



Langham Water Recycling Centre - Committed Investment Plan

Subject: Langham, Colchester WRC

Date: November 2021

Planning Reference: 191830, 210048, 210948, 210949

information relating to Langham Water Recycling Centre (WRC) Investment plan and flow compliance

1 BACKGROUND & EXECUTIVE SUMMARY

This document summarises Anglian Water's position on planning applications at Land to the South of School Road Langham and more widely, to confirm our investment plans to ensure Langham Water Recycling Centre (WRC) is flow compliant.

This statement is to guide the Local Planning Authority in their decision making of planning applications and to address the concerns of the Environment Agency (EA), as detailed within the 2017 Position Statement and in their comments to the above planning application and subsequent discharge of conditions applications.

Langham WRC has been flow non-compliant due to surface water and groundwater infiltration into the foul only network. In order to address this issue, we applied to the EA in October for an increase in permit and have committed investment plans for Langham WRC.

Alongside this we have also completed work on removing surface water from the foul network to ensure surface water flows are reduced during storm events. This work included the following:

- Manhole sealing
- Clearance of blocked surface water sewer
- Sharing investigation findings with Highways regarding blocked highway gullies
- Disconnection of private downpipes to the foul network
- Installation of 6 flow monitors in the Langham WRC catchment

To understand the impact of the above work we have calculated the surface water flows now removed from the foul network factoring in pipe diameter, gradient, typography, and rainfall data.

All the above has been shared with the EA and a set of monitoring actions has been agreed. Quarterly meetings with the EA will be taking place to provide scheme updates, review data, agree any actions, and next steps.

2 FLOW COMPLIANCE

Anglian Water has been working with the EA to find a solution to the issues of flow compliance at Langham WRC and the associated effects arising from the development of 46 homes at School Road Langham and future growth identified in the emerging Local Plan.

There are a couple of issues identified in the Infiltration Reduction Plan that affect Langham WRC and the catchment it serves:

- Surface Water ingress into the foul network infrastructure which uses capacity that should otherwise be used for foul water flows
- Groundwater infiltration in the foul only network

These additional flows may impact the measured DWF however due to the seasonal variation it is hard to quantify. The current flooding issues are caused by the above and prolonged wet weather.

3 WRC INVESTMENT PLAN

We considered two solutions to address the flow non-compliance at Langham WRC; to pump away a proportion of the catchment to the nearby Colchester network, or to apply to the Environment Agency for an increase in permit and upgrade Langham WRC to achieve this.

We are not confident that the pump away option would provide enough capacity to allow for the planned growth and still retain DWF compliance at Langham WRC.

On 7th October 2021, Anglian Water submitted a pre-application to the Environment Agency to understand what new limits will apply to an increased dry weather flow allowance from 420m³/d to 500m³/d at Langham WRC. Following a response from the Environment Agency we will schedule an upgrade of Langham WRC into our programme of works. Completion of design and upgrades usually takes 18-24months. Depending on the response to the pre-application we expect that all upgrades will be complete by 2025 at the latest, however we anticipate this will be earlier as we currently have a P removal WINEP obligation date of 22/12/2024 and we would want to complete the two schemes together where possible.

Time Frame and Investment Plan

| Action | Date |
|---------------------------------------|--|
| AW submits Pre App to EA | Submitted on 7 th October 2021 |
| EA to consider and respond to Pre App | To be agreed with EA |
| Complete design | Once EA has responded to the pre-app |
| Works completed | 18-24 months from Pre-application response |

WRC Monitoring and Enforcement Process

The EA have the power to enforce against us if a WRC is classed as a failing works.

If a WRC exceeds its DWF limit this is noted by the EA when they receive the annual report the following year of the exceedance. For sites that exceed their DWF for a couple of years the EA will write to us and ask what plan is in place to address this exceedance and this would not be recorded as a failure if measures are taken to restore compliance.

4 NETWORK

Investigations and work have already been undertaken on the foul network within the Langham catchment. In AMP 5 (2010-2015) a major scheme was undertaken to reduce dry weather flow infiltration in connection with the DWF compliance issues at the WRC. This work consisted of sewer lining and manhole sealing.

In January and February 2021 there were high flows in the network. In order to understand the issues and potential solutions Anglian Water wrote an Infiltration Reduction Plan which was submitted to the EA. Further information is also available in Section 2.

