SRN31 Lead
Enhancement Business Case

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Version 1.0

from Southern Water

Contents

List of Tables and Figures

Glossary

Acronym	Term	Definition
AMP	Asset Management Period	Water company business plan
	Catchment	The area from which rainfall and groundwater would naturally collect and join the flow of a river
	Central Area	Supply area made up of the Sussex North, Sussex Brighton and Sussex Worthing Water Resource Zones
DWI	Drinking Water Inspectorate	The government's drinking water quality regulator
	Eastern Area	Supply area comprising the Kent Thanet, Kent Medway East, Kent Medway West and Sussex Hastings Water Resource Zones
EA	Environment Agency	The government's environmental regulator
Ofwat	Office of Water Services	The economic regulator of the water sector in England and Wales
WRMP	Water Resource Management Plan	A plan setting out how we intend to achieve a secure supply of water for our customers and a protected and enhanced environment.

Executive Summary

We need to invest in lead pipe replacement during AMP8. This will help enable our 'Lead Free Network' by 2050. This business case sets out how we will manage and reduce lead risk for our customers in AMP8 whilst learning more about the costs and challenges with lead replacement programmes.

The removal of lead pipework is supported by the DWI however decision letters have not yet been issued to Water companies. Once informed about the dangers of lead in water supplies, our customers support the removal of lead pipes.

Our planned investment to address lead risk in AMP8 breaks down into three broad areas as follows:

1. Reactive lead replacement – £1.4m (we consider this is funded through base expenditure)
2. Reducing lead in public buildings – £1.2m (funded through Water Quality enhancement)
3. Reducing lead in customers' supplies – £2.5m (funded through WRMP and Water Quality enhancement)

Every AMP we reactively discover and replace around 300 lead communication pipes through water quality and leakage work. This work is funded through our botex allowance, the costs for this work are therefore excluded from this enhancement funding request.

We are proposing to replace lead in 200 public buildings during AMP8. The level of activity undertaken will provide learning opportunities to improve our understanding of the best approach to targeting lead pipe removal. These learnings will enable us to meet our long-term ambitions for lead removal.

We are planning to replace 300km of water mains during AMP8. When replacing mains, we shall also replace all connected communication pipes. Where these are found to be lead, we will take the opportunity to replace any customer lead supply pipes, the cost of which is part of this claim. Both the location and quantity of pipes to be replaced will change as the WRMP is updated and finalised.

We have ensured our unit costs for lead pipe replacement are efficient by using the latest available data to benchmark and inform our proposed costs.

Table 1: Summary of enhancement case

Summary of Enhancement Case for Lead replacement	
Name of Enhancement Case	Water Quality Enhancements – Lead reduction
Summary of Case	This Business Case addresses: • How we will reduce lead risk for our customers
Expected Benefits	• Reduced customer lead risk
Associated Price Control	Water Networks+

Enhancement TOTEX	£2.337m
Enhancement OPEX	£0m
Enhancement CAPEX	£2.337m
Is this enhancement proposed for a direct procurement for customer (DPC)?	No The value threshold is not met by this investment

1. Introduction and Background

This business case sets out the enhancements required to reduce the lead risk in our network during AMP8. The removal of lead pipework is supported by the DWI however decision letters have not yet been issued to Water companies. Our customers do not know much about the dangers of lead pipes, but once informed, they express concern regarding the impact on children and support the removal of lead pipes. Informed customers rank lead as a 'top 3 priority', because of concerns over health and safety. For further information on our customers' priorities see technical annex SRN14: Customer Insight, Section 1, Index: 178 - Deal Lead Pipes Key Findings Report - Mar '22.

Our planned spend on lead removal breaks down into three broad areas as follows:

1. Reactive lead replacement – £1.4m (funded through Botex allowance)
2. Reducing lead in public buildings – £1.2m (funded through Water Quality enhancement)
3. Reducing lead in customers' supplies – £2.5m (funded through WRMP and Water Quality enhancement)

Delivery of this work will reduce water quality risk to customers. This work will also allow us to better understand the costs and challenges associated with removing lead from our water supply network, in pursuit of our 'Lead Free Network' by 2050.

This investment relates to the continuation of our Lead Risk Reduction Strategy, which aims to reduce the risks to customers from lead in our supply network. Although the installation of lead pipework ceased around 1970, there are still significant amounts of it present in water supply networks throughout the UK. We estimate that at the end of AMP7, we will have c125,000 lead communication pipes still in operation. In addition, our customers also have external lead supply pipes outside their properties and internal lead pipes inside their properties.

Every AMP we reactively discover and replace around 300 lead communication pipes through water quality and leakage work. This work is funded through our botex allowance, the costs for this work are therefore excluded from this enhancement funding request.

