Technical Note: SWB risk scenarios

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1 Introduction

1.1 Background

South Staffordshire Water Plc (SSW) (Cambridge Region) is operated by Cambridge Water (CW), which abstracts groundwater for public water supply (PWS) from 26 sources across its supply zone. The groundwater bodies from which CW abstracts, and their connected surface water bodies, are subject to a range of pressures. These include diffuse and point source pollution and physical modification of the landscape, which, together with abstraction, mean that many of these waterbodies are classified by the Environment Agency (EA) as not achieving Good status under the Water Framework Directive (WFD).

Previously CW has instructed Stantec to provide services in relation to its obligations to meet the 7th Asset Management Plan (AMP7) Water Industry National Environment Programme (WINEP). The broad scope of work involved water resources investigations (desk based) for groundwater sources with WFD no deterioration and status drivers. The sources focussed on in these investigations were the Croydon, Kingston and Westley PWS (the first two being Greensand sources and the third a Chalk source) and separately the Brettenham and Euston PWS (both Chalk sources).

The results of these investigations are documented in Stantec & APEM (2022a) and Stantec & APEM (2022b). The investigations made use of the EA's regional groundwater models (Cam Bedford Ouse (CBO) and North East Anglian Chalk (NEAC) models) and other publicly available datasets, including ecological data. Two sets of scenarios were run in each of these assessments, with naming conventions of CW and AWC for scenarios where abstraction rates for CW sources were altered, and where all Water Company abstractions were altered respectively. NDB is the No Deterioration Baseline scenario, representing abstraction rates agreed between the EA and Water Companies. The F1 scenario applies the maximum peak annual abstraction rate from 2005–2015, while the F2 scenario applies the maximum peak annual rate from 2010–2015 for each source. The F3 scenario is almost identical to the NDB scenario but uses licence capping rates as instructed by the EA. More detailed and comprehensive explanation is found in Stantec & APEM (2022a).

Additional scenario runs were commissioned by CW to assess the effects of increased Westley PWS abstraction rates in isolation (Stantec, 2023a). This assessment also recommended that an environmental monitoring plan should be considered to address the knowledge gaps and uncertainties related to the representativeness of ecological sampling points within relevant surface water bodies (SWBs), additional pressures acting on ecological condition, the ability of the CBO numerical model to accurately simulate small surface water flows (i.e. actual flows), and the likelihood of dependence of SSSI habitats on groundwater (i.e. are they classified correctly as groundwater dependent terrestrial ecosystems (GWDTEs) or not).

Following the completion of these No Deterioration assessments, the EA requested that the cumulative effect of Third-Party groundwater abstractions at full licence rates be accounted for. Rather than developing new model scenarios, a simplified approach was agreed upon using spatial analysis. The approach neglects the potential spatial distribution of increased Third-Party abstraction capture zones, and other hydrogeological complexity that would be represented in a model scenario but is considered appropriate for this assessment. This was reported as Stantec (2023b).

CW have recently published a revised draft Water Resource Management Plan (dWRMP), which outlines measures to manage supply and demand through demand management, leakage



reductions and a set of other asset interventions. Demand management is forecast to reduce overall demand from 2025 to 2032, at which time a supply-side option will enable No Deterioration licence caps to be implemented. However, in some cases there may be a risk of deterioration of the status of a WFD water body associated with an increase in abstraction. WFD water body deterioration is defined as a change in the class of any one of the elements used to determine the status in a water body from its existing class to the class below, or any deterioration within the lowest class (EA, 2018a).

The overall requirements for abstraction to meet demands will have increased since the WFD No Deterioration assessment baseline period, therefore additional work to understand the risk of abstractions to meet the required demands up to 2032 has been commissioned. It should be noted that formal definition of deterioration is binary, where the surface water flow regime either supports Good ecological status or does not support Good ecological status. Typically, this involves the use of EA regional groundwater models and abstraction scenarios to characterise the potential changes in surface water flow metrics. The work reported in this technical note does not explicitly address WFD status but rather the potential risk of deterioration surface water flow metrics.

To support the finalisation of the 2024 WRMP, CW required additional groundwater modelling scenarios to be run using recent abstraction, expected 2025 and 2030 forecast rates in combination with assumptions about other Water Company and 3rd party rates. These have been developed in consultation with the EA, with the primary objective of assessing the deterioration risk to SWBs under these new scenarios compared to the NDB AWC scenario previously run and are reported in Stantec (2023c).

A number of SWBs were flagged with potential medium and high risk classifications under Stantec (2023c), which were deemed unacceptable by the EA, while low risk classifications were considered in a relative sense to be acceptable. In the meantime, Affinity Water (AW) provided estimates of future predicted abstraction which would be more representative of the SWB risk profile than the use of max peak for their sources. Additionally, it was deemed more appropriate for third party abstractions to use max peak instead of peaky full licence. Both of these changes were expected to reduce the SWB risk classifications.

CW requested additional use of the EA regional models to establish a SWB risk profile under revised WRMP future predicted rates, which apply both the No Deterioration caps provided by the EA and the draft WRMP sustainability reductions (Table 1-1). CW also requested a series of scenario runs to determine which CW PWS, under reduced rates, would result in any remaining SWB medium risks being reduced to low risk. Conversely, a reasonable use of the EA regional models would be to determine, within existing licence constraints, how much individual PWS abstraction rates could be increased (i.e. hypothetically modifying EA No Deterioration caps) to meet required WRMP abstraction at a source level, without resulting in increases to SWB risk classifications. This would involve some source abstraction rates increasing above the proposed EA No Deterioration caps, supported by the FP scenario modelling and applying the EA risk assessment framework. It should be noted that the CW target is for Dry Year Annual Average (DYAA), whereas normal year abstractions overall would be less and may be less at each individual source, allowing for more flexibility across sources within the No Deterioration caps. The results of these scenarios are the subject of this technical note.

1.2 Purpose and scope of this document

The purpose of this technical note is to:



- Focus on 2030 (WRMP30 scenario) but also consider 2025 (WRMP25 scenario).
- Revise the WRMP30 scenario from Stantec (2023c) to (i) replace Affinity water max peak
 rates with recently provided future predicted rates, (ii) replace any peaky full licence rates for
 third-party licences with max peak rates and (iii) to determine a more appropriate risk profile
 from which to assess potential changes to CW PWS abstraction rates.
- Describe the approach to running batched scenarios to determine which individual CW PWS abstractions could be reduced below the revised WRMP30 scenario rates to most efficiently change SWB medium risk to SWB low risk classifications.
- Determine the individual CW PWS abstraction rates that can be increased above proposed EA No Deterioration caps, such that the SWB risk classifications do not increase to medium risk.

The overall objective of these scenarios is to determine whether alternative abstraction rate distributions can meet the needs for a DYAA target in the WRMP, with the lowest risk of deterioration at a source level. All scenario results are to be provided to CW and the EA in a separate spreadsheet.

Effects on other No Deterioration assessment elements (GWDTEs, water balance test and saline intrusion) are not reported here.



