. Average scheme may not be acceptable as this will increase recent actual abstraction and is a Category 1 impact.	2
Risk to Designated Sites	Bookham Commons and Mole Gap to Reigate Escarpment SSSIs are within 2km of the abstraction. It is not considered that additional abstraction from this location would have a detrimental impact on these habitats not being situated along the River Mole but on chalk slope and plateau environments.	3
Initial Screening Decision	SCREEN IN	9

Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other water companies downgradient in the area. There are several surface water abstractions downstream that groundwater abstraction needs to demonstrate will not deplete flow. No significant risk given water available status indicating surplus water can be abstracted.	2
Yield uncertainty	Existing source behaviour well understood	3
Water Quality	Existing Chalk source, no significant concerns.	3
Change in DO of scheme	Medium-Large size	3
Flexibility	Potential to be increased beyond existing licence limits depending on CAMS water availability. Source is immediately below AP2 where CAMS states 17 Mld may be available and 2Mld above AP2 which may be utilised depending on abstraction impact distribution to these assessment points.	3
Technical Difficulty	No significant impediments to drilling new boreholes, infrastructure already in place to take raw water to treatment and supply.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Capturing additional spring flows at high groundwater levels should reduce the risk of groundwater flooding.	3
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	43

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	New borehole (Lower Greensand) - Chalk Pit Lane mains connection	
Option Code	R6	
Description of Scheme	This was originally a replacement of Duckpit Wood & Pains Hill Springs but if the EA were to grant an independent 3.4 Ml/d licence, there would still be potential to develop a further replacement for Duckpit Wood under a new scheme (see below). This scheme is therefore to connect and commission the Chalk Pit Lane Borehole (i.e. headworks, treatment, power and pipework) to the Godstone WTW. The scheme allows for a 450mm rather than 300mm main to Godstone WTW to allow for future connection of the Westwood source for treatment at Godstone WTW. This scheme will therefore realise a 3.4 Ml/d increase in ADO and PDO.	
Initial Screening		Score
CAMS status	Medway CAMS, no water available in the uper Eden catchment and tributaries. Scheme will draw Lower Greensand groundwater which is contributes to baseflow in streams feeding the River Eden. May affect flow which is then abstracted downstream for Bough Beech Reservoir. Existing licence requiring mains connection, so CAMS status not relevant.	3
WFD status	On boundary of Upper Eden Surface Water Body and Gibbs Brook Surface Water Body. Upper Eden Poor status though surface water element has not been assessed. Failure appears to relate to pollution issues. Gibbs Brook Moderate status with surface water element not assessed. Kent Greensand Middle Groundwater Body, Poor Quantitative status for water balance and surface water dependent tests. Licence was granted because mitigation was put in place, abstraction must stop when groundwater levels at Duckpit Wood fall below a threshold. Therefore scheme can proceed despite WFD status (EA).	2
WFD Risk of Deterioration	Surface water bodies classified At Risk of not supporting Good Ecological Status but classified Probably Not at Risk of deterioration. Kent Greensand Middle Groundwater Body classified At Risk for impact to surface waters and Probably At Risk for impact on the water balance. The existing site Duckpit Wood is on the Sustainable Catchments list for risk of serious damage so may not be acceptable to EA. Licence acceptable because mitigation was put in place, abstraction must stop when groundwater levels at Duckpit Wood fall below a threshold. Sustainable Catchments impact at Category 4, considered not significant, therefore scheme can proceed despite WFD status (EA).	2
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	10

Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other water companies downgradient in the area.	3
Yield uncertainty	Severe Licence constraints by EA to be precautionary. Groundwater levels are being measured at Duck Pit Wood by EA (and new boreholes drilled at Sandy Lane Oxted in Lower Greensand and Hythe) to help with lifting of constraints when licence renewed.	2
Water Quality	No known issues. Borehole constructed to overcome quality issues at Duckpit Wood.	3
Change in DO of scheme	Medium size	2
Flexibility	Transfer main to be upsized to allow for future connection from Westwood source. Source unlikely to be able to increase licence in future because yield is constrained to a minimum groundwater level at Duckpit Wood.	2
Technical Difficulty	Requires construction of new borehole headworks, treatment and transfer main to Godstone WTW.	3
Sustainability	Minor construction works within existing SESW sites and transfer main.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Neutral	2
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	41

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Enhance borehole output (Lower Greensand) - Water Lane increase in pump capacity & pesticide treatment	
Option Code	R7	
Description of Scheme	Scheme is to increase ADO and PDO by increasing the pump capacity lowering the pump cutout. Water Lane ADO could be increased by at least 2.95 Ml/d (to meet group annual licence) based on average abstraction compared to average daily licence from 2010-2016. PDO could be increased by approx. 1.85Ml/d to the peak potential yield of 4.4Ml/d. The source output has elevated concentrations of pesticides and has to be blended prior to treatment and hence GAC adsorbers may also be required for this scheme.	
Initial Screening		Score
CAMS status	Medway CAMS, no water available in the uper Eden catchment and tributaries. Scheme will draw Lower Greensand groundwater which is contributes to baseflow in streams feeding the River Eden. May affect flow which is then abstracted downstream for Bough Beech Reservoir. Scheme is within licence so CAMS status should not apply.	3
WFD status	Upper Eden Surface Water Body. Poor status though surface water element has not been assessed. Failure appears to relate to pollution issues. Kent Greensand Middle Groundwater Body, Poor Quantitative status for water balance and surface water dependent tests. Category 4 impact so not signficant and surface water body issues appear to relate to water quality rather than water quantity.	2
WFD Risk of Deterioration	Surface water bodies classified At Risk of not supporting Good Ecological Status but classified Probably Not at Risk of deterioration. Kent Greensand Middle Groundwater Body classified At Risk for impact to surface waters and Probably At Risk for impact on the water balance. Although scheme is within licence the site is on the Sustainable Catchments list for risk of serious damage so may not be acceptable to EA as ADO scheme. It is Category 4 so water body not at risk of deteriorating immediately but 'apply good management principles -EA- and establish future risk - SESW'.	2
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	10
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other water companies downgradient in the area.	3
Yield uncertainty	Existing source, behaviour well understood. Small increase in DO should be achievable.	3
Water Quality	Water Lane pesticides and potential for Naturally Occurring Radioactive Materials.	2
Change in DO of scheme	Small size	1
Flexibility	Unlikely to be able to increase the licensed volume in future due to CAMS status and WFD status. Scheme will enable existing licence to be yielded.	1
Technical Difficulty	Pesticide treatment more difficult than other contaminants.	2
Sustainability	Low material and energy inputs to pump side of scheme, but pesticide treatment has higher energy requirements than other standard treatments.	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Neutral	2
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	37

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	North Downs Confined Chalk AR extension 2 (new borehole on SE side of Football Club)	
Option Code	R21	
Description of Scheme	This scheme is contingent on the Bishopsford Road borehole scheme being implemented first as it is effectively an extension of that scheme and assumes that it would tap into a new main running to Bishopsford Rd. The scheme now comprises the drilling of another borehole approximately halfway between Goatbridge and Bishopsford Road boreholes. Subject to a licence variation, this borehole would allow recovery of the water that has been artificially recharged at Hackbridge between November and March at a higher rate and over a shorter period of time than is currently possible. This would effectively increase the PDO by an assumed 5Ml/d to allow the Company to address increases in peak demand from Cheam over the summer months. The annual licence would remain unchanged. Potential for an ADO scheme has been considered by comparing the Cheam group daily average licence limit with abstraction returns for the group from 2010-2016. The group licence offers an average headroom of 2.16 Mld. If this quantity was taken from Cheam and discharged at the Hackbridge discharge borehole then this could offer average use as well as peak.	
Initial Screening		Score
CAMS status	London CAMS. No water available in unconfined chalk at Cheam source and no water available in confined due to chalk dewatering. No increase in volume proposed over a cycle of injection and abstraction. Requires confirmation from EA that increased peak and no increase in annual licence is acceptable.	2
WFD status	Wandle (Croydon to Wandsworth) and the R. Gra Surface Water Body. Classified as Heavily Modified. Moderate Status 2015. Surface water elements Good by 2027. Epsom Chalk Groundwater Body. Poor Status 2015 (no further target available). Bishopsford Rd is outside this groundwater body but dewatering of the confined edge will affect the groundwater body. Overall abstraction of injected waters should be seen as neutral.	2
WFD Risk of Deterioration	Surface Water Body classified Not at Risk of not supporting Good status or potential except Carshalton Branch, considered At Risk. Probably not at risk of deterioration, except Carshalton Branch, classified at Risk. Epsom Chalk Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. Hackbridge licence is on the Sustainable Catchments list but abstraction does not affect stream flows so should not be reviewed by EA. Scheme does not change overall amount of water abstracted.	2
Risk to Designated Sites	Scheme is for abstracting from confined chalk, no impact to surface sites.	3
Initial Screening Decision	SCREEN IN	9
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Water source is downgradient of recharge areas so no affect on upstream asbtractions. Abstracting from an injection mound so no significant effect down gradient.	3
Yield uncertainty	Existing source well understood.	3
Water Quality	Confined Chalk abstraction. No significant concerns.	3
Change in DO of scheme	Medium size.	2
Flexibility	Could be enlarged depending on how mound is managed. Offers flexibility in how much is taken from different boreholes. Low environmental impact so should be seen favourably by EA to increase abstraction in confined aquifer at the expense of unconfined sources.	3
Technical Difficulty	No significant impediments, scheme infrastructure already in place, makes use of new mains connections to new Bishopsford Road borehole (R2).	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Scheme involves injection and abstraction from confined aquifer, no connection to surface waters.	1
Social Impact (drought resilience)	Increased artificial recharge that could be drawn during drought periods when other sources have low yield.	3
Landscape and Heritage	Neutral	3
	Total Score	42

