Royston Sewage Treatment Works Water Cycle Study

August 2012

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1.0 Introduction

1.1 Water infrastructure in North Hertfordshire is provided by three water companies. Veolia Water[1] are responsible for water supply and Anglian Water and Thames Water are the sewerage undertakers.

1.2 Veolia operate in 3 different areas of the UK. The northern area of Veolia's supply area covers a large area north of London which includes Hertfordshire. The administrative areas of Anglian and Thames Water cover the relevant river basins through an appointment made under the Water Industry Act 1991. Thames Water provides waste water services for southern areas of the District. This includes part of the area around Stevenage and Knebworth, but excludes the settlements of Baldock, Royston, Hitchin and Letchworth, which are covered by Anglian Water.

1.3 The Environment Agency has responsibility for the "main" rivers in North Hertfordshire including the River Hiz and River Purwell. Their stated purpose is "to protect or enhance the environment, taken as a whole". Their remit therefore extends beyond responsibility for just rivers and incorporates the whole environment, so their consideration of impacts of potential infrastructure will be key as they also provide consent for increased discharge at Sewage Treatment Works (STW).

1.4 The Water Framework Directive (WFD) is said to be the most significant piece of European water legislation for over twenty years and it came into force in December 2000 and established a new, integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, estuaries, coastal waters and groundwater also placing a greater emphasis on water quality and the need for no deterioration in rivers.

1.5 The Directive requires member states to establish river basin districts and for each of these a river basin management plan. The Directive envisages a cyclical process where river basin management plans are prepared, implemented and reviewed every six years. It also requires all inland and coastal waters to reach 'good' chemical and ecological status for surface waters and 'good' status for groundwater in terms of quality and quantity by 2015, with sufficient robust justification the requirement can be extended until 2027.

Planning and Housing Target Origin

1.6 There are significant changes underway to the planning system. The Coalition Government is proposing to abolish the regional tier of the planning system, including the East of England Plan through the decentralisation agenda and the Localism Bill. In the future housing targets will be determined through each local authority's core strategy.

1.7 The changes have yet to come into force and so at the moment, the East of England Plan and its housing targets still legally exist. However, it is clear that change is coming and the district council's Core Strategy will therefore

[1] What was 3 Valleys Water

seek to establish what the locally-determined housing, employment and other targets for North Hertfordshire should be.

1.8 A Water Cycle Study was prepared for Rye Meads Sewage Treatment Works (STW) in 2009, using RSS housing targets as a basis. This was because there were acknowledged issues with the Rye Meads STW and there was a substantial amount of growth planned for the Stevenage area (and surrounding districts). The Water Cycle Study identified possible solutions up to 2021, however additional work was required past this date as a result of requirements of the Water Framework Directive.

1.9 The Rye Meads WCS was based on RSS growth targets and incorporated housing figures from 7 local authorities. With the enactment of the Localism Bill and the ability for local authorities to plan for the amount of housing that they feel is appropriate, the quantity of new housing draining into the Rye Meads basin will decrease significantly. The figures in the WCS are therefore assumed to be a worse case scenario for the area[2].

Requirements for a Sewage Treatment Works Study / Water Cycle Study

1.10 Following publication of the Coalition Government's letter[3] of the 27th May 2010 stating an intention to revoke the RSSs, the council consulted infrastructure providers regarding various different housing options to try and identify an appropriate growth target that could meet locally derived need.

1.11 Early discussions with Anglian and Thames Water and the Environment Agency did not identify any potential issues with the growth figures on the district's sewerage infrastructure. Also consultation responses on the 2007 preferred options Core Strategy, which was based on higher RSS growth targets, did not identify any potential issues (other than those relating to the Rye Meads Water Cycle Study).

1.12 But the recent publication of detailed guidance by Defra (although still awaiting formal sign off from the Environment Agency) relating to implementation of the Water Framework Directive marked a step change in attitude toward deterioration of watercourses. This subsequently impacted on the responses of both the sewerage undertakers and the Environment Agency as the approach taken responding to the informal consultation on the Council's preferred growth targets changed from one of "no issues" to one of "significant issues".

1.13 From a position of agreement, being able to accommodate the modest level of forecast growth, it appeared that there could be some potentially significant issues at a number of the district's sewage treatment works and it was apparent that further work needed to be done to understand in more detail the potential issues that may arise as a result of the growth. This would then aid with the identification of solutions to try and satisfy the requirements of the

[2] Agreed with EA/TW/AW at a meeting on 5th April 2011
[3] Letter dated 27th May 2010, from The RT Hon Eric Pickles

Water Framework Directive and ensure that the additional growth did not negatively affect the quality district's water environment.