We propose to target 200 public buildings in our highest lead risk areas, where lead vulnerable people (children under 10 and pregnant women – ref Appendix 2 of DWI long term Strategies to Reduce Lead exposure from Drinking Water: DWI14372.2) are most likely to consume water (children's nurseries, primary schools etc). The level of activity undertaken will provide learning opportunities to improve our understanding of the best approach to targeting lead pipe removal. These learnings will enable us to meet our long-term ambitions for lead removal.

We are planning to replace 300km of water mains during AMP8 as part of our WRMP leakage reduction programme. When replacing mains we will also replace all connected communication pipes. Where these are found to be lead, we will take the opportunity to replace any customer lead supply pipes, the cost of which is part of this claim. The number of lead supplies that will be found under the mains replacement programme is not known. We have however estimated it to be in the region of 600 connections, using our lead prediction tool.

Where we replace a lead comm pipe, we propose to offer to replace the first 10m of our customer's external supply pipe for free (replacing the remainder at cost). We will also provide grants to customers to subsidise the replacement of their internal supply pipe. Where we are replacing a comm pipe which feeds a public building, we will ensure that the external and internal supply pipes are also replaced, if they are lead. We will use our powers under Section 75 of the Water Industries Act 1991 to ensure that supply pipes are replaced. Where the comm pipe does not feed a public building, we anticipate that 75% of our customers will allow us to replace their external supply pipe and 25% of customers will replace their internal supply pipe.

The proposed AMP8 spend for lead pipe replacements is as per the following table:

Table 2: Data table references

Area of investment		Data table reference				Capex Costs (£m)	Annual Opex (£m)	Number of pipes replaced through this funding
		Table	Line/s (capex/opex/totex)	Description	Price Control			
Lead	Comm pipe replacements	CW3	106/107/108	Lead communication pipes replaced or relined	WN+	0.561	0	200
	External supply pipe replacements	CW3	109/110/111	External lead supply pipes replaced or relined	WN+	1.281	0	650
	Internal supply pipe replacements	CW3	112/113/114	Internal lead supply pipes replaced or relined	WN+	0.496	0	350
						2.337	**0**	**1,200**

2. Needs Case for Enhancement

Delivery of the work in this Business Case will reduce water quality risks to our customers. This will be measured principally through a reduction in the amount of lead pipework in our network and our customers' properties.

2.1. Lead risk reduction – needs case

The use of lead as a pipe material ceased around 1970, however there are still significant amounts of lead pipework present in our supply network. We estimate that at the end of AMP7 we will have c125,000 lead communication pipes still in operation. This is based on having 128,000 at the beginning of the AMP and removing 3,000 through our Deal Lead programme. In addition, our customers also have external lead supply pipes outside their properties and internal lead supply pipes within their properties.

Prolonged exposure to lead concentrations above the Prescribed Concentration Value (PCV) of 10 µg/l can have impacts on public health. According to the DWI's report 'Long Term Strategies to Reduce Lead Exposure from Drinking Water: DWI14372'[1] the impact is on cognitive development. Those at greatest risk from exposure to lead are therefore children under 10, because this is when the most brain development occurs. There is also a significant risk to unborn children, therefore pregnant women also require protection.

Customers with lead pipes are currently protected through the dosing of orthophosphoric acid. Over time this coats the inside of lead pipes, the coating then acts as a barrier between the lead and water supplied to customers. If pipework is damaged or disturbed, and/or if water is left stationary in a pipe, then lead concentrations can rise significantly, breaching the PCV. The cost of orthophosphoric acid has also increased significantly over recent years, so the cost of this mitigation will continue to be significant, unless the need for dosing can be removed. See Appendix A for further information on orthophosphoric acid costs.

Southern Water has had 22 lead compliance failures in the last nine years (see Table 3). During this period 4,998 lead compliance samples were taken. 22 failures represent a 0.44% failure rate. This low failure rate demonstrates that the current control measures (primarily orthophosphoric acid dosing) are adequately controlling lead risk. However, as these pipes continue to degrade the rate could increase.

Table 3: Southern Water Lead compliance failures 2013-2022

Sample point name	Sample ID	Year	Determinand name	Test result (µg/l)
[redacted]	2482766	2013	Lead (Unflushed)	15
[redacted]	2483279	2013	Lead (Unflushed)	15
[redacted]	2488418	2013	Lead (Unflushed)	21
[redacted]	4131463	2015	Lead (Unflushed)	11

[1] Long Term Strategies to Reduce Lead Exposure from Drinking Water: DWI14372.....

