



SUBJECT Forest Heath WCS - November 2016 Addendum

DATE 9<sup>th</sup> April 2018

**DEPARTMENT** Water Management and Resilience

**TO** Forest Heath District Council OUR REF 5007-UA008525-UU41R

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AUTHOR Florence Lovatt/ Aimee Hart Florence.Lovatt@Arcadis.com/ Aimee.Hart@Arcadis.com

### 1. Executive Summary

This Water Cycle Study (WCS) April 2018 addendum has been commissioned by Forest Heath District Council (FHDC) to provide further evidence that the development proposed within the emerging Local Plan can be accommodated by the existing or new water and wastewater infrastructure, without causing a detriment to the wider receiving water environment. A brief history of the development of previous WCS reports are outlined below:

- Forest Heath Stage 2 Water Cycle Strategy (Detailed WCS) undertaken in 2011.
- Forest Heath Stage 3 Water Cycle Strategy Update, November 2016. The assessment was carried out using the Preferred Options the Single Issue Review of Core Strategy (SIR) and Site Allocations Local Plan (SALP) published for consultation in April 2016.
- Forest Heath WCS Update Addendum December 2016. Following the Secretary of State's
  decision to dismiss the appeal at Hatchfield Farm, Newmarket (for 400 dwellings), the WCS was
  updated to reflect the council's decision to remove this allocation form the plan and redistribute
  housing growth to other locations in the Key Service Centres.
- Forest Heath WCS Update Addendum April 2018. This is to reflect FHDC's review of the SIR of Core Strategy Policy CS7 and SALP Proposed Modifications in February 2018, following the letter on 10<sup>th</sup> January from the Planning Inspector.

Following the hearing sessions for the SIR, which concluded in September 2017, the Inspectors wrote to the Council on 4 October 2017 setting out concerns that the balance of distribution of housing between Market Towns and Key Service Centres in the SIR is not consistent with Visions 1 and 2 and Policy CS1 of the adopted Forest Heath Core Strategy.

The Council responded to the Inspectors' concerns in a letter dated 13 November 2017 but following this correspondence the Inspectors wrote to the Council again on 10 January 2018 to set out their soundness concerns in further detail and indicate possible ways forward.

To address their concerns, the Inspectors set out three possible options open to the Council:

- a) Re-consider the balance of distribution between the Towns and Key Service Centres and put forward main modifications accordingly;
- b) Produce further evidence to justify the present housing distribution proposed; and
- c) Withdraw the SIR.

The Inspectors strongly urged the Council to pursue option (a) above which they stated would be likely to involve increasing the housing in one or more of the towns and potentially decreasing it for one or more of the Key Service Centres. They suggest that in broad terms the level of housing associated with the Hatchfield Farm site (Newmarket) in the April 2016 preferred option (400 homes) might be in the order of that required to re-balance the distribution of housing.

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The proposed changes to the SALP will include the following changes:

- **Newmarket:** provision of extra 50 dwellings at Site SA6(b) and inclusion of new site SA6(g) "land at Hatchfield Farm mixed use allocation" to include 400 dwellings, 5ha of employment land and a 2.2ha school site;
- Lakenheath: deletion of site SA8(d) removing 165 dwellings; and
- **Red Lodge:** removal of 50 dwellings at Site SA10 so that the indicative capacity is reduced from 350 dwellings to 300 dwellings.

The above sites in Newmarket, Lakenheath and Red Lodge were previously assessed by November 2016 Stage 3 WCS.

A comparison of the planned housing allocation figures from the November 2016 Stage 3 WCS to the present WCS addendum is outlined below. Table 1 shows that there is an overall reduction in the new (additional) housing allocation (till 2031) in April 2018 WCS Addendum compared to both November 2016 Stage 3 WCS and December 2016 WCS Addendum.

Table 1: Summary of the SALP new	<sup>,</sup> housing allocations (	(till 2031) shov	ving the changes	against
previously planned numbers				

Settlement	Stage 3 WCS (November 2016)	WCS Addendum (December 2016) <sup>1</sup>	WCS Addendum (April 2018) <sup>2</sup>
Brandon	68	71(+3)	33 (-38)
Mildenhall	1359	1412(+53)	1406 (-6)
Newmarket	654	321(-333)	704 (+383)
Lakenheath	828	828	663 (-165)
Red Lodge	836	1129(+293)	705 (- 424)
Beck Row	372	0 (-372)	0 (-372)
Exning	140	205(+65)	205 (0)
Kentford	94	97(-3)	0 (-97)
West Row	140	152(+12)	152 (0)
Windfall	220	225(+5)	225 (0)
Total	4,771	4,440 (-331)	4,093 (-347)

- <sup>1.</sup> The changes to new housing figures from November 2016 Stage 3 WCS are shown in brackets.
- <sup>2.</sup> The changes to new housing figures from December 2016 WCS Addendum are shown in brackets.