1.14 An assessment of the existing flows at the district's sewage treatment works needed to be undertaken to assess what impact additional flows might have as a result of the growth. If these could be accommodated within agreed limits then no further assessment would be required. However if they could not be adequately accommodated then further assessment work on issues such as "no deterioration" and "improve to good" needed to be investigated further.

1.15 This Water Cycle Study provides a fit for purpose document and a way forward to support the additional growth of Royston, however it is limited to the relevant issues, rather than including expansive detail on the water environment, potable supply and surface water management.

2.0 Water Framework Directive Assessment

Dry Water Flow (DWF) Assessment

2.1 Table 1 below provides a summary of the increase in dry weather flow (DWF) as a result of the growth and the different options of growth around Stevenage. Detailed assessments are included in Appendix 1. It is clear that the quantum of growth proposed to be connected into the Hitchin and Letchworth foul sewerage catchments can be accommodated without breaching the existing permitted Dry Weather Flow (DWF). As a consequence, at these locations/works no further WFD assessment was necessary and there were no water quality constraints to the proposals.

2.2 For Royston STW it was, however, clear that the additional DWF from growth will exceed what is consented.

Table 1 – Dry Weather Flow Assessments for Sewage Treatment Works

NOTE REF.	1	2	3	4	5	6		7
WwTw	AMP 5 revised DWF (Y/N)	Consented DWF m3/d	Measured DWF (m3/d)	Theoretical DWF freeboard (m3/d)	Theoretical additional DWF from growth (m3/d)	Theoretical future DWF (m3/d)	Comments	**WFD Assessment Required ?**
Letchworth	N	**9900**	6818	3082	851	**7669**	Letchworth and Baldock developments	**N**
Hitchin	N	**10290**	6917	3373	648	**7565**	Hitchin catchment developments only -	**N**

							not inc. growth around Stevenage	
Hitchin	*N*	***10290***	*6917*	*3373*	2323	**9240**	*Includes all 5000 dwelling WoS developme nt & Hitchin Catchment*	**N**
Hitchin	*N*	***10290***	*6917*	*3373*	1418	**8335**	*Includes all 2300 dwellings NoS & Hitchin catchment*	**N**
Hitchin	*N*	***10290***	*6917*	*3373*	1184	**8101**	*Includes 1600 dwellings NoS developme nt & Hitchin Catchment*	**N**
Roysto n	Y	**2950**	2334	616	355	**3305**		**Y**

NOTES

1	If site included in AMP 5 DWF revision
2	Existing DWF (consented)
3	Using base figures from DWF Assessment exercise (2004 -2006 & recent 2010 data) - average of past 2 years used.
4	The theoretical difference between measured and consented DWF
5	Using NHDC development projections and discharge flow assumptions for Core Strategy plan period
6	Summation of additional DWF with current measured DWF (or consented DWF for AMP5 schemes)
7	WFD Assessment only required if future DWF exceeds consented DWF

No Deterioration and Improve to Good Status

2.3 The current permitted Dry Weather Flow (DWF) at Royston STW will be exceeded if the proposed growth takes place. Accordingly, assessments were required to establish the changes required to the STW permit as a result of the growth in order to ensure the two WFD objectives of 'No Deterioration' and 'Improve to Good Status' in the Whaddon Brook could be met.

2.4 Results of these assessments are summarised in Table 2 below. More technical information is recorded in Appendix 2.

NO DETERIORATION' ASSESSMENT

	Royston STW		
	BOD	Ammonia	Phosphate
River Downstream of Discharge			
No Deterioration target	Good	Moderate	Poor
Designated Salmonid Fishery ?	N	-	-
River quality target (90-percentile or AA)	5.00	1.10	1.00

Current Consent			
Current DWF (m3/day)	2950		
Consent limits (95%ile or AA)	15	10	2

Discharge Quality Required			
Future DWF (m3/day)	3305		
Effluent quality required (95%ile or AA)	**6.50**	**1.70**	**1.10**

IMPROVEMENT TO GOOD STATUS' ASSESSMENT

	Royston STW		
	BOD	Ammonia	Phosphate
River Downstream of Discharge			
WFD Status target	Good	Good	Good
Designated Salmonid Fishery ?	N	-	-
River quality target (90-percentile or AA)	-	0.60	0.12

Discharge Quality Required - Current			
Current DWF (m3/day)	2950		
Effluent quality required (95%ile or AA)	-	**0.93**	**0.13**

Discharge Quality Required - Future			
Future DWF (m3/day)	3305		
Effluent quality required (95%ile or AA)	**-**	**0.92**	**0.13**

No deterioration assessment

2.5 No deterioration in the Whaddon Brook was recorded as being achievable for ammonia and phosphate. The consent limits required were within those accepted as conventional treatment. Feasibility of achieving those limits would require further consideration, but in theory, it could be done. In red, amber, green terms the colour was scored as **amber**.

