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# ECONOMIC IMPACTS OF COVID-19 ON THE WATER SECTOR

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**Final report**

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Annabelle Ong

 [annabelle.ong@frontier-economics.com](mailto:annabelle.ong@frontier-economics.com)

Emily Nielsen

 [emily.nielsen@frontier-economics.com](mailto:emily.nielsen@frontier-economics.com)

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## EXECUTIVE SUMMARY

### Project objective and scope

The COVID-19 pandemic has impacted almost every aspect of the UK's society and economy, including the water sector. Daily life for many has been greatly disrupted, with children being sent home from school, and thousands of workers furloughed and unable to go to work, to name just two examples. Even with high levels of government intervention, whole industries, notably tourism and hospitality, have struggled to cope.

While there is some anecdotal evidence of the impact of COVID-19 on the water sector from companies and stakeholders, there is no industry-wide robust evidence base that assesses these impacts. To address this lack of information and analysis, in May 2020 Water UK and Ofwat decided to work collaboratively to understand the impacts of COVID-19 on the water sector to date and the potential for future impacts.<sup>1</sup> The objectives of this project are to:

1. Develop a set of possible forward-looking economic, social and behavioural scenarios that capture the potential breadth of changes that could arise from COVID-19.
2. Identify the impact of the changes to date on water companies, including positive and negative impacts.
3. As far as is feasible, project forward these water company impacts, using the forward-looking scenarios developed in (1) as a framework, to test the challenges and opportunities to deliver against the PR19 settlement under these scenarios.

The scope of work focuses on the COVID-19 impacts experienced by the 17 incumbent companies that provide household retail and wholesale water and sewerage services in England and Wales. Recommendations for Ofwat's next steps are outside of the scope.

Frontier Economics was commissioned to deliver this project with support from Atkins and input from the Behavioural Insights Team. We commenced work in June 2020 and collected data from water companies in August 2020 covering the April-July 2020 time period. Companies submitted the data to aid our understanding of their current position at the time of the data request (responses to the data request are not regulatory submissions). Therefore, given the short timeframe, the data we collected was preliminary and not assured. Our findings therefore need to be interpreted with caution.

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<sup>1</sup> A summary of the scope of work has been published here: <https://www.ofwat.gov.uk/wp-content/uploads/2020/08/Economic-impact-of-Covid-19-on-the-water-sector.pdf>

## We have developed an integrated set of scenarios that illustrate the plausible future range of relevant future pandemic paths

We have developed a set of future scenarios to capture the possible future impacts of COVID-19 on the water sector over AMP7. To keep the number of scenarios manageable, we have integrated the following scenarios:

- **Three pandemic scenarios** that describe how the prevalence of COVID-19 and the associated social distancing restrictions may evolve;
- **Three macroeconomic scenarios** that are broadly aligned with the pandemic scenarios and describe how key variables such as Gross Domestic Product (GDP), unemployment and inflation may evolve; and
- **Three behavioural/social scenarios** that are aligned with the pandemic and macroeconomic scenarios and describe how customer behaviour may evolve.

As a result, we use three consolidated scenarios to assess the impacts of COVID-19: Prevalent, Controlled and Diminished.

## We can identify a set of industry-wide impacts

We have identified a number of material, industry-wide impacts and have projected these impacts over AMP7 on the basis of the three scenarios described above. The industry-wide impacts are summarised in Figure 1 and include:

- **Impacts driven by shifting consumption from non-household customers to household customers** as a result of increased working from home, furlough, school closures, etc:
  - Increase in Household (HH) consumption and revenue, decrease in Non-Household (NHH) consumption and revenue, increase in NHH voids;
  - Increase in Per Capita Consumption (PCC) (including Outcome Delivery Incentive (ODI) penalties); and
  - Increase in water production costs.
- **Impacts driven by social distancing rules:**
  - Decrease in travel and discretionary expenditure; and
  - Increase in health & safety expenditure.
- **Impacts driven by macroeconomic scenarios<sup>2</sup>:**
  - Increase in the cost of nominal embedded debt as a result of low inflation – this is driven by the macroeconomic forecasts;
  - Increase in bad debt; and
  - Increase in the number of people on social tariffs.

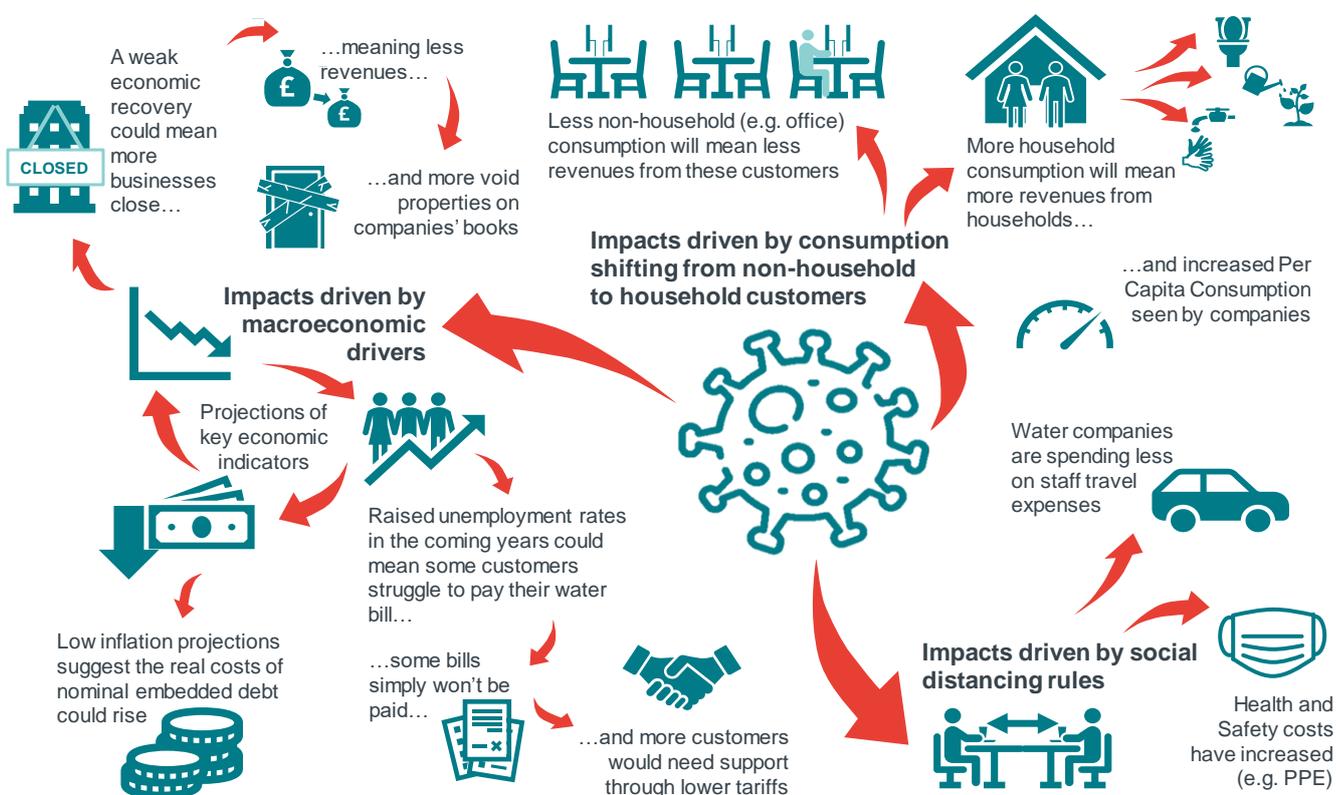
While customers face many impacts from COVID-19, one direct impact relating to the water industry is potential tariff and/or bill fluctuations. This is due to changes in household and non-household revenue as a result of customers spending more

<sup>2</sup> These impacts have not been directly identified in quantitative responses from companies, but are reported in qualitative responses and inferred from past precedents and the macroeconomic downturns projected across all three scenarios. The actual impacts will be driven by macroeconomic outcomes.

time at home and therefore shifting consumption from non-households to households. The exact nature of the tariff and bill changes depend on a range of factors including future outturn revenue and how companies decide to set tariffs.

There are a number of other potential industry-wide impacts that have a higher degree of uncertainty. We have not projected these impacts forward as they are not expected to have a net impact over the AMP due to mitigation and “catch-up”. However, these impacts are uncertain and need to be monitored carefully as they may become material depending on the future path of the pandemic.

**Figure 1 Impacts of COVID-19 on the water sector**



Source for COVID-19 icon: [www.flaticon.com](http://www.flaticon.com)

**The magnitude of the industry-wide impacts depends on the future path of the pandemic**

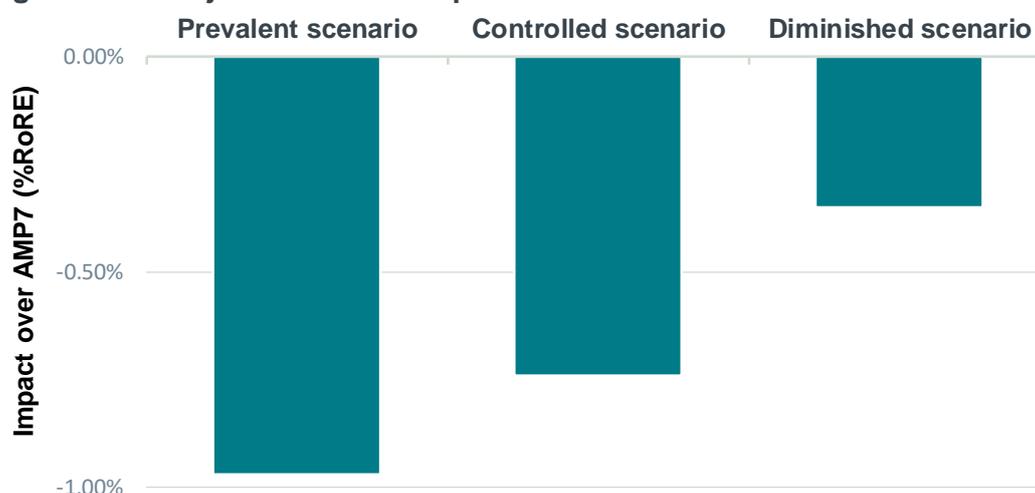
Figure 2 shows that we project the industry-wide impact over AMP7 to range from -0.35% to -0.97% when measured as the change in the return on regulated equity (based on notional gearing and taking account of reconciliation mechanisms). These are average estimates that do not account for company specific impacts. The projected industry-wide impacts depend on the path the pandemic takes in the future, with a larger impact projected under the prevalent scenario (the virus is more prevalent for longer) compared to the diminished scenario (the virus is effectively managed by 2021). While this provides a high level estimate of the impact on the industry under different scenarios, the specific impacts on each

company vary considerably as a result of local circumstances. Furthermore it is important to note that the three scenarios are not equally likely to occur. The likelihood of each scenario continues to be uncertain. For instance, further restrictions reduce the likelihood of the diminished scenario while positive news on potential vaccines increase it.