Table 2 below shows the overall changes in housing numbers (2011 – 2031) from the Stage 3 WCS in November 2016 to this April 2018 WCS Addendum. Even though the total number of new allocated dwellings in Table 1 has progressively been reduced in April 2018 WCS addendum (i.e. compared with Stage 3 November 2016 WCS and December 2016 WCS Addendum), the overall totals in Table 2 have increased by 803 dwellings when the completions and existing commitments are also included. Most of this dwelling increase arises from Mildenhall, Newmarket, Red Lodge, Primary Villages and other rural areas whereas there is a notable reduction in Lakenheath.

Location	Stage 3 WCS November 2016 housing totals (2011 – 2031)	WCS Addendum April 2018 housing totals (2011- 2031)	Difference in new housing totals (2011 – 2031)
Brandon	123	136	13
Mildenhall	1536	1599	63
Newmarket	942	1090	148
Lakenheath	904	768	-136
Red Lodge	1541	1786	245
Primary Villages <sup>3</sup>	1202	1486	284
Other <sup>4</sup>	-	181	181
Windfall	220	225	5
TOTALS	6468	7271	803

Table 2: Summary of the overall change in housing distribution (2011 – 2031) between November 2016 Stage 3 WCS and April 2018 WCS addendum.

- <sup>3</sup> Primary villages include Beck Row, Exning, Kentford and West Row.
- <sup>4</sup> Other includes completions and commitments within rural areas, secondary villages and small settlements.

Both Table 1 and Table 2 confirm that the changes in housing numbers are relatively minor and therefore, the assessments and key conclusions made in the November 2016 Stage 3 WCS and December 2016 WCS Addendum are still broadly valid in terms of water resources, wastewater and receiving water environment implications due to the proposed growth.

The calculations used in this April 2018 WCS addendum have tracked the proposed new housing allocations (from 2017 to 2031) as well as the existing completions and commitments (from 2011 to 2017) as summarised in Table 3 below. It shows that there is an overall increase of 394 dwellings compared to the figures used in WCS Addendum (December 2016).

Table 3: Summary of the housing distribution promoted

	WCS Addendum	WCS Addendum (April 2018)			
Location	December 2016 Totals (2011 - 2031)	Completions and existing commitments (2011-2017)	New allocations (2017 – 2031)	New totals (2011 – 2031)	Difference (compared to December 2016 totals)
Brandon	130	103	33	136	6
Mildenhall	1597	193	1406	1599	2
Newmarket	612	386	704	1090	478
Lakenheath	923	105	663	768	-155
Red Lodge	1828	1081	705	1786	-42
Primary Villages	1407	1129	357	1486	79
Other	155	181	-	181	26
Windfall	225	-	225	225	0
TOTALS	6877	3178	4093	7271	394

The latest information available from FHDC has been used in this WCS addendum for making robust comparisons against the previous WCS work completed. The April 2018 WCS addendum key comments for each topic previously assessed by Stage 3 November 2016 WCS and December 2016 WCS Addendum are summarised in Table 4 below.

Table 4: April 2018 WCS Addendum Outcome Summary

Assessed Topic	Summary Comments
Water Resources	Proposed growth (from 2017 to 2031) makes no notable changes to the additional potable water demand figure previously estimated. Therefore, the conclusions reached as part of the November 2016 Stage 3 WCS and December 2016 WCS Addendum are still valid. However, the overall water demand to serve the existing commitments and planned development (from 2011 to 2031) has slightly increased.
and Supply	Water supply should not be considered a constraint to the proposed amended SALP development trajectory.