Table 1-1	Future Predicted (FP)	abstraction rates	(MI/d) for CW	groundwater abstractions
			(J

Name ¹	Licence	2025-26	2029-30 ²	2030-31	2035-36	2036-37
Abington Pk	6/33/28/*G/0050	1.00	1.00	1.00	0.60	0.60
Babraham	6/33/28/*G/0007	7.17	7.17	7.17	4.45	4.45
Brettenham	6/33/44/*G/0221	8.44	8.44	8.44	8.44	8.44
Dullingham	6/33/34/*G/0203	3.60	3.60	3.60	1.65	1.65
Duxford Airfield	6/33/30/*G/0167	4.56	4.56	4.56	2.25	2.25
Duxford Grange	6/33/30/*G/0191	2.81	2.81	2.81	3.09	3.09
Euston	6/33/42/*G/0107	6.00	6.00	6.00	4.17	4.17
Fleam Dyke	6/33/34/*G/0024	10.80	9.70	9.70	9.74	9.74
Fulbourn	6/33/34/*G/0179	1.30	1.30	1.30	1.30	1.30
Gt Wilbraham	6/33/34/*G/0123	5.60	5.60	5.60	4.08	4.08
Hinxton Grange	6/33/27/*G/0039	5.40	5.40	5.40	5.23	5.23
Lowerfield	6/33/30/*G/0193	3.40	3.40	3.40	3.09	3.09
Melbourn	6/33/30/*G/0156	7.00	6.11	6.11	6.11	6.11
Sawston	6/33/28/*G/0038	1.49	1.20	1.20	0.98	0.98
Westley	6/33/34/*G/0110	10.60	10.6	10.6	7.31	7.31
Weston Colville	6/33/34/*G/0179 / 22506 / W-PWS-330	3.00	3.00	2.60	1.98	1.98
FowImere	6/33/30/*G/0026	3.60	3.25	3.25	3.25	3.25
Linton ³	6/33/28/*G/0012	0.00	0.00	0.00	0.00	0.00
Rivey ³	6/33/28/*G/0051	1.00	1.00	1.00	1.00	1.00
Horseheath ³	6/33/28/*G/0052	1.10	0.87	0.87	0.87	0.87
Gt Chishill	6/33/30/*G/0192	1.00	1.00	1.00	1.30	1.30
Heydon	6/33/30/*G/0169	0.97	0.97	0.97	0.97	0.97
Morden Grange	6/33/30/*G/0171	0.95	0.95	0.95	0.95	0.95
Croydon	6/33/30/*G/0027	0.00	1.40	1.40	1.40	1.40
Kingston	6/33/32/*G/0020	0.00	0.00	0.00	0.00	0.00
St Ives ⁴	6/33/26/*G/0020	0.00	1.60	1.60	1.60	1.60
Sum		90.79	90.93	90.53	75.81	75.81

Notes:

- All the abstractions are represented in CBO, with the exception of Brettenham and Euston, which are in NEAC. St. Ives (which is a sand/gravel source rather than a Chalk source) is not represented in either model; it is not considered further in this report.
- 2) For the WRMP 2030 scenario reported here, the rates for 2029-30 have been used as these have a higher total than those for 2030-31 (and are therefore more conservative from a water resources planning perspective).
- 3) These abstraction rates for Linton, Rivey and Horseheath already take into account the relevant Hands-off Flow (HoF) limits. This meant that it was not necessary to undertake double ("sandwich") runs of the CBO model to account for the HoFs. Furthermore, the period from 2035-36 and 2036-37 have adopted the 2030-2031 rates for these sources.
- 4) St Ives is a WRMP2019 option, which is expected to be in use by 2030 following completion of AMP7 work.



2 Scenario development

2.1 Revised future predicted SWB risk profile

Stantec (2023c) made use of future predicted (FP) abstraction rates for CW and (where available) Anglian Water for 2030 and 2036. Following receipt of FP rates for Affinity Water, CW requested that the models be re-run with these more realistic rates (previously, max peak rates had been used for Affinity) and the SWB risk classifications recalculated. It was anticipated that there would be reductions in risk as abstractions from multiple Water Company sources influence the SWB risk classifications.

The WRMP30 scenario from Stantec (2023c) was revised to include Affinity Water FP rates (rather than max peak), and other third-party licences (i.e. not Anglian or Affinity) were set at max peak rates rather than peaky full licence rates. This represents a more realistic situation for 2030 under DYAA conditions. FP rates for 2025 (where available) were also considered; however, the WRMP2025 scenario is of less interest to CW and is not the main focus of this report.

Each of CW's groundwater abstractions has a unique abstraction licence number and is represented in CBO, and/or in NEAC, by a single well cell. For some other abstractions, including some Affinity Water and Anglian Water PWS abstractions, the situation is more complex, with a single licence covering multiple sources or a single source having multiple abstraction points represented as separate wells. To further complicate the situation, the model input datasets (spreadsheets or .csv files used to generate .wel files for MODFLOW) identify abstractions by licence number rather than by source name, and variations in licence numbering (such as a different suffix or different number of leading zeroes) mean that it may be difficult to identify certain abstractions within the model. When working with both models together, another complication is that some abstractions are represented in both models and this "overlap" must be accounted for when presenting combined results.

For CBO, it was possible to identify the relevant PWS abstractions using previously supplied model data and also by matching well cells to the known geographical locations of the abstractions. FP rates were applied for each source. Where there were multiple well points for a source, the total FP abstraction was shared out in the same ratio as for the peak abstraction for 2005-15. This was considered more realistic than sharing out the FP abstraction equally between well points. For NEAC, little information was available on multi-point abstractions. Given this, and the fact that the two CW abstractions of interest (Brettenham and Euston) are located relatively close to each other (thereby reducing the importance of spatial effects), it was considered appropriate to share non-CW multi-well abstractions equally between the different well points.

For both CBO and NEAC, once abstraction rates had been assigned in the model, the total breakdown of water company abstraction (CW-Affinity-Anglian-other) was checked against the FP totals. Through this process, errors could be identified and corrected (for example, by changing the licence format/suffix in the lookup between FP specification and model input datasets in order to make a correct match). It should also be noted that the CBO is currently undergoing an update, while the NEAC model is also planned to be updated in future. Any updated versions have not been considered within the scope of these results. Table 2-1 provides a summary of relevant model scenarios. The first three rows of the table relate to runs reported in Stantec (2023c) and are included for reference. The final two rows (S36 and S37) represent the new scenario runs for 2025 and 2030. Table 2-2 gives the breakdown of abstraction for these two new scenario runs. The values given represent a combination of the CBO and NEAC models, with the overlap accounted for.



ID	Name	Scenario description	CW	Other WC	3 rd Party
S05	NDB_AWC	All Water Company PWS abstractions (incl. CWC GWAbs) at 2010-2015 average 3rd party abstractions at RA rates	2010 - 2015 avg.	2010 - 2015 avg.	RA
S27	WRMP2030	CWC abstractions at revised dWRMP 2030 rates 3rd party abstractions at max peak	dWRMP 2030	FP/Max peak	Max peak
S29	WRMP2036	CWC abstractions at revised dWRMP 2036 rates 3rd party abstractions at max peak	dWRMP 2036	FP/Max peak	Max peak
S36	WRMP2025_2 (NEW)	CWC WRMP 2025, Affinity FP 2025, Anglian FP 2030, other 3rd parties at max peak 2005-15.	dWRMP 2025	FP	Max peak
S37	WRMP2030_2 (NEW)	CWC abstractions at revised dWRMP 2030 rates. Affinity FP 2030, Anglian FP 2030, other 3rd parties at max peak 2005-15.	dWRMP 2030	FP	Max peak

Table 2-1 Scenario naming and descriptions

Note: 1) NDB abstraction is the average rate from January 2010 to December 2015 inclusive.

2) Max peak abstraction refers to the maximum annual average rate within the 2005–2015 period for all Water Companies, while 3rd Party max peak is 2000–2015.

3) Current abstraction is the average rate from 2016 to March 2021.

4) FP rates for Anglian Water were not available for 2025, so 2030 rates were used for both new scenarios (if a 2025 scenario were to be run in future, this would likely under-represent Anglian Water abstraction).

5) All other 3rd Party abstraction is at max peak, with the exception of spray irrigation licences in S05, S27 and S29 where a 'Peaky FL' abstraction pattern was applied.

ID	Name	CW (MI/d)	Affinity (MI/d)	Anglian (MI/d)	Other WCs (MI/d)	Other 3 rd parties (MI/d)	Total (MI/d)
S36	WRMP2025_2	90.79	219.44	206.11	304.04	188.07	1008.45
S37	WRMP2030_2	89.33	193.70	190.32	304.04	188.07	965.46

Note: 1) Other settings are unaltered and are the same as the EA standard RA scenario, including for example surface water abstractions and discharges, rainfall-recharge, model boundary conditions etc.

2) The CW St. Ives source (1.6 MI/d) is in sand/gravel and is not represented in CBO or NEAC.