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Outwood Lane	
Option Code	R22	
Description of Scheme	This scheme seeks an increase in daily licence from 3 Ml/d to 8 Ml/d and requires an equivalent increase in pump capacity. The hydraulic capacity of the source has been proved during previous test pumping. The increase in PDO associated with the scheme would be 5 Ml/d. Potential for an ADO scheme has been considered by comparing the Woodmansterne group daily average licence limit with abstraction returns for the group from 2010-2016. The group licence offers an average headroom of 3.4 Mld if the borehole can be made to yield it.	
Initial Screening		Score
CAMS status	London CAMS. No water available in unconfined chalk except at flows above Q30, may be available for a Peak scheme as long as annual total does not increase. Requires confirmation from EA that increased peak and no increase in annual licence is acceptable. EA confirmed increasing peak was okay in terms of overall water balance and abstraction is not near the river for any direct impacts. ADO scheme within current licence.	3
WFD status	Wandle (Croydon to Wandsworth) and the R. Gra Surface Water Body. Classified as Heavily Modified. Moderate Status 2015. Surface water elements Good by 2027. Epsom Chalk Groundwater Body. Poor Status 2015 (no further target available). If no overall increase in abstraction then status should not change by increased peak abstraction for short periods or using average headroom.	3
WFD Risk of Deterioration	Surface Water Body classified Not at Risk of not supporting Good status or potential except Carshalton Branch, considered At Risk. Probably not at risk of deterioration, except Carshalton Branch, classified at Risk. Epsom Chalk Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. Outwood Lane licence not on the Sustainable Catchments list so should so licence not likely to be reviewed by EA. Scheme does not change overall amount of water abstracted.	3
Risk to Designated Sites	Mole Gap to Reigate Escarpment Habitats Directive site in surface water body. Not groundwater dependent and not in zone of influence of abstraction.	3
Initial Screening Decision	SCREEN IN	12
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Significant abstraction by Thames Water in the catchment including downgradient, which may complicate EA ability to licence additional abstraction.	2
Yield uncertainty	Existing source well understood.	3
Water Quality	Existing Chalk source, no significant concerns.	3
Change in DO of scheme	Medium to large size.	3
Flexibility	If Peak scheme acceptable in catchment then potential to enlarge but dependent on EA consideration of Thames Water peak schemes.	2
Technical Difficulty	No significant impediments to increasing pump capacity, infrastructure already in place to take raw water to treatment and supply.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Short term additional peak abstraction neutral for groundwater flooding risks.	2
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	44

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Duckpit Wood replacement borehole (not Chalk Pit Lane)	
Option Code	R23	
Description of Scheme	This scheme comprises the construction of a Lower Greensand borehole to replace the Duckpit Wood and Paines Hill Spring licences. It is contingent on neither the Duckpit Wood nor Pains Hill Spring treatment options being implemented. The anticipated increase in ADO is 1.37 Ml/d and in PDO is 2.14 Ml/d. Consider alternative treatment works rather than Duckpit Wood or Pains Hill. Although capex cheaper; opex is an issue for these small treatment works. Perhaps Godstone pipeline or new WTW (Option N8).	
Initial Screening		Score
CAMS status	Medway CAMS, no water available in the uper Eden catchment and tributaries. Scheme will draw Lower Greensand groundwater which is contributes to baseflow in streams feeding the River Eden. May affect flow which is then abstracted downstream for Bough Beech Reservoir. Replacement boreholes for existing source under that licence so CAMS status should not be relevant.	3
WFD status	On boundary of Upper Eden Surface Water Body and Gibbs Brook Surface Water Body. Upper Eden Poor status though surface water element has not been assessed. Failure appears to relate to pollution issues. Gibbs Brook Moderate status with surface water element not assessed. Kent Greensand Middle Groundwater Body, Poor Quantitative status for water balance and surface water dependent tests.	2
WFD Risk of Deterioration	Surface water bodies classified At Risk of not supporting Good Ecological Status but classified Probably Not at Risk of deterioration. Kent Greensand Middle Groundwater Body classified At Risk for impact to surface waters and Probably At Risk for impact on the water balance. The existing site Duckpit Wood is on the Sustainable Catchments list for risk of serious damage so may not be acceptable to EA. EA confirmed it is uncategorised for impact because it is not in use so scheme could proceed but with risks of becoming categorised when in use.	2
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	10
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other water companies downgradient in the area.	3
Yield uncertainty	Constraints likely to be severe. As per Chalk Pit licence constrained to groundwater level limiting yield.	2
Water Quality	Known quality problems, scheme speculative in terms of new location being free of contamination, or contingent on upgrading treatment works (Scheme R24)	1
Change in DO of scheme	Small scheme	1
Flexibility	Unlikely to be able to increase in future as licence likely to have groundwater level constraint.	1
Technical Difficulty	No significant impediments to borehole construction.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	38

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Lowering pumps at Kenley and Purley	
Option Code	R28	
Description of Scheme	Increase Kenley PDO from 18 Ml/d by 6 Ml/d to 24 Ml/d by lowering pump and pump cutout in Borehole No. 1 by 2m. Increase Purley PDO from 6.9 Ml/d by 8.5 Ml/d to 15.4 Ml/d by lowering pump and pump cutout in Borehole Nos. 5, 6 & 7 by approximately 15m Potential for ADO scheme has been considered looking at averag usage at the group licence boreholes, Kenley and Purley. Note SESWANNSRC.xls data shows these licences aggregated and giving an average licence headroom of 4.77 MLd. However SESW licenceinfo.xls shows an additional aggregation to Smitham which is in the Woodmansterne Group. Woodmansterne Group has an average headroom of 3.4 Mld. However uncertain whether this licence information is correct and whether additional Kenley&Purley abstraction can only be up to the licence limit of the lowest of Kenley&Purley and Woodmansterne or Kenley&Purley only.	
Initial Screening		Score
CAMS status	London CAMS. No water available in unconfined chalk except at flows above Q30, may be available for a Peak scheme as long as annual total does not increase. EA confirmed increasing peak was okay in terms of overall water balance and abstraction is not near the river for any direct impacts. Average ADO can be increased as it is headroom within the existing Kenley and Purley licence.	3
WFD status	Wandle (Croydon to Wandsworth) and the R. Gra Surface Water Body. Classified as Heavily Modified. Moderate Status 2015. Surface water elements Good by 2027. Epsom Chalk Groundwater Body. Poor Status 2015 (no further target available). If no overall increase in abstraction then status should not change by increased peak abstraction for short periods or increasing ADO by using headroom under existing licence.	3
WFD Risk of Deterioration	Surface Water Body classified Not at Risk of not supporting Good status or potential except Carshalton Branch, considered At Risk. Classified Probably not at risk of deterioration, except Carshalton Branch, classified as At Risk. Epsom Chalk Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. Kenley licence is on the Sustainable Catchments list considers catchment at risk of serious damage. Scheme does not change overall amount of water abstracted and is not close to river so no sustainability issues expected. Category 4. Part of wider Wandle review by Thames which would identify issues e.g. would water at Kenley show as additional flow further down catchment. (SESW is Carshalton Branch.)	2
Risk to Designated Sites	Mole Gap to Reigate Escarpment Habitats Directive site in surface water body. Not groundwater dependent and not in zone of influence of abstraction.	3
Initial Screening Decision	SCREEN IN	11
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Significant abstraction by Thames Water in the catchment including downgradient, which may complicate EA ability to licence additional abstraction.	2
Yield uncertainty	Existing source well understood.	3
Water Quality	Existing Chalk source, no significant concerns.	3
Change in DO of scheme	Large size.	3
Flexibility	If Peak scheme acceptable in catchment then potential to enlarge but dependent on EA consideration of Thames Water peak schemes.	2
Technical Difficulty	No significant impediments to lowering pumps, infrastructure already in place to take raw water to treatment and supply.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Area is vulnerable to groundwater flooding but peak scheme will abstract additional water at a time that will not benefit winter groundwater flood resilience.	1
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	42