Assessed Topic	Summary Comments
Wastewater Treatment and Sewerage	Overall housing numbers (from 2011 to 2031) at Mildenhall, Newmarket, Red Lodge and within the primary villages have slightly been increased. The impact to the receiving Water Recycling Centres (WRCs) is negligible given the projections showing that Dry Weather Flow (DWF) will still be substantially under the consented flow limits over the study period except for Tuddenham WRC.
	The Red Lodge area drains into Tuddenham WRC and was shown to be exceeding its consented flows around 2026 in the November 2016 WCS and December 2016 WCS Addendum. The environment capacity assessment concluded that the increased discharge due to the trajectory would not lead to a deterioration of WFD status or comprise the achievement of WFD good status. It is now predicted to exceed the existing DWF consent in 2024 but the overall conclusions remain unchanged.
	Anglian Water have previously advised that additional properties have the potential to cause an impact to the wastewater network although this can be combated through early engagement as the growth is relatively nominal across the district; any network capacity issues can be mitigated through relevant sewer upgrades ahead of site occupation.
	Wastewater treatment and sewerage should be considered as a constraint, which can be fully mitigated through early engagement of developers with Anglian Water and considered approach to development planning.
Environmental Capacity WRC Discharge Flood Risk	November 2016 Stage 3 WCS and December 2016 WCS Addendum identified Natura 2000 sites, which could be possible receptors for the proposed growth trajectory, as Breckland SPA/SAC and Chippenham Fen Ramsar/SAC. Previous WCS work also concluded that there were no impacts regarding water supply, flood risk and water quality at either of these potentially impacted Natura 2000 sites. Given the minimal changes to the overall housing numbers (from 2011 to 2031) and the reduction of 347 new properties in the amended SALP development trajectory (compared to December 2016 WCS Addendum), the conclusions previously made within the November 2016 Stage 3 WCS and December 2016 WCS Addendum are still applicable.
	In addition, the increased flows from Tuddenham WRC were assessed as part of the November 2016 Stage 3 WCS assessment, which showed that the additional flows will exceed by only 70 m <sup>3</sup> /day over the consented amount, causing minor impacts on the Tuddenham Stream and River Lark. Therefore, the conclusions previously reached for this section are also still valid.
	Environmental capacity should not be considered a constraint to the proposed amended SALP trajectory.
	An assessment of the impact on WRC discharges on the existing watercourses was carried out as part of the November 2016 Stage 3 WCS and December 2016 WCS Addendum. These calculations were updated to reflect the modified SALP trajectory considered in this WCS Addendum. The results showed that there were only minor increases to existing flood risk with no increase in risk bandings for all impacted WRCs.
	Flood risk should not be considered a constraint to the proposed amended SALP trajectory.

Overall, the assessments carried out as part of this April 2018 WCS addendum can conclude that the conclusions provided as part of the November 2016 Stage 3 WCS and 2016 WCS addendum are still valid and that the proposed amended SALP trajectory does not have any major constraints which cannot be mitigated through considered approach to development planning and stakeholder engagement.

## 2. Introduction

Arcadis has been commissioned by FHDC to produce an addendum to the Stage 3 WCS which assesses the impacts of the modified SALP trajectory on the water infrastructure and water environment. Arcadis produced a Stage 3 WCS in November 2016 and subsequent WCS Addendum in December 2016, which assessed the draft Site Allocation Local Plan (SALP) trajectory which allocated dwellings to several settlements across the district. These reports concluded that there were no unmitigable constraints for the draft trajectory regarding water supply, wastewater treatment and sewerage, environmental capacity, and flood risk.

This WCS addendum in April 2018 contains high level assessments and calculations which should be viewed in conjunction with the previous WCS reports which cover the four key areas of the water cycle: water supply, wastewater treatment and sewerage, environmental capacity, and flood risk.

# 3. Updated SALP Development Trajectory

The amended SALP development trajectory was provided by FHDC and is detailed in the Single Issue Review of Core Strategy Policy CS7 which illustrates how FHDC will meet the objectively assessed need of 6,800 dwellings within the district for the period 2011-2031.

Figure 1 below shows the annual housing trajectory of the committed sites with planning permission and new housing allocations between 2017 - 2031 by SALP. This includes a housing total of 5,616, which is made up of 3.868 houses from SALP allocations, 225 windfall provisions and another 1,523 houses from existing commitments with planning permissions (i.e. 1,254 at large sites and 269 houses at small sites)



Figure 1 – Total Housing trajectory of existing commitments and new allocations within the Forest Heath District (2017 – 2031)

As explained above, the development trajectory shown in Figure 1 only includes the existing commitments and new provisions (totalling 5,616 new houses) but there are another 1,655 housing completions (from 1<sup>st</sup> April 2011 to 31<sup>st</sup> March 2017), which gives a total housing number of 7,271 (between 2011 and 2031).