Manhole Sealing

Our recent investigations have identified 3 manholes allowing Surface Water to ingress. These are currently being sealed to remove these additional flows in the network and subsequently the WRC. It is not possible to estimate the flow rate that will be removed from the foul network by the sealing of this manhole. The water entering through the walls of the chamber is groundwater, so there is no surface area that can be used to calculate a discharge rate. It is worth noting that as sealing these manholes will remove groundwater, these flows will therefore not be dependent on rainfall. One of the leaks was into a square shaped storage chamber and groundwater was witnessed running down all four walls of the chamber. One of the others leaks resembled a full bore discharge from a 75mm diameter pipe. So, although the volume of water cannot be estimated, a significant volume of water has been removed by these works.

This work has been completed.

Clearance of blocked surface water pipe

Discussions with Highways have taken place and they have identified a collapsed surface water sewer. However, the repair of this sewer falls within riparian ownership. We have been in contact with the landowner. The clearance of the blocked SW pipe will remove the need for the customer to drain flood water into the foul sewer. The foul sewer into which the discharge is made is 100mm diameter, which should be laid to a minimum gradient of 1 in 40. If we assume a full-bore capacity at the lowest/shallowest gradient of 1 in 40, the pipe full capacity would be 8.2l/s. However, every rainfall event will not lead to the customer needing to do this, we are therefore not taking this into account in our overall surface water removal calculation.

This work has been completed **Disconnection of Downpipes**

We have also identified 4 properties that have their surface water discharging to the foul network. We are working with the property owners to remove these connections and divert their surface water flows to the surface water sewer. The disconnection from the foul system of the 4 downpipes will give a discharge rate of approximately 0.475l/s

This is based on the measured roof area of the smallest property which is circa 7.2mX4.2. $7.2 \times 4.2 = 30\text{m}^2$ x 4 = 120m². This is a conservative assessment of the roof area as the property measured is the smallest of the 6 in the block and the measurement is based on the plan area. All the roofs are pitched and therefore the actual roof area will be greater than the 30m² used to calculate the SW discharge rate.

We have also used the lowest rainfall intensity value as outlined below.

We use the following formula to calculate surface water run-off from hard surfaces: -

$2.881(\text{constant}) \times \text{impermeable area (hectares)} \times \text{rainfall intensity (mm/hour)}$.

For rainfall intensity we use a range of intensities as follows: -

M2-60 13.74452

M5-60 18

M10-60 21.84615

M20-60 49.5

M50-60 59.4569

$2.881 \times 0.012 \times 13.744 = 0.475$ litres per second.

Three out of the four connection have been removed and the surface water now goes directly to the surface water dedicated sewer. There is one downpipe which could not be diverted to the surface water sewer due to topography. We are working with the home owner on a potential alternative SuDS solution.

Blocked Highway Gullies

There are 3 blocked highway gullies in Wet Lane Boxted, we have liaised with Highways however, they have not confirmed any action to clear the blockage. We believe that even if the blockage was cleared there is still potential for surface water from the road to enter our pumping station in storm conditions. Therefore, we have installed a diversion barrier, any surface water flows from the road will be diverted into the watercourse.

The measured distance between the 3 highway gullies is circa 45m with an average road width of 4.0m, therefore the road area served by the 3 gullies is circa 180m². Using the formula outlined above the discharge rate removed from the foul system is 0.712 litres per second

The construction of the diversion barrier has been completed.

2.881 x 0.018 x 13.744 = 0.712 litres per second.

In conclusion the above works remove a total surface water flow of 9.39l/s from the foul network.

The above actions, whilst helping to address surface water ingress and subsequent flooding, will not help resolve the issue of groundwater and will not make a significant impact on the dry weather flows received at Langham WRC.

In order to fully understand the long-term growth picture and help identify areas of high groundwater infiltration, we are installing flow monitors in the catchment. These will allow us to monitor how the network is performing and how it responds in extreme weather. 12 months of data monitoring will enable us to identify any pinch points in the network and use this to inform growth and investment planning.

All of the above works have been completed.

Summary

In this part of the region, we would expect rainfall of varying intensities to occur on average 202 days a year, therefore the above work will ensure there is a reduction on flow reaching Langham WRC more often than not.

Peak flow from 46 dwellings equates to 0.414 l/s, which we would expect to be generated for two short periods a day. For most of the day this discharge will be lower. Throughout the day we would expect in the region of 0.195l/s. The foul flow calculation also allows 25% infiltration, which we would not expect to see in a new foul system such as that being built by the developer.

Whilst the figures are theoretical, they are based on the lowest rain fall intensity and lowest pipe gradient to ensure that we do not overestimate the benefit that the short-term works will deliver.