[redacted]	4132001	2015	Lead (Unflushed)	11.1
[redacted]	4639646	2017	Lead (Unflushed)	14.8
[redacted]	4717036	2017	Lead (Unflushed)	22.7
[redacted]	5254329	2018	Lead (Unflushed)	19.8
[redacted]	5353313	2019	Lead (Unflushed)	11.9
[redacted]	5461482	2019	Lead (Unflushed)	12.4
[redacted]	5465313	2019	Lead (Unflushed)	12.8
[redacted]	5471109	2019	Lead (Unflushed)	10.3
[redacted]	5802708	2019	Lead (Unflushed)	13.8
[redacted]	5888330	2020	Lead (Unflushed)	14.9
[redacted]	6234858	2020	Lead (Unflushed)	10.9
[redacted]	6468449	2021	Lead (Unflushed)	10.4
[redacted]	6627278	2021	Lead (Unflushed)	37
[redacted]	6687179	2021	Lead (Unflushed)	20.3
[redacted]	6724709	2021	Lead (Unflushed)	11.1
[redacted]	6877665	2021	Lead (Unflushed)	11.1
[redacted]	6912092	2022	Lead (Unflushed)	11.2
[redacted]	7165194	2022	Lead (Unflushed)	2360

It is estimated that there will be c125,000 lead comm pipes throughout our network at the end on AMP7, for further details see below and figures 1 and 2. According to the DWI's research (see report DWI14372) it takes 10 years to remove all lead from a small part of a water network. Given these protracted timescales, as an industry, we must continue to learn and develop the most efficient ways to remove lead pipes now and not leave it solely to future generations to deal with the problem. Lead therefore needs to be removed not only from our network, but also from the parts of the network owned by our customers.

To locate and quantify the number of lead comm pipes we have in our network, we have used geospatial mapping of data gathered during our Universal Metering Programme (UMP) to develop a lead prediction tool. This also enables us to identify lead hotspots, which in turn means we can target our interventions to maximise benefit to public health. The results of our lead location assessment are shown in Figure 1 below. Further details can be found in our "Lead Risk Reduction Strategy"[2].

[2] Southern Water Lead Risk Reduction Strategy – March 2023

Figure 1: Heat map of lead communication pipes (count)

Figure 2: Heat map of lead communication pipes (percentage)

As demonstrated above, we have adequate measures in place to protect our customers from lead now, however the situation could worsen as pipes age. As confirmed by DWI in the 2022 Chief Inspectors' report, like Southern Water, most other water companies are targeting a lead free network by 2050. This is supported by the DWI and the Water Utilities Lead Strategy Board. To achieve these timescales we need to

continue to determine the most effective and efficient means by which to remove lead pipes during AMP8, so that in AMP9 and beyond we are well placed to ramp up removal rates.

3. Best Option for Customers

3.1. Lead risk reduction – Options

To reduce the impact of lead on our customers we considered a number of options ranging from doing the minimum number of communication pipe replacements to commencing an accelerated programme of pipe replacements. These options are assessed in Table 5 below.

Option 1 – Lead failures and incidental discoveries only – As shown in Table 4 below During a typical AMP, through our general sampling programme and general leakage work, we replace in the order of 300 lead comm pipes. This is therefore the minimum that we would expect to require replacement during an AMP. Because this level of replacement has occurred for a number of years, we consider that this activity is funded through our botex allowance.

Table 4: Historical annual replacement of lead comm pipes

Financial year	Lead pipes replaced*
2017-18	41
2018-19	76
2019-20	82
2020-21	46
2021-22	48
Total	**293**
Average per year	**58.6**

*source: Annual Performance Report (APR) for Southern Water

Option 2 – WRMP programme linked – Our revised draft Water Resources Management Plan (dWRMP) includes 300km of mains renewals to reduce leakage. Using our lead prediction tool (as outlined in section 2.1 above) we have estimated that delivery of this programme could result in c. 600 lead comm pipes being discovered.

We therefore propose for our second option, in addition to the 300 comm pipes from option 1 to replace all the lead comm pipes which are discovered during delivery of the WRMP mains renewal programme. Because the pipes will be discovered and delivered through delivery of the WRMP programme, this will make delivery of this option efficient.

Option 3 – Accelerated replacement programme – In addition to the above WRMP linked programme of lead pipe replacement, a further 5,000 comm pipes would be replaced. This scaling up of the replacement rate would accelerate progress towards a lead free network. However, these additional comm pipes would need to be 'found' and would therefore not benefit from the efficiencies from linking with the mains renewal programme. They would also not benefit from the efficiencies which will come following completion of the current industry wide trials and further AMP8 trials.

For all the above options, when we remove lead comm pipes feeding a property, we will also work with the property owners to replace the external supply pipe and the internal supply pipe. Estimating how many of the supply pipes will be replaced is not easy. The numbers are dependent on many factors including socioeconomic factors, length of pipes, location of pipes (under lawns, flower beds, driveways, pipe routes within houses etc). For comparative purposes we have used the same assumptions for all options. We have

assumed that we will be allowed to replace 75% of external supply pipes and that owners will replace 25% of internal supply pipes.

Option 4 – Public buildings – In order to impact lead vulnerable customers in high lead risk areas, we propose enhancing our lead prediction tool to incorporate building use. This will facilitate the identification of primary schools, nurseries and other buildings where children and pregnant women are most likely to consume water. We will target the identification and removal of lead comm pipes from 200 public buildings across our highest lead risk areas.

