



**Defra Guidance Response (APPENDIX A)**

**Climate Change Adaptation**

**Second Round**

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## How to use this document

This document is designed to be used in conjunction with the Portsmouth Water Climate Change Adaptation Second Round Report. Whilst the main report has been structured in alignment with the Portsmouth Water Adaptation Plan, this document explicitly and concisely addresses the questions in the Defra guidance and where appropriate summarises the conclusions in the main report providing reference to the main text.

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# 1. Understanding Climate Risk

## 1.1 How has your understanding of climate risks, impacts and their effects on your organisation and stakeholders advanced since your first round report?

Since the First Round report the Company has further developed its understanding of climate change risk. The work completed in the first round identified that many of the risks presented by climate change are not new, they are monitored and managed through business-as-usual activities, existing risk mechanisms and the industry's regulatory framework. The focus of adaptation planning has therefore sought to specifically identify how climate risk are monitored and managed within the Company and how associated risks can be further integrated into the existing risk mechanisms. Since the first round report was published in 2011 the company continues to attend industry network meetings on climate change and related fields and has integrated climate change further in to Water Resource Management Plans. The industry also has a growing interest in the field of resilience, as defined by the regulator OfWat closely interlinked with climate events.

## 1.2 What climate change evidence or research have you used to better understand the implications for organisational functions?

Portsmouth Water to date has used the following research and data:

- **UKCP09:**
  - **Adaptation Plans (2011 & 2015):** The climate change projections have been used asses the company's vulnerability in the First and Second round of adaptation reporting which feeds in to the resulting adaptation plan. Due to the nature of the data, the approach has been a top level assessment primarily based on assumptions, internal data and company expertise rather than intensive modelling the data to fit organisational functions
  - **Water Resource Management Plan (2014):** In order to model climate change effects on Deployable Output, 10,000 UKCP09 projections were used to model a subset of 100 results on Surface Water and Ground Water over the 25 year planning period.
- **EA Flood Maps:**
  - **AMP 5 Flood Survey (2008):** Following the Gloucestershire floods of 2007 Sir Michael Pitt was commissioned to produce a comprehensive report on the lessons learnt during the event. OFWAT and Water UK both published more specific reviews of water company performance during the flooding and outlined further recommendations. Flood defences installed at 4 high risk sites following the AMP 5 flood survey, these sites were considered to be at a likely risk of a 1-in-100 year fluvial flood or a 1-in-200 coastal flood
  - **AMP 6 Flood Survey (AMP6):** In preparation for the AMP6 Business Plan the Company conducted further flood assesment. The 2009 methodology was again applied to each site using Environmental Agency data and as a result, in AMP6 two further high risk sites are to have flood defences installed.

### 1.3 Has your understanding of thresholds of climate impacts advanced to better pinpoint organisational vulnerability? If so, how?

As demonstrated in 1.2, the company has been able to use climate research to pinpoint vulnerability in relation to its effect on deployable output over the 25 year planning period of the water resource management however with high uncertainty. The company has also used EA flood maps to assess site vulnerability to flooding which has led to investment in flood defences. Both these examples have shown how data has been optimised to better understand impacts of climate change.

Portsmouth Water has also used UKCP09 data to develop a vulnerability assessment of climate change impacts in 2011 and 2015. This is a top-level using UKCP data in conjunction with internal data and company expertise and has a high degree of judgement and therefore uncertainty. The same methodology is used for both assessments using UKCP09 data therefore the underlying thresholds of climate change impacts have not changed. The second round risk assessment however does take into account new company findings, for example in the last five years the company has experienced increased turbidity at two sites associated with rainfall therefore this risk has been adjusted accordingly.

Proposed changes with UKCPnext data include potential higher resolution projections and time series data which would allow for more insight to the potential effect of climate change on the organisation. The company will produce a climate change risk assessment on the release of this data.

### 1.4 How have you developed your quantified assessment and analysis of risk likelihood and impacts?

N/A: The Company continues to risk ratings based on consequence and likelihood scores adapted from existing company risk rating methodologies to across the business including the Drinking Water Safety Plans, Capital Planning, Water Resource Management Plans and Resilience & Emergency plans. Please see Appendix C for the risk assessment methodology.

