

Aylesford Sludge Treatment Centre Environmental Permit Application

Climate Change Risk Assessment
790101_ERA_CCRA_AYL

Revision	Date	Originator	Checker	Approver	Description
A	09.04.2021	Sophie Robinson	Nikki van Dijk	Anita Manns	Draft climate change risk assessment
B	24.05.2021	Sophie Robinson	Shannon Stone	Anita Manns	Final draft climate change risk assessment

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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 (EA) 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 4°C rise in global mean temperature by the end of the century (a so-called 4°C 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, and the residual likelihood and severity of the climate impact is 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 \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/684212/Adapting_to_climate_change_risk_assessment_for_your_environmental_permit_-_GOV.UK_(www.gov.uk).pdf)

- 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, tailored to each identified climate impact. Some are specific actions which follow methods already in place at the site today – for example, 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.

There have been no flood events recorded on site. However, there are flood gates on one of the two access roads to the site (Administration Building Road) which are maintained by the Environment Agency.

The site has balancing water tanks and when the capacity of the tank is reached, all the inflows into the tanks are stopped to prevent them from overflowing. They have a combined volume capacity of 3579.63m³.

A. Aylesford site climate change risk assessment worksheet

Operator Name: Southern Water Services Limited

Permit reference number: EA/EPR/DP3998HH

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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.	a) 3	a) 3	a) 9	a) 1) Implement additional odour control measures a) 2) Introduce additional water to the system	a) 2	a) 2	a) 4
	b) Anaerobic digestion has an optimum operation temperature range of 34-39°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 still be reached rarely, if at all, hence this is classed as low likelihood event.	b) 2	b) 2	b) 4	b) None required			
	c) Increased efficiency of activated sludge processes due to slightly warmer temperatures throughout the year.	This is a positive effect.						
	d) CHP is out of service at the moment, however there is potential that it will be replaced. No temperature sensitivities recorded at present for existing plant. However, potential that future temperatures will affect CHP process depending on the operating temperature maximums of the replacement plant. Likelihood of impact identified as likely at this stage as a worst case scenario.	d) 3	d) 2	d) 6	d) Additional measures to ensure cooling of the CHP if required. These could include raising the CHP unit to improve airflow below and around it.	d) 2	d) 2	d) 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)
	e) Staff exposed to extreme temperatures, effecting 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 temperatures, both warmer and colder than present.	Colder temperatures than those experienced at present may impact as follows: a) Generators/boilers do not like starting below -15°C. b) Whesoe valves can freeze at temperatures below -5°C. These are both low likelihood events.	a) 2	a) 2	a) 4	a) None required			
	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).	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.	a) 3	a) 3	a) 9	a) 1) Ensure screening in place where required for any wastewater. overtopping the stormwater storage (screening on the outfall). a) 2) Increasing the stormwater storage capacity. a) 3) 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. There are no instances of flood risk recorded on the site. Surface water flood risk is identified to be low ³ .	b)2	b) 1	b) 2	b) None required			

³ Available at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/risk>

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.	a) 3	a) 3	a) 9	a) 1) Ensure screening in place where required for any wastewater overtopping the stormwater storage (eg. screening on the inlet or outfall). a) 2) Increasing the stormwater storage capacity could be another option. a) 3) 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) There are no instances of flood risk recorded on the site. The site is located within Flood Zone 1 ⁴ , however it is adjacent the River Medway which is classified as areas benefitting from flood defences which would otherwise have a high risk of flooding.	b) 1	b) 1	b) 1	b) None required			

⁴ Available at: <https://flood-map-for-planning.service.gov.uk/>

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)
5. Sea level could be as much as 0.6m higher compared to today's level.	a) The site is not at risk of flooding from the sea.	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 (for offices, poly make up (centrifuge and thickeners)) equating to around 2%. Water use is also required as carrier water for the final effluent. If drought is severe enough to interrupt potable water supply, site operations will be disrupted / could be affected.	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.			
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) Lower 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) 1) Additional storage capacity on site. b) 2) Potentially tankering to other sites, could also be considered.	b) 2	b) 2	b) 4