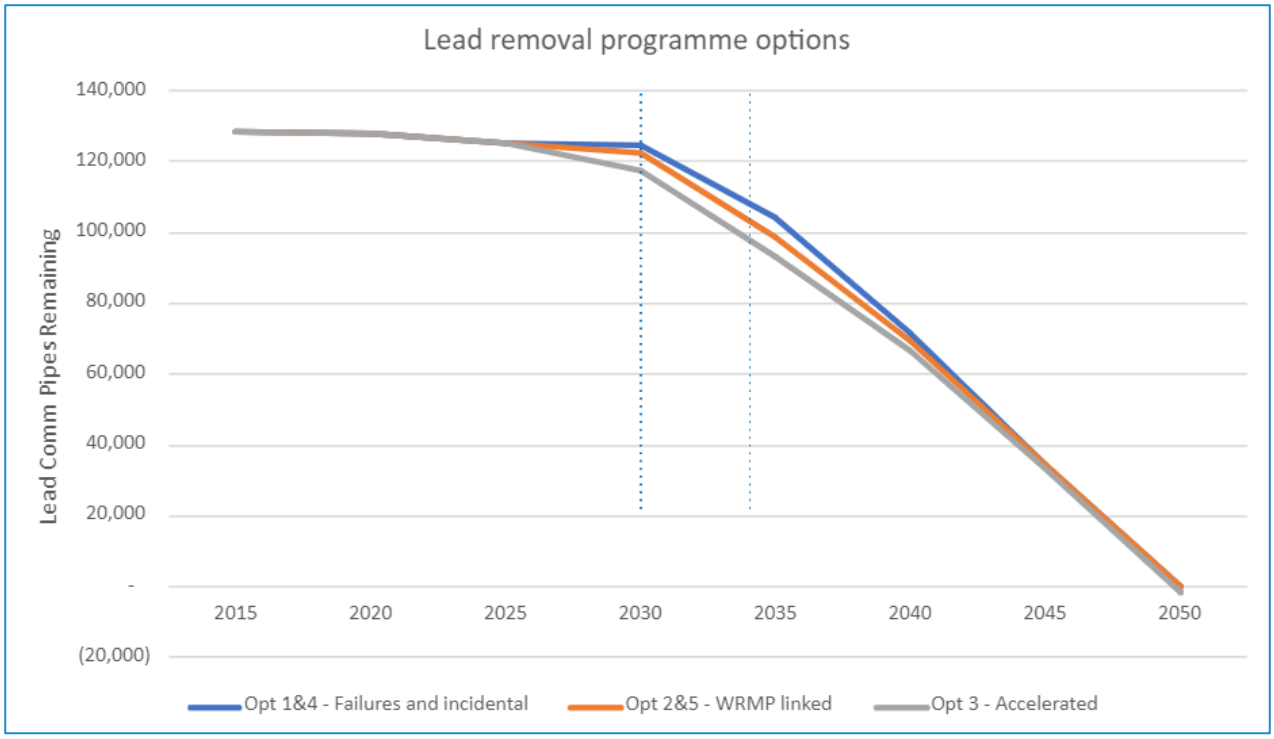
We are currently undertaking limited interventions at public buildings. The 200 proposed replacements will provide learning opportunities to improve our understanding of the best approach to targeting lead pipe removal. These learnings will enable us to meet our long-term ambitions for lead removal.

Where lead pipes are identified feeding public buildings, we will work with building owners to ensure the complete removal of lead pipework. Where building owners do not cooperate, we will issue notices under Section 75 of the Water Industry Act 1991 to ensure that lead pipework is replaced.

Option 5 – Public buildings and WRMP linked – For this option we have combined the WRMP linked mains renewal with targeting public buildings. This option has the benefit of efficient delivery through the linkage with the WRMP programme with the additional benefit that public buildings in high lead risk areas are also targeted.

All of the above options help us to progress towards our target of removing all lead comm pipes from our network by 2050, however the pace and delivery efficiency varies for each option. The graph below (Figure 3) shows how the delivery rates are forecast to vary between the different options.

Figure 3: Graph to show lead comm pipe removal rates for options



All five options are summarised below in Table 5.

Table 5: Lead risk reduction options considered for AMP8

Ref	Option description	Comm pipes replaced	External supply pipes repl*	Internal supply pipes repl**	Total Costs (£m)	Assessment
1	Lead failures and incidental only	300	225	75	1.390	Regressive relative to AMP7 – botex funded
2	WRMP linked delivery	600	450	150	2.519***	Most efficient for delivery. Some uncertainty of volumes of pipes.
3	Accelerated programme (WRMP plus extra 5,000)	5,600	4,200	1,400	21.179***	Step change in rate, missing out on learning from other Water Cos
4	Public buildings	200	200	200	1.238***	Beneficial to lead vulnerable customers in high risk areas
5	WRMP linked and public buildings	800	650	350	4.019***	**Preferred option.** Good balance of benefit and delivery efficiency which is appropriate for this 'learning' stage of our lead removal strategy. Some uncertainty in volumes of pipes due to WRMP.