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Mole catchment 3rd party licence trading	
Option Code	N1	
Description of Scheme	In the Mole catchment there are numerous smaller licence holders which may give the opportunity for trading smaller volumes from numerous abstractors in the catchment to be drawn at existing SESW sources in the catchment (e.g Fetcham and Leatherhead). Small licences may be able to offer 0.1 Mld, and large abstractors over 0.5 MLd, which when summed may offer SESW in the order of 2-5 Mld. The largest abstractor is for surface water and is licensed for over 17 Mld, however it is not known how consumptive this licence is and therefore whether a significant volume would be available for consumptive use.	
Initial Screening		Score
CAMS status	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Hence CAMS status unaffected.	3
WFD status	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in status, opportunity for local improvement if abstraction reduced higher in catchment and taken lower in catchment where River Mole has higher flow.	3
WFD Risk of Deterioration	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in deterioration risk. Opportunity to reduce risk if abstraction reduced higher in catchment and taken lower in catchment where River Mole has higher flow.	3
Risk to Designated Sites	No groundwater dependent sites near existing Leatherhead and Fetcham sources. Potential for improved condition if traded sources are near designated sites.	3
Initial Screening Decision	SCREEN IN	12
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No other significant abstractors near potential sources to take traded water. River Mole flows should be higher on arrival at Leatherhead so derogration from additional abstraction considered unlikely.	3
Yield uncertainty	Taking existing source yields so well known.	3
Water Quality	Existing Chalk sources to trade, no significant concerns.	3
Change in DO of scheme	Small-medium size	2
Flexibility	Can be increased as and when trading opportunities arise.	3
Technical Difficulty	Uses all existing infrastructure, significant spare capacity at Elmer WTW to accept additional inflows.	3
Sustainability	Low carbon and materials, using existing assets.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Dependent on where trades are made, groundwater rebound in dry valleys may increase groundwater flood risk. Catchment has few recorded incidents, considered lower susceptibility.	2
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	45

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Wandle catchment 3rd party licence trading	
Option Code	N2	
Description of Scheme	In the Wandle catchment there are large abstractors offering the opportunity for a small number of trades that offer significant additional resources. Licences over 2 Mld may be able to offer trades of 0.5 Mld. However most licence purposes are non consumptive in which the EA would not allow a trade to a consumptive use	
Initial Screening		Score
CAMS status	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Hence CAMS status unaffected.	3
WFD status	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in status, opportunity for local improvement if abstraction reduced nearer Wandle spring lines and taken further away reducing drawdown near spring lines.	3
WFD Risk of Deterioration	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in deterioration risk. Opportunity to reduce risk if abstraction reduced in any areas of known flow problems affecting ecology.	3
Risk to Designated Sites	No groundwater dependent sites near existing sources such as Kenley Group and Woodmansterne Group and Cheam where additional abstraction could potentially occur. Potential for improved condition if traded sources are near designated sites.	3
Initial Screening Decision	SCREEN IN	12
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No other significant abstractors near potential sources to take traded water. If upgradient then higher groundwater levels will reach the sources where additional water is taken.	3
Yield uncertainty	Taking existing source yields so well known.	3
Water Quality	Existing Chalk sources to trade, no significant concerns.	3
Change in DO of scheme	Small size, limited consumptive licences available.	1
Flexibility	Can be increased as and when trading opportunities arise.	3
Technical Difficulty	Uses all existing infrastructure, significant spare capacity at Cheam WTW to accept additional inflows. Depends on which source EA agree could abstract the traded water. If Woodmansterne then more limited WTW capacity.	2
Sustainability	Low carbon and materials, using existing assets.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Dependent on where trades are made, dry valleys in Wandle catchment are susceptible to flooding from groundwater rebound.	1
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	42

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Eden catchment 3rd party licence trading	
Option Code	N3	
Description of Scheme	SESW abstract from surface water to fill Bough Beech reservoir. There are numerous surface water abstractors upstream of Bough Beech Reservoir so there may be opportunity for SESW to trade upstream volumes in order to take more at Bough Beech. Licences over 3 Mld may offer trades of 0.5 Mld assuming the whole licence is not being used. Licences of 1Mld or less may be able to offer 0.1 MLd.	
Initial Screening		Score
CAMS status	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Hence CAMS status unaffected. EA will be contacting all those with licence to see if still needed, during 2017. Only consumptive sources can be traded e.g. a non consumptive source will not get approval for a trade to become consumptive.	3
WFD status	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in status, opportunity for local improvement if abstraction reduced higher in catchment and taken lower in catchment where River Eden has higher flow. Same catchment to avoid NN invasive species. Recirculation of water upstream may have adverse effect on eradication.	3
WFD Risk of Deterioration	Scheme is to use unused licence headroom from 3rd party licence holders so no new water abstracted from catchment. Therefore no change in deterioration risk as long as trade with other consumptive licence. Opportunity to reduce risk if abstraction reduced higher in catchment and taken lower in catchment where River Eden has higher flow.	3
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	12
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No other significant abstractors near potential source to take traded water at Bough Beech. If upgradient abstraction reductions occur then higher flows will reach the sources where additional water is taken.	3
Yield uncertainty	Taking existing source yields so well known.	3
Water Quality	Existing Eden surface water sources to trade, no significant concerns.	3
Change in DO of scheme	Small-medium size	2
Flexibility	Can be increased as and when trading opportunities arise.	3
Technical Difficulty	Uses all existing infrastructure, significant spare capacity at Bough Beech WTW to accept additional inflows.	3
Sustainability	Low carbon and materials, using existing assets.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Concentrating existing surface water licences with one licence holder gives the opportunity to abstract to reduce flood risk if reservoir has capacity at the time.	2
Social Impact (drought resilience)	Low level of resilience for surface water resources that are the likely trades in the catchment.	1
Landscape and Heritage	Neutral	3
	Total Score	44

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Leatherhead licence increase	
Option Code	N4	
Description of Scheme	Scheme to increase licence by 2 Mld to take water available at least 50% of the time in CAMS policy. Treat at Elmer as per existing source where there is existing capacity.	
Initial Screening		Score
CAMS status	Scheme based on making use of CAMS water availability.	3
WFD status	Mole (Horley to Hersham) Surface Water Body. Moderate Ecological Status and Good chemical status. The supporting flow element has not been assessed. Using CAMS water available should not affect status.	3
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters.	2
Risk to Designated Sites	Bookham Commons and Mole Gap to Reigate Escarpment SSSIs are within 2km of the abstraction.	3
Initial Screening Decision	SCREEN IN	11
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other water companies downgradient in the area. There are several surface water abstractions downstream that groundwater abstraction needs to demonstrate will not deplete flow. No significant risk given water available status indicating surplus water can be abstracted.	2
Yield uncertainty	Existing source well understood.	3
Water Quality	Existing water quality from current abstraction, hence no issues anticipated.	3
Change in DO of scheme	Potential for small scheme.	1
Flexibility	Due to CAMS water availability there is limited opportunity to increase once implemented.	1
Technical Difficulty	Using existing infrastructure and capacity at Elmer WTW	3
Sustainability	Low carbon and materials, using existing assets.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Potential to improve outcomes in groundwater flooding. Catchment susceptible but no significant groundwater flood recorded to date.	2
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	40

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	New Lower Mole Abstraction source	
Option Code	N5	
Description of Scheme	Water availability in CAMS at least 50% of the time below Leatherhead. Scheme is to identify new source location for groundwater abstraction from the Chalk or surface water abstraction (or river terrace gravels). Pipeline required for treatment at Elmer WTW where there is existing capacity. Depending on land access can be as short a pipeline distance as possible once down gradient of CAMS assessment point at Leatherhead. Using this source for the 50% of water availablliity reduces the ADO on other sources which means they can be increased above current ADO when in use to meet existing annual licence.	
Initial Screening		Score
CAMS status	Scheme based on making use of CAMS water availability. (Surface water available 50% of the time, not groundwater unless groundwater is close to river due to lag times with surface water interaction). Hence EA preferred a surface water scheme to make licensing and constraining simple.	3
WFD status	Mole (Horley to Hersham) Surface Water Body. Moderate Ecological Status and Good chemical status. The supporting flow element has not been assessed. Scheme based on making use of CAMS water availability so should not affect status if surface water abstraction. Groundwater abstraction from confined Chalk so no impact to stream environment.	3
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters.	2
Risk to Designated Sites	Bookham Commons and Mole Gap to Reigate Escarpment SSSIs in area. It is not considered that additional abstraction from this area would have a detrimental impact on these habitats not being situated along the River Mole but on chalk slope and plateau environments.	3
Initial Screening Decision	SCREEN IN	11
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other groundwater abstractions in the confined Chalk north of Leatherhead. There are several surface water abstractions.	2
Yield uncertainty	New source so yield not certain but in well known aquifer block.	2
Water Quality	New source so quality not certain but in well known aquifer block. Confined Chalk water may require separate treatment instead of pipeline to existing	2
Change in DO of scheme	Potential for large scheme	3
Flexibility	Large amount of water availability to develop a scheme in the area on a demand needs basis over time.	3
Technical Difficulty	Typical abstraction site works anticipated. If water quality cannot be directly used at existing works via pipeline (e.g. up to 5km) may require additional treatment at Elmer or new works.	2
Sustainability	New site requiring new infrastructure and connections to mains network.	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Potential to improve outcomes in groundwater flooding. Catchment susceptible but no significant groundwater flood recorded to date.	2
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	40