Although the current housing completions (between 2011 – 2017) have been factored in the WCS analysis to consider the overall development impacts at a high level, a general assumption was made that they were previously considered in more detail through the normal planning and regulatory process whereby, Anglian Water, FHDC and developers would ensure wastewater, potable water and environmental mitigation requirements as the planning permissions were given and properties were connected to the public system.

### Newmarket increased site allocation

The major increase in new dwellings considered within this WCS addendum was the additional 450 properties in Newmarket. This includes the addition of 400 dwellings at Site SA6(g) in Hatchfield Farm and another 50 dwellings in the SA6b location. The site SA6(g) at Hatchfield Farm mixed use allocation was previously assessed in the November 2016 Stage 3 WCS but this was removed in December 2016 WCS Addendum. Similarly, the site SA6b was assessed within both the November 2016 Stage 3 and December 2016 WCS Addendum. As both sites have previously been assessed the conclusions previously made for these sites are still relevant.

### Lakenheath and Red Lodge decreased site allocations

As mentioned before, the Site SA8 (d) has now been deleted removing 165 dwellings in Lakenheath and another 50 dwellings have been removed at Site SA10 in Red Lodge.

# 4. Water Resources and Supply

The November 2016 Stage 3 WCS provided an assessment for a total of 5,680 extra dwellings between 2015-2031, following a review of Anglian Water's 2015 Water Resource Management Plan (WRMP) it was identified that these numbers were below the growth predictions used for the WRMP. The housing completions (2011 – 2015) and 2011 census data was also used to account for the overall water demand. This meant that through the measures identified within the WRMP including water transfers and water efficiency, Anglian Water could meet the projected extra water demand.

The figure assessed as part of this April 2018 WCS addendum for water supply is 5,616 extra dwellings. The 2011 census data and housing completions (2011 – 2017) were used again to estimate the overall water demand. The revised extra housing figure is lower than the 5,680 previously assessed therefore the previous conclusions are still valid (i.e. assuming the completions of 145 additional dwellings between 2015 to 2017 have been accounted by Anglian Water through the normal planning process). The water supply should not be considered a constraint for the modified SALP development trajectory. Furthermore, Anglian Water are currently preparing their WRMP19 and the latest development used in this WCS Addendum can be used to inform their emerging plan.

The following equation was used to assess the developing trajectory's impact on water demand:

Total District Demand = Change in demand from existing dwellings + new dwelling demand Where demand from new and existing dwellings is calculated from:

Number of dwellings \* occupancy rate \* Per capita Consumption (PCC)

In line with the Stage 3 WCS, three potable water demand scenarios, dependant on PCC projections have been developed. The demand projection results for Forest Heath District are shown in Figure 2 below. This includes likely water demand from the existing dwellings and planning commitments as well as the new dwellings.



Figure 2: Forest Heath District Demand Projections 2017-2031 (Final 2031 figures shown in red).

The projections show that there is limited variation between scenarios with a final increased difference of 264m<sup>3</sup>/day between best and worst-case scenarios by 2031. This is due to these figures being mainly influenced by the demand from the existing dwellings.

Table 5 below shows the overall percentage change is 16% in a worst-case scenario and highlights the importance of further developing policies to encourage the conservation of water in new and existing dwellings, and commercial properties.

Table 5: overall percentage change in demand usage from 2017 – 2031.

Scenario	Change in Demand (m3/day)	Change in Demand (%)
Best Case	1,386	14%
Preferred Business Case	1,452	14%
Worst Case	1,650	16%

## 5. Wastewater Treatment and Sewerage

The November 2016 Stage 3 WCS and the December 2016 WCS addendum undertook assessments for the five Water Recycling Centres (WRC) across the district which were impacted by the draft trajectory.

The amended SALP development trajectory makes negligible changes to the settlements where new dwellings are allocated, however it does alter the numbers allocated to these settlements. This WCS addendum has therefore assessed the same five WRCs as the November Stage 3 WCS. Some of the WRCs serve multiple communities as listed in Table 6 below.