3) Abstraction rates of other Water Companies are unchanged between these scenarios and therefore have no impact on the risk classification changes that are the subject of this assessment.

The SWBs considered for this investigation include **22 SWBs for the CBO model area**: Bottisham Lode - Quy Water, Bourn Brook, Cam (Audley End to Stapleford), Cat Ditch, Cherry Hinton Brook, Granta, Hobson's Brook, Hoffer Brook, Mel, Mill River, Millbridge and Potton Brooks, New River, Rhee (DS Wendy), Rhee (US Wendy), Shep, Soham Lode, Stour (u/s Wixoe), Swaffham - Bulbeck Lode, Tributary of Cam, Wendon Brook Cam (Stapleford to Hauxton Junction), and Cam (Audley End to Stapleford) as well as **4 SWBs for the NEAC model area**: Sapiston River, Thet (DS Swangey Fen), Little Ouse (Sapiston Confluence to Nuns' Br) and Little Ouse (Hopton Common to Sapiston Confl).

The CW PWS that are expected to influence the SWBs the most are summarised in Table 2-3. It should be noted that more distant PWS from each SWB will also have an effect but one which may not influence flow metrics noticeably.



Site Name	Licence	Waterbody ID	Waterbody Name	% Average proportional impact (estimated by EA WRGIS)
Hinxton Grange 6/33/27/*G/0039		GB105033037600	Cam (Stapleford to Hauxton Junction)	20
		GB105033037590	Cam (Audley End to Stapleford)	93
		GB105033037620	Hobson's Brook	10
		GB105033037810	Granta	24
Babraham	6/33/28/*G/0007	GB105033042700	Bottisham Lode - Quy Water	24
		GB105033037590	Cam (Audley End to Stapleford)	19
Linton	6/33/28/*G/0012	GB105033037810	Granta	100
		GB105033037810	Granta	20
Sawston	6/33/28/*G/0038	GB105033037590	Cam (Audley End to Stapleford)	80
	0/00/00/#0/0050	GB105033037810	Granta	20
Abington Pk	6/33/28/*G/0050	GB105033037590	Cam (Audley End to Stapleford)	80
Rivey	6/33/28/*G/0051	GB105033037810	Granta	100
Horseheath	6/33/28/*G/0052	GB105033037810	Granta	100
	6/33/30/*G/0026	GB105033037610	Rhee (DS Wendy)	61
Fowlmere		GB105033038080	Shep	10
		GB105033038120	Hoffer Brook	3
		GB105033037610	Rhee (DS Wendy)	20
Melbourn	6/33/30/*G/0156	GB105033038060	Mel	15
		GB105033038080	Shep	65
		GB105033037570	Tributary of Cam	0
		GB105033037610	Rhee (DS Wendy)	9
Duxford Air	6/33/30/*G/0167	GB105033038120	Hoffer Brook	52
		GB105033037590	Cam (Audley End to Stapleford)	39
Heydon	6/33/30/*G/0169	GB105033037570	Tributary of Cam	91
Пеучоп	0/33/30/ 0/0103	GB105033037610	Rhee (DS Wendy)	10
Morden Grange	6/33/30/*C/0171	GB105033037740	Cat Ditch	26
Morden Grange	0/33/30/ 0/01/1	GB105033038030	Mill River	74
		GB105033037570	Tributary of Cam	50
Duxford Grange	6/33/30/*G/0191	GB105033038120	Hoffer Brook	40
		GB105033037590	Cam (Audley End to Stapleford)	10
		GB105033037560	Wendon Brook	70
Gt Chishill	6/33/30/*G/0192	GB105033037570	Tributary of Cam	10
		GB105033037610	Rhee (DS Wendy)	20
		GB105033037610	Rhee (DS Wendy)	94
Lowerfield	6/33/30/*G/0193	GB105033038060	Mel	4
		GB105033038080	Shen	2

	Table 2-3	Summary	of CW PWS	influencing	SWBs	within the	СВО	and NEAC	model	areas
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Site Name	Licence	Waterbody ID	Waterbody Name	% Average proportional impact (estimated by EA WRGIS)
		GB105033037620	Hobson's Brook	15
		GB105033037810	Granta	5
Fleam Dyke	6/33/34/*G/0024	GB105033042670	Cherry Hinton Brook	3
		GB105033042700	Bottisham Lode - Quy Water	80
		GB105033042710	Swaffham - Bulbeck Lode	10
		GB105033042700	Bottisham Lode - Quy Water	27
Westley	6/33/34/*G/0110	GB105033042710	Swaffham - Bulbeck Lode	35
		GB105033042780	New River	30
		GB105033042860	Soham Lode	8
Gt Wilbraham	6/33/34/*G/0123	GB105033042700	Bottisham Lode - Quy Water	83
		GB105033042710	Swaffham - Bulbeck Lode	17
	6/33/34/*G/0179	GB105033037810	Granta	40
Fulbourn		GB105033042700	Bottisham Lode - Quy Water	48
		GB105033042710	Swaffham - Bulbeck Lode	74
		GB105033042780	New River	13
		GB105033042710	Swaffham - Bulbeck Lode	15
Dullingham	6/33/34/*G/0203	GB105033042780	New River	80
		GB105033042860	Soham Lode	5
		GB105033043070	Sapiston River	19
Euston	6/33/42/*G/0107	GB105033043090	Little Ouse (Sapiston Confluence to Nuns' Br)	11
		GB105033043100	Little Ouse (Hopton Common to Sapiston Confl)	26
		GB105033043070	Sapiston River	2
Brettenham	6/33/44/*G/0221	GB105033043090	Little Ouse (Sapiston Confluence to Nuns' Br)	10
		GB105033043100	Little Ouse (Hopton Common to Sapiston Confl)	17
		GB105033043190	Thet (DS Swangey Fen)	54

2.2 Batched scenarios with reducing PWS rates

As noted above, the revised WRMP2030 scenario (S37) is of most interest to CW. Given that a number of SWBs were still classified as medium risk (see Appendix A), S37 was taken forward for further investigation. The CW PWS in the vicinity of the medium-risk SWBs were targeted for a series of batched runs, where individual PWS abstraction rates were reduced from FP rates to the NDB rates in a number of steps. This approach was applied to eight CW PWS represented in the CBO model, resulting in 45 scenarios.

Following comparison of which sources most effectively removed the medium risk classifications (i.e. the smallest reduction in abstraction, for the greatest increase in Q95 flow), a number of consolidation scenario runs were developed to establish a new WRMP2030 abstraction profile with



no medium risk classifications across any of the 26 focus SWBs. It was expected that there would be some net reduction in CW abstraction as a result.

A new "baseline" scenario, referred to here as S38, was established in which all the medium risks had been reduced to low (see Chapter 3). The most effective solution was to reduce CW abstraction by a total of 2.9 MI/d, split between Westley (reduced from 10.6 to 8.0 MI/d) and Rivey (reduced from 1.0 to 0.7 MI/d). As explained in the following section, this new scenario formed a baseline from which abstraction could then be increased at different CW sources, with a view to recovering the original total (or even exceeding it) without increasing any of the SWB risk classifications to medium or above.

2.3 Batched scenarios with increasing PWS rates

Using a similar approach to that applied for the batched decrease scenarios described above (but in reverse), batched model runs were undertaken in which selected PWS abstraction rates were increased from the consolidated S38 scenario rates (the new "baseline"). Initially, 22 runs were undertaken in which individual abstractions were increased above the proposed EA No Deterioration caps. Then a number of consolidation runs were carried out, involving changes to eight PWS across 29 scenarios. Most of these runs involved increasing more than one abstraction. The aim was to recover, or exceed, the S37 CW abstraction total (but using a different spatial distribution of abstraction), while at the same time, avoiding introducing medium risk classifications across any of the 26 focus SWBs. The abstraction recoveries and risk classifications were compared for the various runs.

Where the required abstraction target in a preferred scenario should increase any of the abstractions above the proposed EA No Deterioration caps for 2030, CW would propose to consider additional environmental monitoring. Such monitoring would provide a credible evidence base from which local-scale mitigation controls could be implemented to reduce the potential abstraction impact on environmental receptors or consideration of other options.



