Executive Summary
This intake study was carried out to determine lead consumption from tap water in three different regional areas (WC1, 2 and 3) and for different risk groups. The study was carried out at two times of the year: winter and summer between 2012 and 2013. The different risk groups were as follows:

- Leaded properties and non-phosphate (non-P) dosed
- Leaded properties and phosphate (P) dosed
- Unleaded properties with leaded fixtures and fittings and non-P dosed
- Unleaded properties with leaded fixtures and fittings and P dosed
- Control properties from P and non-P dosed properties

Participants from properties fitting one of the risk groupings above were recruited to the intake study by the researchers. Participants were provided with carefully written instructions on how to undertake duplicate sampling. This protocol enabled samples of each of the participant’s drinks to be taken as well as information about the volume and nature of the drink to be recorded over a three-day period. Determination of the lead concentration in each of these samples was then undertaken by an accredited laboratory.

In total, 104 individuals took part in the duplicate intake study. The study has shown that lead consumption from drinking water is generally low and is unlikely to have a significant impact on human health when considered in isolation. Only 6 out of 104 individuals were consuming higher lead intakes than the European Food Standards Agency (EFSA) benchmark dose lower confidence limit values (BMDL). These individuals all lived in properties with lead pipes and no P dosing.

In addition to lead consumption understanding, the intake study also found the following:

- Drinking water consumption rates were broadly in line with previous studies of this kind for adults and children
- Lead concentrations were highest in leaded properties with no P dosing. On a regional basis, WC1 then WC2 had the highest lead content in the drinking water. WC3 had consistently low lead concentrations but both supplies studied had P dosing.
- Low alkalinity and high natural organic matter source waters had the highest potential for plumbosolvency.
- Consistent with other studies, lead concentrations were lower in P dosed areas than non P dosed areas. P dosing had the greatest benefit in WC1, followed by WC2. There appeared to be no beneficial effect of P dosing in WC3, but this was probably because as it later transpired both areas studied had P dosing.
- All water companies were effectively meeting the water quality standard for lead of 25 µg/L (at the time of the study).
- However, more than 7.5% of all the samples taken exceeded the current standard of 10 µg/L. All bar one of these samples were from homes where there was no P dosing. These results were skewed by deliberate selection of properties containing lead in areas where P dosing is not deployed, but provides useful focus of where water companies should apply their resources to reduce future failure rates.
- There was no discernible link between high lead levels and the first drink of the day.
• Boiling water appeared to have interesting, but different, effects on lead concentrations in
drinking water depending on the area of the study. A number of mechanisms were
proposed to explain these differences, all of which require further exploration.

The results from this work demonstrate that it is prudent to reduce lead intakes by as much as
possible where feasible and, given that lead in water is something that can be demonstrably
controlled using P dosing, drinking water is an area which can be effectively controlled. Water
companies should therefore ensure that all water supplies where lead remains a risk factor are P
dosed. This does not obviate the need to employ other strategies to reduce risk.