Our quantitative impacts have to be interpreted with caution as they are based on company data from April-July 2020 that was not assured<sup>3</sup>. The overall magnitude should be viewed as an initial estimate of the potential impact but the specific impacts on individual companies depend strongly on the circumstances of each company, the future path of the pandemic, how each company responds and how governments respond.

In our estimates, the impact of low inflation on the real cost of embedded debt and bad debt are projected to be the largest impacts in all scenarios. Both of these impacts are driven by the macroeconomic response to the pandemic. The inflation projections used to assess the low inflation impact were developed by reputable institutions at the time of the analysis but are subject to change depending on new information, and external factors such as Brexit. Water UK agrees with this approach. Ofwat has suggested that more evidence is needed on what the nature of the link between COVID-19 and the level of inflation is, what that quantum might be and how unusual such fluctuations are in the course of a price review period. The size of the projected bad debt impact is also influenced by companies' approaches to manage bad debt costs efficiently and effectively.

**Figure 2 Projected scale of impacts under three illustrative scenarios**



Source: Frontier Economics analysis

### Company-specific impacts need to be considered in addition to the industry-wide impacts

In addition to the industry-wide impacts identified in this study, there are also company-specific impacts that primarily affect individual companies. These impacts may be driven by differences between companies and different paths of

<sup>3</sup> Companies submitted the data to aid our understanding of their current position at the time of the data request (responses to the data request are not regulatory submissions).

the pandemic (e.g. regional lockdowns). These impacts may be material but have not been included in our scope of work as we focused on industry-wide impacts.

### We have identified a range of opportunities

We can identify a number of opportunities that have arisen as a result of the COVID-19 pandemic. These opportunities mainly relate to adopting and trialling new ways of working and new technologies. Companies made various technological adaptations to their ways of working, with some of these adaptations proving successful. Some examples include:

- replacing existing technology such as digital meter reading processes;
- virtual home visits for supporting vulnerable customers and those with affordability issues;
- accelerating the trend towards handling customer interactions via lower cost digital channels; and
- making greater use of existing technology such as more remote working.

All of these examples may improve efficiency across the sector beyond the pandemic. It is not clear how these opportunities will affect the sector in the long-run as the effectiveness of using some new technologies is yet to be fully determined. The COVID-19 circumstances also provide an opportunity for water companies to engage with customers on topics including resilience, value-for-money and support for local communities.

### Further analysis is needed to strengthen the evidence base

This project provides an important first step in establishing the evidence base on the impact of COVID-19 on the water sector. It shows that the impacts of the pandemic are complex and there are many interactions between consumption, costs and revenue that companies must respond and adapt to. However, the results of this study are based on a preliminary dataset and, as the path of the pandemic continues to evolve, further analysis of the COVID-19 impacts is needed to ensure that future decisions are based on a strong and robust evidence base.

# 1 INTRODUCTION

## 1.1 Project objective

The COVID-19 pandemic has presented an unprecedented challenge in modern times. We have all had to adapt to living and working with the pandemic and it is clear that COVID-19 has had a significant impact on UK society and the economy. The impact of COVID-19 has varied by sector. Daily life for many has been greatly disrupted, with children being sent home from school, and thousands of workers furloughed and unable to go to work, to name just two examples. Even with high levels of government intervention, whole industries, notably tourism and hospitality, have struggled to cope.

Water companies have felt the impact of these changes in various ways, including increases in household consumption and reductions in non-household consumption as a result of the Spring lockdown. While there is some anecdotal evidence of the impact of COVID-19 on the water sector from companies and stakeholders, there is no industry-wide robust evidence base that assesses these impacts.

To address this lack of information and analysis, in May 2020 Water UK and Ofwat decided to work collaboratively to understand the impacts of COVID-19 on the water sector to date and the potential for future impacts.<sup>4</sup> The objectives of this project were to:

1. Develop a set of possible forward-looking economic, social and behavioural scenarios that capture the potential breadth of changes that could arise from COVID-19.
2. Identify the impact of the changes to date on water companies, including positive and negative impacts.
3. As far as is feasible, project forward these water company impacts, using the forward-looking scenarios developed in (1) as a framework, to test the challenges and opportunities to deliver against the PR19 settlement under these scenarios.

The scope of work focuses on the COVID-19 impacts experienced by the 17 incumbent companies that provide household retail and wholesale water and sewerage services in England and Wales and projected in our scenarios. Recommendations for Ofwat's next steps are outside of the scope of our project.

Frontier Economics was commissioned to deliver this project with support from Atkins and input from the Behavioural Insights Team. We commenced work in June 2020 and collected data from water companies in August 2020 covering the April-July 2020 time period. Companies submitted the data to aid our understanding of their current position at the time of the data request (responses to the data request are not regulatory submissions). Therefore, given the short timeframe, the data we collected was preliminary and not assured. Our findings therefore need to be interpreted with caution.

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<sup>4</sup> A summary of the scope of work has been published here: <https://www.ofwat.gov.uk/wp-content/uploads/2020/08/Economic-impact-of-Covid-19-on-the-water-sector.pdf>

## 1.2 Caveats

Our findings provide an important first step in understanding the potential impacts of COVID-19 on the water sector but need to be interpreted in the context of the following caveats:

- Even though we are now many months into the pandemic, the effects of the pandemic are still evolving and there is still a lot of uncertainty around the future path of COVID-19. As a result, the findings in this report need to be put in the context of the timing of the analysis. We developed our economic, social and behavioural scenarios in June and July 2020 and undertook the analysis of the impacts between July and September 2020. Since the analysis was undertaken, some previous unknowns (such as whether a second set of national lockdowns would be imposed and efficacy of vaccine candidates) are now clear – but many uncertainties remain.
- Our analysis of the impacts is based on data provided by water companies covering historical data on AMP6 and the first four months of AMP7 (April 2020 to July 2020 which largely corresponds to the first lockdown period). Not all companies were able to provide complete data for all the impacts we investigated. Where data was provided, the data was preliminary, not always provided in a consistent way and not assured.
- The limited time period covered by the data means that we cannot identify the long-run interactions and implications of COVID-19 impacts and opportunities. As most of the COVID-19 impacts do not occur in isolation, it would be useful to identify these nuances but this would require an assured dataset covering a longer time period.
- Our focus is on the impact of COVID-19 on the industry. While we identify impacts that are relevant for smaller groups of companies or individual companies, our main focus is on the impacts that are industry-wide. This means that the projected sector-wide impact does not account for company-specific impacts (e.g. specific penalties, rewards or impacts on costs). These company-specific impacts can be material and therefore need to be considered when assessing individual companies.
- As we cover the full range of potential impacts on the industry, it is outside our scope to provide detailed estimates of specific parameters. An example of a specific parameter is the split between the impact of COVID-19 and the weather on consumption. We have used high level estimates in our work and more detailed estimates will be available from other projects.<sup>5</sup>
- Our projections are based on illustrative scenarios developed in July 2020. These scenarios were informed by a detailed review of the macroeconomic forecasts, public health research, government guidelines and announcements, experience of COVID-19 in other countries and behavioural economics studies. The pandemic has progressed since July, with some aspects becoming clearer,

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<sup>5</sup> Artesia has been commissioned by a group of water companies and the Environment Agency to explore the split between COVID-19 and weather in detail.

but the future is still very uncertain. However, our illustrative scenarios still remain useful for considering plausible future paths for the virus, the economy and short-term and long-term behaviour change and their impacts.

Due to the limitations of our analysis, further work is needed to ensure that future decisions are based on a strong and robust evidence base. To do so, we recommend collecting further data. The data will need to be assured, comparable and granular enough to identify changes (e.g. monthly data). More information will also be needed on external factors affecting water companies, such as regional weather outturns and unemployment projections. Finally, to understand the long-term implications and interactions of impacts, more detail is required in some key areas such as the long-term impact on the supply/demand balance.

### 1.3 Structure of this report

This report is structured as follows:

- Section 2 provides a summary of the pandemic, macroeconomic and social/behavioural scenarios that we developed;
- Section 3 provides our key findings on the impacts of COVID-19 on the water sector; and
- Section 4 provides our conclusions.