2.6 For Biochemical Oxygen Demand (BOD), however, the consent limit required was 6.5 mg/l (as a 95 %ile) to maintain the current Good Status in the Whaddon Brook. 8 mg/l is the accepted limit as being achievable by conventional treatment, so the proposed growth at Royston would lead to a breach of the WFD requirement for No Deterioration in the brook. As such, this issue was regarded as a major blocker, and it was regarded as being a **red** classification at this time.

Improve to good assessment

2.7 As BOD is already at 'Good' status in the Whaddon Brook, the 'Improve to Good Status' assessment was not necessary. For ammonia and phosphate, the assessment showed that the proposed quantum of growth at Royston would not have a significant impact on the ability to achieve Good status in the Whaddon Brook. For ammonia, there was little difference between permit limits required to achieve Good status before and after growth. For Phosphate there was therefore no chance of achieving Good status either before or after growth, therefore the growth proposed would not, in itself, prevent 'Good Status' from being achieved. So, this part of the assessment was **green.**

Interim Conclusions

2.8 The Environment Agency, in conjunction with Anglian Water, raised concerns that the amount of growth proposed in Royston would result in a deterioration of water quality at Whaddon Brook, particularly for Biochemical Oxygen Demand (BOD). In order to be compliant with the WDF, substantial upgrades to the sewage treatment works at Royston were considered to be required.

3.0 Options Discussion

3.1 It was clear from the outputs of the assessment that further work was required to identify potential solutions to the issue. Detailed discussions[4] took place between the Environment Agency and Anglian Water to determine the extent of the upgrades required or if there were any other possible solutions that could reduce the impact of the levels of increased effluent. These discussions also needed to make judgements on whether solutions could be realistically achieved from within existing and potential future budgets. This could then inform a response to the District Council for further debate.

The discussions identified the following options:

i) Split discharge

3.3 A potential short term solution was identified, which involved splitting the effluent produced into another water-body in addition to Whaddon Brook. This, however, could lead to a deterioration in quality of the additional brrok which was also classified as "Good". Therefore this option would only move the issue to another watercourse. .

ii) Improvement treatment technology

3.4 It was considered by Anglian Water that high end technologies would be needed to meet the permit limits required to comply with the WFD and that conventional wastewater treatment technologies would not be able to maintain the "status quo" at the sewage treatment works. The technology to achieve the level of treatment required would be very expensive and would have huge carbon implications. Improvements at sewage treatment works are funded through agreed (by Ofwat the economic regulator) increases to future bill rates for all existing customers, therefore justification of this option would be difficult.

[4] Meeting 22 June 2011

iii) Reassessing the options methodology

3.5 As the two options above were regarded as either relocating the issue or largely expensive, a further assessment of the modelling involved in the assessment and the overall approach were re-evaluated to investigate whether the figures recorded and the potential for capacity were as accurate as they could be.

4.0 Agreed Solution / Way Forward

4.1 Following internal deliberation and additional testing work in partnership with the Environment Agency, Anglian Water identified that the proposed growth (811 additional planned dwellings / 961 dwellings in total[5]) is likely to trigger a new discharge consent for Royston STW within the lifetime of the North Hertfordshire Core Strategy and that the potential indicative standards proposed are extremely tight. However, ultimately there will be a technical solution to serve the proposals, but in order to meet these standards energy intense processes will need to be installed at the STW.

4.2 It was suggested by Anglian Water that the implications mentioned above need to be considered (with appropriate weight) alongside other factors. Therefore, it is recommended the Core Strategy Sustainability Appraisal considers the necessary measures to protect water quality and the implications growth has on wastewater infrastructure requirements.

5.0 Phasing and Strategy

5.1 The timing of the upgrades is a key issue. Anglian Water and the Environment Agency will need to agree how and when these upgrades are required as there was some discrepancy regarding interpretation of existing capacity. The agreement to work together on this issue is detailed in Appendix 3. This also sets out a requirement for the Local Planning Authority to should contain an appropriate policy to ensure that development coming forward does not have a negative impact on achieving the targets of the Water Framework Directive (WFD).