WRC	Community Served
	Mildenhall
Mildenhall	Beck Row
	West Row
Nourserlast	Exning
Newmarket	Kentord
Brandon	Brandon
Lakenheath	Lakenheath
Tuddenham	Red Lodge

Table 6: Summary of WRCs and Communities Served

As identified within Section 1, there are slight increases to the overall dwelling numbers (from 2011 to 2031), with the largest increase of 245 dwellings at Red Lodge when compared with the equivalent numbers used in November 2016 WCS. This addendum has identified that Tuddenham WRC would be exceeding existing volumetric discharge consents by an additional 70m<sup>3</sup>/d from 2024 to 2031. Sufficient DWF headroom is available at the remaining four WRCs.

A high-level assessment has been undertaken for this addendum to calculate the Dry Weather Flow (DWF) for each WRC by 2031, using the same methodology as the Stage 3 WCS Update:

#### Total DWF = Existing DWF + New DWF

Where:

DWF = (number of dwellings.occupancy rate.PCC) + infiltration + trade flow

As before, the per capita consumption (PCC) rate used is 131 l/p/d, infiltration is taken as 25% and trade effluent remains a constant. The existing DWF has been taken from Anglian Water's measured June Return 2015 values. In this WCS addendum assessment, the extra DWF has been estimated from the modified SALP new dwellings trajectory (2017 - 2031) and the completions and existing commitments numbers as identified in Section 1 and Section 3, to determine the total DWF at each WRC shown in Table 7 below.

WRC	Existing Consent (m³/day)	November 2016 Stage 3 WCS DWF Total to 2031 (m <sup>3</sup> /day)	December 2016 WCS Addendum DWF Total to 2031 (m3/day)	April 2018 WCS Addendum DWF Total to 2031 (m <sup>3</sup> /day)	Net Change in Total DWF: April 2018 Addendum Vs November 2016 WCS (m <sup>3</sup> /day)	Net Change in Total DWF: April 2018 Addendum Vs December 2016 WCS (m <sup>3</sup> /day)
Brandon	2,006	1,214	1,214	1,208	-6	-6
Lakenheath	860	781	769	697	-84	-72
Mildenhall	3,900	2,849	2,846	2810	-39	-36
Newmarket	6,100	5,577	5,447	5555	-22	108
Tuddenham	1,100	1,138	1,208	1170	+32 (+70 over the consented limit)	-38 (+70 over the consented limit)

Table 7: Wastewater effluent DWF summary for the modified SALP development trajectory

Key: Green = Below consent | Red = Above consent

Each WRC community was assessed using the modified SALP trajectory. The results presented in Table 7 show that generally total DWFs estimated by November 2016 Stage 3 WCS provides the worst-case estimate except for Tuddenham WRC whereas December 2016 WCS Addendum provides the highest DWF estimate. It can therefore be concluded that the conclusions made in the previous WCS reports are still valid as collectively they provide the worst-case impact analysis on the wastewater treatment aspects for the above WRCs.

Figures 3 to Figure 6 below, clearly illustrate that the proposed growth can be accommodated at the existing WRC without exceeding the currently permitted DWF. However, as per the previous WCS reports the existing DWF consent at Tuddenham WRC will be slightly exceeded by the proposed modified SALP development trajectory, which is further discussed in Section 5.1 and Section 6.1 below.

Figure 3: Brandon DWF projections



Figure 4: Lakenheath DWF projections



Figure 5: Mildenhall DWF projections



Figure 6: Newmarket DWF projections



The impact of exceeding the DWF consent values for Tuddenham WRC is considered in Section 5.1 and Section 6.1 below.

# 5.1 Tuddenham WRC

Table 7 shows that the total DWF value (to 2031) is 32m<sup>3</sup>/day higher that the corresponding DWF value estimated by November 2016 Stage 3 WCS but 38m<sup>3</sup>/day lower than December 2016 WCS Addendum estimate. The new DWF total of 1170m<sup>3</sup>/day will exceed the existing DWF consent limit by 70m<sup>3</sup>/day by 2031.

This is further illustrated in Figure 7 below, which also confirms that the existing consent will be exceeded in 2024.



Figure 7: Tuddenham DWF projections

As part of the November 2016 Stage 3 WCS the Environment Agency assessed the impacted of increasing consented DWF values on the existing Tuddenham Stream WFD status and the target WFD goals. This assessment concluded that the increased DWF to Tuddenham Stream would have no impact for either of these areas.

This assessment was subsequently updated by the Environment Agency to reflect the updated higher DWF flows considered in December 2016 WCS Addendum, which again concluded no changes are required for the currently permitted flow consent to account for the proposed growth.