## 2 SUMMARY OF PANDEMIC, MACROECONOMIC, SOCIAL AND BEHAVIOURAL SCENARIOS

We have developed a set of future scenarios to capture the possible future impacts of COVID-19 on the water sector over AMP7. To keep the number of scenarios manageable, we have integrated the following scenarios:

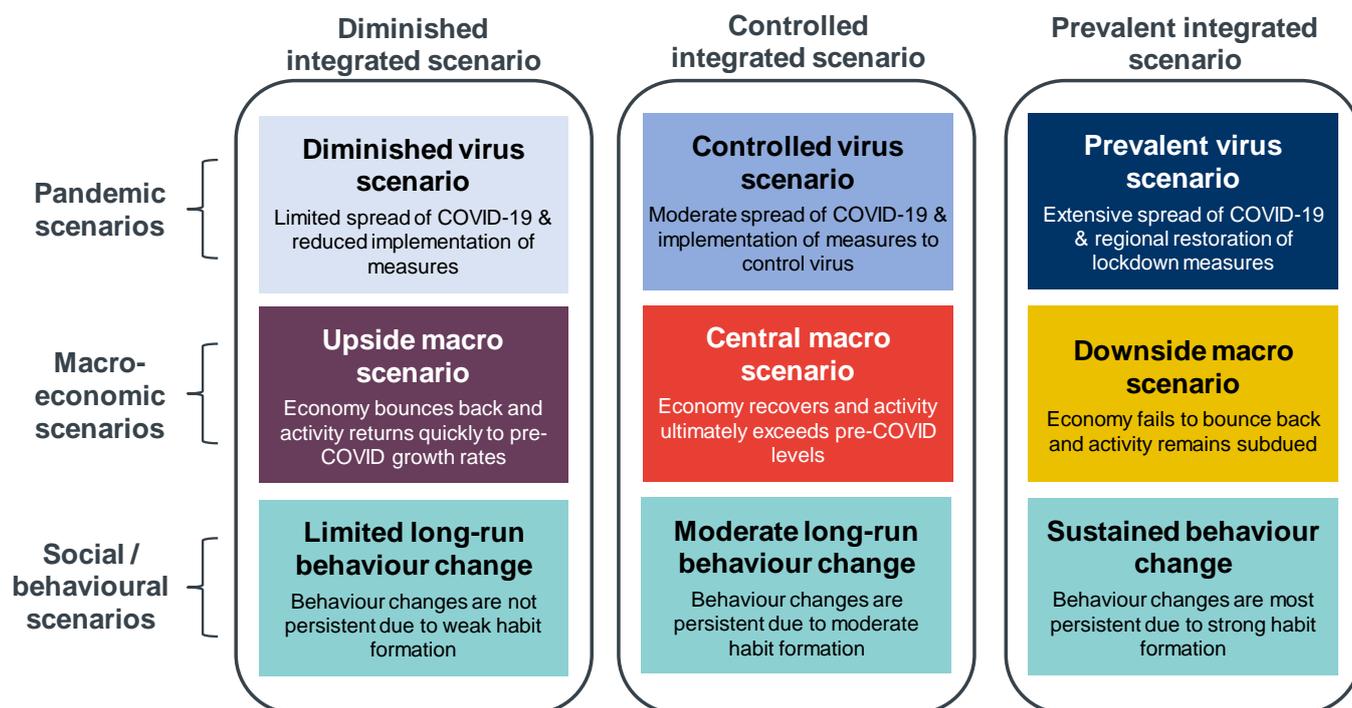
- **Three pandemic scenarios** that describe how the prevalence of COVID-19 and the associated social distancing restrictions may evolve;
- **Three macroeconomic scenarios** that are broadly aligned with the pandemic scenarios and describe how key variables such as Gross Domestic Product (GDP), unemployment and inflation may evolve; and
- **Three behavioural/social scenarios** that are aligned with the pandemic and macroeconomic scenarios and describe how customer behaviour may evolve.

The following sections describe each of the scenarios.

Figure 3 illustrates how we have combined the scenarios into one set of three integrated scenarios. In our view, these scenarios encompass a wide range of potential future paths that help illustrate the potential impact of COVID-19 on the water sector. We did not apply any likelihood judgements to the three scenarios, as all three scenarios present plausible future paths. The specific paths of COVID-19, and the macroeconomic and behavioural responses to the pandemic could take many forms which lie in-between these integrated scenarios.

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Figure 3 Summary of all scenarios



Source: Frontier

## 2.1 Pandemic scenarios

Before looking at macroeconomic and behavioural scenarios, we think it is important to consider the possible paths the pandemic may take in the future. This is because infection rates and associated social distancing and potential lockdown restrictions could affect both the economy and the public’s behaviour. To create a set of pandemic scenarios, we have used the UK Government’s alert levels that were introduced in May 2020 and are set by the Joint Biosecurity Centre.

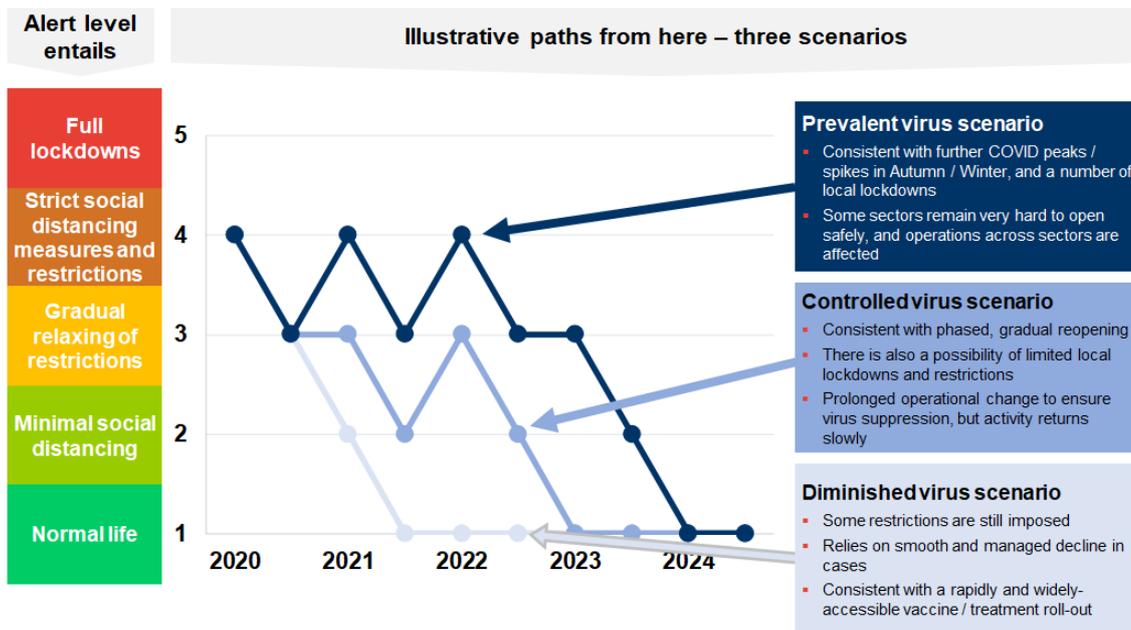
The alert levels range from 1 to 5 and relate the prevalence of the virus to different levels of social distancing and other restrictions. Alert level 5 describes a full lockdown while alert level 1 has no restrictions. In May 2020, the UK started at alert level 4, then moved down to level 3 in June 2020 before moving back to level 4 in September.<sup>6</sup>

Figure 4 summarises the three scenarios we developed in July 2020. In the **prevalent scenario** the alert level varies between 3 and 4 and this is consistent with high infection rates, strict social distancing requirements and some restrictions on specific sectors (though not necessarily a return to the strictest measures seen in the Spring of 2020). In the **controlled scenario**, the alert level varies between 2 and 3 with gradual re-opening and prolonged efforts to suppress the virus.

<sup>6</sup> Local tiered restrictions were also introduced in September, which allow for regional restrictions based on recent local case numbers and R0. A second national lockdown in England was imposed on 5 November 2020, shortly after similar action was taken in Wales. In England, tiered local restrictions were reintroduced following this lockdown, however the national alert level framework will continue to be applied by the Joint Biosecurity Centre and remains the most appropriate tool to help frame projections of material, industry-wide impacts across England and Wales.

Restrictions and social distancing requirements are less onerous than in the prevalent scenario. In the **diminished scenario**, the alert level moves down to 1 relatively quickly consistent with a widely-available vaccine. As we developed these scenarios in July 2020, the pandemic has continued to evolve and the diminished scenario appears somewhat less likely to materialise. This is due to the recent return to lockdown conditions at alert level 4, but promising clinical trial results for various vaccine candidates also suggest that an effective vaccine is likely to be developed (although with limited availability until mid-2021).

**Figure 4 Overview of pandemic scenarios**



Source: Frontier

Based on the balance of information available in July 2020, we assume that restrictions are largely removed (i.e. alert level 1) within AMP7 across all scenarios, but the prevalent and controlled scenarios take longer to get there. This does not necessarily require a vaccine but may be possible with further adaptation and management of the infection risk via track-and-trace, better treatments and embedded social distancing. As we focus on the impact of COVID-19 on the whole water sector (and across the whole UK), we did not develop detailed scenarios on local lockdowns.<sup>7</sup> The COVID-19 situation has also moved on since the scenarios were constructed in July, with aspects of vaccine development and lockdown re-imposition becoming clearer, but the scenarios remain a useful high-level framework for framing the possible range of impacts over the AMP7 horizon.