5.2 To inform these discussions Appendix 4 sets out the estimated phasing of the Strategic Housing Land Availability Assessment (SHLAA) sites in Royston. This information is summarised in the table below:

Planning Permissions Granted	224
Sites up to 2016	311
2016 - 2021	100
2021-2026	151
2026-2031	25
Small Sites Allowance	150
Total	961

[5] The larger figure includes small sites allowance and planning permissions already granted

5.3 It is clear that in the short term a large proportion of the housing sites are predicted to come forward. Many of these are likely to be in advance of the Local Development Framework as can be seen by permissions granted. Up to 2016 approximately 535 homes could come forward (not including small sites allowance).

5.4 Based on the uncertainty regarding existing capacity, it is not desirable to physically phase development, preventing development coming forward at a certain point as this may unnecessarily restrict sites coming forward when suitable capacity exists.

5.5 From the local authority perspective the fact that the upgrades are possible provides the degree of reassurance needed to inform infrastructure planning. The timing element does need to be solved however, ultimately Anglian Water will have to ensure that there is appropriate capacity in the system to accommodate the growth. They have accepted that there is a future need to upgrade the treatment works and will continue to monitor the levels of capacity in the system.

Costs

5.6 In terms of sources of funding, there are provisions within the Water Industry Act 1991 for the majority of water and wastewater infrastructure requirements. There are different methods for calculating contribution. It generally means that water and wastewater infrastructure is usually financed outside the planning framework by developers (particularly for the network improvements) and partly on agreement by our financial regulator (Ofwat) to increase customer bills. However, should a strategic solution be required for issues such as flood risk or surface water management contributions through s106 or CIL may be appropriate.

Short term solutions

5.5 In the short term Anglian Water have stated that there may also be other solutions available to reduce flow to the works from elsewhere in the catchment. These opportunities are being investigated by Anglian Water in consultation with the Environment Agency as again this feeds into to the capacity agreement detailed in Appendix 3.

6.0 Sustainable Drainage Systems (SuDS)

6.0 Feeding into the need for upgrades to the works and other short term solutions is the requirement for Sustainable Drainage Systems (formally what was known as Sustainable Urban Drainage Systems (SUDS)). SuDs are a mechanism for managing surface water run-off, and should never be discharged into the foul sewer. However, Anglian Water have identified that there is potential to identify where currently surface water is being discharged into the foul network and remove this potential additional flow.

6.1 The idea behind SuDS is to try to replicate natural systems that use cost effective solutions with low environmental impact to drain away dirty and surface water run-off through collection, storage, and cleaning before allowing

it to be released slowly back into the environment, such as into water courses. This is to counter the effects of conventional drainage systems that often allow for flooding, pollution of the environment – with the resultant harm to wildlife – and contamination of groundwater sources used to provide drinking water. The paradigm of SUDS solutions should be that of a system that is easy to manage, requiring little or no energy input (except from environmental sources such as sunlight, etc.), resilient to use, and being environmentally as well as aesthetically attractive. Examples of this type of system are reed beds and other wetland habitats that collect, store, and filter dirty water along with providing a habitat for wildlife.

6.2 Defra have recently released a consultation on the new SuDS approval and adoption system. Within this process they have also started to develop guidance to support the application of the proposed National Standards for SuDS.

6.3 Through the recent consultation it is clear that Hertfordshire County Council as the Lead Local Flood Authority will be ultimately responsible for making sure that arrangements for the new SuDS regime are in place and operate (the SAB - SuDS Approval Body). Although the SAB process is a separate process outside the planning system there will be nonetheless required and *de facto* links with both development plans and development control that need to be understood and accommodated, as potentially from October of 2012 a working system will have to be in place.

6.4 The SuDS viability map is set out in Appendix H of the North Hertfordshire Strategic Flood Risk Assessment. This identifies the entirety of Royston as being suitable for SuDS.