As pointed out in the text above, December 2016 WCS Addendum provided a higher DWF of 38m<sup>3</sup>/day than the April 2018 WCS Addendum estimate for Tuddenham WRC. Therefore, this April 2018 WCS Addendum also concludes that the modified SALP trajectory will not lead to a detriment of current WFD status or impede the WFD target status for Tuddenham Stream.

#### 5.2 Sewerage Network

As part of the Stage 3 WCS Update Anglian Water were consulted regarding the capacity of the existing sewerage network, at each of the settlements. Anglian Water have previously advised that any additional properties have the potential to cause an impact to the waste water network although this can be combated through early engagement as the growth is relatively nominal across the district; any network capacity issues can be mitigated through relevant sewer upgrades ahead of site

occupation. It is recommended that FHDC consult Anglian Water prior to granting planning permissions and include suitable planning conditions for the development sites in Red Lodge and other locations as per Stage 3 WCS Update Red Amber Green (RAG) tables provided to ensure such sewer upgrades are implemented with the agreed developer contributions.

The final trajectory does add new sites in certain settlements however given Anglian Water's existing advice on sewerage capacity and assessments undertaken by previous WCS it can be concluded that it is not considered a major constraint to the modified SALP development trajectory.

### 6. Environmental Capacity

The November 2016 Stage 3 WCS assessed both the impact of the draft development trajectory on watercourses (where wastewater discharges were forecast to be increased above the existing consented levels) and Natura 2000 sites in terms of water supply, water quality and flood risk. These are discussed separately in the following sections.

### 6.1 Wastewater Discharge Impact

The November 2016 WCS initially undertook an assessment to understand the impact of the increased flows from Tuddenham WRC calculated as part of the wastewater assessment on the Water Framework Directive (WFD) status and targets. This assessment concluded that the increased discharge to Tuddenham Stream would not compromise the existing WFD status or impede the achievement of 'Good' status by 2027.

As identified in Section 5, total DWF from Tuddenham WRC is now 1170 m<sup>3</sup>/day, which is 32 m<sup>3</sup>/day higher than the November 2016 Stage 3 WCS total DWF estimate of 1138 m<sup>3</sup>/day but 38m<sup>3</sup>/day lower than the December 2016 DWF estimate of 1208 m<sup>3</sup>/day. The Environment Agency were consulted as part of the December 2016 WCS Addendum and they provided the following key conclusions, which are still valid because the total DWF from the latest modified SALP trajectory is lower than the value used in their previous assessment as explained above.

#### No Deterioration Assessment:

AMP6 No Deterioration schemes for ammonia and phosphate should be sufficient to maintain the current High and Poor classifications for all three assessed DWF figures, which include flows from the final development trajectory. The ammonia limit should be tightened to 0.6 mg/l, but current and predicted future over-performance is likely to deliver the required effluent quality.

A BOD limit of 8 mg/l is required (for all 3 DWFs) to ensure current Good status in the Tuddenham Stream is maintained. Again, current effluent quality and predicted continued over-performance means that the permit change will not be required unless actual river quality deteriorates.

#### Improve WFD status assessment:

Permit limits of 0.3 mg/l and 0.12 mg/l are required to improve river phosphate status to Moderate and/or Good status respectively. Both are currently considered to be below the limit of 'technical feasibility' (pending outcome of AMP6 '0.1 mg/l P Trial').

#### WCS Addendum Conclusion

No proposed permit changes to account for growth. Permit limits planned for AMP6 will ensure no deterioration in the Tuddenham Stream. Delivery of proposed growth will not compromise future status improvements.

#### 6.2 Natura 2000 sites

The November 2016 Stage 3 WCS assessed the impact for ten Natura 2000 sites within the district, of these two sites (i.e. Chippenham Fen Ramsar and Breckland SAC/SPA) were taken forward for further assessment due to their proximity and relation to the impacted settlements. Chippenham Fen is located downstream of Newmarket and Breckland covers a large area to the north east of Forest Heath District. The assessment looked at three elements regarding the sites: flood risk, water quality and water supply which concluded that there would be no impact for any of these elements as illustrated within the supporting WCS sections.

This addendum has taken the same approach and reached the following conclusions:

- Flood Risk: Section 7 has evidenced that the impacts on river flows from the WRCs within the district are uniformly low. Assuming required upgrades are implemented to the impacted sewer network, there is no impact identified.
- Water Quality: Sections 5.1 and 6.1 have shown that only Tuddenham WRC is expected to increase wastewater discharges above consented levels and that this increase will not lead to a negative impact regarding water quality.
- Water Supply: Section 4 has evidenced that the modified SALP development trajectory can be supplied without increasing the existing abstraction licences, thereby it can be concluded that there is no impact.