## 2.2 Macroeconomic scenarios

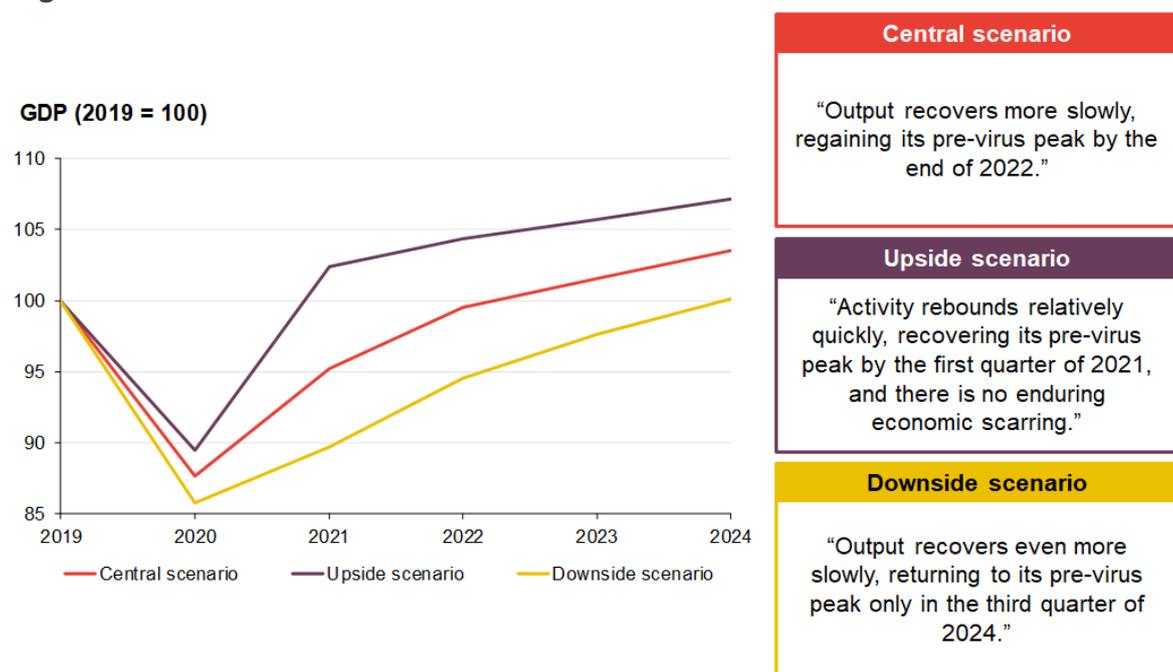
The prevalence of the virus and the associated restrictions will also have an impact on the economy, so we examined a wide range of COVID-19 macroeconomic

<sup>7</sup> Note that explicitly incorporating local lockdowns into our scenarios could have resulted in a greater variation in the sizes of company-level impacts in our projections. However, the scope of the project was to identify material, industry-wide impacts across all 17 companies in the study.

forecasts available in July 2020. We concluded that the scenarios available in the Office of Budget Responsibility Fiscal Sustainability Report (OBR FSR) were plausible and consistent with our pandemic scenarios, making them the most useful macroeconomic forecasts for the purposes of this project. The OBR’s scenarios also encompassed the range of other macroeconomic forecasts we encountered in our research, providing a wide range of the possible macroeconomic impacts of COVID-19. In addition, the advantages of using the OBR scenarios is that they provide forecast data out to 2024 and include a range of macroeconomic variables (other forecasts often only focus on GDP). OBR have made similar assumptions on the availability of Government support to individuals and business for all three scenarios.

Figures 2 to 4 provide an overview of the three GDP, unemployment and inflation scenarios. GDP and unemployment are based on the OBR. For inflation, the OBR only developed one scenario as it “assumed that the Bank’s MPC will be successful in setting policy so as to bring inflation back to target over the medium term.”<sup>8</sup> We use the OBR as the upside inflation scenario and have included two scenarios from the Organisation of Economic Co-operation and Development (OECD) as the central and downside cases for inflation. We have also included the consensus inflation forecast from the Bank of England survey of other forecasters’ expectations as an additional sensitivity.

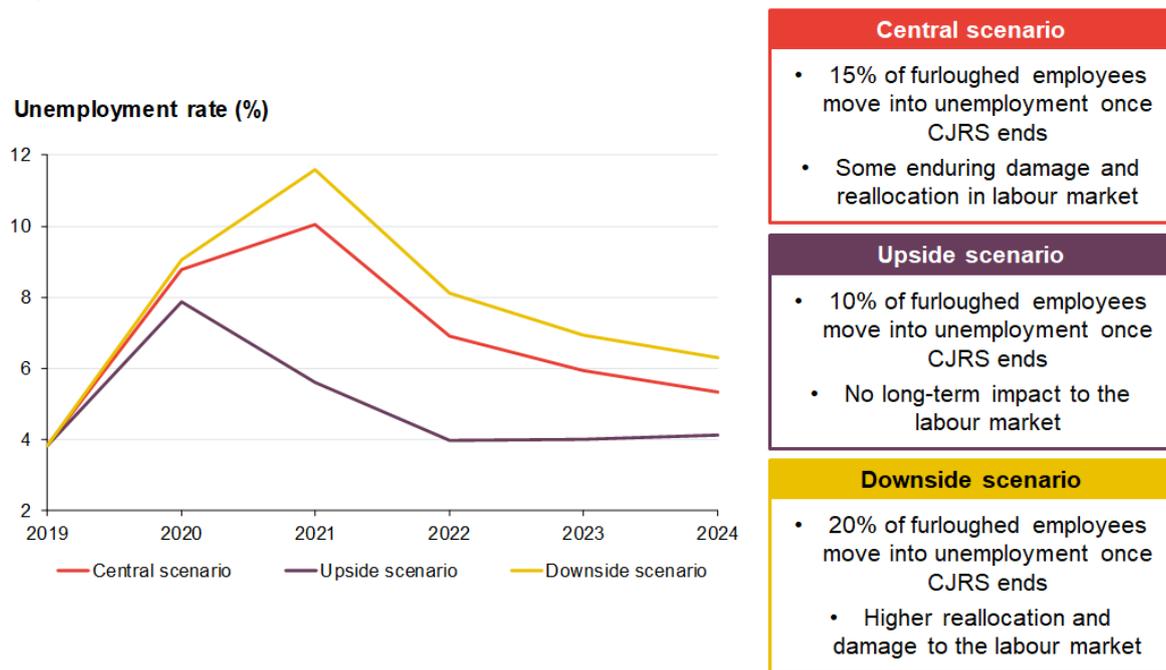
**Figure 5 Macroeconomic scenarios**



Source: Office of Budget Responsibility, July 2020, Fiscal Sustainability Outlook

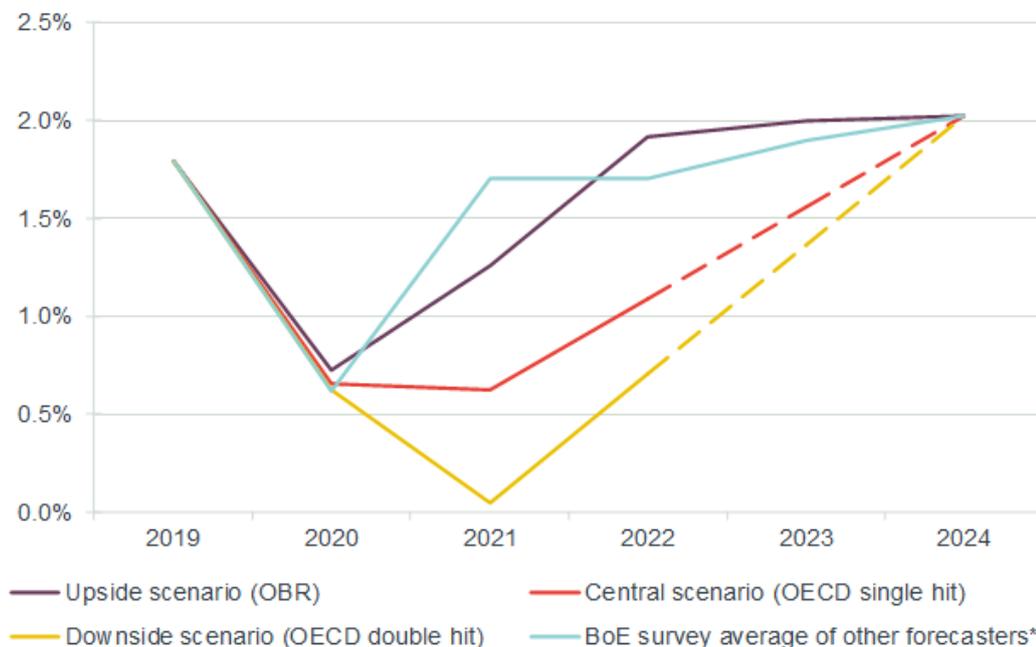
<sup>8</sup> Office of Budget Responsibility, July 2020, Fiscal Sustainability Outlook

**Figure 6 Unemployment scenarios**



Source: Office of Budget Responsibility, July 2020, Fiscal Sustainability Outlook  
 Note: CJRS – Coronavirus Job Retention Scheme

**Figure 7 Inflation scenarios**



Source: Upside inflation scenario: Office of Budget Responsibility, July 2020, Fiscal Sustainability Outlook; Downside and central inflation scenarios: OECD, June 2020, Economic Outlook; Sensitivity based on Other forecasters' expectations (average), Bank of England, August 2020, Monetary Policy Report and Financial Stability Report Annex

## 2.3 Social and behavioural scenarios

In addition to the pandemic and macroeconomic scenarios, customer behaviour changes can have a significant impact on water companies. Importantly, we need to consider not just the direct impact of the pandemic on customer behaviour but also potential longer-term shifts in behaviour that may be sustained beyond the pandemic as a result of:

- **Habit formation, supported by overcoming one-off friction** – behaviour change can be the result of overcoming one-time friction, for example installing software for videoconferencing or buying a screen to work from home. COVID-19 has been a key driver to overcome the one-time friction. This could then lead to long-term habit formation as working from home becomes the “easiest” option. An example of this are longer-term behaviour shifts that have been observed as a result of the London Tube strikes in 2014, where around 250,000 commuters that switched to walking or cycling to work continued to do so permanently after the strikes ended<sup>9</sup>.
- **Changed incentives** – permanent changes in incentives can lead to longer-term behaviour changes. For example, companies that find that workers whose productivity is unchanged when working from home may face strong incentive to save office costs.
- **Behavioural traits such as loss aversion** will influence customers’ behaviour – the extent to which customers return to pre-COVID behaviours is influenced by behavioural traits. For example, the continued saliency of the pandemic through personal experience and vivid reporting in the media may mean that customers’ perception of the risk of infection persists even if the actual risk from the virus is much diminished. This could lead to behaviour changes that sustain beyond the pandemic. For example, the International Air Transport Association (IATA) suggests that US domestic air travel was c.7% lower in the five years after 9/11 than it would have been had the attacks not occurred.<sup>10</sup>

To assess both the direct and potential long-term behaviour changes, we identified five potential behaviour changes that are related to COVID-19 shown in Figure 8 below. The figure describes each behaviour, how it is related to COVID-19, what the potential impact on the water companies may be and then discusses whether there is sufficient evidence to include the behaviour in our scenarios.

