**18 Water Supply Description of the hazard (HHSRS; Housing Act 2004) for dwellings;**

**For the purposes of an HHRS assessment, a dwelling is any form of accommodation which is used for human habitation, or intended or available for such use.**

18.01 This category covers the quality and adequacy of the supply of water within the dwelling for drinking and for domestic purposes such as cooking, washing, cleaning and sanitation. As well as the adequacy, it includes threats to health from contamination by bacteria, protozoa, parasites, viruses, and chemical pollutants. (Contamination by radon and lead are dealt with separately.)

18.02 The quality of water supplied from public mains is outside the HHSRS assessment and is subject to separate controls. Potential for harm Most vulnerable group and statistical averages used for rating

18.03 There is no particular age group more vulnerable than others. Basis of estimates

18.04 The statistics are for persons of all ages and are largely derived from the report Health Risks from Private Water Supplies (1996) which compares concentrations of Cryptosporidium and Campylobacter and reported infections from these causes for private water supplies in England. For Legionnaire’s disease, PHLS Disease facts (2001) has been used to estimate that in the year 2000. Less than 13 cases of Legionella arose as a result of infection from domestic water systems, of which less than 2 proved fatal.

18.05 Generally, however, as there are many causes of gastro-intestinal illness it is difficult to make risk attributions for water related illness. While Legionella related illness can be better attributed, overall, there is a weak basis for the estimates used in the production of these statistics. Housing Health and Safety Rating System 123 Health effects

18.06 Water is essential to sustain life. At normal temperature, with little or no exercise, an adult needs to consume around 2.5 litres of fluid each day, but in hot conditions and with heavy exercise the output rises substantially. Mild dehydration is associated with fatigue, headaches, dry skin, constipation, bladder infections, and poor concentration.

18.07 In the UK, the main threats to health from water result from contamination. Microbiological pathogens which affect drinking water typically cause gastro-intestinal illness. Campylobacter and Cryptosporidium are the most common causes of gastrointestinal illness associated with drinking water. Legionella, which typically causes respiratory infection, also presents an infection risk from domestic water systems.

18.08 Young children and the immuno-compromised are most at risk from ingested pathogens, and the elderly and immuno-compromised are most at risk from Legionella.

18.09 Private water supplies may be untreated and can become contaminated more readily, although there is a lower rate of reported illness. While this may be due to the occupiers developing some acquired immunity, visitors may be at risk.

18.10 In 2000 there were 173 reported cases of Legionnaires’ disease, of which 76 (44%) were community acquired. It is estimated that 1 in 6 community acquired cases is due to domestic water systems. Most infections with Legionellas are respiratory infections, acute pneumonia – Legionnaires disease – of which 10 to 15% of cases are fatal. Legionella can also cause wound infections from contact with contaminated water. Causes

18.11 The vast majority of dwellings in the UK are served by public mains water, with around 1% of the population served by private water supplies. **Private supplies may become contaminated more readily because water is usually pumped into a storage tank within the dwelling**. Water supply Average likelihood and health outcomes for persons of all ages, 1997-1999 Dwelling type & age Average Spread of health outcomes Average likelihood HHSRS 1 in Class 1 Class II Class III Class IV scores %% % % Non HMOs Pre 1920 1,292,201 0.0 1.0 9.0 90.0 0 (J) 1920-45 1,019,217 0.0 1.0 9.0 90.0 0 (J) 1946-79 1,700,211 0.0 1.0 9.0 90.0 0 (J) Post 1979 4,414,406 0.0 1.0 9.0 90.0 0 (J) HMOs Pre 1920 1,063,416 0.0 1.0 9.0 90.0 0 (J) 1920-45 980,981 0.0 1.0 9.0 90.0 0 (J) 1946-79 2,229,732 0.0 1.0 9.0 90.0 0 (J) Post 1979 720,721 0.0 1.0 9.0 90.0 0 (J) All Dwellings 1,423,649 0.0 1.0 9.0 90.0 0 (J) Housing Health and Safety Rating System 124

18.12 Legionella can be dispersed into the air during use of showers, and this, although rare, is the most likely route for transmission of Legionnaires’ disease in homes. Legionella thrive between 20ºC and 45ºC.