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	New Middle Mole Abstraction source	
Option Code	N6	
Description of Scheme	Water availability in CAMS at least 50% of the time in Dorking area. Scheme is to identify new source location for groundwater abstraction from the Lower Greensand or surface water abstraction along the River Mole east of Dorking. Existing Dorking Lower Greensand abstraction delivered to Elmer WTW for treatment, so can use existing infrastructure to add additional source. Alternatively additional volume could be delivered via a new pipe connection to Headley Reservoir or Buckland Booster to deliver it to the Buckland area and north toward Croydon where there is greater demand, improving network resilience. Using this source for the 50% of water availabliity reduces the ADO on other sources which means they can be increased above current ADO when in use to meet existing annual licence.	
Initial Screening		Score
CAMS status	Scheme based on making use of CAMS water availability upstream of the Dorking assessment point AP3 which includes surface water and the Lower Greensand aquifer. (Surface water available 50% of the time, not groundwater unless groundwater is close to river due to lag times with surface water interaction). Hence EA preferred a surface water scheme to make licensing and constraining simple.	3
WFD status	Mole (Horley to Hersham) Surface Water Body to east of Dorking. Moderate Ecological Status and Good chemical status. The supporting flow element has not been assessed. Pipp Brook Surface Water Body to west of Dorking. Moderate ecological status with moderate status for flow element. Scheme based on making use of CAMS water availability so should not affect status if surface water abstraction.	3
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters.	2
Risk to Designated Sites	Mole Gap to Reigate Escarpment SSSIs in area. It is not considered that additional abstraction from this area would have a detrimental impact on these habitats not being situated along the River Mole but on chalk slope and plateau environments.	3
Initial Screening Decision	SCREEN IN	11
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Few other abstractors in Lower Greensand in the area.	3
Yield uncertainty	New source so yield not certain but in well known aquifer block.	2
Water Quality	Known quality from Lower Greensand abstractions at Dorking. Some former landfill in the area, abstraction location could target being outside of downgradient flow direction.	2
Change in DO of scheme	Potential for large scheme	3
Flexibility	Large amount of water availability to develop a scheme in the area on a demand needs basis over time.	3
Technical Difficulty	Typical abstraction site works anticipated. If water quality cannot be directly used at existing works via pipeline (e.g. up to 5km) may require additional treatment at Dorking WTW or new works.	2
Sustainability	New site requiring new infrastructure and connections to mains network.	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Groundwater flood risk in Lower Greensand around Dorking. Additional abstraction may help moderate flooding.	3
Social Impact (drought resilience)	Moderate level of resilience for groundwater resources.	2
Landscape and Heritage	Neutral	3
	Total Score	42

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Leatherhead new boreholes	
Option Code	N7	
Description of Scheme	Leatherhead group averages 22 Mld, licensed average daily rate 42 MLd. With the development of new boreholes or lowering pumps to enable additional yield, the licensed volume may be able to be abstracted. Will require additional pipeline to Elmer WTW for treatment.	
Initial Screening		Score
CAMS status	Scheme within existing licence. CAMS status not relevant.	3
WFD status	Scheme within existing licence. Should not affect WFD status.	3
WFD Risk of Deterioration	Mole (Horley to Hersham) Surface Water Body classified Probably Not at Risk of not supporting Good Ecological Status but considered Probably at Risk of Deterioration. Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. Needs EA clarification whether significant increase in recent actual abstraction does not lead to deterioration. Leatherhead and Elmer are on the Sustainable Catchments list as Category 1, which is inconsistent with CAMS water availability.	2
Risk to Designated Sites	Bookham Commons and Mole Gap to Reigate Escarpment SSSIs are within 2km of the abstraction. It is not considered that additional abstraction from this location would have a detrimental impact on these habitats not being situated along the River Mole but on chalk slope and plateau environments. Norbury Park local wildlife site nearby, containing grassland habitats adjacent River Mole. Citation does not specify groundwater dependence (wet grassland or wetland) so understood to be not at risk from abstraction.	3
Initial Screening Decision	SCREEN IN	11
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	There are no other water companies downgradient in the area. There are several surface water abstractions downstream that groundwater abstraction needs to demonstrate will not deplete flow. Not considered a significant risk given water is already licensed.	2
Yield uncertainty	Unproven whether aquifer can yield the daily licensed rate.	1
Water Quality	Existing source with known quality and ability to treat at Elmer WTW. This scheme would use all of the available capacity at Elmer WTW which would affect viability of other Mole schemes.	3
Change in DO of scheme	Large scheme.	3
Flexibility	Scheme is to achieve licence so could not be increased in future. Option N4 is to use remaining available water.	1
Technical Difficulty	Drilling a wellfield e.g. 4 boreholes to yeild 5 MLd each. No significant impediments. Uncertainty regarding land size and availablility to space boreholes	2
Sustainability	Limited additional inputs for new boreholes and connection to treatment at nearby Elmer WTW.	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Additional sources enable all sources to pump at a lower rate, extending time before watertable falls to such a point to significantly affect yields.	2
Landscape and Heritage	Neutral	3
	Total Score	**39**

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Removal of constraints and or optimisation of WRZ source use.	
Option Code	N9	
Description of Scheme	Scheme is to remove the constraints identified in the deployable output study and identify operational system improvements and efficiencies in order to achieve the licence average rate. Headroom has been calculated by comparing abstraction returns for group licences from 2010-2016 and licensed daily rates.	
Initial Screening		Score
CAMS status	All schemes within existing licences so CAMS status not relevant.	3
WFD status	All schemes within existing licences so WFD status not relevant.	3
WFD Risk of Deterioration	All schemes within existing licences so WFD status not relevant unlesss some sources identified for reductions or on Sustainable Catchments list.	2
Risk to Designated Sites	Dependent on each source. Sites all within licence so should not be an issue.	2
Initial Screening Decision	SCREEN IN	10
Secondary Screening		Score
Customers		
Other abstractors / water companies		
Yield uncertainty		
Water Quality		
Change in DO of scheme		
Flexibility		
Technical Difficulty		
Sustainability		
Social Impact (people and places)		
Social Impact (flood resilience)		
Social Impact (drought resilience)		
Landscape and Heritage		
	Total Score	0

Appendix 2

Treatment Option Information Sheets

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Upgrade WTW (Lower Greensand) - The Clears ammonia and pesticide treatment	
Option Code	R8	
Description of Scheme	The Cliftons Lane Licence Group (Cliftons Lane, Buckland and The Clears) ADO is constrained by combination of DAPWL (Cliftons Lane) and water quality (Buckland) but is only 1.6 Ml/d short of licence based on difference between daily laverage licence and abstraction returns from 2010-2016, so little scope for significant increase in ADO. The Group PDO is constrained by combination of DAPWL (Cliftons Lane - base of the confining layer) and water quality (Buckland) and is 2.57Ml/d short of group licence. PDO could potentially be increased by 2.57Ml/d by provision of ammonia treatment at The Clears (or possibly Buckland) to allow pumping reintroduction of the source (or pumping beyond the operational guideline of 1.4Ml/d at Buckland). This scheme is therefore to provide ammonia removal plant (ion exchange with zeolite) and GAC adsorbers (for residual pesticides) on site at The Clears. The anticipated ADO gain is 0.38 Ml/d and the PDO gain is 2.57 Ml/d	
Initial Screening		Score
CAMS status	Treatment scheme for existing licensed water source.	3
WFD status	Mole (Horley to Hersham) Surface Water Body. Moderate status though surface water element has not been assessed. Reigate Lower Greensand Groundwater Body, Poor Quantitative status for water balance and GWDTE tests.	2
WFD Risk of Deterioration	Abstraction on sustainable catchments list Category 1 priority risk for waterbody at risk of deterioration.	2
Risk to Designated Sites	There are no designated sites in the water body.	3
Initial Screening Decision	SCREEN IN	10
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	NA	0
Yield uncertainty	NA	0
Water Quality	Works to treat existing water sources (with ammonia and pesticide).	3
Change in DO of scheme	Small-medium sized scheme.	2
Flexibility	NA	0
Technical Difficulty	Upgrading existing works with known contamination issues.	2
Sustainability	Higher energy inputs for pesticide treatment than standard treatments.	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	NA	0
Social Impact (drought resilience)	NA	0
Landscape and Heritage	Neutral	3
	Total Score	28