3 Scenario results

3.1 Hydrological regime risk assessment methodology

The EA methodology for No Deterioration assessment uses the future scenario flow compliance band classification and the change in flow between NDB and Future scenarios (as a percentage of Naturalised flow) at Q95 to assign deterioration risk categories (EA, 2018a; 2018b).

The colour shading from green, yellow, amber to red used below represents the future flow compliance bands (Compliant, Band 1, Band 2 to Band 3, respectively), which are calculated differently for different abstraction sensitivity band (ASB) classifications (see Table 3-1).

Abstraction	% reduction from naturalised flows at Q95					
(ASB)	Compliant (EEI)	Non-compliant	Non-compliant	Non-compliant		
	Compliant (EFI)	Dallu I	Ddilu Z	Ballu S		
ASB3	<10%	<35%	<60%	>60%		
ASB2	<15%	<40%	<65%	>65%		
ASB1	<20%	<45%	<70%	>70%		

 Table 3-1
 Percentage difference from natural flows for each compliance band (EA, 2013)

The Table 3-2 shading in grey, blue, purple and pink used below shows the flow deterioration risk classification (No risk, Low risk, Medium risk and High risk, respectively) according to EA (2018a), which can be applied to each flow statistic.

Table 3-2Surface water risk of deterioration due to increase in abstraction (EA, 2018a)

	Reduction in flow between recent actual (NDB) and forecast scenario, as a % of natural flow at each of Q95, Q70, Q50, Q30						
Forecast flow compliance	>=15%	>=10% and <15%	>=5% and <10%	<5%	<=0%		
Band 3	High risk	High risk	Medium risk	Low risk	No risk		
Band 2	High risk	Medium risk	Low risk	Low risk	No risk		
Band 1	Medium risk	Medium risk	Low risk	Low risk	No risk		
Compliant	Low risk	Low risk	Low risk	No risk	No risk		
Surplus over natural flow (Q95)	No risk	No risk	No risk	No risk	No risk		

All model scenario run SWB outflow results have been processed using the above classification tables, including the future flow compliance band classifications (which have the potential to change), so that the model outputs can be interpreted in terms of SWB deterioration risk.

3.2 Initial FP scenarios: WRMP 2025 and WRMP 2030

The SWB deterioration risk classifications for the WRMP 2025 (S36) and WRMP 2030 (S37) scenarios are presented in Appendix A (Table A-1 and Table A-2). Note that these tables also include the results of previous runs (Stantec, 2023b and c); these are shown for comparison.

3.3 Reduced abstraction scenarios

Following implementation of Affinity Water 2030 FP rates and changes to other third party abstractions, there were medium risk classifications remaining in three SWBs (Granta, Bottisham



Lode and Swaffham-Bulbeck Lode) within the CBO model (the other 19 had either low or no risk classifications – see Appendix A, Table A-2). The four focus SWBs within the NEAC model were already at low risk or no risk for the WRMP2030 (S37) scenario, so reduced abstraction scenarios were not run for NEAC.

Ten CW abstractions were located within the waterbodies having medium risk, namely Fleam Dyke, Fulbourn, Great Wilbraham, Horseheath, Rivey, Linton, Babraham, Sawston, Weston Colville and Westley. Nine of these (excluding Linton, which has FP = 0) were taken forward for batched scenario runs in which rates for the individual abstractions were progressively reduced, typically in increments of 0.25 or 0.5 Ml/d. The aims of this were (1) to determine how much influence the individual abstractions and (2) to identify potential reductions (or combinations of reductions) that could reduce the medium risks to low, or no, risk.

The results of the batched runs are illustrated by Figure 3-1, in which abstraction reduction is plotted against the resulting change (increase) in Q95 flow at the waterbody outflow point (for selected waterbodies). In each plot, the red dashed vertical line represents the threshold (Q95 flow change) that would take the waterbody from medium to low risk (in the figure, L = low risk and M = medium risk). The scenarios for each abstraction plot along a roughly linear trend, the gradient of which represents the effectiveness, or efficiency, of that abstraction for increasing Q95 flow. A lower gradient means that the Q95 flow is more sensitive to changes in that abstraction, whereas a higher gradient indicates lower sensitivity. A vertical trend along the y-axis indicates that the abstraction does not influence Q95 flow in the waterbody.

For Bottisham Lode SWB, reductions from five CW PWS were similarly effective in increasing Q95 but the most effective was Fleam Dyke. Westley was most effective for increasing Swaffham-Bulbeck Lode SWB Q95 (noting the concurrent effectiveness for increasing Bottisham Lode SWB Q95) and the most effective reductions were from Rivey PWS for increasing the Granta SWB Q95. A consolidated run (S37) demonstrated that no medium risk classifications existed within the focus 26 SWBs if Westley and Rivey PWS were reduced by 2.6 and 0.3 Ml/d respectively. This was a total reduction of 2.9 Ml/d from the CW 2030 FP and represents an abstraction scenario with risk classifications that are more acceptable (i.e. of the 26 focus SWBs, 14 are at no risk and eight are at low risk for Q95 flows). As explained above, this new scenario was named S38 and formed a baseline from which to explore increasing different CW abstractions with a view to recovering, or exceeding, the original (S37) total for CW. This consolidated scenario (S38) is with EA No Deterioration caps in place along with above-listed reductions to remove medium risk classifications.



Bottisham Lode



Figure 3-1 Abstraction reduction and SWB Q95 increase for selected waterbodies



3.4 Increasing abstraction scenarios

As explained above, Scenario 38 (S38) formed a new "baseline" from which selected CW abstractions were then increased, first in 22 individual runs, Inc1-Inc22 (with a single abstraction increased in each), and then in 29 consolidated runs, Inc23-Inc51 (mostly with in-combination changes). The results are presented in Appendix A (Table A-3 and A-4 for the individual runs¹ and Table A-5 and Table A-6 for the consolidated runs). Figure 3-2 illustrates some of these runs; the figure shows the abstraction increase plotted against the change (decrease) in Q95 outflow for selected waterbodies. Where the line for a particular abstraction crosses the (red dashed) threshold line, the risk classification for the waterbody rises to the next highest category (in the figure, N = no risk, L = low risk and M = medium risk).

Many of the individual and consolidated scenarios showed increases in risk compared to S38, with some SWBs changing from low risk to medium risk (Swaffham – Bulbeck Lode only) or from no risk to low risk. However, some scenarios did not result in an increase in risk, despite there having been an increase in abstraction relative to S38 (this was the case for S25 and S29 in the consolidated runs).

Swaffham – Bulbeck Lode is of particular interest because its risk classification increases to medium in some scenarios. CW's Dullingham abstraction exerts an influence on the Q95 flow and risk classification of Swaffham – Bulbeck Lode, despite being located outside of this SWB (although it is only just outside). This influence can be seen in the third plot in Figure 3-2. Note that these changes were superimposed on an existing increase relative to S38 (see Section 2.3), hence the intercept of the Dullingham line on the y-axis. Data points for the other abstractions all plot on the y-axis, indicating that they do not affect Q95 flow in the SWB.



¹ Note that S22 in this batch was an in-combination run with changes to Melbourn and Morden Grange.



Figure 3-2 Abstraction increase and SWB Q95 decrease for selected waterbodies



For the batched increase runs, Morden Grange was set to abstract up to 2.28 MI/d (full licensed annual quantity expressed as a daily average). However, it is understood that this source is currently out of supply because of high concentrations of nitrate. Given that there are no immediate plans to bring the source back online, it is assumed that CW may need to recover not only the 2.9 MI/d reduction made to Westley and Rivey to reach S38 but also an additional 2.28 MI/d to allow for the inability to use Morden Grange in the short term. In other words, the recovery should be at least 2.90 + 2.28 = 5.18 MI/d. It should be noted that Morden Grange is expected to be back in service at some future point in time following completion of AMP7 works.