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<sup>9</sup> *Life after lockdown: an opportunity for change?* Behavioural Insights Team, June 2020, available at: <https://www.bi.team/blogs/life-after-lockdown-an-opportunity-for-change/>

<sup>10</sup> *Economics Briefing: The Impact of the 9/11 Terrorist Attacks*. IATA, May 2006, available at: <https://www.iata.org/en/iata-repository/publications/economic-reports/impact-ofsept-11th-2001-attack/>

**Figure 8 Overview of potential relevant behaviour changes**

Behaviour relevant to water company	How COVID-19 influences behaviour	Potential impact on water companies	Sufficient evidence to include in scenarios
1 Using water at home	<ul style="list-style-type: none"> <li>Working from home, school closure, retail closure, restrictions on going out</li> </ul>	<ul style="list-style-type: none"> <li>Increase in PCC changes in demand patterns</li> </ul>	<ul style="list-style-type: none"> <li>Yes – substantial evidence of long-run change in working from home</li> </ul>
2 Using more water at home	<ul style="list-style-type: none"> <li>Increase in water-intensive activities at home, e.g. gardening, paddling pool use</li> </ul>	<ul style="list-style-type: none"> <li>Potential further increase in PCC</li> </ul>	<ul style="list-style-type: none"> <li>Not as a separate impact from 1</li> </ul>
3 Flushing and putting things down the drains that shouldn't go there	<ul style="list-style-type: none"> <li>Toilet paper shortage leads to use of alternative products</li> </ul>	<ul style="list-style-type: none"> <li>Increased sewer blockages</li> </ul>	<ul style="list-style-type: none"> <li>No – limited evidence available to include as a specific scenario</li> </ul>
4 Paying more attention to water	<ul style="list-style-type: none"> <li>Changed context as a result of spending more time at home</li> </ul>	<ul style="list-style-type: none"> <li>Changing customer views and preferences</li> </ul>	<ul style="list-style-type: none"> <li>No – mixed evidence as impact working in multiple directions</li> </ul>
5 Not paying water bill	<ul style="list-style-type: none"> <li>Changed employment situation and expectation of water company support</li> </ul>	<ul style="list-style-type: none"> <li>Increased bad debt</li> </ul>	<ul style="list-style-type: none"> <li>Not included as behavioural scenario but linked to unemployment</li> </ul>

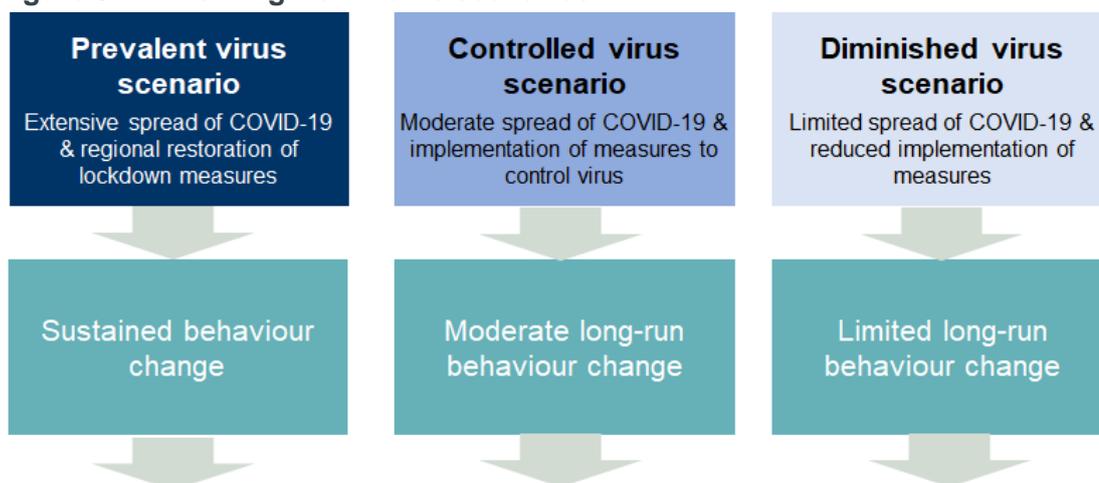
Source: Frontier

While each of the behaviours have the potential to have a significant impact, we only include specific scenarios for the first behaviour “using water at home”. This is because a substantial evidence base exists that supports the inclusion of potential longer-term changes in this behaviour in our scenarios. As closures of schools and retail are less likely on the future, we focus on research on the proportion of people working from home.

Based on a literature review, we have identified three scenarios that describe the extent to which the increase in the level of working from home observed under strict lockdown (such as the one seen in April-June 2020) will be sustained in the long run. Figure 9 describes these scenarios. One of our key findings is that working from home is not likely to be a binary decision (e.g. work from home all the time or not at all) but our research suggests that a mix of working from home and in the office is most likely.<sup>11</sup> This is why we have include some retention of the change in working from home in all scenarios. In our view, a larger proportion of the increase is likely to be retained in the prevalent pandemic scenario where restrictions are in place for longer.

<sup>11</sup> Some of the most relevant research has been conducted by Nicholas Bloom at Stanford University: <https://siepr.stanford.edu/research/publications/how-working-home-works-out>

**Figure 9 Working from home scenarios**



**WFH scenarios relative to Apr-20 - Jul-20 peak**

	Aug-Dec 2020	2021	2022	2023	2024
Controlled	50%	50%	30%	30%	30%
Diminished	50%	15%	15%	15%	15%
Prevalent	100%	100%	50%	50%	50%

Source: Frontier

Notes: Percentages in WFH scenarios represent the % of the increase in WFH levels seen in the lockdown of Spring 2020 that continues in a given year. For example, under the Controlled scenario: in 2021 half of the increase in working from home during the initial lockdown (April-July 2020) persists.

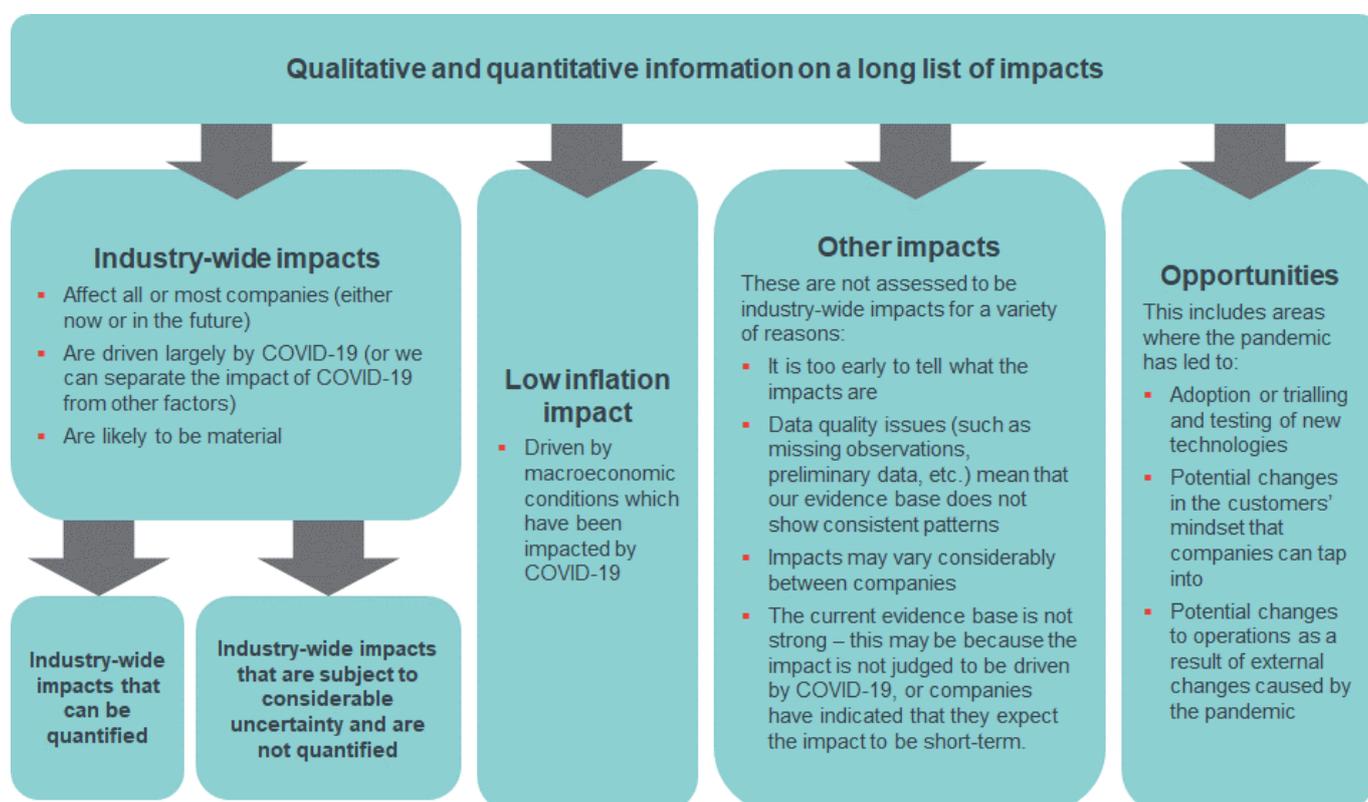
### 3 THE IMPACTS OF COVID-19 ON THE WATER SECTOR

Our analysis of the impacts of COVID-19 on the water sector is based on an independent assessment of two rounds of data collection. The first data request (completed in May and June 2020) asked the 17 incumbent water companies to identify how COVID-19 is affecting their businesses. This provided a valuable starting point for developing a second, more detailed data request that covered:

- Qualitative and quantitative information on more than 80 potential impacts;
- Monthly and quarterly data for April 2020 to July 2020 as well as historical data for comparison;
- All areas of water companies’ operations including costs, finance, Performance Commitments (PCs) and associated Outcome Delivery Incentives (ODIs); and
- Impacts that have already been felt as well as expected impacts.