## 2. Understanding uncertainties

### 2.1 What uncertainties remain in monitoring and evaluating climate risks to your organisation's functions?

- Effects on supply and demand to capture uncertainty in the Water Resource Management Plan
- Properties & Population Forecasts
- Above ground asset deterioration
- Network deterioration
- Flooding
- Water Quality measures
- Interruptions to supply
- River Flows
- Rain Fall

### 2.2 What new uncertainties have come to light?

The vulnerability assessments have demonstrated that whilst the risks associated with climate change are not new to the company, the extent to which they will affect the companies functions have raised new uncertainties, these include;

- Occurrence and frequency of drought events
- Rising salinity effect on network and assets
- How rising sea level will effect salinity levels in the aquifer
- The extent to which biological and bacterial will grow with reduced cloud cover, lower flows and increased temperature
- How increased storminess and temperatures will increase interruptions to telecommunications and telemetry
- Socio-economic and behavioural change
- Population migration
- The extent of increased tourism
- The extent that new wetting & drying cycles and earth movement will effect bursts
- Climate effects on interdependent industries such as energy which may lead to increased interruption to electrical supply
- Agriculture response leading to increased demand and abstraction

### 2.3 What further implications do uncertainties have on actions your organisation has taken or plans to take?

- **Cost:** As a part of the investment submission to Ofwat the company must demonstrate using customer research that the business plan meets customer's expectancies and 'willingness to pay'. Many of the climate change factors are considered to be long term with high uncertainty and as such customers are unlikely to want to pay for significant investment in the short term for an increased cost of water.
- **Regulative Structure:** The current 5 year planning cycles allow for short to medium term adaptation and flexibility, however it is not as suited to long term drivers such as Climate Change. Capital investment requires significant justification to the regulator however the wide uncertainty of the UKCP09 does not provide this. For example Portsmouth Water currently has no raw water storage, increasing demand and the reduced availability of water in the long term may require greater raw water capacity to be constructed such as a reservoir, however the company would not be able to justify this with the UKCP09 data. It is likely that such investment would be triggered as demand increases over time.

## 2.4 What progress have you made to address information gaps?

- The company seeks to ensure it uses up to date research and data, the primary method by which the company obtains this information is through industry network meetings in the field of climate change, resilience, demand, water resources, resilience, flooding.
- Up to date Environmental Agency flood maps used in AMP5 and AMP 6 flood survey
- During AMP6 the Company proposes to appoint a consultant to undertake an Operational Resilience Study. The study will be a combination of a written report, that will identify potential areas of improvement, and a strategic operational model which will enable the Company to assess the impact on demand dependent on site outages, planned maintenance and operational events.
- Investment in data and modelling techniques which will enhance the Company's ability to monitor climate related risk
- UKCP09 data has been used to model effect on groundwater and river flows over the 25 year planning period in the 2014 Water Resource Management Plan to calculate headroom. In the 2019 Water Resource Management Plan there is an investigation into stochastic modelling to further capture uncertainties on supply and demand such as climate change, this is project lead by an UKWIR.
- Continuous monitoring of climate thresholds listed under 2.1

## 2.5 What are the strategic business and methodological assumptions that underpin your analysis of impacts and risks?

The vulnerability assessment used in the second round risk report applies a consequence/likelihood score as used in the first round methodology, a copy of the methodology applied is available in appendix C and the resulting risk matrixes are available in appendix B.

### Assumptions:

- The vulnerability assessment applies a top level approach, using judgement based on the Company's assets, experience, risk management procedures and existing risk assessments together with UKCP09 projections.
- Risk scores are produced assuming no mitigating investment, only current standard operational procedures.

## 3. Addressing barriers and understanding interdependencies

### 3.1 Where you've identified interdependencies, how have these assisted or hindered actions to address climate risk?

The Portsmouth Water adaptation plan is based on building capacity within existing risk mechanisms and so the interdependencies that exist with other infrastructures have neither assisted nor hindered the progress of the plan.

### 3.2 What were the main barriers to implementing adaptation actions and why?

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### 3.3 Have new barriers been identified? Are these being addressed? If so, how?

In the Round 2 risk report the following barriers have been identified; Cost, Regulative Structure, Limitations of UKCP09, External Awareness and Internal Awareness. The majority of the barriers affect climate adaptation on a strategic level impacting how theoretically likely the company would be able to gain evidence to support mitigating investment, such as a reservoir to adapt to increasing peak demand.