One of the scenarios, Inc31, was found to provide a recovery of 5.7 MI/d (Table A-5 in Appendix A) but also increased the risk classification of Swaffham – Bulbeck Lode from low to medium. The simulated Q95 flow for this SWB was only 0.69 MI/d below the threshold for low risk. This suggested that a modified version of this scenario with a slightly lower abstraction recovery would avoid medium risk while at the same time providing most of the desired recovery. A further model run, referred to here as S39, was undertaken to check this. This showed that the medium risk could be reduced to low with an abstraction recovery of 37.49 - 32.79 = 4.7 MI/d (Table 3-3), leaving a residual loss in target abstraction of 5.18 - 4.70 = 0.48 MI/d (noting the assumption that Morden Grange needs to be accounted for, which is unlikely to be the case by 2030). S39 is presented here as the best abstraction scenario of those run for this investigation (i.e. maximising abstraction while avoiding medium risk classifications).

The above analysis excludes Brettenham and Euston, which are not represented in CBO. These sources are represented in NEAC, and the WRMP 2030 NEAC run (Table A-2 in Appendix A) provides useful information about how much "headroom" there may be for increasing these abstractions without causing SWB deterioration. Analysis suggests that there may be c. 2 Ml/d of headroom in the Thet (DS Swangey Fen) SWB, which may be influenced by Brettenham. The same analysis suggests c. 6 Ml/d headroom in the Little Ouse (Sapiston Confluence to Nuns' Br) SWB, which may be influenced by both Brettenham and Euston. These results suggests that the shortfall in the recovery discussed above could potentially be made up by increasing abstraction from Brettenham and/or Euston which have been capped at No Deterioration rates but are below their previous full licensed rates by around 1 and 2 Ml/d respectively. A relatively small increase at Brettenham and/or Euston, even if assuming a 1:1 relationship between abstraction change and effect on flows, would not breach the c. Ml/d headroom on the Thet (DS Swangey Fen) SWB.

Within the dWRMP 2024 it is recognised that supply-side options to meet No Deterioration requirements are not fully available until 2032. However, the results presented here for 2030 are still applicable for the required abstraction scenarios up until 2032. With respect to the identified shortfall in the preferred abstraction scenario (S39) that minimises environmental risk, there are a number of additional options under consideration for demand management and supply enhancement to allow for this difference. For example, CW are intending to accelerate their metering programme and implement full smart metering, and are evaluating the management of non-household demand in the period up to 2032, alongside fast-tracking of a small supply-side option. These options combined are expected to provide up to an additional 5.7 Ml/d. The work to confirm this is ongoing at the time of writing.



Model run>	Current (S30)	WRMP 2030 (S27)	WRMP 2030_2 (S37)	WRMP 2030_2 (S38) Westley &	WRMP 2030_2 (S39)
			FP	Rivey	Best
Abstraction recovery (MI/d)	N/A	N/A	N/A	decreased	4 70
Rhee (DS Wendy)	Norisk	Low risk	Norisk	Norisk	Norisk
Hobson's Brook	Low risk	Low risk	Low risk	Low risk	Low risk
Millbridge and Potton Brooks	Norisk	Low risk	Low risk	Low risk	Low risk
Mill River	Low risk	Low risk	No risk	No risk	No risk
> Mel	No risk	Low risk	No risk	No risk	No risk
Shep	No risk	Low risk	No risk	No risk	Low risk
Rhee (US Wendy)	No risk	Low risk	No risk	No risk	No risk
Soham Lode	No risk	No risk	No risk	No risk	No risk
Cherry Hinton Brook	No risk	No risk	No risk	No risk	No risk
S Bourn Brook	No risk	No risk	No risk	No risk	No risk
Bottisham Lode - Quy Water	Low risk	Medium risk	Medium risk	Low risk	Low risk
Swaffham - Bulbeck Lode	Low risk	Medium risk	Medium risk	Low risk	Low risk
Cam	No risk	No risk	No risk	No risk	No risk
New River	Low risk	Low risk	Low risk	Low risk	Low risk
Wendon Brook	No risk	No risk	No risk	No risk	No risk
Cat Ditch	No risk	High risk	No risk	No risk	No risk
Granta	Medium risk	Medium risk	Medium risk	Low risk	Low risk
Hoffer Brook	Low risk	Low risk	Low risk	Low risk	Low risk
Stour (u/s Wixoe)	Medium risk	Low risk	Low risk	Low risk	Low risk
Tributary of Cam	No risk	No risk	No risk	No risk	No risk
Cam (Stapleford to Hauxton Junction)	No risk	High risk	No risk	No risk	Low risk
Cam (Audley End to Stapleford)	No risk	High risk	No risk	No risk	Low risk

Table 3-3SWB risk classifications for 2030 FP (S37), "new baseline" (S38) and "best"(S39) abstraction scenarios compared to "current" and previous 2030 (S27)



CWC abstraction	FL rate ⁺	Current (S30)	WRMP 2030 (S27)	2030 FP (S37)	New baseline (S38)	Best (S39)
Abington Pk	1.00	0.75	1.00	1.00	1.00	1.00
Babraham	9.09	6.12	7.17	7.17	7.17	7.17
Brettenham*	8.44	8.90	8.44	8.44	8.44	8.44
Dullingham	4.50	1.93	3.60	3.60	3.60	3.51
Duxford Airfield	4.56	3.83	4.56	4.56	4.56	4.56
Duxford Grange	3.41	2.73	2.81	2.81	2.81	3.41
Euston*	6.00	6.90	6.00	6.00	6.00	6.00
Fleam Dyke	15.88	12.18	9.70	9.70	9.70	9.70
Fulbourn	1.95	1.22	1.30	1.30	1.30	1.30
Gt Wilbraham	5.67	4.87	5.60	5.60	5.60	5.60
Hinxton Grange	5.77	5.14	5.40	5.40	5.40	5.77
Lowerfield	3.41	3.08	3.40	3.40	3.40	3.40
Melbourn	7.95	5.88	6.11	6.11	6.11	7.94
Sawston	1.49	1.20	1.20	1.20	1.20	1.20
Westley	11.40	6.91	10.60	10.60	8.00	8.00
Weston Colville	3.65	2.58	3.00	3.00	3.00	3.00
Fowlmere	3.60	2.91	3.25	3.25	3.25	3.60
Linton	1.93	0.89	0.00	0.00	0.00	0.00
Rivey	2.20	1.27	1.00	1.00	0.70	0.70
Horseheath	2.30	1.32	0.87	0.87	0.87	0.87
Gt Chishill	1.15	0.59	1.00	1.00	1.00	1.15
Heydon	1.13	0.76	0.97	0.97	0.97	1.13
Morden Grange	2.28	1.07	0.95	0.95	0.95	2.28
Croydon	1.99	0.00	1.40	1.40	1.40	1.40
Kingston	1.00	0.00	0.00	0.00	0.00	0.00
St lves*	1.62	0.00	1.60	1.60	1.60	1.60
Sum (MI/d)	113.36	83.04	90.93	90.93	88.03	92.73

Table 3-4CWC abstraction rates for scenarios S37, S38 and S39 (MI/d) with FL rateshown for reference

Note: ⁺FL rate as of Sept 2024

*Brettenham and Euston are in the NEAC model but not the CBO model. Note also that NEAC was not run for S38 or S39 and that St. Ives PWS is not represented in either model.

