

# Peacehaven Sludge Treatment Centre Environmental Permit Application

Climate Change Risk Assessment  
790101\_ERA\_CCRA\_PEA

Revision	Date	Originator	Checker	Approver	Description
A	23.02.2022	Jessica Wilson	Nikki Van Dijk	Anita Manns	Draft climate change risk assessment
B	26/05/22	Jessica Wilson	Nikki Van Dijk	Anita Manns	2 <sup>nd</sup> Draft climate change risk assessment
C	24/06/22	Jessica Wilson	Nikki Van Dijk	Anita Manns	Final version

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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'<sup>1</sup>. 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 projected changes in temperature and precipitation.

<sup>1</sup> 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)<sup>2</sup>. 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).

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<sup>2</sup> 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 <https://www.gov.uk/guidance/adapting-to-climate-change-risk-assessment-for-your-environmental-permit#choose-the-correct-risk-assessment-worksheet>

- 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.

## **A. Peacehaven site climate change risk assessment worksheet**

Operator Name: Southern Water Services Limited

Permit reference number: EPR/KP3435RB

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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) Risk of increase in odour issues due to higher temperatures.	a) 3	a) 3	a) 9	a) Implement additional odour control measures and review/update the Odour Management Plan (OMP) as appropriate. a) Introduce additional water to the system	a) 2	a) 2	a) 4
	b) Anaerobic digestion has an optimum operation temperature range of 33-38°C. The anaerobic digestion at the site has an optimum operating temperature of 35°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, 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) There are no temperature sensitivities reported for the CHP within the documentation provided. It is known from other sites that operation of CHP systems can be affected by high temperatures, therefore, in the absence of information and taking a precautionary approach, this is identified as a potential future impact. Taking a conservative approach, the likelihood of this impact has been scored as likely.	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, 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, are issued with appropriate PPE for hot weather, 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.	a) Colder temperatures than those experienced at present may affect operation of generators/boilers which do not operate well starting below -15°C.	a) 1	a) 2	a) 2	a) None required			
	b) Colder temperatures than those experienced at present may affect operation of Whesso valves which can freeze at temperatures below -5°C.	b) 2	b) 2	b) 4	b) None required			
	c) Longer growing season due to warmer temperatures and milder winter may lead to additional vegetation management.	c) 3	c) 1	c) 3	c) None required			
	d) Staff unable to access site due to effects of cold weather (snow and/or ice blocking road access).	d) 2	d) 2	d) 4	d) None required			
	e) Extreme cold temperatures may affect the anaerobic digestion processes.	e) 2	e) 2	e) 4	e) None required			

3. The biggest rainfall events are up to 20% more intense than current extremes (peak rainfall intensity).	a) There is a potential risk of site stormwater treatment capacity being exceeded leading to direct discharges to sea (via the long sea outfall) due to increased incoming flows linked to increased rainfall.	a) 2	a) 4	a) 8	<ul style="list-style-type: none"> <li>a) Ensure screening in place for any wastewater (i.e. screening on the outfall).</li> <li>a) Consider increasing the stormwater storage capacity and retention period in future to cope with extreme rainfall events if necessary</li> <li>a) Prevent stormwater from entering sewerage system. Southern Water is launching a task force to cut storm overflows by 80% by 2030, focusing on nature-based solutions – such as ponds and wetlands, soak aways and rain gardens. Manage the reduction in the amount of rainwater run-off from roads and roofs entering the pipeline system to reduce storm overflows.</li> <li>a) Site emergency plan and site management plan to be kept up to date with any new data on flood risk from</li> </ul>	a) 2	a) 2	a) 4
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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)
					Environment Agency.			
	b) The site is located in Flood Zone 1 and is therefore at very low risk of flooding from rivers and the sea under present conditions. There are some small areas across the site with low (between 0.1% and 1% chance), medium (between 1% and 3.3%) and high (>3.3% chance) surface water flood risk <sup>3</sup> under current conditions. Increased rainfall as a result of climate change could exacerbate the existing flood risk.	b) 2	b) 3	b) 6	b) Monitor change to local river levels and plan for flood defences as appropriate. b) Demountable flood barriers could be implemented during periods of flooding.	b)2	b)2	b)4
	c) Risk of additional sediment collection on site due to heavy rain following drought.	c) 2	c) 1	c) 2	c) None required			

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



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 sea via the long sea outfall if stormwater storage is exceeded.	a) 3	a) 3	a) 9	<ul style="list-style-type: none"> <li>a) Ensure screening in place for any wastewater overtopping the stormwater storage (i.e. screening on the outfall).</li> <li>a) Consider increasing the stormwater storage capacity and retention period in future to cope with extreme rainfall events if necessary</li> <li>a) Prevent stormwater from entering sewerage system. Southern Water is launching a task force to cut storm overflows by 80% by 2030, focusing on nature-based solutions – such as ponds and wetlands, soak aways and rain gardens. Manage the reduction in the amount of rainwater run-off from roads and roofs entering the pipeline system to reduce storm overflows.</li> <li>a) Site emergency plan and site management plan to be kept up to date</li> </ul>	a) 2	a) 2	a) 4
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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)
					with any new data on flood risk from Environment Agency.			
	b) Risk of surface flooding on the site. There are areas with low, medium and high risk of surface water flooding across the site <sup>4</sup> under the current conditions. Increased rainfall as a result of climate change could exacerbate the existing flood risk.	b) 2	b) 3	b) 6	<p>b) Monitor change to local river levels and plan for flood defences as appropriate.</p> <p>b) Demountable flood barriers could be implemented during periods of flooding.</p>	b)2	b)2	b)4
	c) The site is located within Flood Zone 1 therefore at low risk of flooding from rivers or the sea under the current conditions. Increased rainfall as a result of climate change could exacerbate the existing flood risk.	c) 2	c) 3	c) 6	<p>c) Monitor change to local river levels and plan for flood defences as appropriate.</p> <p>c) Demountable flood barriers could be implemented during periods of flooding.</p>	c)2	c)2	c)4
	d) Risk of additional sediment collection on site due to heavy rain following drought.	d) 2	d) 1	d) 2	d) None required			

<sup>4</sup> 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)
5. Sea level could be as much as 0.6m higher compared to today's level.	a) The site is located 1km from the coast, so not at risk from coastal flooding.	a) N/A	a) N/A	a) N/A	a) N/A			
6. Drier summers, potentially up to 44% less rain than now.	a) The site uses potable water for a number of processes (including within the offices, cooling systems, poly make up and internal hoses). 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, if necessary, water could be supplied to site using bowsers.			
	b) Increased dust on site.	b)2	b)1	b)2	b) No mitigation required			
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) Lower flows in receiving waters can lead to issue with discharging – either cannot discharge, or discharge and risk exceeding pollution concentration thresholds. This can lead to a potential breach in DWF consents which is 78,304 m <sup>3</sup> /day.	a) 3	a) 3	a) 9	a) Additional storage capacity on site. a) Potentially tankering to other sites, could also be considered.	a) 2	a) 2	a) 2

