Ashford Sludge Treatment Centre
Environmental Permit Application
Climate Change Risk Assessment
790101_ERA_CCRA_ASH

Revision	Date	Originator	Checker	Approver	Description
A	08.04.2021	Nikki van Dijk	Maria Pooley	Anita Manns	Draft climate change risk assessment
B	25.05.2021	Nikki van Dijk	Shannon Stone	Anita Manns	Final draft climate change risk assessment
C	23.06.2021	Grace Peel	Shannon Stone	Anita Manns	Final climate change risk assessment

Document reference: 790101_ERA_CCRA_ASH

Information class: Standard

1 Introduction

1.1 Background and scope

This report provides an assessment of the risks and impacts arising from future climate change which would limit and constrain the operation of the permitted activities.

The risk assessment has been produced following an application for a bespoke permit and will subsequently be kept with the Management System on site.

This document assesses risks to the operations of the site in accordance with Environment Agency guidance 'Adapting to climate change: risk assessment for your environmental permit'[1]. The Environment Agency guidance includes tailored worksheets for each river basin, which include climate change projections data for that river basin. The climate change data includes projects changes in temperature and precipitation.

[1] Available here: https://www.gov.uk/guidance/adapting-to-climate-change-risk-assessment-for-your-environmental-permit

1.2 Assumptions and limitations

The assessment of effects has been based on information sourced from relevant and applicable legislation, guidance and websites. It is assumed that all guidance documents produced by the Environment Agency are up to date and correct at the time of writing.

2 Climate Change Risk Assessment

2.1 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; and
- Peak flow in watercourses.

The change values given are for the 2050s time period (compared to a 1961-1990 baseline 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)[2]. 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 is scored. 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 impact. The residual likelihood and severity of the climate impacts 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).

[2] The Environment Agency has stated its 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)

- 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.
- 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
- 4 to 6: moderate to low
- 1 to 3: low

2.2 Mitigation measures

Mitigation measures are identified and tailored to each identified climate impact. Some are specific actions which follow methods already in place at the site – for example, implementing additional odour control measures if higher summer temperatures have been identified, to reduce the potential for increased odour issues.

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.

A. Ashford site climate change risk assessment worksheet

Operator Name: Southern Water Services Limited

Permit reference number: EPR/BP3296SB

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2.3 Risk assessment worksheet for the 2050s

Potential changing climate variable	A Impact	B Likelihood	C Severity	D Risk (B x C)	E Mitigation (what will you do to mitigate this risk)	F Likelihood (after mitigation)	G Severity (after mitigation)	H Residual risk (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. Currently the site receives a high number of odour complaints in summer.	a) 3	a) 3	a) 9	a) Implement additional odour control measures a) Introduce additional water to the system	a) 2	a) 2	a) 4
	b) Digesters have an optimum operation temperature range of 32-36°C. With a projected increase in daily maximum temperatures of up to 7°C compared to present day, the higher end of this temperature scale will be reached more frequently.	b) 3	b) 2	b) 6	b) Ensure adequate mixing in digesters. b) Paint external surfaces in a light colour and create shade around the digesters e.g. by planting trees.	b) 2	b) 2	b) 4
	c) Increased efficiency of activated sludge processes due to slightly warmer temperatures throughout the year.	This is a positive effect.						
	d) Overheating of CHP units	d) 2	d) 2	d) 4	d) None required	d) 2	d) 2	d) 4
	e) Staff exposed to extreme temperatures, affecting health and wellbeing, and productivity if they are unable to work.	e) 2	e) 3	e) 6	e) Ensure staff have access to water to remain hydrated and are able to take breaks when required to prevent heat stress.	e) 1	e) 1	e) 1
2. Winter daily maximum temperature could be 4°C more than the current average, with the potential for more extreme	a) Colder temperatures than those experienced at present may affect operation of equipment e.g. Whesso valves can freeze at temperatures below -5°C.	a) 2	a) 2	a) 4	a) None required			

Potential changing climate variable	A Impact	B Likelihood	C Severity	D Risk (B x C)	E Mitigation (what will you do to mitigate this risk)	F Likelihood (after mitigation)	G Severity (after mitigation)	H Residual risk (F x G)
temperatures, both warmer and colder than present.	b) Longer growing season requiring additional vegetation management.	b) 3	b) 1	b) 3	b) None required			
	c) Staff unable to access site due to effects of cold weather (snow and/or ice blocking road access). Site can only be accessed by one bridge.	c) 2	c) 2	c) 4	c) None required			
	d) Extreme cold temperatures may affect the anaerobic digestion processes.	d) 1	d) 2	d) 2	d) None required			