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4 Conclusions and recommendations

The key conclusions and recommendations are described below:

- The CBO and NEAC regional groundwater models have been used to predict the effect of future CW abstraction scenarios (WRMP 2025 and WRMP 2030) on the deterioration risk of surface waterbodies that depend on baseflow from the Chalk aquifer. The model runs have been revised after taking into account predicted future abstraction rates for both Affinity Water and Anglian Water, as well as for CW.
- The WRMP 2030 scenario (S37) is of particular interest to CW for planning purposes and identifying risk of deterioration from the baseline before 2030. Modelling of this scenario has identified that the following waterbodies may be at medium risk of deterioration: Bottisham Lode – Quy Water, Swaffham – Bulbeck Lode and the Granta.
- Multiple runs of the CBO model have been used to explore the effects of re-distributing CW's abstraction spatially for 2030 with a view to reducing the medium risk SWBs to low risk. Stepwise decreases in individual abstractions have been used to identify those abstractions that have the most influence on the medium risk classification SWBs.
- A new "baseline" scenario (S38) has been established in which the medium risks have been eliminated through the following abstraction reductions: 2.6 M/d for Westley and 0.3 MI/d for Rivey (i.e. a total reduction of 2.9 MI/d). From this new "baseline", other CW abstractions have been increased with a view to recovering, or exceeding, the 2.9 MI/d without increasing the deterioration risk of any of the waterbodies to medium. As the modelling assumes 2.28 MI/d for Morden Grange, a source that is currently out of supply and the subject of AMP7 works, may not be completely back online by 2030, this rate (representing the full annual licence as a daily average) has been added to the 2.9 MI/d requiring recovery as a precautionary approach, giving a total of 5.18 MI/d to be potentially recovered.
- A scenario has been identified (S39) in which 4.7 MI/d can be recovered without increasing any of the SWB deterioration risks to medium. The remaining shortfall of 0.48 MI/d in CW's target total for 2030 (noting exclusion of Morden Grange for the purposes of this scenario) could potentially be made up by an increase in abstraction for Brettenham, as the NEAC run for WRMP 2030 suggests that there is "headroom" for increasing abstraction without increasing the deterioration risk classifications of surface waterbodies. Morden Grange may also be returned to service within the period at up to 2.28MI/d
- There are several additional WRMP options under consideration for demand management and supply enhancement in parallel to this piece of work to allow for further resilience of supplies to growth, which would also allow for some of this difference (e.g. accelerated metering programme and implementation of full smart metering, and re-evaluation of nonhousehold demand management, alongside fast-tracking of a small supply-side option). These options combined could provide up to an additional 5.7 MI/d but the work to confirm this is ongoing at the time of writing.
- It should be noted that the CW target is for DYAA, in which case normal year abstractions may be less, and with more flexibility across sources within the No Deterioration caps. Headroom and outage allowances are not included in the abstraction targets as these would



be both minimised in a DYAA scenario and apportioned across all sources in a variable way over a typical abstraction period.

• It is recommended that one or more runs of NEAC to explore the effects of increasing abstraction from Brettenham and/or Euston.



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Appendix A: Deterioration risk tables



СВО

	1	1						1								1				
			Com	pliance Band	d									Deteriorati	on Risk					
Waterbody	NDB AWC	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2025_2 (S36)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (\$33)	Current peak (S34)	All Peak (S35)	Waterbody	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2025_2 (S36)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (S33)	Current peak (S34)	All Peak (\$35)
Rhee (DS Wendy)	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Rhee (DS Wendy)	Low risk	Low risk	No risk	No risk	Low risk	Low risk	Low risk	No risk	Medium risk
Hobson's Brook	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 2	Hobson's Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	No risk	Low risk	High risk
Millbridge and Potton Brooks	Compliant	Band 1	Band 1	Band 1	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Millbridge and Potton Brooks	Low risk	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	Low risk	Medium risk
Mill River	Band 1	Band 1	Band 1	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Mill River	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Medium risk
Mel	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Mel	Low risk	Low risk	No risk	No risk	Low risk	Low risk	Low risk	No risk	Medium risk
Shep	Band 2	Band 2	Band 2	Band 2	Band 1	Band 2	Band 2	Band 2	Band 2	Band 2	Shep	Low risk	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	No risk	Low risk
Rhee (US Wendy)	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Rhee (US Wendy)	Low risk	Low risk	No risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk
Soham Lode	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Soham Lode	No risk	No risk	No risk	No risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk
Cherry Hinton Brook	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Cherry Hinton Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	Low risk
Bourn Brook	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Bourn Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	Low risk
Bottisham Lode - Quy Water	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 3	Bottisham Lode - Quy Water	Medium risk	Medium risk	Medium risk	Low risk	Medium risk	Medium risk	No risk	Low risk	High risk
Swaffham - Bulbeck Lode	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Swaffham - Bulbeck Lode	Medium risk	Medium risk	Medium risk	Low risk	High risk	High risk	Low risk	Low risk	Medium risk
Cam	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
New River	Band 1	Band 1	Band 1	Band 1	Band 1	Band 2	Band 2	Band 2	Band 2	Band 2	New River	Low risk	Low risk	Low risk	Low risk	High risk	High risk	Medium risk	Medium risk	High risk
Wendon Brook	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Wendon Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cat Ditch	Band 2	Band 3	Band 3	Band 1	Band 2	Band 3	Band 3	Band 3	Band 3	Band 3	Cat Ditch	High risk	High risk	No risk	No risk	High risk	High risk	High risk	High risk	High risk
Granta	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Granta	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Low risk	Medium risk	High risk
Hoffer Brook	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Hoffer Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Stour (u/s Wixoe)	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Stour (u/s Wixoe)	Low risk	Low risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk
Tributary of Cam	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Tributary of Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cam (Stapleford to Hauxton Junction)	Band 1	Band 2	Band 2	Band 1	Band 1	Band 2	Band 2	Band 2	Band 2	Band 2	Cam (Stapleford to Hauxton Junction)	High risk	High risk	Low risk	No risk	High risk	High risk	Medium risk	Low risk	High risk
Cam (Audley End to Stapleford)	Band 1	Band 2	Band 2	Band 1	Band 1	Band 2	Band 2	Band 2	Band 1	Band 2	Cam (Audley End to Stapleford)	High risk	High risk	Low risk	No risk	High risk	High risk	High risk	Low risk	High risk

NEAC

			Complia	nce Band						
Waterbody	NDB AWC	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2025_2 (S36)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (\$33)	Current peak (S34)	All Peak (\$35)
Thet (DS Swangey Fen)	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1
Sapiston River	Band 1	Band 1	Band 1	Band 1	Band 1	Band 2	Band 2	Band 2	Band 1	Band 2
Little Ouse (Sapiston Confluence to Nuns' Br)	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1
Little Ouse (Hopton Common to Sapiston Confl)	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3

		Det	erioration R	lisk					
Waterbody	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2025_2 (S36)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (S33)	Current peak (S34)	All Peak (\$35)
Thet (DS Swangey Fen)	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Sapiston River	Low risk	Low risk	Low risk	Medium risk	High risk	High risk	High risk	Low risk	High risk
Little Ouse (Sapiston Confluence to Nuns' Br)	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Little Ouse (Hopton Common to Sapiston Confl)	Medium risk	Medium risk	High risk	Low risk	High risk	High risk	Medium risk	High risk	High risk



СВО

				Compliance	Band						
Waterbody	NDB AWC	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2030_2 (S37)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (\$33)	Current peak (S34)	All Peak (S35)	Waterbody
Rhee (DS Wendy)	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Rhee (DS Wendy)
Hobson's Brook	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 2	Hobson's Brook
Millbridge and Potton Brooks	Compliant	Band 1	Band 1	Band 1	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Millbridge and Potton Brooks
Mill River	Band 1	Band 1	Band 1	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Mill River
Mel	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Mel
Shep	Band 2	Band 2	Band 2	Band 2	Band 1	Band 2	Band 2	Band 2	Band 2	Band 2	Shep
Rhee (US Wendy)	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Rhee (US Wendy)
Soham Lode	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Soham Lode
Cherry Hinton Brook	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Band 1	Cherry Hinton Brook
Bourn Brook	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Bourn Brook
Bottisham Lode - Quy Water	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 3	Bottisham Lode - Quy Water
Swaffham - Bulbeck Lode	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Band 2	Swaffham - Bulbeck Lode
Cam	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Cam
New River	Band 1	Band 1	Band 1	Band 1	Band 1	Band 2	Band 2	Band 2	Band 2	Band 2	New River
Wendon Brook	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Wendon Brook
Cat Ditch	Band 2	Band 3	Band 3	Band 1	Band 2	Band 3	Band 3	Band 3	Band 3	Band 3	Cat Ditch
Granta	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Granta
Hoffer Brook	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Hoffer Brook
Stour (u/s Wixoe)	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Stour (u/s Wixoe)
Tributary of Cam	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Tributary of Cam
Cam (Stapleford to Hauxton Junction)	Band 1	Band 2	Band 2	Band 1	Band 1	Band 2	Band 2	Band 2	Band 2	Band 2	Cam (Stapleford to Hauxton Junction)
Cam (Audley End to Stapleford)	Band 1	Band 2	Band 2	Band 1	Band 1	Band 2	Band 2	Band 2	Band 1	Band 2	Cam (Audley End to Stapleford)