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Duckpit Wood hydrogen sulphide treatment	
Option Code	R24	
Description of Scheme	This scheme provides hydrogen sulphide removal to enable the source to be put back into supply. Treatment would consist of tower aeration with GAC odour control. The scheme would realise an ADO of zero and a PDO of 0.77 Ml/d.	
Initial Screening		Score
CAMS status	Treatment scheme for existing licensed water source.	3
WFD status	Existing source but will not have recent actual abstraction so coming back on line may affect WFD status. However considered low risk in Risk of Deterioration so should not affect status.	3
WFD Risk of Deterioration	No risk in terms of Sustainable Abstraction because not in use. EA to confirm likely category if abstraction came into use. There is a risk that when in use it could then be put onto the Sustainable Catchments list and then be the target of reductions. If so likely to be classified in same way as Pains Hill at Category 4 low risk.	3
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	12
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	NA	0
Yield uncertainty	NA	0
Water Quality	Works to treat existing water sources with H2S	3
Change in DO of scheme	Small scheme	1
Flexibility	NA	0
Technical Difficulty	Upgrading existing works with known contamination issues.	2
Sustainability	Standard treatment no change in energy or materials.	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	NA	0
Social Impact (drought resilience)	NA	0
Landscape and Heritage	Neutral	3
	Total Score	29

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Pains Hill Springs refurb including UV	
Option Code	R25	
Description of Scheme	This scheme allows this source to be put back into supply by providing UV treatment for the cryptosporidium risk and general refurbishment of the source and associated infrastruture. The anticipated increase in ADO and PDO is 1.37 Ml/d.	
Initial Screening		Score
CAMS status	Treatment scheme for existing licensed water source.	3
WFD status	Existing source but will not have recent actual abstraction so coming back on line may affect WFD status. However considered low risk in Risk of Deterioration so should not affect status.	3
WFD Risk of Deterioration	EA classify abstraction that feeds this treatment scheme as a category 4 on sustainable catchments list which means there is no immediate risk and potential risk in 40 years time.	3
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	12
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	NA	0
Yield uncertainty	NA	0
Water Quality	Works to treat existing water sources.	3
Change in DO of scheme	Small sized scheme.	1
Flexibility	NA	0
Technical Difficulty	Upgrading existing works with known contamination issues. (refurbishment to include UV treatment for reduction of cryptosporidium risk).	2
Sustainability	Higher energy inputs for UV treatment than standard treatments	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	NA	0
Social Impact (drought resilience)	NA	0
Landscape and Heritage	Neutral	3
	Total Score	29

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Secombe Centre UV	
Option Code	R26	
Description of Scheme	This scheme provides UV treatment for the Secombe Centre groundwater source which is currently out of supply due to bacti detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcote, Oaks, Langley Park, Sutton and Sutton Court Rd boreholes as well as Secombe Centre. Although the PDO of Secombe Centre is only 4.54 Ml/d, the daily licence for the East Main sources is 66 Ml/d and so the plant would need to have this capacity. This would provide pre-emptive protection against any further bacti or cryptosporidium detections at other sources on the main. The anticipated increase in ADO is 2.07 Ml/d (= 3.9 ADO of source - 1.53 that could be reassigned to Cheam and 0.3 to Sutton Court Rd) and in PDO is 4.54 Ml/d. SES Water assumptions for WRMP19 that this scheme would treat only Secombe Centre water locally and would not be require to construct works at Cheam.	
Initial Screening		Score
CAMS status	Treatment scheme for existing licensed water source.	3
WFD status	Wandle (Croydon to Wandsworth) and the R. Gra Surface Water Body. Classified as Heavily Modified. Moderate Status 2015. Surface water elements Good by 2027. Epsom Chalk Groundwater Body. Poor Status 2015 (no further target available). Increase in abstraction compared to recent actual may affect status.	2
WFD Risk of Deterioration	Surface Water Body classified Not at Risk of not supporting Good status or potential except Carshalton Branch, considered At Risk. Classified Probably not at risk of deterioration, except Carshalton Branch, classified as At Risk. Epsom Chalk Groundwater Body considered At Risk for the Water Balance test and Probably at Risk for the Impact to Surface Waters. Abstraction source is on Sustainable catchments list as Category 2.	2
Risk to Designated Sites	Mole Gap to Reigate Escarpment Habitats Directive site in surface water body. Not groundwater dependent and not in zone of influence of abstraction.	3
Initial Screening Decision	SCREEN IN	10
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	NA	0
Yield uncertainty	NA	0
Water Quality	Works to treat existing water sources.	3
Change in DO of scheme	Small-medium sized scheme.	2
Flexibility	NA	0
Technical Difficulty	Upgrading existing works with known contamination issues. (refurbishment to include UV treatment for reduction of cryptosporidium risk)	2
Sustainability	Higher energy inputs for UV treatment than standard treatments	2
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	NA	0
Social Impact (drought resilience)	NA	0
Landscape and Heritage	Neutral	3
	Total Score	28

SES WATER OPTIONS APPRAISAL	AECOM
Option Name	Increase Bough Beech WTW capacity from 50Ml/d to 70Ml/d - Items 1
Option Code	P1c
Description of Scheme	Bough Beech WTW has a current peak deployable output of 45Ml/d. Ongoing refurbishment works at the WTW will increase the output to 50Ml/d by the end of AMP5. These AMP5 funded works have been included as a planned scheme within the baseline supply-demand balance. Further substantial utilisation of the reservoir storage can be provided to meet peak demand. This option would involve increasing the WTW capacity from 50Ml/d to the licensed peak abstraction volume of 70Ml/d. The scheme is expected to have limited environmental impact as the abstraction licence to refill the reservoir from the river would remain unchanged. The capacity increase to 70Ml/d will require further refurbishment and additions to all aspects of the Bough Beech WTW treatment process, including clarification, filtration, chemical dosing, adsorption, THM stripping, disinfection, and washwater recovery. Improvements to the high lift pumping station and distribution network will also be required to accommodate the increased peak output into supply throughout the East Surrey WRZ. The DO as modelled in Aquator allows for a WTW output of 70Ml/d for a 2-week period in July, with a 2-week period either side of this during which 50Ml/d is output. This allows SESW flexibility to accommodate more than one peak week, should this occur, and also allows operational flexibility during the summer to respond to above annual average demands.

Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	NA	0

Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	NA	0
Yield uncertainty	NA	0
Water Quality	Works to treat existing water sources.	3
Change in DO of scheme	Large scheme.	3
Flexibility	NA	0
Technical Difficulty	No complex treatment issues for existing source water.	3
Sustainability	Standard treatments, no change in energy or materials, increase in capacity lowers unit costs.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	NA	0
Social Impact (drought resilience)	NA	0
Landscape and Heritage	Neutral	3
	Total Score	21

Appendix 3

Transfer and Bulk Supply Option Information Sheets

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14	
Option Code	R2	
Description of Scheme	Bishopsford Rd borehole was drilled and constructed in 2008. This scheme connects the borehole into the Cheam WTW East Main at Goatbridge. The objective of the scheme is to increase the PDO of the licence group by allowing recovery of the artificially recharged volume at Hackbridge at a higher abstraction rate over a shorter period of time during the subsequent peak demand period. In order to realise this 5 Ml/d increase in PDO, a licence variation would be required allowing a 5 Ml/d increase in the daily licence from 19 Ml/d to 24 Ml/d.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Water source is downgradient of recharge areas so no affect on upstream asbtractions. Abstracting from an injection mound so no significant effect down gradient	3
Yield uncertainty	Existing source well understood	3
Water Quality	Confined Chalk abstraction. No significant concerns.	3
Change in DO of scheme	Medium size	2
Flexibility	Could be enlarged depending on how mound is managed. Offers flexibility in how much is taken from different boreholes. Low environmental impact so should be seen favourably by EA to increase abstraction in confined aquifer at the expense of unconfined sources.	3
Technical Difficulty	No significant impediments, scheme infrastructure already in place, requiring extension of mains connections to new borehole.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Scheme involves injection and abstraction from confined aquifer, no connection to surface waters.	1
Social Impact (drought resilience)	Increased artificial recharge that could be drawn during drought periods when other sources have low yield.	3
Landscape and Heritage	Neutral	3
	Total Score	33