We have combined our analysis of the data provided by water companies with the scenarios discussed in Section 2 to estimate industry-wide impacts and other impacts. Figure 10 below summarises the different categories of impacts that are further explained in this section.

**Figure 10 Overview of different categories of impacts**



Source: Frontier

## 3.1 Industry-wide impacts

Based on our analysis of the evidence provided by companies, we have identified 19 industry-wide impacts that:

- affect all or most companies (either now or in the future);
- are driven largely by COVID-19 (or we can separate the impact of COVID-19 from other factors); and
- are likely to be material.

Industry-wide impacts split into two further groups. In the first group are 10 impacts where the information is sufficient to estimate a magnitude and project impacts forward. However, the results of this analysis need to be interpreted with caution as they are subject to the limitations discussed in section 1.2. We refer to these as material industry-wide impacts. In the second group are 9 impacts where there is still considerable uncertainty but these have the potential to affect all companies. We refer to these as potential industry-wide impacts.

### 3.1.1 Overview of material industry-wide impacts

We have grouped the material industry-wide impacts into three categories, depending on the key driver.

#### Impacts driven by shifting consumption from non-household to household

COVID-19 has led customers to spend more time at home and less time in workplaces, hospitality venues, etc. The magnitude of this has varied. At the height of the national lockdown in Spring schools, restaurants, pubs and retail shops were closed, many employees were furloughed and the Government encouraged everyone to work from home if possible. Travel restrictions were also in place so people could not go on holiday or travel to visit family and friends. This meant that customers spent most of their time at home. More recently, we have seen different levels of restrictions in different parts of the UK, and restrictions have also changed over time with a new national lockdown in England imposed from 5 November 2020, shortly after similar action was taken in Wales. Nevertheless, all of the restrictions encourage people to spend more time at home.

As a result of customers spending more time at home and less time in non-household venues, we can observe:

- **An increase in household consumption** – almost all companies experienced a significant increase in household consumption over the April-July 2020 period. This was a result of the combination of the COVID-19 restrictions and the hot weather. In line with the location of household and non-household consumption, this meant that the location of demand has changed.<sup>12</sup>
- **A decrease in non-household consumption** – all companies that provided data experienced a significant reduction in non-household water consumption

<sup>12</sup> This could have implications regarding supply and demand balance, system resilience and the need for local investments. We received preliminary evidence on these wider impacts and have not been able to establish these impacts in detail. Further work is needed to understand these longer-term impacts.

over the April-July 2020 period. Non-household customers in the 0.5-50MI per year usage category (representing relatively low usage customers such as high street retailers) saw the biggest reduction.

- **An increase in non-household voids** – while data comparability issues mean that it is difficult to differentiate temporary vacant flags<sup>13</sup> from businesses that are permanently closed in the data we received, there is a clear increase in non-household voids for the majority of companies. As temporary vacant flags had to be removed by the end of September 2020 more recent data will provide information on the scale of businesses that are permanently closed.
- **An increase in household revenue** – revenue from metered household customers has increased as a result of increased demand. Revenue from unmetered households is unchanged in the short-run. As a result, companies with comparatively more metered customers will see a greater increase in household revenue in the short-term. While increased household consumption will lead to increased household revenue from metered customers, it may also drive bad debt (see discussion of the bad debt impact below). However, the impact on revenue in the short-run needs to be interpreted with caution as a result of the difficulties around meter reading during the lockdown.
- **A decrease in non-household consumption and revenue** – all companies experienced a significant reduction in non-household consumption and revenue over the April-July 2020 period. Aligned with reductions in consumption, the biggest fall can be observed in the non-household customers in the 0.5-50MI per year usage category. In addition to changes in consumption, increases in non-household voids also contribute to the reduction in revenue from non-households. Closed businesses may also drive unemployment and bad debt, however this is discussed later as an impact driven by macroeconomic factors.
- **Increase in per capita consumption (PCC)** – almost all companies saw a material increase in PCC over the April-July 2020 period. Some of the increase in household consumption and PCC has been driven by the hot weather in spring. There are also interactions between the warm weather and the COVID-19 restrictions. For example, families with young children that were not at school were more likely to use a paddling pool in warmer weather which increased water usage. Specific research is currently underway to distinguish the weather impact from the COVID-19 impact<sup>14</sup>. Overall, we observe that at least some of the increase in PCC is driven by the restrictions caused by COVID-19. This impact is relevant as all companies have outcome delivery incentives (ODIs) around the performance commitment (PC) levels of PCC.
- **Increase in water production costs** – almost all companies experienced an increase in the total amount of water entering the system. This is because the increase in household demand more than offset the reduction in non-household demand. As a result, water production costs have increased over the April-July

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<sup>13</sup> This means that non-household retailers can temporarily identify a property as vacant for the purposes of billing.

<sup>14</sup> Artesia has been commissioned by a group of water companies and the Environment Agency to explore the split between COVID-19 and weather in detail.

2020 period. As for changes to PCC, this is likely to be a result of a combination of COVID-19 and the weather.

Combining the effects that we can observe over the April-July 2020 period with the scenarios presented in section 2, all of these impacts are likely to persist to a certain extent while COVID-19 is prevalent and some impacts may be sustained in the long-run as a result of behaviour shifts towards working from home. The magnitude of the persistent impacts depends on the path of the pandemic and the size of the long-term behaviour shift. This is reflected in our scenarios discussed in Section 2.

### Impacts driven by social distancing rules

To reduce infection rates, the UK Government has introduced various social distancing rules such as keeping 2 metres distance where possible. This has led to two key impacts on water companies:

- **Decrease in travel and discretionary expenditure** – Due to social distancing requirements, meetings and conferences were moved online where possible and this also reduced the need for travel, venue hire, etc. All companies reported reductions in this expenditure category compared to budgets, and a proportion of this reduction in spend may continue beyond the pandemic due to the opportunities provided by increased WFH behaviour. We have applied the behavioural scenarios to this item.
- **Increase in health & safety expenditure** – to make sure that workplaces are COVID-secure, water companies had to purchase additional equipment such as hand sanitiser, personal protective equipment, etc. This is particularly relevant where the minimum social distance of 1-2 metres cannot be observed. All companies saw increases in this expenditure category when compared to the budget. While some of these costs may decline over time as increased supply leads to lower prices or one-off purchases have been made, the data showed a consistent pattern over the four months.

Both of these impacts are directly related to the pandemic scenarios discussed in section 2.1. The magnitude of these impacts will be higher in the prevalent pandemic scenario and lower in the diminished scenario.

### Impacts driven by macroeconomic scenarios

The restrictions imposed as a result of COVID-19 have led to a sharp reduction in GDP and so far we have seen a slow recovery. The macroeconomic scenarios discussed in section 2.2 demonstrate how COVID-19 is expected to affect the economy.<sup>15</sup> This effect on the economy leads to three main impacts on water companies:

- **Increase in costs of nominal embedded debt** – companies hold a significant proportion of their debt as fixed nominal embedded debt. The regulatory methodology set company revenue allowances based on a forecast of the real

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<sup>15</sup> Note that the macroeconomic scenarios were developed by the relevant institutions around July 2020, and as such do not capture more recent developments. Nonetheless they provide a guide as to how different rates of recovery will affect the ultimate impact of COVID-19 on the water industry.

cost of debt. This means that a reduction in inflation increases the real cost of fixed nominal embedded debt relative to that forecast. Section 2.2 provides various inflation scenarios and shows that all scenarios are lower than the 2% targeted by the Bank of England. The inflation projections used to assess the low inflation impact were developed by reputable institutions at the time of the analysis but are subject to change depending on new information, and external factors such as Brexit. Water UK agrees with this approach. Ofwat has suggested that more evidence is needed on what the nature of the link between COVID-19 and the level of inflation is, what that quantum might be and how unusual such fluctuations are in the course of a price review period.

- **Increase in bad debt** – While the quantitative evidence does not point directly towards a significant reduction in collection rates to date, we project that higher unemployment will increase bad debt. The unemployment scenarios in section 2.2 show that unemployment is expected to increase considerably across all three macroeconomic scenarios, and historical precedent from the global financial crisis in 2008 indicates a clear relationship between unemployment and bad debt.
- **Increase in social tariffs** – to manage increasing bad debt as a result of higher unemployment, the number of people on social tariffs is likely to increase. Some companies have already seen higher demand for social tariffs.

All of these impacts depend on how the macroeconomic situation evolves over AMP7. These impacts have not been directly identified in quantitative responses from companies, but are reported in qualitative responses and the actual impacts will be driven by macroeconomic outturns.

### Potential overall impact on customers

The pandemic has had a big impact on water customers' daily lives, with children being sent home from school, and thousands of workers furloughed and unable to go to work, to name just two examples. COVID-19 has also impacted water sector customers significantly, with social distancing requirements impacting non-household customers and causing many household customers to spend more time at home. This has led to a marked shift from non-household to household consumption, which is likely to have an impact on future tariffs and bills as: Household customers consume more water so metered customers' bills increase (even if tariffs are constant);

- Household tariffs may need to adjust as:
  - Increases in revenue from household customers is limited in the short run by the proportion of customers that are unmetered;
  - Decreases in revenue from non-household customer in the short run are not limited in the same way as almost all non-household customers are metered.

As companies are subject to a fixed revenue control, this means that any short-run shortfall in revenue will likely lead to adjustments in tariffs. The exact nature of the changes depend on outturn future revenue and how companies decide to balance different tariffs.

- Potential increases in social tariffs to support customers affected by the macroeconomic impacts of COVID-19 may also affect overall tariffs and bills.