Appendix 1: Dry Weather Flow Assessment

North Hertfordshire District Council Core Strategy - DWF assessment

NOTE REF.	1	2	3	4	5	6	
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Royston	Y	**2950**	2334	616	355	**3305**	

NOTES

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4 The theoretical difference between measured and consented DWF
5 Using NHDC development projections and discharge flow assumptions for Core Strategy plan period
6 Summation of additional DWF with current measured DWF (or consented DWF for AMP5 schemes)

DEVELOPMENT DATA AND DESIGN ASSUMPTIONS

Per capita flow/day: 145 l/h/d

Occupancy per dwelling = 2.31 as advised by NHDC

Letchworth growth = 2541 dwellings (includes Baldock)

Hitchin growth = 1343 dwellings (includes Ickleford and Pirton)

Royston growth = 1059 dwellings

West of Stevenage = 5000 dwellings (3000 in North Herts and subject to appeal - in reality development unlikely to be split between AW and TW)

North of Stevenage -option 1 = 2300 (17000 in North Herts - in reality development unlikely to be split between AW and TW)

North of Stevenage - option 2 = 1600 (1000 in North Herts - in reality development unlikley to be split between AW and TW)

FLOWS

	Consented DWF m3/d	AMP 5 Flow assessment data			Recent annual flows (TSFR)	
		2004	2005	2006	2009	2010
Letchworth	9900	7506	7445	8107	7039	6597
Hitchin	10290	11508*	6775	6406	6677	7157
Royston	2950	1646	2294	2458	2495	2174

Appendix 2: Water Framework Assessment

WFD Assessment Datasheet

Catchment	**Royston STW**
Date	10-May-11
Receiving Water	Whaddon Brook
WFD Waterbody ID	GB1050033038020
Upstream Sample Point	None
Downstream Sample Point	30M19, *****

STW Permit limits

Variable	Unit	Limit	Statistic
DWF	m3/day	**2950**	-
BOD	mg/l	**15**	95 %ile
Ammonia	mg/l	**10**	95 %ile
Phosphate	mg/l	**2**	AA

Post-growth DWF - m3/day *(from "DWF Assessment" tab)*
3305

Upstream River data

Variable	Unit	Mean	SD	Comments/Assumptions
Flow	m3/day	**397**	**138**	**Q95** river flow. Estmated using Low Flows Enterprise, May 2011.
BOD	mg/l	**1.86**	**1.12**	Discharge point is considered to be the start of Whaddon Brook. Assume mid-High status quality for all parameters.
Ammonia	mg/l	**0.07**	**0.04**	
Phosphate	mg/l	**0.05**	**0.05**	

STW discharge data

Variable	Unit	Mean	SD	Comments/Assumptions

Pre-growth Flow	m3/day	**3711**	**1237**	Based on current (AMP5) DWF of 2950 m3/day
Post-growth Flow	m3/day	**4131**	**1377**	Based on calculated DWF of 3305 m3/day
BOD	mg/l	**2.84**	**1.77**	11/06/08 to 29/03/11 (i.e. since last step change)
Ammonia	mg/l	**0.56**	**0.8**	28/03/06 to 15/03/11 (i.e. since last step change)
Phosphate	mg/l	**1.32**	**0.42**	09/01/09 to 29/03/11 (OSM data only since P-removal)

Downstream WFD Targets

Salmonid Fishery (Y/N) ?	**N**

1. No Deterioration

Variable	Status	90 %ile (mg/l)	AA (mg/l)
BOD	Good	**5.00**	**-**
Ammonia	Moderate	**1.10**	**-**
Phosphate	Poor	**-**	**1.00**

2. Improve to Good Status

Variable	Status	90 %ile (mg/l)	AA (mg/l)
BOD	Good	**-**	**-**
Ammonia	Good	**0.6**	**-**
Phosphate	Good	**-**	**0.12**

Comments/Assumptions

Targets for Whaddon Brook (waterbody GB1050033038020)

<u>No Deterioration</u>
RBMP status (based on 2006-2008 data at sample point 30M19):
BOD - Good
Ammonia - Moderate
Phosphate - Bad

However, UWWTD P-removal scheme installed at the end of 2008 (a measure quoted in the RBMP) has resulted in an improvement to Good, Good, Poor respectively. As this measure is planned and accounted for in the RBMP, **Poor** (i.e. current) status **should be used as the No Deterioration target for phosphate.**

<u>Improve to Good Status</u>
Applies to Ammonia and phosphate elements only (BOD already at Good status).

Appendix 3: Royston Sewage Treatment Works – AWSL/EA position

Background

Water cycle strategies (WCS) are used as an evidence base to support Local Plans. They identify whether a proposed allocation of growth, at locations across the district, can be delivered without a breach of environmental legislation.

WCSs allow us to plan ahead, using the best information available, and advise local authorities on any potential constraints to their plans. They also show what, if anything, can be done to remove those constraints and whom is responsible.

The findings of the WCS must be included within the Local Plan's Sustainability Appraisal. Without them it will be unsound as it would not pass all four tests of soundness (paragraph 182 of the National Planning Policy Framework).

