# 1 Climate Risk Assessment

# GREAT BILLING STC

## 1.1 Risk Assessment

This section of the report
identifies potential climate impacts to the site, arising from the changing climate variables identified by the Environment Agency in the template worksheet.

The Environment Agency templates identifies, for each river basin, the projected change in the following seven climate variables between now and the 2050s:

- Summer daily maximum temperature;
- Winter daily maximum temperature;
- Peak rainfall intensity (biggest rainfall events);
- Average winter rainfall;
- Sea level;
- Average summer rainfall;
- Peak flow in watercourses.

The change values given are for the 2050s time period, consistent with a 4ºC rise in global mean temperature by the end of the century (a so-called 4ºC scenario). They are based on the UK Met Office climate projections 2009 (UKCP09)[1]. Overall the climate projections indicate hotter, drier summers and warmer, wetter winters, together with an increase in storm events.

Based on the potential changing climate variables, key impacts to the site and its operation have been identified. For a wastewater treatment plant, impacts commonly identified include potential increases in odour issues associated with future warmer summer temperatures, and potential increase in the risk of fluvial or surface flooding due to changes in precipitation regime.

Following the Environment Agency guidance, once all the potential climate impacts for a site have been identified, the Likelihood and Severity of each climate impact identified for an individual site is scored, following Environment Agency scoring guidance. The combination of Likelihood and Severity provides the Risk rating for each climate impact. (Risk = Likelihood x Severity). Where the risk rating for a climate impact is greater than 5, mitigation measures are identified to reduce the effect of the climate impact should it occur, and the residual likelihood and severity of the climate impact are re-rated after mitigation to ensure the residual risk is at an acceptable level.

The scoring criteria for severity and likelihood of impact, as set out by the Environment Agency guidance, are below:

**Severity of impact:**

- severe impact: short-term, acute impact to operations resulting in permanent compliance breach(es)
- medium impact: short-term, acute impact to operations resulting in multiple temporary compliance breaches
- mild impact: short-term, acute impact to operations resulting in single temporary compliance breach

[1] The Environment Agency has stated it s intention to update the worksheets to take full account of the UK Climate projections 2018 (UKCP18), the latest climate projections. Meanwhile, UKCP18 is broadly consistent with UKCP09 so the worksheets are still valid for screening risk. See Adapting to climate change: risk assessment for your environmental permit - GOV.UK (www.gov.uk)

- minor impact: short or long-term impact resulting in additional measures for compliance

**Likelihood of impact:**

- highly likely: event appears very likely in the short term and almost inevitable over the long term, or there is evidence of the event already happening
- likely: it is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term
- low likelihood: circumstances are such that an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term
- unlikely: circumstances are such that it is improbable the event would occur even in the long term

**Risk score calculation**

| | Severe impact (score= 4) | Medium impact (score = 3) | Mild impact (score = 2) | Minor impact (score = 1) |
|---|---|---|---|---|
| **Highly likely (score = 4)** | 16 | 12 | 8 | 4 |
| **Likely (score = 3)** | 12 | 9 | 6 | 3 |
| **Low likelihood (score = 2)** | 8 | 6 | 4 | 2 |
| **Unlikely (score = 1)** | 4 | 3 | 2 | 1 |

**Risk categories**

- 12 to 16: high
- 8 to 9: moderate to high
- to 6: moderate to low
- 1 to 3: low

## 1.2 Mitigation measures

Mitigation measures are identified, tailored to each identified climate impact. Some are specific actions which follow methods already in place at the site today – for e.g. implementing additional odour control measures if higher summer temperatures have been identified as potentially leading to increased odour issues in future.

In some instances, mitigation measures are not solely physical actions, they can include for example, increased monitoring, or carrying out regular reviews of existing site flood plans and ensuring these are updated in line with any new Environment Agency guidance. Mitigation actions identified should be proportionate to the risk identified.

Operator Name: Anglian Water

Permit reference number:

## 1.3 Risk assessment worksheet for the 2050s

As the final score was above 10, this document has been included in the permit application and has been fed into the environmental management plan

| Potential changing climate variable | A<br>Impact | B<br>Likelihood | C<br>Severity | D<br>Risk<br>(B x C) | E<br>Mitigation<br>(what will you do to mitigate this risk) | F<br>Likelihood<br>(after mitigation) | G<br>Severity<br>(after mitigation) | H<br>Residual risk<br>(F x G) |
|---|---|---|---|---|---|---|---|---|
| 1. Summer daily maximum temperature may be around 7°C higher compared to average summer temperatures now. | a) Increase in odour due to high temperatures.<br>b) The CHP unit at the site has a maximum operating temperature of 40ºC. With a projected increase in daily maximum temperatures of up to 7ºC compared to present day, 40ºC temperatures will still be reached rarely, if at all, hence this is classed as low likelihood event.<br>c) Potential increase in risk of biogas or AD explosion due to higher temperatures. | a) 4<br>b) 2<br>c) 1 | a) 3<br>b) 2<br>c) 4 | a) 12<br>b) 4<br>c) 4 | a 1) Implement additional odour control measures.<br>a 2) Introduce additional water to the system.<br>b) none required.<br>b 2) Boiler house has auto cut off above 40ºC to safeguard against high temperatures<br>b 2) CHPs have auto shut down if risk of over heating. | a) 3<br>b) - | a) 3<br>b) - | b) 4<br>b) - |
| 2. Winter daily maximum temperature could be 4°C more than the current average, with the potential for more extreme temperatures, both warmer and colder than present. | Colder temperatures than those experienced at present may impact as follows:<br>a) Generators/boilers do not like starting below -15ºC.<br>b) Whesso valves can freeze at temperatures below -5ºC.<br>These are both low likelihood events. | a) 2<br>b) 2 | a) 2<br>b) 3 | a) 4<br>b) 6 | a) None required.<br>b) None required. | - | - | - |