NEAC

			Complia	nce Band									Det	erioration R	isk					
Waterbody	NDB AWC	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2030_2 (\$37)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (S33)	Current peak (S34)	All Peak (S35)	Waterbody	WRMP 2030 (S27)	WRMP 2030 50% (S28)	WRMP 2030_2 (S37)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (S33)	Current peak (S34)	All Peak (S35)
Thet (DS Swangey Fen)	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Thet (DS Swangey Fen)	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Sapiston River	Band 1	Band 1	Band 1	Band 1	Band 1	Band 2	Band 2	Band 2	Band 1	Band 2	Sapiston River	Low risk	Low risk	No risk	Medium risk	High risk	High risk	High risk	Low risk	High risk
Little Ouse (Sapiston Confluence to Nuns' Br)	Band 1	Band 1	Band 1	Compliant	Band 1	Band 1	Band 1	Band 1	Band 1	Band 1	Little Ouse (Sapiston Confluence to Nuns' Br)	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Little Ouse (Hopton Common to Sapiston Confl)	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Band 3	Little Ouse (Hopton Common to Sapiston Confl)	Medium risk	Medium risk	Low risk	Low risk	High risk	High risk	Medium risk	High risk	High risk

Deteriorati	on Risk					
WRMP 2030_2 (S37)	Current (S30)	WRMP 2030 peak (S31)	WRMP 2030 50% peak (\$32)	WRMP 2036 peak (S33)	Current peak (S34)	All Peak (S35)
No risk	No risk	Low risk	Low risk	Low risk	No risk	Medium risk
Low risk	Low risk	Low risk	Low risk	No risk	Low risk	High risk
Low risk	No risk	Low risk	Low risk	Low risk	Low risk	Medium risk
No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Medium risk
No risk	No risk	Low risk	Low risk	Low risk	No risk	Medium risk
No risk	No risk	Low risk	Low risk	Low risk	No risk	Low risk
No risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk
No risk	No risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk
No risk	No risk	No risk	No risk	No risk	No risk	Low risk
No risk	No risk	No risk	No risk	No risk	No risk	Low risk
Medium risk	Low risk	Medium risk	Medium risk	No risk	Low risk	High risk
Medium risk	Low risk	High risk	High risk	Low risk	Low risk	Medium risk
No risk	No risk	No risk	No risk	No risk	No risk	No risk
Low risk	Low risk	High risk	High risk	Medium risk	Medium risk	High risk
No risk	No risk	No risk	No risk	No risk	No risk	No risk
No risk	No risk	High risk	High risk	High risk	High risk	High risk
Medium risk	Medium risk	Medium risk	Medium risk	Low risk	Medium risk	High risk
Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Low risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk
No risk	No risk	No risk	No risk	No risk	No risk	No risk
No risk	No risk	High risk	High risk	Medium risk	Low risk	High risk
No risk	No risk	High risk	High risk	High risk	Low risk	High risk

WRMP

2030

(S27)

Low risk

Low risk

Low risk

Low risk

Low risk

Low risk

No risk

No risk

No risk

No risk

Low risk

No risk

High risk

Low risk

Low risk

No risk

High risk

High risk

WRMP

2030 50%

(S28)

Low risk

Low risk

Low risk

Low risk

Low risk

Low risk

No risk

No risk

No risk

Medium risk Medium risk Medium risk

Medium risk Medium risk Medium risk

No risk

Low risk

No risk

Medium risk Medium risk Medium risk

Low risk

Low risk

No risk

High risk

High risk

High risk No risk

Low risk Low risk



 Table A-3 Batched increase runs (CBO) – mostly changes to individual abstractions (part 1)

Waterbody risk classifications			Bold text ind	licates an incl	rease in risk r	elative to S3	38.						
Model run	WRMP 2030_2 (S37) FP	WRMP 2030_2 (S38) Westley & Rivey decreased	Inc1	Inc2	Inc3	Inc4	Inc5	Inc6	Inc7	Inc8	Inc9	Inc10	Inc11
Rhee (DS Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Hobson's Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Millbridge and Potton Brooks	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Mill River	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Mel	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Shep	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Rhee (US Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Soham Lode	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cherry Hinton Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Bourn Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Bottisham Lode - Quy Water	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Swaffham - Bulbeck Lode	Medium risk	Low risk	Medium risk	Medium risk	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
New River	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Wendon Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cat Ditch	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Granta	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Hoffer Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Stour (u/s Wixoe)	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Tributary of Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cam (Stapleford to Hauxton Junction)	No risk	No risk	No risk	No risk	No risk	No risk	Low risk	No risk	No risk	No risk	No risk	No risk	No risk
Cam (Audley End to Stapleford)	No risk	No risk	No risk	No risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	No risk	Low risk

CW abstractions for which rates were changed Abstraction rates in MI/d. Grey values are und

FL rate	Name	2030 FP	new baseline	Inc1	Inc2	Inc3	Inc4	Inc5	Inc6	Inc7	Inc8	Inc9	Inc10	Inc11
4.51	Dullingham	3.60	3.60	3.90	4.20	4.51	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
3.41	Duxford Grange	2.81	2.81	2.81	2.81	2.81	3.11	3.41	2.81	2.81	2.81	2.81	2.81	2.81
5.77	Hinxton Grange	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.50	5.60	5.70	5.77	5.40	5.40
7.94	Melbourn	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.61	7.11
3.60	FowImere	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1.15	Gt Chishill	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.13	Heydon	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
2.28	Morden Grange	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
11.40	Westley (fixed to remove 2030 FP medium)	10.60	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
2.20	Rivey (fixed to remove 2030 FP medium)	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

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Report Status: Final

ed relative to new baseline.



Table A-4 Batched increase runs (CBO) – mostly changes to individual abstractions (part 2)

Waterbody risk classifications			Bold text ind	licates an inc	rease in risk	relative to S	38.			
Model run	WRMP 2030_2 (S37) FP	WRMP 2030_2 (S38) Westley & Rivey decreased	Inc12	Inc13	Inc14	Inc15	Inc16	Inc17	Inc18	inc19
Rhee (DS Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Hobson's Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Millbridge and Potton Brooks	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Mill River	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Mel	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Shep	No risk	No risk	Low risk	Low risk	No risk	No risk	No risk	No risk	No risk	No risk
Rhee (US Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Soham Lode	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cherry Hinton Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Bourn Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Bottisham Lode - Quy Water	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Swaffham - Bulbeck Lode	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
New River	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Wendon Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cat Ditch	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Granta	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Hoffer Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Stour (u/s Wixoe)	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Tributary of Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cam (Stapleford to Hauxton Junction)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Cam (Audley End to Stapleford)	No risk	No risk	Low risk	Low risk	No risk	No risk	Low risk	No risk	No risk	No risk

CW abstractions for which rates were changed

Abstraction rates in MI/d. Grey values are unchanged from new baseline. Bold values have changed relative to new baseline.