Considering the above it can therefore be concluded that the final development trajectory does not adversely impact either receiving watercourses for wastewater discharges or negatively impact Natura 2000 sites.

#### 7. Flood Risk

As part of the November 2016 Stage 3 WCS and December 2016 WCS Addendum, assessments were carried out to understand the impact of the future WRC DWF flows on the watercourses that received them. Calculations were undertaken which quantified the increase to QMED for receiving watercourses from the flow to full treatment (FTFT), typically three times DWF. The increases to flows were converted to percentages and assigned a risk rating dependant on their values, as detailed in the table below. The previous WCS assessments concluded that the increased DWF flows from the development did not increase risk of flooding to the receiving watercourses.

For this April 2018 addendum, the calculations were updated to represent the final DWF flows from each of the WRCs. The outputs of these calculations are shown below in Table 8.

As with the previous work, flood risk calculations for Tuddenham WRC have been undertaken for both the Tuddenham Stream and the River Lark. Tuddenham stream is a small watercourse not located in proximity to any potential flood risk receptors, with discharges from Tuddenham WRC only briefly flowing through the stream before joining the River Lark. Due to Tuddenham's relative size the assessment in terms of percentage is not reflective of the true flood risk arising from increased discharge. The assessed impact of the River Lark is a more accurate illustration of the potential impacts on flood risk within the district. It is assumed that Anglian Water will undertake further modelling to confirm the impact of increased discharge as part of their future work.

WRC	Impact of existing WRC FTFT on baseline river flows (i.e. without extra flows from new development under final option)	Increase in river flows by 2031 based on entire WRC FTFT ( <b>including</b> existing WRC DWF)	Increase in river flows by 2031 based on entire WRC FTFT ( <b>excluding</b> existing WRC DWF)
Brandon	0.23%	0.23%	0.00%
Lakenheath	2.90%	3.85%	1%
Mildenhall	1.24%	1.50%	0.30%
Newmarket	4.63%	4.74%	0.12%
Tuddenham (Tuddenham Stream)	38.72%	55.03%	13%
Tuddenham + Fornham All Saints (River Lark)	0.41%	2.06%	1.65%

#### Table 8: WRC Discharge impact on existing 1 in 2-year flows (QMED)

Key: Green = 0 to 3% increase (Low Risk) | Yellow = 3 to 20% increase (Medium Risk) | Red = 20%+ increase (High Risk)

The above results show that as with the previous WCS assessments that flood risk is increased marginally. It can therefore be concluded that the wastewater discharges from the final trajectory do not increase flood risk unacceptably within the district.

### 8. Conclusions

- Arcadis completed a Stage 3 Water Cycle Study Update in November 2016 and an addendum in December 2016 (following a decision to overturn planning permission by the Secretary of State for a development site at Hatchfield Farm), and the conclusions of these earlier documents have been reviewed against the proposed modified SALP development trajectory used in this April 2018 WCS Addendum to ensure that the water cycle and infrastructure needs are sufficiently considered.
- Assessments have been carried out for the modified SALP development trajectory for: water resources and supply, wastewater treatment and sewerage, environmental capacity, and flood risk.
- In terms of water resources and supply this addendum has confirmed that the modified SALP development trajectory can be adequately supplied, considering it is below the previous assessed growth figure in the Stage 3 WCS and the trajectory used to inform Anglian Water's 2015 WRMP.
- The modified SALP development trajectory has re-allocated sites to existing settlements identified in the previous Stage 3 WCS Update, and of the five Water Recycling Centres impacted by the development trajectory four will not exceed existing volumetric consents. The fifth, Tuddenham WRC has been identified to exceed its current flow consent limits but the WCS assessment showed that this will not lead to a detriment of WFD status or impede the achievement of 'Good' status by 2027 and therefore is not a major constraint at this stage.
- The WCS Addendum has confirmed that there is no impact to the previous Stage 3 WCS Update conclusions for the Natura 2000 sites within the district, and therefore the previous conclusions are still valid for the modified SALP development trajectory.
- Flood risk from increased DWF discharges from WRCs has been assessed with the conclusions that flood risk is not significantly impacted by the modified SALP development trajectory.