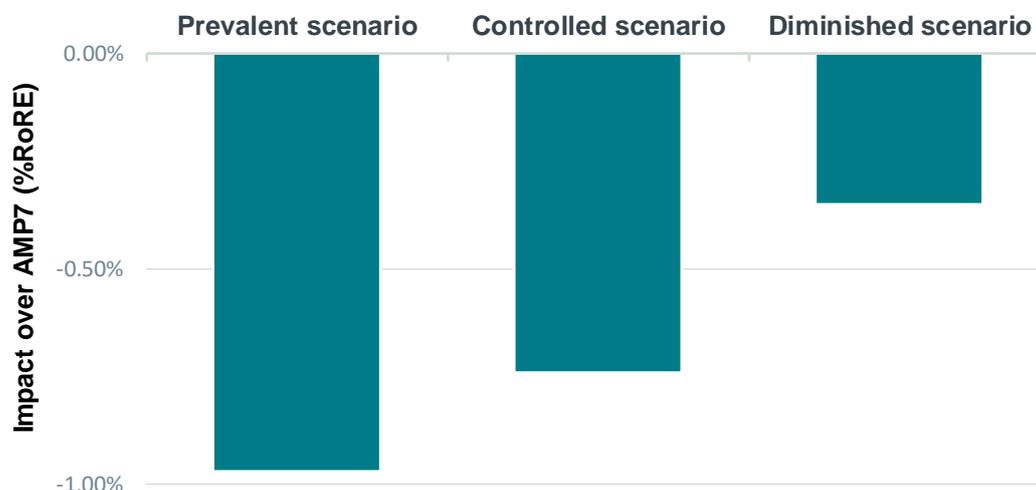
This raises a number of regulatory and policy issues, particularly in the context of increasing unemployment following COVID-19.

In addition, customers have also experienced different ways of engaging with their water companies due to social distancing requirements. While this may have led to reduced engagement in the earlier stages of lockdown due to the unprecedented nature of the crisis, water companies have adapted. For example, this includes innovative online solutions for meter reading and a move to virtual engagement with school children.

### 3.1.2 Magnitude of material industry-wide impacts under different scenarios

We have projected the impacts of COVID-19 on the water sector under three different scenarios discussed in section 2. Our projections take account of Ofwat’s draft reconciliation rulebook. We find that the impact over AMP7 on the industry ranges from -0.35% to -0.97% when measured as the change in the return on regulated equity (based on notional gearing). While this provides a high level estimate of the impact on the industry under different scenarios, the specific impacts on each company vary considerably as a result of local circumstances.

**Figure 11 Projected scale of impacts under three illustrative scenarios**



Source: Frontier Economics analysis

In all scenarios, the impact of low inflation on the real cost of nominal embedded debt is projected to be the biggest impact. It makes up more than half of the total impact. The magnitude depends on the inflation forecast scenario but the impact is material under all scenarios. This highlights the importance of inflation when considering the impacts of COVID-19 on the water sector. The inflation projections used to assess the low inflation impact were developed by reputable institutions at the time of the analysis but are subject to change depending on new information, and external factors such as Brexit. Water UK agrees with this approach. Ofwat has suggested that more evidence is needed on what the nature of the link

between COVID-19 and the level of inflation is, what that quantum might be and how unusual such fluctuations are in the course of a price review period. In all scenarios, the second largest impact is the potential increase in bad debt. It makes up between a quarter and a third of the total impact. The magnitude of this impact depends on how the economy evolves and how bad debt changes as a result of higher unemployment. This shows how important it is for companies to effectively and efficiently manage bad debt and for the industry to consider the role that social tariffs can play.

The other industry-wide impacts are of a smaller magnitude but can be significant for individual companies.

We have undertaken a range of sensitivity tests and the overall results are most sensitive to changes in the inflation forecast and the bad debt elasticity. This is expected as these are the two largest impacts.

### 3.1.3 Potential industry-wide impacts

There are a number of potential industry-wide impacts that are still subject to uncertainty for various reasons:

- **Annual Survey for Hours and Earnings (ASHE) true up** – the PR19 price control includes a true-up mechanism for real price effects at the end of the price control. The labour cost adjustment is based on the hourly manufacturing wages as part of the ASHE index published by the Office for National Statistics (ONS).<sup>16</sup> This mechanism adjusts a proportion of company costs in line with economy-wide inflation in manufacturing. COVID-19 and the resulting government policies for job support could lead to a disconnect between the labour cost pressures experienced in the water sector and the labour cost growth measured by the ASHE index. Reasons for this disconnect may include:
  - It is currently unclear how the ONS will reflect government support for wages such as the Coronavirus Job Retention Scheme or the Job Support Scheme in the ASHE index.
  - It is also unclear how job losses in manufacturing might impact on the ASHE index.
- **Capital programmes** – all companies that provided data had to either delay or re-prioritise their capital programmes for AMP7. This was mainly driven by social distancing rules as programmes and processes had to be adapted to comply with guidance. At the time of data collection (August 2020), there was no strong expectation that the impacts could not be mitigated across AMP7. However, reprioritising and rephasing can have significant impacts on companies with regard to project-specific PCs and meeting PC targets. Companies also identified a second wave, strict lockdown and changing/more stringent rules as key risks that could mean that “catch-up” in later years cannot be achieved.

<sup>16</sup> Manufacturing wages were chosen by Ofwat as a good reflection of wage pressure in the water sector given the similar skills sets and labour markets.

- **Developer services costs and grants and contributions** – all companies saw a reduction in developer services costs as well as grants and contributions over the April-July 2020 period. The monthly patterns we observe indicate that by July activities had recovered and were close to pre-COVID levels. At the time of data collection (August 2020), most companies expected that activities would “catch-up” and did not expect an impact over AMP7. Clearly this will depend on the future path of the pandemic.
- **Meter reading costs** – meter reading costs fell over the April-July 2020 period as companies adapted to social distancing requirements. However, meter reading costs recovered close to pre-COVID levels by July 2020. Reductions in meter reading costs are not likely to persist as companies mitigate and adapt to social distancing requirements. However, some innovations and adaptations may have an impact on long-run costs, such as increased self-service meter readings using online portals or via apps, but these are currently still uncertain.
- **Ability to engage with 3<sup>rd</sup> parties to deliver PCs** – social distancing rules meant that companies could not use their usual methods of engagement with third parties such as school children, farmers, communities, etc. Engagement has been moved online where possible but this may not be aligned with the definition of company-specific PCs. It is also not clear how effective online engagement will be in delivering the required outcomes, or how much it might cost to do so. This impact does not affect common PCs but a range of company-specific PCs.
- **Number of customers on the priority service register (PSR)** – some companies have increased the growth in the PSR register over the April-July 2020 period and some of this was driven by COVID-19 as large groups of the population were identified as vulnerable (e.g. advice to over 70-year-olds on shielding in spring 2020). It is not clear how COVID-19 will continue to affect PSRs as the observed increases may have been one-off changes. This will also depend on how COVID-19 affects the definition of who is vulnerable.
- **C-MeX** – C-MeX is a relative performance measure so as long as all companies are affected in the same way, there is no industry-wide financial impact. There is mixed qualitative evidence on the impact of COVID-19 on customer satisfaction. However, if local lockdowns mean that some customers are subject to much tighter restrictions than others for prolonged periods of time, this could have a disproportionate impact on satisfaction for some companies. This could raise fairness issues. Further evidence would be required to establish this impact.<sup>17</sup>

## 3.2 Other impacts

Other impacts are those that have not been included in the industry-wide category for various reasons including:

- It is too early to tell what the impacts are.

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<sup>17</sup> The cross-sector threshold of customer satisfaction required for companies to receive higher performance payments may also be affected if the water sector is more/less impacted by COVID-19 than other sectors.

- Data quality issues (such as missing observations, preliminary data, etc) mean that our evidence base does not show consistent patterns.
- Impacts may vary considerably between companies. These impacts may be driven by exogenous differences between companies and different paths of the pandemic (e.g. regional lockdowns). These impacts can be material but have not been included in our scope of work as we focused on industry-wide impacts.
- The current evidence base for the particular impact is not strong. This may be because the impact is not judged to be driven by COVID-19, or companies have indicated that they expect the impact to be short-term.

This does not mean that individual companies cannot experience significant impacts from COVID-19 in these areas but there is not sufficient evidence to include these impacts in the industry-wide group. These include:

- **Other cost impacts** – we have analysed impacts on all of the annual return cost categories but have not observed industry-wide patterns in the data covering April to July 2020.
- **Specific cost impacts** – we have analysed a number of specific potential cost impacts (e.g. energy costs, disruption to supply chain, etc) but these do not show industry-wide changes when analysing data covering April to July 2020.
- **Impacts on other PCs and ODIs** – while there are clearly COVID-19 impacts on other PCs and ODIs for specific companies, we have not observed industry-wide impacts that are comparable to the impact on PCC, voids or social tariffs. The same applies to impacts on PCs and ODIs that are bespoke to individual companies.
- **Longer-term supply and demand impacts** – the changes in consumption could lead to significant impacts on the long-term supply and demand balance, which may put extra stress on particular parts of the water network. The data we received on water resource zones was not sufficient to establish the impacts.
- **Other finance impacts** – we considered a range of other finance impacts but have not identified other industry-wide impacts. For example, we analysed whether the cost of new debt is now lower but have not assessed this to be an industry-wide impact as the impact of the pandemic was temporary and Ofwat's methodology includes a reconciliation mechanism.
- **Productivity impacts** – there are a number of COVID-19 related changes such as increased working from home, greater use of technology, etc that could increase or decrease productivity. At this stage, there is still considerable uncertainty on the net impact in the longer-run.

### 3.3 Opportunities

In addition to the positive and negative impacts of COVID-19 that we can observe, we have identified the key opportunities that have arisen as a result of the pandemic. These have the potential to increase efficiency in the longer-term but as a lot of the opportunities are related to using new technologies this is likely to require some time for trial, error and learning.