18.13 There is potential for pathogens to proliferate in filters attached to taps, or in a plumbed in filter.

18.14 **Water for drinking, cooking, washing and laundry, needs to be of high quality**. However water for flushing toilets and irrigating gardens, can be of lower quality, and it is possible to use reclaimed rainwater or greywater (bathroom waste water). Preventive measures and the ideal

18.15 **Drinking water should be wholesome, and the supply to and within the dwelling should not be interrupted, except in emergencies.**

18.16 The entire installation (taps, pipes, any storage tanks) should not adversely affect the quality of the water: a) by allowing ingress of contamination (e.g. tanks should be covered to prevent access to mice, birds and insects); b) by stagnation, particularly at high temperatures (e.g. there should not be any deadends in pipework, particularly for the supply of hot water); c) by materials in contact with the water being unsuitable for the purpose (e.g. tar lined tanks are not allowed); d) as a result of backflow of water from water fittings, or water using appliances, into pipework connected to mains or to other fittings and appliances; and/or e) by cross-connection between pipes conveying water supplied for drinking water with pipes conveying water from some other source.

18.17 **All dwellings should have at least one tap for drawing drinking water, and there should be adequate arrangements for connection to a wholesome supply of drinking water**. Drinking water taps can be supplied direct from the supply pipe, from a pump delivery pipe drawing water from a supply pipe, or from a distributing pipe drawing water exclusively from a storage cistern supplying wholesome water. There should be regular sampling and analysis of drinking water stored and supplied from a tank (such as from a private supply).

18.18 The water should be supplied at a pressure adequate for appliances at a dwelling, if necessary, with the use of a booster pump.

18.19 To prevent Legionella growth hot water needs to be maintained above 55ºC. To achieve this hot water tanks should be set store hot water at above 60ºC. (However, the benefit from maintaining hot water at this temperature may be offset by the risk of scalding, unless there are thermostatic mixer valves at taps, particularly bath taps.) It should also be noted, that if hot water is used regularly and not stored for long periods, this reduces the risk of an infective dose of Legionella. Housing Health and Safety Rating System 125

18.20 Other risk factors for the domestic acquisition of Legionnaires disease include low chlorine levels, most commonly found with a private water supply, and cold water stored, or held in pipework, at above 20ºC. Cold water, therefore should be stored and held in pipework at a temperature as low as possible, and at least below 20ºC.

18.21 Typically water softeners introduce sodium into the water, which should not be used for infants in the preparation of powdered milk for feeds, or for those on a low-sodium diet. There is a link between cardiovascular disease and consumption of naturally soft water. No link is proven with artificially softened water. However, as a precaution it is usually recommended that softened water is not used for drinking. Where a water softening treatment system is installed, there should be a tap providing unsoftened water for drinking and cooking.

18.22 Any filters attached to taps, or plumbed in, should be fitted properly and the filter cartridge changed regularly according to the manufacturer’s instructions.

18.23 If rainwater or grey water replaces mains water for toilet flushing, then it should be treated by filtration and disinfection. Maintenance is required to ensure that treatment remains effective.

18.24 In multi-occupied buildings, where there is inadequate pressure from mains water to supply all dwellings, water is stored in tanks. In older blocks, water may be stored in a header tank at the top of the block. However, it is now more common to find storage tanks at lower level with booster pumps to supply water to flats. Legionella are more likely to be found in the water systems of multi-occupied buildings than in other domestic accommodation. Drinking water to such buildings should be sampled and analysed regularly, particularly for new installations, and where extensive repairs or alterations have been carried.

18.25 For further information see – British Standards BS6700 Specification for design, installation, testing and maintenance of services, Building Regulation Approved Document H on reuse of grey-water and rainwater, and the Water Regulations Advisory Scheme Information and Guidance Note: Reclaimed Water Systems – Information about installing, modifying or maintaining reclaimed water systems. Relevant matters affecting likelihood and harm outcome

18.26 Matters relevant to the likelihood of an occurrence and the severity of the outcomes include: a) Water supply tap – lack of a tap for drawing wholesome water for drinking within the dwelling. b) Intermittent supply – regular or prolonged interruption of supply. c) Water pressure – water delivered to taps at inappropriate pressure. d) Water temperature – water stored at an inappropriate temperature. e) Defective pipework etc – inappropriate materials used for pipework, storage tanks, or fittings. Housing Health and Safety Rating System 126 f) Contamination of tanks – inadequate protection against contamination of water storage tanks. g) Water filter defects – poor maintenance of water filters. h) Water softening system – poor maintenance of water softening system. Hazard Assessment

18.27 A visual examination of the installations and fittings within the dwelling for supply of water should be followed by checking the water visually and for odours. Where there is justification for further investigation, sampling and analysis of water will be necessary.

18.28 In multi-occupied buildings, where there are greater risks from Legionella, it may be considered appropriate to check the temperature of water in pipes, cold water cisterns, hot water storage vessels, and the discharge from taps. Water sampling and analysis may also be considered necessary. Housing Health and Safety Rating System