Potential changing climate variable	A Impact	B Likelihood	C Severity	D Risk (B x C)	E Mitigation (what will you do to mitigate this risk)	F Likelihood (after mitigation)	G Severity (after mitigation)	H Residual risk (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 therefore risks in relation to direct discharges to the watercourses if stormwater storage is exceeded. Currently water is discharged to reedbeds to north of site when stormwater capacity exceeded.	a) 3	a) 3	a) 9	a) 1) Ensure screening in place for any wastewater. overtopping the stormwater storage (i.e. screening on the outfall). a) 2) Increase stormwater storage capacity a) 3) Extend area of reedbed to allow greater volume of water to be discharged. a)4) Site emergency plan AND site management 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	a) 2	a) 4
	b) Risk of surface flooding on the site, particularly areas of low topography such as the car park outside of offices.	b) 3	b) 1	b) 3	b) None required			
	c) Staff unable to access site due to flooding or flood damage to access (bridge). Site can only be accessed by one bridge.	c) 2	c) 2	c) 4	c) None required	c) 2	c) 2	c) 4

Potential changing climate variable	A Impact	B Likelihood	C Severity	D Risk (B x C)	E Mitigation (what will you do to mitigate this risk)	F Likelihood (after mitigation)	G Severity (after mitigation)	H Residual risk (F x G)
4. Average winter rainfall may increase by 44% on today's averages.	As above, the same risks arise: a) Site wastewater treatment capacity exceeded due to incoming flows - risk of direct discharges to the watercourses if stormwater storage is exceeded. Currently water is discharged to reedbeds to north of site when stormwater capacity exceeded.	a) 3	a) 3	a) 9	a) 1) Ensure screening in place for any wastewater overtopping the stormwater storage (i.e. screening on the outfall). a) 2) Increase stormwater storage capacity a) 3) Extend area of reedbed to allow greater volume of water to be discharged. a) 4) Site emergency plan AND site management 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	a) 2	a) 4
	b) Risk of surface water flooding on the site particularly areas of low topography such as the car park outside of offices.	b) 3	b) 1	b) 3	b) None required			

Potential changing climate variable	A Impact	B Likelihood	C Severity	D Risk (B x C)	E Mitigation (what will you do to mitigate this risk)	F Likelihood (after mitigation)	G Severity (after mitigation)	H Residual risk (F x G)
	c) Fluvial flooding of the site from the River Great Stour. Part of the site (to the north west) is in Flood Zone 2 and fluvial flood risk is likely to increase over time.	c) 2	c) 3	cd) 6	c) Site emergency plan AND site management 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). Potential need for flood defences in future.	c) 2	c) 2	c) 4
	d) Staff unable to access site due to flooding or flood damage to access (bridge). Site can only be accessed by one bridge.	d) 2	d) 2	d) 4	d) None required			
5. Sea level could be as much as 0.6m higher compared to today's level.	a) The site is approximately 15km inland and not at risk from coastal flooding.	a) 1	a) 1	a) 1	a) None required			
6. Drier summers, potentially up to 44% less rain than now.	a) Site uses potable water for a number of processes (polymer make up, heat exchange, eye bath and safety showers, wash down hoses near digestors and liming plant). Primary poly is also mixed with wash water. If drought is severe enough to interrupt potable water supply, site operations will be disrupted / could be affected. This has not been experienced to date.	a) 1	a) 4	a) 4	a) No mitigation required as very low risk. Score under 5. However, water could be supplied to site using bowsers.			

Potential changing climate variable	A Impact	B Likelihood	C Severity	D Risk (B x C)	E Mitigation (what will you do to mitigate this risk)	F Likelihood (after mitigation)	G Severity (after mitigation)	H Residual risk (F x G)
7. At its peak, the flow in watercourses could be 50% more than now, and at its lowest it could be 75% less than now.	a) Risk of additional sediment collection on site due to heavy rain following drought.	a)2	a) 1	a) 2	a) None required			
	b) Low flows in receiving waters can lead to issue with discharging – either cannot discharge, or discharge and risk exceeding pollution concentration thresholds.	b) 3	b) 3	b) 9	b) Additional storage on site, potential tankering to other sites could be considered.	b) 2	b) 2	b) 2