*based on 75% of customers allowing us to replace their external supply pipe when we replace their comm pipe
**based on 25% of customers replacing their internal supply pipes utilising our grants when we replace their comm pipe
***excluding botex funded costs

Our preferred option is Option 5. We have chosen this option because it strikes a good balance between pace and delivery efficiency. It is important to progress with removing lead comm pipes from our network, but there are a lot of industry trials being progressed at the moment which will help to refine delivery plans and approaches in future AMPs.

We're keen to benefit from these trials to make delivery as efficient as possible for our customers in future AMPs. While the comm pipe removal programme is ramping up, it is also important that action is taken to reduce the lead exposure risk to our most lead vulnerable customers.

We are therefore also keen to progress with our public buildings proposal which will target high lead risk areas, where lead-vulnerable customers are most likely to be exposed to lead.

4. Cost Efficiency

In this section we describe the approach we have taken to ensure cost efficiency of our proposed options. Further detail on our general approach to cost efficiency can be found in our technical annex.

4.1. Lead risk reduction – Cost efficiency

We have used industry benchmarks to determine the efficient costs for our lead reduction options.

We have several data sets to inform the costs of the programme, they are:

- PR19 Business Plan data
- 2012-22 Outturn Annual Performance Report (APR) data
- 2021-22 Outturn Special Data Request (SDR) data
- Green Recovery determinations (Severn Trent and South West Water)

The most up to date and relevant of these data sources are the SDR data and the Green Recovery determinations. The SDR data was requested by Ofwat in August 2022 in order to provide more granular cost data.

To determine the efficient cost for lead comms pipe replacement, we apply a similar approach as Ofwat used at PR19 but using only the two years of outturn data in AMP7/PR19 (2020/21 and 2021/22) available in SDRs, which include more granular cost drivers. The regression models were estimated based on the number and length of pipes replaced. In addition, a model with a combination of both length and number of pipes replaced was also estimated. We have used benchmarks based on the average of the econometric model and the industry median unit cost per pipe replaced.

We present the benchmarks unit costs for different volumes of replacement activity in the table below. Our proposed costs for PR24 have been informed by this approach.

Table 6: Benchmarked costs for lead pipe replacements (in 2017/18 prices)

Number of pipes replaced	Unit	Outturn SDR data 2021-22 (£/pipe)	Green Recovery – Severn Trent (£/pipe)	Green Recovery – South West Water (£/pipe)	SW Proposed costs for PR24 (£/pipe)
Lead comm pipes					
200	£/pipe	2,947			2,947
500	£/pipe	2,592			2,592
1,000	£/pipe	2,375			2,375
5,000	£/pipe	2,005			2,005
10,000	£/pipe	1,889			1,889
20,000	£/pipe	1,792			1,792
30,000	£/pipe	1,744			1,744
External supply pipes					
200	£/pipe	1,913	1,354	2,736	1,913
500	£/pipe	1,670			1,670
1,000	£/pipe	1,533			1,533
2,000	£/pipe	1,320			1,320
3,000	£/pipe	1,259			1,200
Internal supply pipes					
Median cost per number of pipes replaced	£/pipe	1,374	1,301		up to £1,200 (grant to customers)
Median cost per length of pipe replaced	£/m	1,115			

Using the above cost benchmarks (Table 6) the options considered above would attract the costs as shown in Table 7 below.

Table 7: Option costs using benchmarked costs

Ref	Option description	Total Number of Pipes			Total Cost (£m)			Total (£m)
		Comm	ext supply	int supply	Comm	ext supply	int supply	
1	Lead failures and incidental replacements	300	225	75	0.841	0.443	0.106	1.390
2	WRMP linked delivery	600	450	150	1.420	0.887	0.212	2.519
3	Accelerated programme	5600	4200	1400	13.249	8.277	1.982	21.179
4	Public buildings	200	200	200	0.561	0.394	0.283	1.238
5	Preferred: WRMP linked and public buildings	800	650	350	2.242	1.281	0.496	4.019

Lead failures and incidental replacements are funded through botex and the WRMP mains replacement costs include replacing comm pipes. Therefore, these costs need to be removed from the above table. Revised option costs are shown in Table 8 below (changes are highlighted in red text).

Table 8: Option costs using benchmarked costs

Ref	Option description	Total Number of Pipes			Enhancement Cost* (£m)			EnhancementTotal* (£m)
		Comm	ext supply	int supply	Comm	ext supply	int supply	
1	Lead failures and incidental replacements	300	225	75	0	0	0	0
2	WRMP linked delivery	600	450	150	0	0.887	0.212	1.099
3	Accelerated programme	5600	4200	1400	11.830	5.947	1.982	19.759
4	Public buildings	200	200	200	0.561	0.394	0.283	1.238
5	Preferred: WRMP linked and public buildings	800	650	350	0.561	1.281	0.496	2.337

*excluding WRMP costs and botex costs

As outlined in Pillar 1 of our updated Lead risk reduction strategy, we propose to replace comm pipes at no cost to the owner of the property the comm pipe feeds. We will also replace the first 10 metres of any external supply pipes that we find for free (replacing the remainder at cost to the customer – this will be fewer than 5% of customers). For internal supply pipes, we propose to offer grants to customers up to the value of £1,200 per property, to assist the customer to replace their own internal lead pipework.