Through our work so far we have confirmed that the majority of growth proposed across North Herts can be delivered sustainably - it can be accommodated without the requirement for major upgrades to sewage treatment works (STW).

For Royston, however, the proposed quantum of growth could lead to a significant upgrade to the STW with a considerable increase in energy use and this could affect the delivery of the proposed growth in Royston.

Royston STW

Much work has been done, via the WCS, to demonstrate that the dwellings already identified by the council as 'coming forward' can be accommodated. There is an element of risk associated with connecting them, but that risk can be managed.

In order to demonstrate a workable solution, we have agreed that in principle a technically feasible engineering solution can be delivered to accommodate all of the growth proposed for Royston (based on the housing numbers that the council has presented in the WCS). Should a new permit be required in order to meet the requirements of the Water Framework Directive, this would involve a tightening of standards. This would necessitate a costly upgrade of Royston STW with an initial estimate exceeding £3 million. Upgrading Royston STW would require a lead-in time managed through standard processes such as temporary treatment or tankering. Once it was operating there would be a considerable increase in energy usage for processing to meet the tighter standards.

The council has concluded from its sustainability appraisal that such an upgrade is sustainable. If it is later deemed not the case, then this could affect the delivery of the proposed growth in Royston.

The Environment Agency's position is that there is capacity for the properties coming forward (anticipated to be up to 2015 based on the housing trajectory provided by NHDC). In order to accommodate proposed growth beyond this point a revised discharge permit for Royston STW will be required. This is to prevent deterioration in the receiving watercourse in order to comply with the requirements of the Water Framework Directive.

Anglian Water forecasts that there is, and will be, sufficient capacity to serve the proposed growth for the council's plan period. Anglian Water regularly reviews available STW capacity. The onus will be on Anglian Water to maintain standards set within the environmental permit. Should the review of STW capacity identify compliance concerns, Anglian Water will apply for a revised permit, and scope associated upgrades should they be required.

Moving Forward

The Environment Agency and Anglian Water are working together to consider the positions of both parties regarding the proposed growth at Royston.

The onus will be on Anglian Water to maintain standards set within the environmental permit. Temporary measures can be implemented in case of any gap between development proceeding and STW extensions being completed. This is in accordance with reducing the risks identified in the WCS.

Anglian Water has suggested a number of measures can be taken to help create further 'headroom' in the system (i.e. removal of surface water, reduced trade effluent input). These should help to reduce the risk from connecting in the properties already coming forward and depending on their efficacy, may ultimately prove to be a preferable alternative to the proposed STW upgrade.

There is currently no evidence to demonstrate the extent to which the above measures can deliver 'headroom', but as that evidence becomes available the Environment Agency and Anglian Water, can make a judgement on the necessity and timing of a major STW upgrade.

Since a solution has been identified, it is agreed growth can be delivered in Royston. The Local Plan must be informed by a sound Sustainability Appraisal which should consider whether the quantum of development can be served sustainably. The Local Plan should contain an appropriate policy to ensure that development coming forward does not have a negative impact on achieving the targets of the Water Framework Directive (WFD).

The above is in agreement from the Environment Agency (Steve Hopper, Anna Parr) and Anglian Water Services Ltd (Jennifer Dean, Max Shone).

Appendix 4: Phasing of Housing Sites:

Parish	Permissions	Small sites allowance	SHLAA sites	Additional dwellings 2011-2031
Royston	224	150	587	961

Reference	Site	Dwelling estimate	Priority	SHLAA phasing
R/r16	former Priory Cinema, Newmarket Road	14	1	2011-2016
137	Heath House, Princes Mews	14	1	2011-2016
143	Land Adj 51 Melbourn Road	4	1	2011-2016
R/r19	Land east of, Thackeray Close	23	2	2011-2016
R/r03	Land north of, Betjeman Road	100	2	2011-2016
R/r04	Land north of, Coombelands Road	56	2	2011-2016
R/r11	Land north of, Lindsay Close	100	2	2011-2016
R/r06	Agricultural supplier, Garden Walk	56	1	2016-2021
R/e2	Land at, Lumen Road	75	1	2021-2026
84	Ivy Farm, Baldock Road	41	2	2021-2026
R/r12	The Warren Car Park, London Road	35	1	2021-2026
R/r13	Industrial estate, Lower Gower Road	25	1	2026-2031
R/r07	Royston FC, Garden Walk	44	2	2026-2031
		587		