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	North Downs Confined Chalk AR extension 1 (Bishopsford Road). This scheme connects the existing licensed borehole into the WTW A East Main at Source 14	
Option Code	R2	
Description of Scheme	Bishopsford Rd borehole was drilled and constructed in 2008. This scheme connects the borehole into the Cheam WTW East Main at Goatbridge. The objective of the scheme is to increase the PDO of the licence group by allowing recovery of the artificially recharged volume at Hackbridge at a higher abstraction rate over a shorter period of time during the subsequent peak demand period. In order to realise this 5 Ml/d increase in PDO, a licence variation would be required allowing a 5 Ml/d increase in the daily licence from 19 Ml/d to 24 Ml/d.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Water source is downgradient of recharge areas so no affect on upstream asbtractions. Abstracting from an injection mound so no significant effect down gradient	3
Yield uncertainty	Existing source well understood	3
Water Quality	Confined Chalk abstraction. No significant concerns.	3
Change in DO of scheme	Medium size	2
Flexibility	Could be enlarged depending on how mound is managed. Offers flexibility in how much is taken from different boreholes. Low environmental impact so should be seen favourably by EA to increase abstraction in confined aquifer at the expense of unconfined sources.	3
Technical Difficulty	No significant impediments, scheme infrastructure already in place, requiring extension of mains connections to new borehole.	3
Sustainability	No significant additional material or energy requirements.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Scheme involves injection and abstraction from confined aquifer, no connection to surface waters.	1
Social Impact (drought resilience)	Increased artificial recharge that could be drawn during drought periods when other sources have low yield.	3
Landscape and Heritage	Neutral	3
	Total Score	33

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	30Ml/d bulk supply from Thames Water (London WRZ) to SESW at Merton	
Option Code	R9	
Description of Scheme	This option comprises a 30Ml/d bulk transfer from Thames Water's London ring main into the north of SESW's area at Merton. The scheme comprises a new pumping station at Merton, significant mains upgrade works to transport water from Merton to Cheam WTW, where it will require additional softening at a new ion exchange softening plant before being blended with the other water treated at Cheam and distributed throughout the SESW area. Two new distribution mains will then also be required to transport the water from Cheam WTW to SESW's North Looe and Langley Park service reservoirs, for onward distribution throughout the northern area. This scheme is mutually exclusive with the other two size variants of this option.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	IN WRSE	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from TW region - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Availability well known as source is TW ring main.	3
Water Quality	Water quality is good having been treated by TW. Requires additional softening prior to blending with SESW supplies. Maybe score 2 if softening not required. Then Cheam possibly not required ? Tbc SESW	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on further upgrade works to treatment plant and oversizing of transmission mains. Mutually exclusive with Schemes R10 and R11.	3
Technical Difficulty	Requires new pumping station to be located in intensely developed part of South London, mains upgrades over approximately 8.0 km within major roads including crossings of tram, underground and railway lines to Cheam WTW. 2 new distribution mains totalling approximately 8 km including 3 railway crossings to North Looe and Langley Park service reservoirs.	2
Sustainability	Significant construction works, mains replacement / upgrades and WTW upgrades. Increased pumping by up to 75m total height.	2
Social Impact (people and places)	Neutral once infrastructure improvements completed.	3
Social Impact (flood resilience)	Minor negative impact due to slight increased risk of flooding in built up areas due to failure of new mains.	1
Social Impact (drought resilience)	Increased resilience during drought periods by facility to import treated water from alternative WRZ which may not be subject to same levels of stress.	2
Landscape and Heritage	Neutral	3
	Total Score	30

SES WATER OPTIONS APPRAISAL		
Option Name	15Ml/d bulk supply from Thames Water (London WRZ) to SESW at Merton	
Option Code	R10	
Description of Scheme	This option involves the same infrastructure components as the 30Ml/d transfer scheme, but each component is instead sized to accommodate a 15Ml/d bulk transfer from Thames Water's London ring main into the north of SESW's area at Merton. The scheme comprises a new pumping station at Merton, significant mains upgrade works to transport water from Merton to Cheam WTW, where it will require additional softening at a new ion exchange softening plant before being blended with the other water treated at Cheam and distributed throughout the SESW area. Two new distribution mains will then also be required to transport the water from Cheam WTW to SESW's North Looe and Langley Park service reservoirs, for onward distribution throughout the Sutton WRZ. This scheme is mutually exclusive with the other two size variants of this option.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	IN WRSE	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from TW region - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Availability well known as source is TW ring main.	3
Water Quality	Water quality is good having been treated by TW. Requires additional softening prior to blending with SESW supplies.	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on further upgrade works to treatment plant and oversizing of transmission mains. Mutually exclusive with Schemes R9 and R11.	3
Technical Difficulty	Requires new pumping station to be located in intensely developed part of South London, mains upgrades over approximately 8.0 km within major roads including crossings of tram, underground and railway lines to Cheam WTW. 2 new distribution mains totalling approximately 8 km including 3 railway crossings to North Looe and Langley Park service reservoirs.	2
Sustainability	Significant construction works, mains replacement / upgrades and WTW upgrades. Increased pumping by up to 75m total height.	2
Social Impact (people and places)	Neutral once infrastructure improvements completed.	3
Social Impact (flood resilience)	Minor negative impact due to slight increased risk of flooding in built up areas due to failure of new mains.	3
Social Impact (drought resilience)	Increased resilience during drought periods by facility to import treated water from alternative WRZ which may not be subject to same levels of stress.	2
Landscape and Heritage	Neutral	3
	Total Score	32

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	5Ml/d bulk supply from Thames Water (London WRZ) to SESW at Merton (maximum existing capacity requiring no mains upgrade works)	
Option Code	R11	
Description of Scheme	This option comprises a 5Ml/d bulk transfer from Thames Water's London ring main into the north of SESW's area at Merton. The scheme has been sized to be accommodated within the existing bulk transfer infrastructure between Thames Water and SESW at Merton. This bulk transfer has historically only been designed for emergency use; however, to be suitable for an annual average bulk supply, the water would need to be softened. Hence this scheme involves construction of a new softening plant at Merton, prior to distribution throughout the area. This scheme is mutually exclusive with the other two size variants of this option.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from TW region - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Availability well known as source is TW ring main.	3
Water Quality	Water quality is good having been treated by TW. Does not require additional softening prior to blending with SESW supplies.	3
Change in DO of scheme	Medium size.	2
Flexibility	No potential to be increased without construction of new pumping station, upgrade works to treatment plant and transmission mains to Cheam WTW and new transmission mains to North Looe and Langley Park service reservoirs. Mutually exclusive with Schemes R9 and R10.	1
Technical Difficulty	Minor works only within SESW site.	3
Sustainability	Minor construction works within existing SESW site.	3
Social Impact (people and places)	Neutral once infrastructure improvements completed.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased resilience during drought periods by facility to import treated water from alternative WRZ which may not be subject to same levels of stress.	2
Landscape and Heritage	Neutral	3
	Total Score	31

SES WATER OPTIONS APPRAISAL		
Option Name	20Ml/d transfer from Langley Park/North Looe Reservoirs to Outwood PS	
Option Code	R12	
Description of Scheme	This option involves constructing a new internal transfer option. There is an existing transfer in the opposite direction, which can transfer up to 18Ml/d peak flow. Having a reverse transfer would enable any transfers into the SESW area at Merton to be transported to the south should it be required. This 20Ml/d variant of the option is not mutually exclusive with the 12Ml/d variant - they could be constructed in parallel to total a 32Ml/d transfer capacity. The transfer will comprise new pumping stations at on the sites of existing service reservoirs at Langley Park, North Looe, Nork and Margery, as well as new storage capacity at Margery service reservoir to enable reverse flow to Buckland. This transfer is bi-directional.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from Sutton WRZ (and TW region into Sutton) - liable to be under pressure from similar drought conditions.	1
Yield uncertainty	Availability well known from Sutton WRZ and TW.	3
Water Quality	No issues with water quality.	3
Change in DO of scheme	Large size.	3
Flexibility	Dependent on existing infrastructure capacity. Increase in flow would require significant mains upsizing. Can be constructed alongside Scheme R13.	2
Technical Difficulty	Requires construction of new pump stations at Langley Park, North Looe, Nork and Margery service reservoirs, as well as new storage capacity at Margery.	3
Sustainability	Minor construction works within existing SESW sites. May require Thames Water export for water availability to support case for new main.	3
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative zone and water company.	3
Landscape and Heritage	Neutral	3
	Total Score	33