As part of our AMP7 lead programme, we carried out extensive customer research in our Deal area. Our research found that although customers welcomed the offer of a £250 grant, to help replace internal lead supply pipes, they were aware that potential replacement costs could be way in excess of the £250 grant. They therefore felt unable to undertake the work to remove internal lead pipework. We have also found that some of the areas in our region with the highest lead risk are also amongst the most deprived areas in our region. Reducing lead risk in these areas has the potential to improve educational outcomes in these areas, breaking the cycle of economic disadvantage. As can be seen below in figures 1 to 4, areas of high lead risk in Southampton and Gravesend/Chatham correlate with areas of deprivation, as shown through the Department for Levelling Up, Housing and Communities (DLUHC) Indices of Deprivation.

Figure 4: 2019 DLUHC areas of deprivation data for Gravesend/Chatham (Kent)

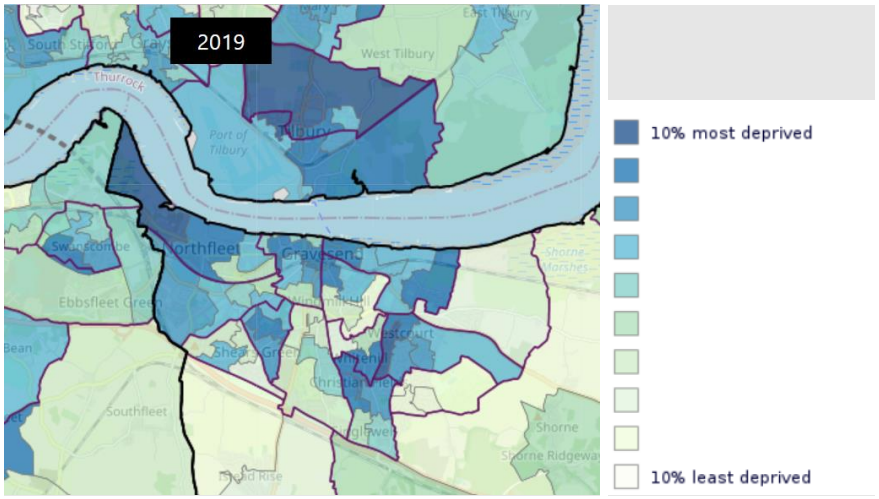
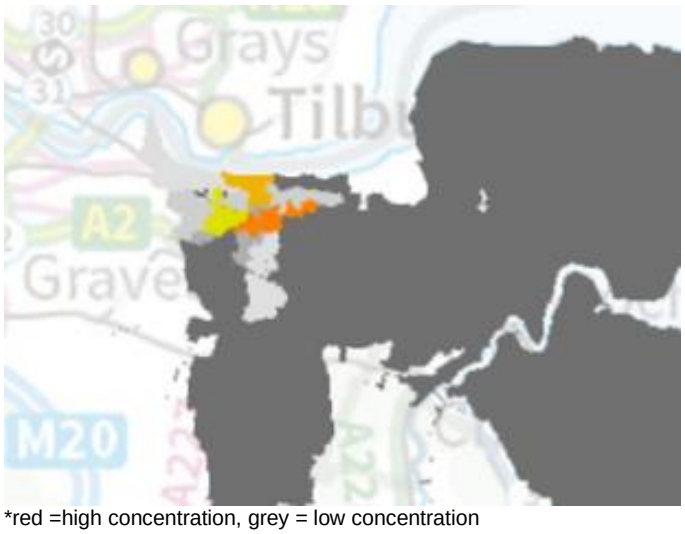