We have identified the following opportunities:

- **Innovative solutions for meter inspections** – one company has reported using WhatsApp video messaging for meter inspections. Others have used self-reporting. COVID-19 has meant that companies had to experiment with alternative ways of meter reading and depending on whether different approaches prove to be reliable in the long-run this presents opportunities to save costs.
- **Productivity gains as a result of working from home** – while the debate around whether working from home increases or decreases productivity is ongoing, there is an opportunity to use working from home selectively in the future (post-pandemic) and therefore increase productivity. This could also save office space in the long-run.
- **Online engagement with stakeholders** – companies had to use alternative methods to engage with farmers, schoolchildren and other stakeholders. This has generally led to an increase in the quantity of engagement but has in some cases reduced quality (due to teething issues or lack of in-person engagement). Nevertheless, online engagement could be an important complement to face-to-face engagement in the future and increase water companies' reach.
- **Testing of new technologies** – using technologies such as robotics and artificial intelligence for virtual water inspections could lead to efficiency gains in the future. COVID-19 has led companies to investigate and trial how the technologies could be used.
- **Reduced congestion** – traffic levels dropped significantly during the Spring lockdown but have since recovered in most places. However, longer-term behaviour shifts towards working from home may change traffic patterns and therefore could reduce travel times and improve road access in the long-run.
- **Working from home could increase customers' receptiveness to water efficiency initiatives** – while it is not clear that customers are more or less interested in water saving initiatives during the pandemic, companies could explore whether a longer-term shift towards working from home may increase awareness of water usage and willingness to engage with companies.
- **Opportunities for customer engagement on specific topics** – The pandemic may provide an opportunity to engage with customers on a range of topics including resilience (low probability events are more present in people's minds), value-for-money (in the context of water being an essential service) and the options and plans for local communities (as customers spend more time at home and in their local communities). All of this could be framed in the context of water being an essential service as awareness is likely to be higher during the pandemic.

## 4 CONCLUSIONS

### We can identify a clear set of industry-wide impacts

Material industry-wide impacts for which we have sufficient information to estimate a magnitude include:

- **Impacts driven by shifting consumption from non-household customers to household customers** as a result of increased working from home, furlough, school closures, etc:
  - Increase in HH consumption and revenue, decrease in NHH consumption and revenue
  - Increase in PCC; and
  - Increase in water production costs.
- **Impacts driven by social distancing rules:**
  - Decrease in travel and discretionary expenditure; and
  - Increase in health & safety expenditure.
- **Impacts driven by macroeconomic scenarios<sup>18</sup>:**
  - Increase in real costs of nominal embedded debt costs as a result of low inflation;
  - Increase in bad debt; and
  - Increase in the number of people on social tariffs.

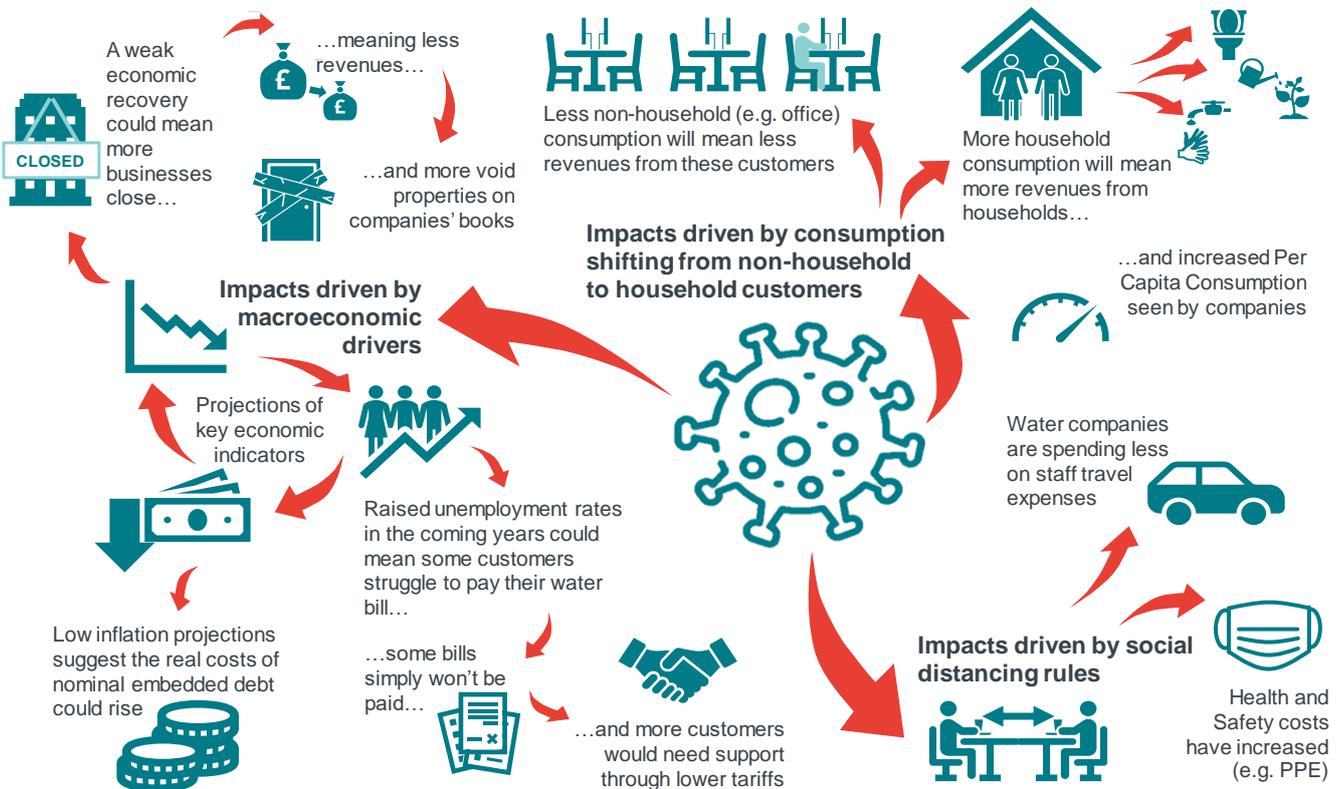
There are a number of other potential industry-wide impacts that have a higher degree of uncertainty. As a result of the combined impact higher household demand, lower non-household demand and increases in social tariffs, tariffs and bills are likely to change. This raises a number of regulatory and policy issues, particularly in the context of increasing unemployment.

Figure 12 illustrates some of the key impacts and key drivers.

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<sup>18</sup> These impacts have not been directly identified in quantitative responses from companies, but are reported in qualitative responses and inferred from past precedents and the macroeconomic downturns projected across all three scenarios. The actual impacts will be driven by macroeconomic outcomes.

Figure 12 Impact of COVID-19 on the water sector



Source for COVID-19 icon: [www.flaticon.com](http://www.flaticon.com)

The magnitude of the impacts depends on the future path of the pandemic but the two largest impacts are the same in all scenarios

We have projected the impacts of COVID-19 on the water sector under three different scenarios discussed in section 2. Our projections take account of Ofwat’s draft reconciliation rulebook. We find that:

- The impact in the diminished scenario is about half of the impact in the controlled scenario; and
- The impact in the prevalent scenario is about one third larger than the impact in the controlled scenario.
- In all scenarios, the impact of low inflation on the real cost of nominal embedded debt is the biggest impact and makes up about half of the impact. We note that the inflation projections used to assess the low inflation impact were developed by reputable institutions at the time of the analysis but are subject to change depending on new information, and external factors such as Brexit. Water UK agrees with this approach. Ofwat has suggested that more evidence is needed on what the nature of the link between COVID-19 and the level of inflation is, what that quantum might be and how unusual such fluctuations are in the course of a price review period. The second largest impact is the potential

increase in bad debt which makes up between a quarter and a third of the total impact. The other industry-wide impacts are of a smaller magnitude but can be significant for individual companies.

- The overall results are most sensitive to changes in the inflation forecast and the bad debt elasticity. This is expected as these are the two largest impacts.

### The impacts on specific companies vary considerably

The magnitude of the industry-wide impacts vary from company to company and depends on a range of factors including:

- Companies that have seen particularly large shifts from non-household consumption to household consumption are likely to experience bigger changes in PCC, water production costs and revenue. At the same time, companies that have seen smaller reductions in non-household consumption and smaller increases in household consumption are likely to experience smaller impacts on PCC, water production costs and revenue.<sup>19</sup>
- Companies with a larger/smaller proportion of fixed nominal embedded debt will experience a bigger/smaller impact from the reduction in inflation.
- Companies with larger/smaller increases in unemployment and/or a greater/smaller elasticity of bad debt to unemployment are likely to experience bigger/smaller impacts. Companies' ability to manage bad debt will influence the magnitude of bad debt.

In addition to the industry-wide impacts, we have identified a number of other impacts. Some of these clearly affect individual companies but there is not sufficient evidence to establish an industry-wide impact. This means that the overall impact on individual companies may include a wider set of impacts.

### COVID-19 has created some opportunities

The key opportunities are related to using new technologies. COVID-19 has led companies to adopt, trial and test new technologies and channels for a range of operational issues such as meter reading, engagement with stakeholders and employee collaboration while working from home. These technologies have the potential to reduce costs in the long-run but are likely to require a period of trial, error and learning.

In addition, the pandemic may provide an opportunity to engage with customers on a range of topics including resilience (low probability events are more present in people's minds), value-for-money (in the context of water being an essential service) and the options and plans for local communities (as customers spend more time at home and in their local communities).

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<sup>19</sup> Note that non-household consumption also includes water-intensive industries which vary across different companies.

### The pandemic is evolving and further evidence will need to be collected to monitor the ongoing impacts

This project provides an important first step in establishing the evidence base on the impact of COVID-19 on the water sector. It shows that the impacts of the pandemic are complex and there are many interactions between consumption, costs and revenue.

As our analysis is based on preliminary data that covers the April-July 2020 period, further work is needed to ensure that future decisions are based on a strong and robust evidence base. Due to the limitations of our analysis, further work needs to be based on assured, comparable and granular data (e.g. monthly data). More information would also be needed on external factors affecting water companies, such as regional weather outturns and unemployment projections. Finally, to understand the long-term implications and interactions of impacts, more detail is required in some key areas such as the long-term impact on the supply/demand balance.