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	12Ml/d transfer from Langley Park/North Looe Reservoirs to Buckland	
Option Code	R13	
Description of Scheme	This option involves constructing a new internal transfer option. There is an existing transfer in the opposite direction, which can transfer up to 18Ml/d peak flow. Having a reverse transfer would enable any transfers into SESW's area at Merton to be transported south should it be required. This 12Ml/d variant of the option is not mutually exclusive with the 20Ml/d variant - they could be constructed in parallel to total a 32Ml/d transfer capacity. The transfer will comprise new pumping stations at on the sites of existing service reservoirs at Langley Park, North Looe, Nork and Margery, as well as new storage capacity at Margery service reservoir to enable reverse flow to Buckland. This transfer is bi-directional.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from Sutton WRZ (and TW region into Sutton) - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Availability well known from Sutton WRZ and TW.	3
Water Quality	No issues with water quality.	3
Change in DO of scheme	Large size.	3
Flexibility	Dependent on existing infrastructure capacity. Increase in flow would require significant mains upsizing. Can be constructed alongside Scheme R12.	2
Technical Difficulty	Requires construction of new pump stations at Langley Park, North Looe, Nork and Margery service reservoirs, as well as new storage capacity at Margery.	3
Sustainability	Minor construction works within existing SESW sites.	3
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative zone and water company.	3
Landscape and Heritage	Neutral	3
	Total Score	34

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	20Ml/d transfer from Outwood PS to Langley Park/North Looe Reservoirs	
Option Code	R12-Reverse	
Description of Scheme	This option is the reverse internal transfer for R12. No additional capex is assumed to be required for this scheme, as pumping stations will be required at the same number of nodes, and the pipeline requirements will be the same, but the variable opex is different.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from East Surrey WRZ - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Availability well known from East Surrey WRZ.	3
Water Quality	No issues with water quality.	3
Change in DO of scheme	Large size.	3
Flexibility	Dependent on existing infrastructure capacity. Increase in flow would require significant mains upsizing. Can be implemented alongside Scheme R13-Reverse.	2
Technical Difficulty	Dependent on construction of R12 infrastructure - no additional requirements.	3
Sustainability	Operating resources only.	3
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative WRZ.	3
Landscape and Heritage	Neutral	3
	Total Score	34

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	12Ml/d transfer Outwood PS to Langley Park/North Looe Reservoirs	
Option Code	R13-Reverse	
Description of Scheme	This option is the reverse internal transfer for R13. No additional capex is assumed to be required for this scheme, as pumping stations will be required at the same number of nodes, and the pipeline requirements will be the same, but the variable opex is different.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from East Surrey WRZ - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Yield well known from East Surrey WRZ.	3
Water Quality	No issues with water quality.	3
Change in DO of scheme	Large size.	3
Flexibility	Dependent on existing infrastructure capacity. Increase in flow would require significant mains upsizing. Can be implemented alongside Scheme R13-Reverse.	2
Technical Difficulty	Dependent on construction of R13 infrastructure - no additional requirements.	3
Sustainability	Operating resources only.	3
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative WRZ.	3
Landscape and Heritage	Neutral	3
	Total Score	34

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	5Ml/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to Outwood PS	
Option Code	R14	
Description of Scheme	This option involves a 5Ml/d bulk supply from South East Water's (SEW's) RZ2 at Whitely Hill into SESW's area at Outwood. A new pumping station would be required at Whitely Hill, a new treated water transfer main to transport water north to Outwood, and a new softening plant at Outwood to soften the water prior to distribution throughout the area. This variant of the option is not mutually exclusive with the 10Ml/d option, i.e. there could be in total a 15Ml/d transfer.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from SEW region - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Yield reasonably well known from SEW.	2
Water Quality	Water quality is good having been treated by SEW. May require additional softening prior to blending with SESW supplies.	3
Change in DO of scheme	Medium size.	2
Flexibility	Potential to be increased dependent on further upgrade works to pumping station, treatment plant and oversizing of transmission mains. Can be constructed alongside Scheme R15.	2
Technical Difficulty	Requires new pumping station to be located in existing service reservoir site at Whitely Hill, construction of approximately 15 km of new transfer main to Outwood and new water softening plant prior to mixing with SESW supplies. Main along M23 ? SESW looking to be able to reverse flow. Option with WRSE. Pipeline route designed (SESW)	2
Sustainability	Significant construction works, new mains and WTW upgrades.	2
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative WRZ.	3
Landscape and Heritage	Whitely Hill service reservoir is located adjacent to ancient woodland. Extension of site may have slight detrimental impact.	3
	Total Score	30

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	10Ml/d bulk supply from SEW RZ2 (Maidenbower/Whitely Hill) to Outwood PS	
Option Code	R15	
Description of Scheme	This option involves a 10Ml/d bulk supply from South East Water's (SEWs) RZ2 at Whitely Hill into SESWs area at Outwood. A new pumping station would be required at Whitely Hill, a new treated water transfer main to transport water north to Outwood, and a new softening plant at Outwood to soften the water prior to distribution throughout the area. This variant of the option is not mutually exclusive with the 5Ml/d option, i.e. there could be in total a 15Ml/d transfer.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from SEW region - liable to be under pressure from similar drought conditions.	2
Yield uncertainty	Availability reasonably well known from SEW.	2
Water Quality	Water quality is good having been treated by SEW. Requires additional softening prior to blending with SESW supplies.	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on further upgrade works to pumping station, treatment plant and oversizing of transmission mains. Can be constructed alongside Scheme R14.	2
Technical Difficulty	Requires new pumping station to be located in existing service reservoir site at Whitely Hill, construction of approximately 15 km of new transfer main to Outwood and new water softening plant prior to mixing with SESW supplies.	2
Sustainability	Significant construction works, new mains and WTW upgrades.	2
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative WRZ.	3
Landscape and Heritage	Whitely Hill service reservoir is located adjacent to ancient woodland. Extension of site may have slight detrimental impact.	3
	Total Score	31

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	10Ml/d bulk supply from Thames Water (Shalford WTW, Guildford WRZ) to SESW at Effingham SR.	
Option Code	R16	
Description of Scheme	This option involves a 10Ml/d bulk supply from Thames Water's Guildford WRZ (Shalford WTW) to SESW's Effingham service reservoir. The option would involve laying of a pipeline that would enable bi-directional flow to/from the bulk supply connection. However, from the point of view of SESW's WRMP14, the option has the potential to supply the area with 10Ml/d of additional supply at average or at peak. SESW has reviewed Thames Water treated water quality information and concluded that a treated water transfer could be taken directly into supply at SESW's Effingham service reservoir.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN OUT	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	Assumes surplus resources available from TW region - liable to be under pressure from similar drought conditions.	1
Yield uncertainty	Availability reasonably well known from TW.	3
Water Quality	Water quality is good having been treated by TW. SESW believes water requires no additional treatment.	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on oversizing of transmission main.	2
Technical Difficulty	Requires construction of new pumping station at Shalford WTW and new transmission main of approximately 17km to be laid from Shalford WTW to Effingham Service reservoir. Potential static height of 100m to overcome depending on route and/or skirting busy roads in central Guildford.	2
Sustainability	Significant new mains required. Additional pumping.	2
Social Impact (people and places)	Neutral.	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Increased drought resistance due to increased access to resources from alternative zone and water company.	3
Landscape and Heritage	Neutral	3
	Total Score	32

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	5Ml/d bulk supply from SESW Outwood PS to SEW RZ2 (Maidenbower/Whitely Hill)	
Option Code	n/a 1	
Description of Scheme	This option involves a 5Ml/d bulk supply from SESW at distribution node G to South East Water's (SEW's) RZ2. This is the reverse direction of the '5Ml/d bulk supply from SEW RZ2 (Whitely Hill) to Outwood scheme, and it is expected that a new pumping station would be required at SESW's distribution node G, although the treated water transfer main used for the '5Ml/d bulk supply from SEW RZ2 (Whitely Hill) to Outwood would be the conduit of the flow. In the investment modelling and WRSE modelling process, this scheme is considered to be mutually inclusive of the reverse direction transfer, so capex costs are not duplicated should both directions be required at different points in the planning period. This variant of the option is not mutually exclusive with the 10Ml/d option, i.e. there could be in total a 15Ml/d transfer.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is a net export of resources.	3
Yield uncertainty	Yield well known as within SESW operational area and control.	3
Water Quality	Good - treated water to SESW standards.	3
Change in DO of scheme	Medium size.	2
Flexibility	Dependent on Scheme R14 being implemented. Potential to be increased dependent on further upgrade works to new pumping station and oversizing of transmission mains during this scheme. Can be constructed alongside similar scheme sized for 10Ml/d which is dependent on Scheme R15 being implemented.	2
Technical Difficulty	Requires new pumping station to be located at Outwood.	3
Sustainability	Other than construction of new pumping facility at Outwood, no additional construction works required.	3
Social Impact (people and places)	No benefit to SESW.	1
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	No benefit to SESW.	1
Landscape and Heritage	Neutral	3
	Total Score	30