Figure 5: Heat map of lead communication pipes in Gravesend/Chatham*



*red =high concentration, grey = low concentration

Figure 6: 2019 DLUHC areas of deprivation data for Southampton

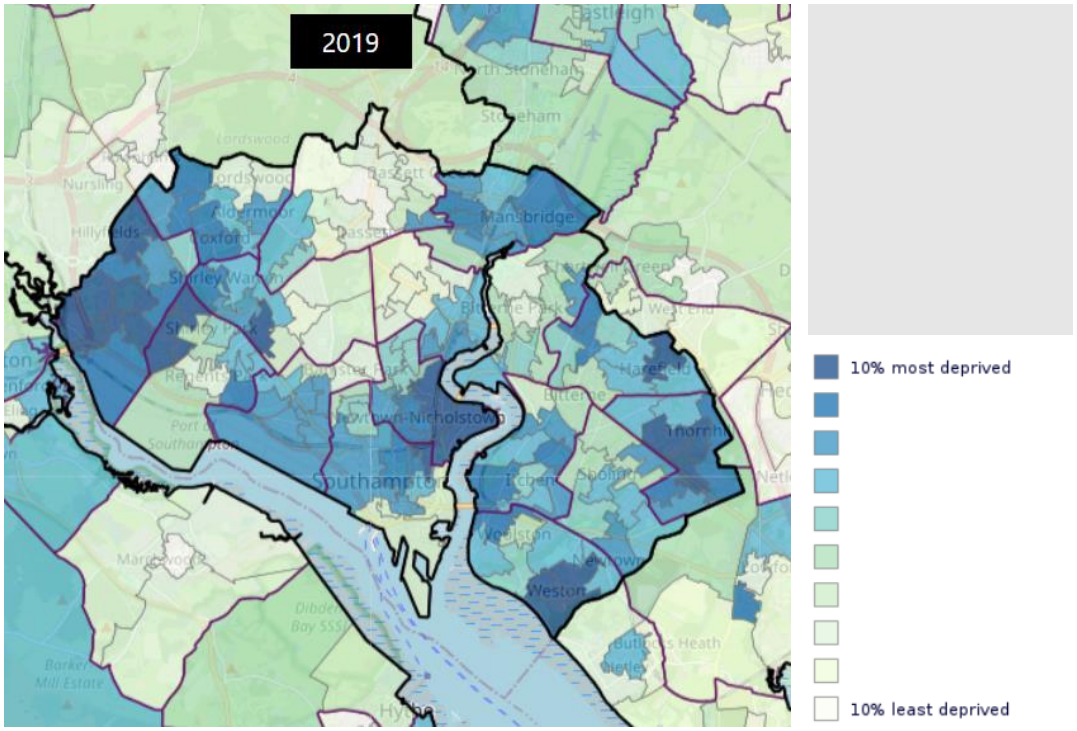


Figure 7: Heat map of lead communication pipes in Southampton*

*red =high concentration, grey = low concentration

The above correlation between deprivation and lead pipe concentrations shows the importance of raising the lead pipe replacement grant to better align with the cost of replacement. This is because in our region, many of those most at risk from lead are those least able to afford to replace it themselves. We also plan to investigate alternative sources of funding to do further work and help reduce lead risk in these most deprived areas.

5. Customer Protection

Our preferred option for delivering our lead strategy includes some very certain scope and some less certain scope (see option 5 in section 4.1 above).

The scope of the public buildings part of our plan is well quantified and is controllable. The WRMP part of our plan is less certain, because it is based on an estimate of lead pipes rather than a set target. However, the value of the programme is significantly below the materiality threshold for a PCD, therefore we do not propose to use a PCD in this area.

We have also considered the benefits to existing performance commitments from our programme of activity, however, given we have had very few compliance failures with lead we do not believe there is a measurable impact on performance commitments.

6. Conclusion

Section	Key Commentary	Page
Introduction & Background	We need to invest in lead pipe replacement during AMP8 to enable our 'Lead Free Network' by 2050. In AMPs 7&8 a lot of work is being carried out across the industry to better understand how to remove lead pipes and how much it will cost. In AMP8 we intend to continue learning the best techniques to remove lead and to improve our understanding of the costs for removing lead.	6
Need for Enhancement Investment	Lead is particularly harmful to young children and unborn babies. There are approximately 125,000 lead pipes feeding properties in Southern Water's supply area. In Southern Water's supply area, there is some correlation between 'high lead risk' and 'deprivation'. A programme of work to reduce lead in these areas could therefore contribute towards improved educational outcomes, which helps to break the intergenerational cycle of disadvantage and deprivation.	8
Best Option for Customers	We considered a number of options ranging from doing the minimum number of communication pipe replacements to commencing an accelerated programme of pipe replacements. The option we are proposing is efficient, it builds on our AMP7 work and allows us to continue to learn from ongoing industry wide trials to determine the best methods and costs for lead removal in future AMPs. We are placing an increased focus on removing lead pipes from public buildings where lead vulnerable customers consume water. We will also replace customer lead pipes where discovered through the WRMP mains renewal programme.	11
Cost Efficiency	We have used industry benchmarks to determine the efficient costs for our lead reduction options. We are delivering efficiencies by linking delivery of lead pipe replacement with our WRMP leakage mains	14

	renewal programme to efficiently find and replace lead pipes.	
Customer Protection	We are not proposing a PCD, because the value is well below the threshold for a PCD.	18