In real terms, the adaptation plan is based on building capacity within the existing company risk mechanisms. The greatest barrier the adaptation plan has faced is raising the internal profile of climate change risk, whilst the company has taken a number of actions towards further integrating climate change into the existing risk mechanisms, since the adaptation plan was introduced in 2011 changes in the company structure has meant that ownership of the adaptation actions has in more recent years been unclear. In response the overall responsibility for the plan has been centralised within the Regulation Department who will oversee the development of the plan, annually review progress and share new findings in order to raise awareness of climate change.

Please see the '*Barriers, Opportunities and Interdependencies*' section of the main report for further details.

## 4. Monitoring and evaluating

### 4.1 How effectively has consideration of climate change risks been embedded within your organisation?

Climate change in many respects is embedded within the company as the challenges it presents are not new and through the four existing bottom-up risk mechanisms, namely Capital Planning, Drinking Water Safety Plans, Water Resources Management Planning & Drought Planning and Resilience & Emergency Planning, the company has a solid foundation to monitor climate risk. As more extreme climate events are expected to increase over time the levels of risk the company faces will also increase, as many of these risks have a slow onset much of the risk will be captured through the existing mechanisms and allow appropriate adaptation.

The purpose of Portsmouth Water adaptation plan established in 2011 is to capture residual risk that may remain. The plan is a top level approach to monitor and improve how climate change risks are monitored within the business, the review used in the Round 2 report has shown that the company has made good progress to further imbedding climate risks however appreciate that there are still improvements to be made in creating a greater organisational awareness of climate risk (see 3.3 on barriers)

### 4.2 How effective have organisational monitoring and evaluation processes been to ensure adaptation responses are implemented and on track? If these have not been effective, what barriers prevented this?

During AMP5 and AMP6 the company has demonstrated how through the monitoring of critical thresholds that adaptive action has been taken to trending climate related events, see the section '**Capital Investment: Demonstrating Resilience at Portsmouth Water**' in the main report for further details of how risks are translate in to capital actions.

### 4.3 How effective were monitoring and evaluation processes in determining how the organisation handled recent extreme weather conditions?

Since the first round report in 2011 the company has not suffered any significant exposure as a result of extreme weather conditions which have affected the supply of water or access to company sites.

During AMP5 flood water was close to entering the Walderton Treatment Works and similarly Westergate Treatment Works experienced water ingress into the head pit that could have potentially given rise to treatment problems as the water quality could be at risk from contaminants within the flood water. As a result of this new exposure to flooding risk the company produces a flood assessment of all the companies sites, during AMP6 the Company will extend the head pit of the Westergate borehole No.1 by a further metre to provide additional mitigation against future flood water ingress whilst Walderton Treatment Works will have flood defences installed to increase the site resilience to flooding.

### 4.4 Has the organisation identified any financial benefits from implementing adaptation actions? Perhaps through cost benefit analysis, fewer working days lost, more efficient operations etc?

The Company has taken a number of capital planning actions during AMP5 and AMP6 which will mitigate climate related risks covering flooding, water quality & treatment and the overall resilience of the Company's network and assets. The Climate Change Adaptation Report Round 2 takes a holistic view of the Company's progress of the adaptation plan and for the purposes of the report, the benefits of adaptation for specific capital schemes have not been quantified.



#### 4.5 Has there been sufficient flexibility in the approach to adaptation within the organisation, which allowed you to pursue alternative courses of action? If not what remedial measures could you take to ensure flexibility?

The Portsmouth Water Climate Change Adaptation Plan has been to build capacity for future adaptation within the company's existing risk mechanisms as opposed to a highly optimised investment focused plan, this approach has allowed a high degree of flexibility.

The justification for the Company's flexible approach to building capacity for adaptation can be found in within **'The action plan: where we are in 2015'** section of the main report.

\* 'Details of actions: implemented and new' from the Defra repeat reporters guidance does not appear in this document as it progress on the company's actions are explained in full within **'The action plan: where we are in 2015'** section of the main report. Questions relating to 'Opportunities and benefits' have not been addressed as few opportunities for the company have been identified with any confidence.