Summary Table:

| | Litres Per Second | Hourly Volume (litres) |
|---|--------------------------|-------------------------------|
| Peak foul flow from 46 units including infiltration allowance | 0.414 | 1490 |
| Total surface water removed | 9.39* | 33,804* |
| Surface water removed without opened cover to drain flood water | 1.19* | 4284* |

* These figures exclude the flows removed by sealing the 3 manholes

5 Monitoring Agreement

To ensure the impact of the above work is monitored we will provide the EA with the following data

| Monitoring Action | Frequency |
|--|--|
| Update on downpipe removal solution for 1 dwelling | When scheme identified |
| Flow monitor locations and time of delivery | Flow monitors already installed in the following locations: <ul style="list-style-type: none"> • Chapel Road Boxted Cross • Parsonage Hill Boxted • Off Cage Lane & King George V field, Boxted • Greyhound Hill, Langham • Grove Hill, Langham • Land East of Greyhound Hill, Langham |
| Flow monitoring data once installed | <ul style="list-style-type: none"> • Quarterly data to be provided via email • Quarterly meetings to discuss data • Details of any actions resulting from flow monitoring data |
| Q90 data and rainfall data | Q90 data to be provided to EA. Details to be agreed. |
| Update on investment and design stage (once Pre App has been returned by EA) | Update on scheme status every 6 months |

Windfall Sites

Since 2018 the following windfall sites have been approved within the catchment of Langham WRC:

| Planning Ref | Development Description | Number of new Dwellings | Notes |
|--------------|--|-------------------------|---|
| 180540 | Erection of 36 residential dwellings | 36 | These dwellings are occupied and already connected to the public foul network. The foul flows from these dwellings are already accounted for. |
| 181858 | 4 bed house to replace existing bungalow | 0 | |
| 182787 | Conversion of barn to dwelling | 1 | |
| 190664 | One dwellings | 1 | |
| 191640 | Conversion of barn to dwelling | 1 | |
| 192134 | 3 dwellings | 3 | |
| 192146 | Replacement dwelling | 0 | |
| 202085 | New two storey dwelling | 1 | |
| 210171 | Erection of 4 bungalows | 4 | |

| | | | |
|----------------------------|--------------------------------|-----------|--|
| 210775 | Erection of 4 bedroom dwelling | 1 | |
| Total new dwellings | | 12 | |

There are 12 additional dwellings from the windfall sites connecting into the foul network. This equates to a peak flow rate of 0.108l/s.

As stated above, the peak flow from the additional 46 dwellings at School Road is 0.414 l/s plus the flow from the windfall sites of 0.108 l/s gives us a total additional flow of 0.522 l/s.

The windfall sites have a minimal impact on flows received in the network and Langham WRC.

6 PLANNING CONSIDERATIONS

This statement is intended to support Colchester Borough Council and its planning officers to make an informed decision regarding the discharge of conditions application and any future development proposals within the Langham WRC catchment.

In order to ensure that the proposed development did not make the situation worse a planning condition was imposed when permission was granted. The condition required that Langham WRC has capacity to receive the additional flows from the development prior to commencement on site.

The issue of surface water and ground water infiltration and the resulting effect that it has on volumes discharged to the water course via Langham WRC is not an issue that is within the developer's capacity to resolve. It is therefore important that Anglian Water works with the Environment Agency to find a solution to the existing issue.

Whilst it is recognised that reducing surface water ingress in the network will not significantly reduce the flow into the WRC it is important to understand the impact the development site would have on the foul network and receiving WRC. We calculated the foul flows from 46 dwellings using the following criteria:

- Average property occupancy – 2.35
- Consumption – 125 litres per head per day
- Allowance for infiltration – 25%

For 46 dwellings the foul flow would be approximately 0.195 litres per second.

We apply a peak flow factor of 2.12 for a gravity discharge which equates to a peak foul flow from the development of 0.414 litres per second. As stated above we would expect this amount of flow to only be generated for two periods a day. Throughout the rest of the day, we would expect in the region of 0.195l/s.

7 Discharge of Planning Condition 21 – Foul Drainage

Based on the above short-term actions and calculations and the long-term investment plan Anglian Water recommend discharge of condition 21. However, we understand the concerns of the Environment Agency and Colchester Borough Council regarding protection of the water environment. We will therefore work with all parties to ensure there is sufficient information to enable the site to move forward.

8 Summary

Anglian Water recognise the concerns of the EA and will continue to work with them. Based on the above investigations and information we recommend that 50%, 23 units, can be built and occupied now. The remainder to be delivered as agreed in consultation with all concerned parties.

We currently cannot say how long the permitting and investment process will take; however, we have allocated funding for this scheme in our current Asset Management Plan period (up to 2025). Continued engagement with the EA will happen through the permit pre application discussions and monthly data reviews, we will provide updates to all relevant parties throughout the process.