SES WATER OPTIONS APPRAISAL		
Option Name	10Ml/d bulk supply from SESW Outwood PS to SEW RZ2 (Maidenbower/Whitely Hill)	
Option Code	n/a 2	
Description of Scheme	Scheme within WRSE. This option involves a 10Ml/d bulk supply from SESW at distribution node G to South East Water's (SEWs) RZ2. This is the reverse direction of the 10Ml/d bulk supply from SEW RZ2 (Whitely Hill) to Outwood scheme, and it is expected that a new pumping station would be required at SESW's distribution node G, although the treated water transfer main used for the 10Ml/d bulk supply from SEW RZ2 (Whitely Hill) to Outwood would be the conduit of the flow. In the investment modelling and WRSE modelling process, this scheme is considered to be mutually inclusive of the reverse direction transfer, so capex costs are not duplicated should both directions be required at different points in the planning period. This variant of the option is not mutually exclusive with the 5Ml/d option, i.e. there could be in total a 15Ml/d transfer.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	IN WRSE	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is a net export of resources.	3
Yield uncertainty	Yield well known as within SESW operational area and control.	3
Water Quality	Good - treated water to SESW standards.	3
Change in DO of scheme	Large size.	3
Flexibility	Dependent on Scheme R15 being implemented. Potential to be increased dependent on further upgrade works to new pumping station and oversizing of transmission mains during this scheme. Can be constructed alongside similar scheme sized for 10Ml/d which is dependent on Scheme R14 being implemented.	2
Technical Difficulty	Requires new pumping station to be located at Outwood.	3
Sustainability	Other than construction of new pumping facility at Outwood, no additional construction works required.	3
Social Impact (people and places)	No benefit to SESW.	1
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	No benefit to SESW.	1
Landscape and Heritage	Neutral	3
	Total Score	31

SES WATER OPTIONS APPRAISAL

Option Name	5Mld (ADO or PDO) Bough Beech to Blackhurst (SEW) treated water transfer	
Option Code	n/a 3	
Description of Scheme	This option involves a treated water transfer of 5Ml/d at ADO and/or PDO directly from Bough Beech reservoir (post-treatment) to South East Water's RZ1.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is a net export of resources.	3
Yield uncertainty	Yield well known as within SESW operational area and control.	3
Water Quality	Good - treated water to SESW standards.	3
Change in DO of scheme	Medium size.	2
Flexibility	Potential to be increased dependent on further upgrade works to pumping station and oversizing of transmission main.	2
Technical Difficulty	Requires new pumping station to be located at Bough Beech WTW and approximately 18 km of transfer main to Blackhurst service reservoir, involving at least 2 railway crossings and increase in elevation of up to 100m.	2
Sustainability	Significant construction works, mains installation. Increased pumping by up to 100m total height.	2
Social Impact (people and places)	No benefit to SESW.	1
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	No benefit to SESW.	1
Landscape and Heritage	Neutral	3
	Total Score	28

SES WATER OPTIONS APPRAISAL

AECOM

Option Name	10Mld (ADO) & 15Ml/d (PDO) Bough Beech to Blackhurst (SEW) treated water transfer (1)	
Option Code	n/a 4	
Description of Scheme	This option involves a treated water transfer of 10Ml/d at ADO and/or 15Ml/d at PDO directly from Bough Beech reservoir (post-treatment) to South East Water's RZ1.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is a net export of resources.	3
Yield uncertainty	Yield well known as within SESW operational area and control.	3
Water Quality	Good - treated water to SESW standards.	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on further upgrade works to pumping station and oversizing of transmission main.	2
Technical Difficulty	Requires new pumping station to be located at Bough Beech WTW and approximately 18 km of transfer main to Blackhurst service reservoir, involving at least 2 railway crossings and increase in elevation of up to 100m.	2
Sustainability	Significant construction works, mains installation. Increased pumping by up to 100m total height.	2
Social Impact (people and places)	No benefit to SESW.	1
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	No benefit to SESW.	1
Landscape and Heritage	Neutral	3
	Total Score	29

SES WATER OPTIONS APPRAISAL		
Option Name	10Mld (ADO) & 15Ml/d (PDO) Bough Beech to Blackhurst (SEW) treated water transfer (2)	
Option Code	n/a 5	
Description of Scheme	Added to the 5Ml/d option and the other 10Ml/d/15Ml/d option, the total potential transfer capability from Bough Beech to Blackhurst could be up to 25Ml/d at ADO and 35Ml/d at PDO.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is a net export of resources.	3
Yield uncertainty	Yield well known as within SESW operational area and control.	3
Water Quality	Good - treated water to SESW standards.	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on further upgrade works to pumping station and oversizing of transmission main.	2
Technical Difficulty	Requires new pumping station to be located at Bough Beech WTW and approximately 18 km of transfer main to Blackhurst service reservoir, involving at least 2 railway crossings and increase in elevation of up to 100m.	2
Sustainability	Significant construction works, mains installation. Increased pumping by up to 100m total height.	2
Social Impact (people and places)	No benefit to SESW.	1
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	No benefit to SESW.	1
Landscape and Heritage	Neutral	3
	Total Score	29

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	10Ml/d (ADO) & 15Ml/d (PDO) Bough Beech to Riverhill (SEW) treated water transfer	
Option Code	n/a 8	
Description of Scheme	Scheme in WRSE. This option involves a treated water transfer of 10Ml/d at ADO and/or 15Ml/d at PDO directly from Bough Beech reservoir (post-treatment) to South East Water's RZ1.	
Initial Screening		Score
CAMS status	NA	0
WFD status	NA	0
WFD Risk of Deterioration	NA	0
Risk to Designated Sites	NA	0
Initial Screening Decision	SCREEN IN	0
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is a net export of resources.	3
Yield uncertainty	Yield well known as within SESW operational area and control.	3
Water Quality	Good - treated water to SESW standards.	3
Change in DO of scheme	Large size.	3
Flexibility	Potential to be increased dependent on further upgrade works to pumping station and oversizing of transmission main.	2
Technical Difficulty	Requires new pumping station to be located at Bough Beech WTW and approximately 11 km of transfer main to Riverhead service reservoir, involving increase in elevation of up to 160m.	2
Sustainability	Significant construction works, mains installation. Increased pumping by up to 160m total height.	2
Social Impact (people and places)	No benefit to SESW.	1
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	No benefit to SESW.	1
Landscape and Heritage	Neutral	3
	Total Score	29

SES WATER OPTIONS APPRAISAL		AECOM
Option Name	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone	
Option Code	N8	
Description of Scheme	Pipeline linking Pains Hill, Duckpit Wood and Chalk Pit Lane to existing treatment works at Westwood and Godstone (alternative to R24 and R25 treatment and R6 pipeline). Making use of existing spare capacity at Godstone WTW for general water treatments but required treatment at source for specific problems at Pains Hill and Duckpit Wood (as per R24 amd R25).	
Initial Screening		Score
CAMS status	Medway CAMS, no water available in the uper Eden catchment and tributaries. Scheme will draw Lower Greensand groundwater which is contributes to baseflow in streams feeding the River Eden. May affect flow which is then abstracted downstream for Bough Beech Reservoir. Scheme involves replacement boreholes and treatment for existing sources so CAMS status should not be relevant.	3
WFD status	Kent Greensand Middle Groundwater Body, Poor Quantitative status for water balance and surface water dependent tests.	2
WFD Risk of Deterioration	Surface water bodies classified At Risk of not supporting Good Ecological Status but classified Probably Not at Risk of deterioration. Kent Greensand Middle Groundwater Body classified At Risk for impact to surface waters and Probably At Risk for impact on the water balance. The existing site Duckpit Wood is on the Sustainable Catchments list for risk of serious damage so may not be acceptable to EA.	2
Risk to Designated Sites	There are no designated sites from the Upper Eden down to the confluence with the River Medway.	3
Initial Screening Decision	SCREEN IN	10
Secondary Screening		Score
Customers	No significant local issues known.	3
Other abstractors / water companies	No negative affect on other water companies as this is an internal transfer	3
Yield uncertainty	Availability well known from East Surrey WRZ.	3
Water Quality	No issues with water quality.	3
Change in DO of scheme	Small scheme	1
Flexibility	Potential to be increased dependent on oversizing of transmission main.	2
Technical Difficulty	Requires construction of circa 8km of main. Potential to use M25 corridor	2
Sustainability	Scheme may be more efficient use of resources than implementing options R24 and R25.	3
Social Impact (people and places)	Neutral	3
Social Impact (flood resilience)	Neutral	3
Social Impact (drought resilience)	Greater flexibility - slight increase	2
Landscape and Heritage	Neutral	3
	Total Score	41

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