Appendix

Appendix A – Orthophosphoric acid supply and costs

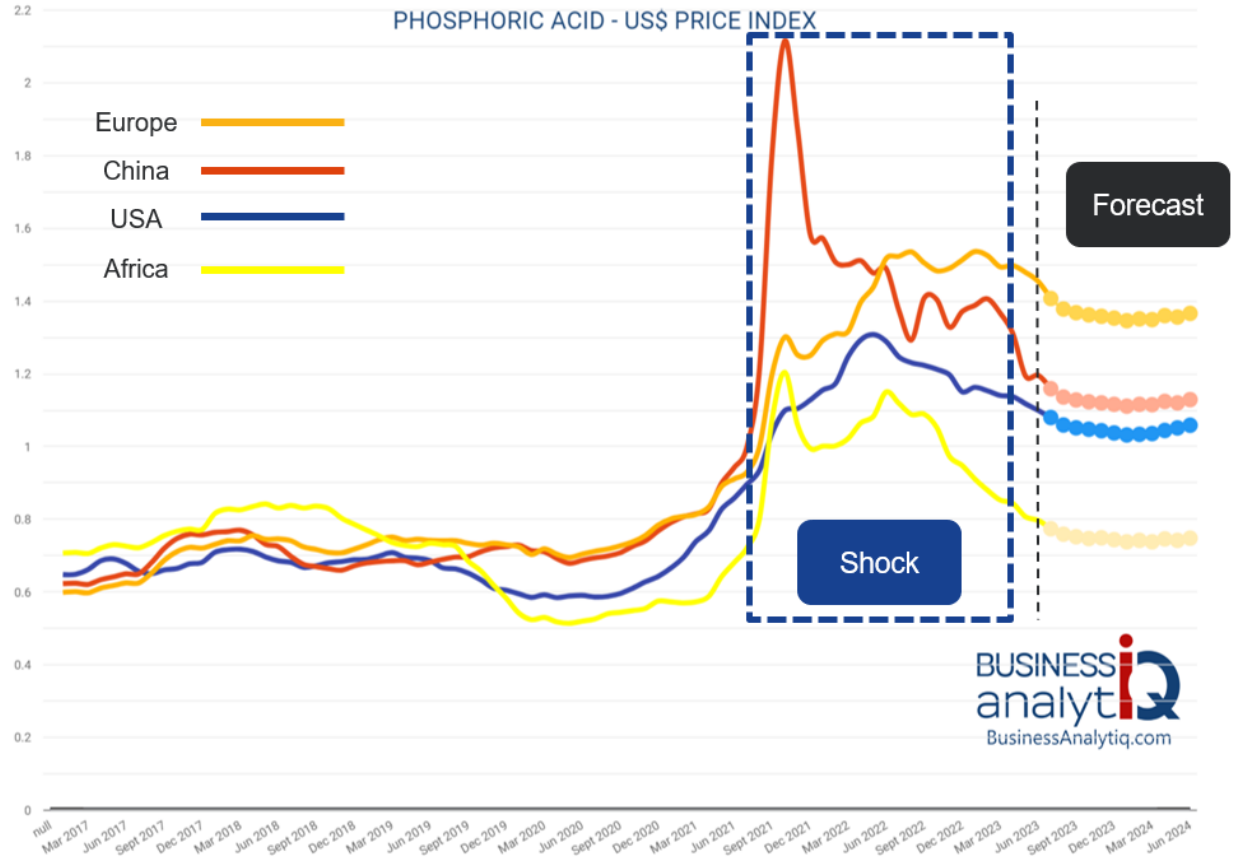
There was a significant jump in Phosphoric Acid pricing during 2022. Pricing has started to drop since then; current contract price is c£2800/ tonne. Prior to 2022, pricing was relatively stable. From 2019-2021 it was around £860/ tonne. And in 2018 it was even lower than this, with pricing in the £700s.

There are two main producers that supply to the UK and Europe: Israeli Chemicals (who manufacture in Israel) and Prayon (who manufacture in France & Belgium). Some product also comes in from Asia (mainly India and China), but this is usually packed in IBCs or drums, so not suitable for supply to Southern Water because our deliveries are transferred into in-situ storage tanks.

The main drivers that influence pricing are raw material costs and supply/ demand. The main raw materials are phosphorous rock and sulphuric Acid. Phosphorous rock is mined, but there are only a few sources globally which are tightly controlled. Sulphuric acid is a globally traded commodity, linked closely to metal smelting. During 2022 there was a global shortage of sulphuric acid which was part of the reason for price increases.

Supply & demand was however a larger factor. One of the main uses for phosphorous/ phosphoric acid is in fertilisers – global demand for these is growing. In addition to this, Russia and Ukraine are two of the world's largest fertiliser producers – the war in Ukraine has put significant pressure on the supply chain, resulting in reduced supply and increased pricing. Until this situation is resolved prices are expected to remain high. Below is a chart illustrates the significant increase that has been seen in phosphoric acid prices globally.

Figure 8: Graph to show fluctuations in global phosphoric acid prices since 2017



Source: Business Analystiq; https://businessanalytiq.com/procurementanalytics/index/phosphoric-acid-price-index/
NB: The index represents locally manufactured prices, or local FOB prices