FL rate	Name	2030 FP	new baseline	Inc12	Inc13	Inc14	Inc15	Inc16	Inc17	Inc18	Inc19	Inc20	Inc21	Inc22
4.51	Dullingham	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
3.41	Duxford Grange	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81
5.77	Hinxton Grange	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40
7.94	Melbourn	6.11	6.11	7.61	7.94	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	7.81
3.60	FowImere	3.25	3.25	3.25	3.25	3.35	3.45	3.60	3.25	3.25	3.25	3.25	3.25	3.25
1.15	Gt Chishill	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.00	1.00	1.00	1.00	1.00
1.13	Heydon	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	1.13	0.97	0.97	0.97	0.97
2.28	Morden Grange	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.45	1.95	2.28	2.15
11.40	Westley (fixed to remove 2030 FP medium)	10.60	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
2.20	Rivey (fixed to remove 2030 FP medium)	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

Inc20	Inc21	Inc22
No risk	No risk	No risk
Low risk	Low risk	Low risk
Low risk	Low risk	Low risk
No risk	No risk	No risk
No risk	No risk	No risk
No risk	No risk	Low risk
No risk	No risk	No risk
No risk	No risk	No risk
No risk	No risk	No risk
No risk	No risk	No risk
Low risk	Low risk	Low risk
Low risk	Low risk	Low risk
No risk	No risk	No risk
Low risk	Low risk	Low risk
No risk	No risk	No risk
No risk	No risk	No risk
Low risk	Low risk	Low risk
Low risk	Low risk	Low risk
Low risk	Low risk	Low risk
No risk	No risk	No risk
No risk	No risk	No risk
No risk	No risk	Low risk



Table A-5 Batched increase runs (CBO) – consolidated scenarios (part 1)

Waterbo	ody risk classifications	Bold text	t indicates a	n increase	in risk relativ	ve to S38.											
	Model run	WRMP 2030_2 (S37) FP	WRMP 2030_2 (S38) Westley & Rivey	Inc23	Inc24	Inc25	Inc26	Inc27	Inc28	Inc29	Inc30	Inc31	Inc32	Inc33	Inc34	Inc35	Inc36
	Abstraction recovery (MI/d)	N/A	0.00	2.24	2.68	2.86	2.46	2.72	2.42	2.79	3.12	5.70	2.21	2.41	2.61	2.90	2.41
	Rhee (DS Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Hobson's Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Millbridge and Potton Brooks	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Mill River	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Mel	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Shep	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	Low risk	No risk	No risk	No risk	No risk	No risk
	Rhee (US Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
les	Soham Lode	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
Tar	Cherry Hinton Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Bourn Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
po d	Bottisham Lode - Quy Water	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
ter	Swaffham - Bulbeck Lode	Medium risk	Low risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Low risk	Medium risk	Medium risk	Medium risk	Low risk
Š	Cam	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk
	New River	LOW FISK	Low risk	Lowrisk	LOW risk	LOW risk	LOW risk	LOW risk	LOW risk	LOW FISK	LOW RISK	LOW risk	LOW risk	LOW risk	LOW FISK	LOW RISK	LOW risk
	Vvendon Brook	No risk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	NO TISK	NO TISK	Norisk	Norisk	No risk	Norisk
	Gai Diich	Modium rick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick	Lowrick
	Hoffer Brook	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrick	Lowrick	Lowrisk	Lowrick	Lowrisk	Lowrisk	Lowrick	Lowrick	Lowrisk	Lowrick
	Stour (u/s Wixee)	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Low risk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk	Lowrisk
	Tributary of Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Cam (Stapleford to Hauxton Junction)	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Norisk	Low risk	Norisk	Norisk	Norisk	Norisk	Norisk
	Cam (Audley End to Stapleford)	No risk	No risk	No risk	Low risk	Low risk	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk

CW abstractions for which rates were changed

Abstraction rates in MI/d. Grey values are unchanged from new baseline. Bold values have changed relative to new baseline (red = FL).

FL rate	Name	2030 FP	new baseline	Inc23	Inc24	Inc25	Inc26	Inc27	Inc28	Inc29	Inc30	Inc31	Inc32	Inc33	Inc34	Inc35	Inc36
4.51	Dullingham	3.60	3.60	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	3.60	3.80	4.00	4.29	3.60
3.41	Duxford Grange	2.81	2.81	2.81	2.86	2.87	2.83	2.81	2.81	2.81	2.90	3.41	2.90	2.90	2.90	2.90	2.90
5.77	Hinxton Grange	5.40	5.40	5.40	5.43	5.44	5.42	5.40	5.40	5.40	5.46	5.77	5.46	5.46	5.46	5.46	5.46
7.94	Melbourn	6.11	6.11	6.11	6.36	6.46	6.23	6.36	6.23	6.60	6.60	7.94	6.60	6.60	6.60	6.60	6.80
3.60	FowImere	3.25	3.25	3.25	3.37	3.41	3.31	3.48	3.31	3.31	3.48	3.60	3.48	3.48	3.48	3.48	3.48
1.15	Gt Chishill	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.00	1.00	1.00	1.00	1.00
1.13	Heydon	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	1.13	0.97	0.97	0.97	0.97	0.97
2.28	Morden Grange	0.95	0.95	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28
11.40	Westley (fixed to remove 2030 FP medium)	10.60	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
2.20	Rivey (fixed to remove 2030 FP medium)	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70



Table A-6 Batched increase runs (CBO) – consolidated scenarios (part 2)

Waterbody risk classifications

Bold text indicates an increase in risk relative to S38.

	Model run	WRMP 2030_2 (S37) FP	WRMP 2030_2 (S38) Westley & Rivey decreased	Inc37	Inc38	Inc39	Inc40	Inc41	Inc42	Inc43	Inc44	Inc45	Inc46	Inc47	Inc48	Inc49	Inc50	Inc51
	Abstraction recovery (MI/d)	N/A	0.00	2.71	2.91	2.23	2.33	0.93	1.43	1.93	2.06	2.26	2.43	1.33	1.82	1.56	1.42	1.36
	Rhee (DS Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Hobson's Brook	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Millbridge and Potton Brooks	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Mill River	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Mel	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Shep	No risk	No risk	Low risk	Low risk	No risk	No risk	No risk	Low risk	Low risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
ဖ	Rhee (US Wendy)	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
a a	Soham Lode	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
na	Cherry Hinton Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
d V	Bourn Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
d d	Bottisham Lode - Quy Water	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
ate	Swaffham - Bulbeck Lode	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Š	Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	New River	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Wendon Brook	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Cat Ditch	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Granta	Medium risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Hoffer Brook	Lowrisk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Stour (u/s Wixoe)	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
	Tributary of Cam	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk	No risk
	Cam (Stapleford to Hauxton Junction)	No risk	No risk	Low risk	Low risk	No risk	No risk	No risk	Low risk	Low risk	No risk	No risk	Low risk	No risk	No risk	No risk	No risk	No risk
	Cam (Audley End to Stapleford)	No risk	No risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk	No risk	Low risk	Low risk	Low risk	No risk

CW abstractions for which rates were changed

Abstraction rates in MI/d. Grey values are unchanged from new baseline. Bold values have changed relative to new baseline (red = FL).

FL rate	Name	2030 FP	new baseline	Inc37	Inc38	Inc39	Inc40	Inc41	Inc42	Inc43	Inc44	Inc45	Inc46	Inc47	Inc48	Inc49	Inc50	Inc51
4.51	Dullingham	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
3.41	Duxford Grange	2.81	2.81	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.81	2.81	2.81	2.81	2.81	2.81	2.90	2.81
5.77	Hinxton Grange	5.40	5.40	5.46	5.46	5.46	5.46	5.46	5.46	5.46	5.40	5.60	5.77	5.40	5.40	5.40	5.40	5.43
7.94	Melbourn	6.11	6.11	7.10	7.30	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.11	6.60	6.11	6.11	6.11
3.60	Fowlmere	3.25	3.25	3.48	3.48	3.50	3.60	3.48	3.48	3.48	3.48	3.48	3.48	3.25	3.25	3.48	3.25	3.25
1.15	Gt Chishill	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.13	Heydon	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
2.28	Morden Grange	0.95	0.95	2.28	2.28	2.28	2.28	1.00	1.50	2.00	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28
11.40	Westley (fixed to remove 2030 FP medium)	10.60	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
2.20	Rivey (fixed to remove 2030 FP medium)	1.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