| Potential changing climate variable | A<br>Impact | B<br>Likelihood | C<br>Severity | D<br>Risk<br>(B x C) | E<br>Mitigation<br>(what will you do to mitigate this risk) | F<br>Likelihood<br>(after mitigation) | G<br>Severity<br>(after mitigation) | H<br>Residual risk<br>(F x G) |
|---|---|---|---|---|---|---|---|---|
| 3. The biggest rainfall events are up to 20% more intense than current extremes (peak rainfall intensity)*. | a) Site wastewater treatment capacity exceeded due to incoming flows – risks direct discharges to the watercourses if stormwater storage is exceeded. | a)2 | a) 3 | a) 6 | a)1) Ensure screening in place for any wastewater. overtopping the stormwater storage (i.e. screening on the outfall).<br>a)2) Alternatively increasing the stormwater storage capacity could be another option.<br>b) Site emergency plan and site management to be kept up-to-date with any new data on flood risk from Environment Agency (new flood risk will be available as knowledge of future climate change progresses).<br>b) None needed | a)1<br>b) - | a)2<br>b) - | a)2<br>c) - |

| Potential changing climate variable | A<br>Impact | B<br>Likelihood | C<br>Severity | D<br>Risk<br>(B x C) | E<br>Mitigation<br>(what will you do to mitigate this risk) | F<br>Likelihood<br>(after mitigation) | G<br>Severity<br>(after mitigation) | H<br>Residual risk<br>(F x G) |
|---|---|---|---|---|---|---|---|---|
| 4. Average winter rainfall may increase by 35% on today's averages. | As above, the same risks arise<br>1)Site wastewater treatment capacity exceeded due to incoming flows - risk of direct discharges to the watercourses if stormwater storage is exceeded.<br>b) Risk of surface flooding on the site. Very low risk of surface water flooding form sea level as shown on gov.uk's flooding risk calculator. | a)3<br><br><br><br><br><br>b)3 | a) 3<br><br><br><br><br><br>b) 2 | a) 9<br><br><br><br><br><br>b) 6 | a)1) Ensure screening in place for any wastewater overtopping the stormwater storage (i.e. screening on the inlet screens).<br>A) 2) Storm tanks at feed TPS to carry excess water away from works<br>a) 2) Alternatively increasing the stormwater storage capacity could be another option.<br>b) Site emergency plan to be kept up-to-date with any new data on flood risk from Environment Agency (new flood risk will be available as knowledge of future climate change progresses). | a) 2<br><br><br><br><br><br>b) 2 | a) 2<br><br><br><br><br><br>b) 2 | a) 4<br><br><br><br><br><br>b) 4 |
| 5. Sea level could be as much as 0.6m higher compared to today's level *. | Site is in land so very low risk of flooding from sea level as shown on gov.uk's flooding risk calculator. | 1 | 3 | 3 | 1) Ensure flood plan for site follows EA guidance.<br>2) Include provision of sump pump to keep site clear of surface flood water.<br>3) Ensure diesel generators are at sufficient height to ensure they are not at risk of flooding | 2 | 2 | 4 |

| Potential changing climate variable | A<br>Impact | B<br>Likelihood | C<br>Severity | D<br>Risk<br>(B x C) | E<br>Mitigation<br>(what will you do to mitigate this risk) | F<br>Likelihood<br>(after mitigation) | G<br>Severity<br>(after mitigation) | H<br>Residual risk<br>(F x G) |
|---|---|---|---|---|---|---|---|---|
| 6. Drier summers, potentially up to 39% less rain than now. | a) Increase in odour issues due to higher temperatures.<br>b) Site uses potable water for a number of processes (for poly make up, heat exchange, eye bath and safety showers. Also wash down hoses near digestors and liming plant). If drought is severe enough to interrupt potable water supply, site operations will be disrupted / could be affected. | a) 3<br>b) 1 | a) 4<br>b) 4 | a) 12<br>b) 4 | a) 1) Implement additional odour control measures.<br>a) 2) Introduce additional water to the systems.<br>b) No mitigation required as very low risk. Score under 5. However, water could be supplied to site using bowsers.<br>Potable water is assessed by water regs team.<br>No potable water = boilers turn off = turn off stc | a) 2 | a) 2 | a) 4 |
| 7. At its peak, the flow in watercourses could be 35% more than now, and at its lowest it could be 80% less than now. | None beyond those already covered above under 3,4 (for higher flow), and 6 (reduced flow in watercourses). | | | | | | | |